



# Nonpoint Source News-Notes

*The Condition of the Water-Related Environment  
The Control of Nonpoint Sources of Water Pollution  
The Ecological Management & Restoration of Watersheds*

## Notes on the National Scene

### American Heritage Rivers Initiative — Restoring America's Majestic River Systems

Criteria for selecting the first "American Heritage Rivers" have been announced, following a series of 12 meetings across the nation. Hundreds of people participated in developing the guidelines that will be used to implement President Clinton's State of the Union vow to "designate 10 American Heritage Rivers [and] to help the communities alongside them revitalize their waterfronts and clean up pollution."

Through, the American Heritage Rivers Initiative (AHRI), communities will nominate rivers for the designation. President Clinton will then select 10 of the nominees, and a task force will work with each community to identify technical and funding needs. Though only a few rivers will be designated the first year, all communities that nominate sites will benefit from project-related workshops and other information tailored to their needs.

A federal liaison will be appointed to work with the communities whose rivers are selected. The liaison will help the community access existing federal services.

#### *River Communities Charged with Nominating Rivers*

Meetings held in various cities during April and May resulted in an abundance of ideas for the program and an early consensus: namely, that the rivers should symbolize America's traditional water heritage and represent a variety of stream sizes and surrounding land uses. They embrace a wide range of values, including strong community support, a vision of the river's historic and

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cultural significance, and a demonstration by the sponsoring group that it can and will enter into partnership agreements to benefit the river. The following criteria were announced in the Federal Register on June 20, and will be finalized in September after an appropriate time for public comment:

- A broad spectrum of private citizens, organizations, elected officials, and local and state agencies must support the designation and the goals of the American Heritage Rivers.
- The proposed river area must have a range of natural, economic, scenic, historic, cultural, and/or recreational uses that demonstrate distinctive qualities of America's river heritage.
- The principal party or parties nominating the river and local or regional governmental entities must show their willingness and capability to enter into new partnership agreements, or to expand existing partnerships with each other, as well as with federal and state agencies, Indian tribes, and/or other parties to implement a plan for the river area.
- The sponsoring party or organization must have or develop a broad plan of action for the river that includes a community vision, operating procedures and policies, a schedule of actions, projects and products, resources committed and anticipated, and anticipated obstacles to the community action.
- Implementation of the community's vision must result in measurable benefits to the river community reflecting the community's goals.

The initiative's interagency task force (see the accompanying box) is streamlining access to federal environmental, historic, and economic services that communities can tap into to improve rivers and riverside localities. Funding for the program will come from existing programs and services that can be used by communities engaged in a variety of river restoration projects. Special emphasis will be given to ensuring the availability of the program to as many communities as possible.

### American Heritage River Interagency Taskforce Members

Department of Agriculture  
Department of Commerce  
Department of Defense  
Department of Energy  
Department of Interior  
Department of Justice  
Department of Housing and Urban Development  
U.S. Environmental Protection Agency  
Advisory Council on Historic Preservation  
Army Corps of Engineers  
National Endowment for the Humanities

### Internet Resources

The American Heritage Rivers homepage, offers up-to-date information on the latest developments concerning the initiative. There, web surfers, whether participating in the initiative or just curious, can find information on environmental conditions and demographics of rivers nationwide and local information such as drinking water sources, land use, and population through a link to EPA's Surf Your Watershed. The site also provides the published Federal Register Notice, minutes from the regional stakeholder meetings, and a list of the federal interagency workgroup contacts. More information on river restoration and revitalization, including ongoing efforts will be posted on the web site in the future.

### Widespread Praise for Initiative

Environmental advocates, commerce, and local and state governments have all expressed enthusiasm for the initiative. In

Illinois, where citizens plan to nominate the Illinois river, Lieutenant Governor Bob Kustra, was "happy to see a complementary effort . . . that also recognizes the importance of the economy and the environment to the future of river communities."

The United States Conference of Mayors also applauded the President for "bringing national attention and resources to the creation of preserved environments in urban areas as well as in the remote wildernesses of our nation."

Applications for the first round of designations will be due in December. The designated rivers will be announced in January 1998.

[For more information, call 1-888-40-RIVER or visit the web page set up by U.S. EPA's Office of Wetlands, Oceans, and Watersheds at [www.epa.gov/rivers](http://www.epa.gov/rivers).]

**EDITOR'S NOTE:** Adapted from *Enviro-Newsbrief*, U.S. EPA, August 13, 1997.

EPA's final policy statement on Total Maximum Daily Loads (TMDLs) requires EPA and states to agree on a schedule for setting TMDLs by October 1. States are also required to deal with nonpoint source load allocations for waterbodies affected by runoff. According to a memorandum signed by EPA Assistant Administrator for Water Robert Perciasepe, states would have between 8 and 13 years to set total maximum daily loads of pollutants in water.

Perciasepe wrote, "The two new policies I am establishing today for developing and implementing TMDLs are another step toward the goal of clean water everywhere. It is crucial that EPA managers, together with our federal, state, local, and tribal partners, take every step we can to make sure that the TMDL program is carried out effectively and quickly."

The time frame for each state to set TMDLs will be based on state-specific factors, including the number of polluted water bodies in the state, the size of the geographical area covered by these waterbodies, the proximity of listed waters to each other, the number and complexity of TMDLs, the similarities or differences between the source categories to be allocated, availability of monitoring data and models, and the significance of the environmental threat to the area.

The policy also directs states and EPA regional offices to work together to achieve TMDL load allocations for nonpoint sources for waters that are polluted by runoff. Regional offices are empowered to take additional steps if states don't develop these plans.

Some representatives of states are concerned about a lack of funding for these initiatives. According to the policy statement, EPA has requested \$5 million in grants to states under the Clean Water Act, an additional \$8 million for technical assistance, and an additional \$5 million to support nonpoint source activities.

*[For more information on TMDLs, contact U.S. EPA, Watershed Branch (4503F), 401 M St. SW, Washington, DC 20460 or fax (202) 260-1517.]*

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## National Clean Boating Campaign Announced

On August 6, the Marine Environmental Education Foundation (MEEF) kicked off the National Clean Boating Campaign, which will include a week-long celebration in every state between July 11 through 19, 1998.

Under the leadership of MEEF, 36 prominent marine trade associations, key environmental groups, marinas, major corporations, and government agencies have outlined a national program to reduce water pollution from boating activities and facilities through an outreach education program. The campaign's purpose is to create boater awareness of water quality protection and water pollution sources and impacts.

Recreational boating is one of the most popular uses of coastal and inland waters. Over 17.2 million boats were used in 1996, and \$17.8 billion retail was spent on those boats. "Clearly, Americans like boating," said MEEF President Neil Ross of Rhode Island. "However, boating activities and facilities can impact the environment in significant ways, such as shoreline erosion, bottom/reef habitat damage, oil spills, sewage discharge, contaminated solid runoff. Fortunately, almost all these problems are relatively small and are easy to prevent and control."

At the conclusion of the two-day planning workshop held in Rhode Island, the 36 participants, from 16 states and Puerto Rico, voted to form a partnership under MEEF to establish the National Clean Boating Campaign. "The preceding two days have produced a national initiative unparalleled in our industry," said MEEF Chairman Phil Keeter of Oklahoma. "This campaign will highlight the importance of clean water so that boating can remain fun for the 70 million Americans who enjoy it."

Larry Innis of Maryland, a former chairman of National Safe Boating Week, was elected unanimously to chair the campaign. "I look forward to working with leaders in the environmental community and the boating industry to increase the public's awareness of the

need for clean water. We all agreed on a common blueprint for an annual celebration of recreational boating and clean water," said Innis.

The MEEF program planning workshop, organized by Neil Ross, was made possible through the sponsorship by the U.S. Environmental Protection Agency and SeaLand Technology, Inc.

The Marine Environmental Education Foundation, Inc. (MEEF) was incorporated in Rhode Island in 1994, as a national nonprofit charitable foundation to bring national experts together to develop educational programs and research on marine environmental issues. MEEF is a tax-exempt consortium of professional groups dedicated to working together to improve boating through clean water education.

[For more information, contact Neil Ross, President, Marine Environmental Education Foundation, P.O. Box 36, Kingston, RI 02881-0036. Phone: (401) 782-2116; email: goMEEF@aol.com.]

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## Urban Runoff Notes

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### The Top Ten — Watershed Lessons That May Help Your Watershed

by Ben Ficks, Watershed Outreach Coordinator, U.S. EPA Office of Wetlands, Oceans, and Watersheds

The national watershed community comprises an eye-opening variety of people and tasks — from a coal miner in West Virginia to a local government official in Puget Sound, from a Detroit student monitor to a Texas industrial representative. Their work ranges from clean ups to pollution prevention to watershed planning. An EPA project is drawing on the experience of such seasoned veterans to collect and evaluate the lessons learned in watershed programs throughout the United States. As that project winds up, plans are to publish it this fall.

#### The Process

Last year, EPA convened an advisory group of 20 key partners such as the River Network, Know Your Watershed, and the Center for Watershed Protection who eagerly embraced the idea of sharing the top lessons they'd learned over the years. Vigorous brainstorming produced a list that was circulated and expanded with the insights of about 100 other watershed practitioners who offered their experiences to illustrate each lesson.

#### Some Valuable Lessons

The lessons learned spanned many different projects but all were similar in their emphasis on the importance of community and communication. For example, the first lesson about clear visions, goals, and action items is illustrated through work done in the Chesapeake Bay. Bay communities set out a clear vision: "improve and protect the water quality and living resources of the Chesapeake Bay estuarine system"; then used this formal (even bureaucratic-sounding) dictum to set their goal: "to reduce nutrient loads by 40 percent."

What makes the vision accessible, however, are actions like those of Bernie Fowler. Fowler, a former Maryland state senator, wades out each year into one of the Bay's tributaries, exclaiming that he "wants to be able to see his feet." That image, easy for people to envision, grabs a lot of attention. It also helps people understand one of the main issues plaguing the Chesapeake Bay — the turbidity that results from sediments and excess nutrients. EPA Administrator Carol Browner joined Fowler in his most recent wade-in, which was covered by the *Washington Post* and the *Baltimore Sun*.

It is abundantly clear throughout these lessons that success depends on people, with institutions in a supporting role. The third lesson, for example, describes the benefit of having a project coordinator based in the watershed. Mike Adcock, a coordinator in the Tensas River Watershed, exemplifies this lesson. His position is funded jointly by USDA conservation funds, EPA nonpoint source and wetlands grant funds, the Nature Conservancy, the McKnight Foundation, and the National Fish and Wildlife Foundation. This long-term local position — he has been a coordinator for four years — allowed him to establish credibility among the farmers. Adcock says that the secret to his success has been finding farmers who were willing to restore wetlands in the watershed (where 80 percent of the original bottomland hardwoods have been lost).

Adcock then arranges for other farmers to see first-hand, the benefits of the restoration, including its economic ones (e.g., revenue from duck hunters). Adcock depends on these painstakingly established, one-on-one relationships to further the protection of the Tensas watershed.

The tenth lesson also emphasizes the importance of starting small and building incrementally on modest successes. Several years ago,

Dwight Siemaczko, a West Virginia coal miner, organized a watershed cleanup along Paint Creek. Starting with only a few committed folks, a small stretch of Paint Creek was cleaned up. A second effort was planned, however, and then another. Now as the cleanup gains momentum, more people are pitching in. At the most recent one — the fifth — as many as 25 people combed the banks.

Starting small also worked for the Upper Arkansas Watershed in Colorado, where a history of mistrust among the stakeholders had to be overcome to organize a watershed partnership. A brainstorming session among interested parties yielded an idea to hold a seminar for citizens and public officials on water law — something everyone could use. The popular seminar brought people together and helped establish an atmosphere of trust on which citizens could begin to build a partnership.

### Top Tools

In addition to identifying various projects and project leaders as exemplars of the “top ten,” practitioners detailed the tools that had worked for them. For example, John Hassell of the Oklahoma Conservation Commission said he and his staff use the River Network’s *Starting Up* handbook produced by Kathy Luscher to help establish watershed associations. The book provides critical and relevant information on such things as grants and bylaws. A California state worker recommends *Watershed Techniques*, a periodical published by the Center for Watershed Protection in Maryland, citing its “great case studies and best management practices information.” Another state participant at the Watershed ‘96 conference pointed to the conference itself as the motivator to implement the watershed approach in his region. (The proceedings from this conference can now be accessed and searched at [www.epa.gov/owow/watershed/Proceed](http://www.epa.gov/owow/watershed/Proceed)).

[To reserve a copy of *Watershed Lessons Learned*, call (800) 490-9198 and ask for EPA 840-F-97-001. When completed, the report will be available on EPA’s Web site, where people can also share their own watershed lessons learned. For more information, contact Ben Ficks (4501F), U.S. EPA, 401 M Street SW, Washington, D.C. 20460. Phone: (202) 260-8652; email: [ficks.ben@epamail.epa.gov](mailto:ficks.ben@epamail.epa.gov).]

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## Highway Construction Erosion Problem Revamps Washington State’s Program

Following numerous fines for excessive erosion topped off with a work shut down and escalating fault-finding among contractors, inspectors, and regulators on an eight-year construction project on state Route 18, the Washington State Department of Transportation decided that it was time to get its act and its contractors together.

Accordingly, it invited contractors and grading inspectors to meet with the Department to discuss the roles and challenges that each player has in the construction process. The discussions built understanding, and on the heels of understanding came the ability to work together. The state now boasts a brand new highway runoff manual, a certification course for construction personnel, an innovative test facility, and a new attitude.

### The Top Ten

1. The Best Plans Have Clear Visions, Goals, and Action Items
2. Good Leaders Are Committed and Empower Others
3. Having a Coordinator at the Watershed Level Is Desirable
4. Environmental, Economic, and Social Values Are Compatible
5. Plans Only Succeed if Implemented
6. Partnerships Equal Power
7. Good Tools Are Available
8. Measure, Communicate, and Account for Progress
9. Education and Involvement Drive Action
10. Build on Small Successes

The difficulty of resolving problems between contractors and inspectors on the Route 18 project led the state, with the help of the University of Washington and the International Erosion Control Association, to develop a training program that emphasizes cooperation and communication skills as well as technical knowledge. Similarly, to encourage a "partnership approach" in complying with sediment and erosion control regulations, the state developed new contract specifications requiring that contractors have a lead worker certified in erosion and spill control. Certification is based on attending the department's training program.

The course, based on the new highway runoff manual, helps contractors plan for, prevent, and control erosion during highway construction. The manual requires a temporary erosion and sediment control plan for all transportation projects that involve excavation, clearing, grubbing, trenching, or any other activity that exposes bare soil to wind or precipitation.

Courses are offered off-season to accommodate construction workers. They cover the difference between erosion controls and sediment controls; measures to prevent erosion; rules for the proper installation, maintenance, and inspection of erosion control materials; and chemical spill controls.

To support the education program, the department has also built an erosion control test facility that is probably the first of its kind in the nation. The facility, lodged in two separate locations to accommodate the state's varying topography, helps workers match the most suitable control methods with different soil and weather conditions. Water erosion is the principal problem in the deep soils in western Washington, while eastern Washington's dry, rocky soils are plagued by wind erosion.

Today, the Route 18 project progresses in a spirit of cooperation. No further fines or shutdowns have occurred, erosion is under control, and the Department of Ecology and King County inspectors continue to monitor the project's success.

*[For more information, contact David Jenkins, Erosion Control Coordinator, Washington State Department of Transportation, Environmental Affairs Office, P.O. Box 47331, Olympia, Washington 98504-7331. Phone: (360) 705-7479; fax: (360) 705-6893.]*

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## Are Golf Courses Under Par When It Comes to NPS Pollution Prevention?

Golf courses, which many turf experts see as intensively managed agro-ecosystems, are proliferating rapidly in the coastal southeastern United States. Because many of these courses are adjacent to tidal creeks and wetlands, best management practices are needed to prevent nonpoint source pollutants from entering coastal waters. The BMPs may add significant costs to golf course development; yet there is little empirical data to show that they effectively reduce NPS pollution. To address this gap, a state and federal partnership between NOAA's National Ocean Service, North Carolina, South Carolina, and Delaware has been established to test the effectiveness of these practices on both traditional agricultural and golf course landscapes. (Delaware is concentrating largely on agriculture; North Carolina and South Carolina have yielded promising data on golf course runoff.)

### South Carolina

The South Carolina project encompasses approximately 11,500 acres of tidal marshes and water in the Winyah Bay watershed near Georgetown. Since about 1984, South Carolina has required builders of new courses to submit stormwater management plans. A common construction strategy now used for NPS pollution control is a system of drains, tiles, and landscaping that directs subsurface and surface runoff waters to a central detention pond. The water eventually flows from the detention ponds into tidal waters by way of a spillway or control structure.

Researchers are studying sites representing four different scenarios along the Waccamaw River. The first site is a modern golf course engineered to capture and detain runoff (i.e., it incorporates BMPs). The second represents an older golf course, 1960s vintage, built without benefit of BMPs (stormwater drains through a series of four linked ponds created from a natural wetland). The third site is a reference site, an undeveloped, diked and ponded, forested wetland managed for waterfowl and wading birds. The fourth site is also a reference site, a tidal creek

that receives runoff from a forested watershed without the influence of a golf course or an impoundment. The discharge waters from all the sites eventually enter the Waccamaw River through the tidal creeks. The golf courses were surveyed to determine the amount and timing of chemicals used in their management.

At eight stations, automatic data loggers record water levels, salinity, conductivity, temperature, dissolved oxygen, turbidity, and pH at 30 minute intervals. During storms, automated samplers collect water for nutrient analyses and to monitor site-specific rainfall and flow measurements that can be used to quantify pollutant loadings. In addition, scientists at the University of South Carolina Baruch Marine Field Lab also make bimonthly surveys to quantify the diversity and numbers of benthic invertebrates at each site, as an index of habitat quality and effluent impact.

### **Cleaner Water — One Stroke at a Time**

Golfers competing in last fall's Second Annual Water Quality Open held at Tiburon Golf Course in Omaha, Nebraska, played by an unusual set of rules. Hosted by the Wehrspann Lake Watershed Project, the tournament allowed players to move their balls closer to the holes depending on Secchi disk measurements in the lake. A Secchi disk reading of the lake was taken before the game began, and each team could then use that measurement (all at once or in increments) to sink a putt and save a stroke during the day. In the process, golfers learned more about the effects their sport has on water quality, and about the measures that the Tiburon Golf Course is taking to protect Wehrspann Lake.

To emphasize the tournament's theme, stations throughout the course provided water quality information to the golfers as they moved from hole to hole. At the end of the tournament, players who had completed a water quality questionnaire were eligible for a special prize drawing. Last year, fully 64 percent of players listed something new that they learned about water quality, while 88 percent could identify a source of NPS pollution and a means of prevention.

The project is funded in part through a Section 319 grant from the Nebraska Department of Environmental Quality and the U.S. Environmental Protection Agency, Region 7.

*[For more information, contact Diana Allen, Lower Platte River Corridor Alliance, 3125 Portia Street, P.O. Box 83518, Lincoln, Nebraska 68501. Phone: (402) 476-2729.]*

Three major storms were successfully sampled in 1996. Preliminary study results suggest that unvegetated detention ponds are not very effective at removing nutrients from the runoff water.

#### *North Carolina*

North Carolina is conducting a similar project in the Howe Creek watershed of New Hanover County. This productive tidal creek is bordered by marshes, woodlands, single-unit housing, inactive farmland, and a large residential development that includes a golf course.

North Carolina researchers are comparing runoff from the golf course at two places: at the outflow from a large pond (the pond functions as a BMP); and at a ditch that receives golf course runoff and channels it directly into the creek without benefit of BMPs. In addition, four other stations are located along Howe Creek: one upstream and one downstream of the golf course? and two in between.

During the first year of this project, researchers sampled three major storms. Analysts found significant differences in discharge characteristics between the treatment station (the pond) and the untreated runoff (the ditch). Storm runoff at the non-BMP station was much like a flash flood, sending a large, short-term pulse of fresh, nutrient-laden water into Howe Creek. Runoff at the BMP station increased during and after storms and was more prolonged than at the ditch, but its nutrient levels were lower.

In fact, both areas channel large quantities of water and nutrients into the creek, but the timing varies significantly.

During periods of successive storms, the BMP retention pond failed to control sediment discharge. When the pond and surrounding drainage reached a certain level of saturation, increased sediments and water, along with other constituents, were released from the pond. Although Howe Creek is near an ocean inlet, during storms these discharges (along with others feeding the creek) dramatically decreased its salinity. This decrease, in turn, changes the biological characteristics of the creek. As the significance of these changes becomes known, the results may lead to useful changes in stormwater runoff management.

Early indications are that this pilot project will be a useful tool for comparing the impacts and efficacy of various nonpoint source BMP strategies. Complete results and analyses of the first two years data are expected by the end of 1997.

*[For more information on the North Carolina and South Carolina golf course projects, call Steve W. Ross, North Carolina National Estuarine Research Reserve, 7205 Wrightsville Avenue, Wilmington, North Carolina 28403. Phone: (910) 395-3905; email: ross@uncwil.edu. Or contact Joseph Schubauer-Berigan, North Inlet-Winyah Bay National Estuarine Research Reserve, USC Baruch Marine Field Lab, P.O. Box 1630, Georgetown, SC 29442. Phone: (803) 546-3623; email: jschubau@belle.baruch.sc.edu.]*

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## *Business in the Blue — Restaurateurs Educated on their Clean Water Role*

Food establishments in the Mason County, Washington-portion of the Hood Canal watershed are going "clean-water" blue. Since 1994, *Business in the Blue*, a Washington State University (WSU) Cooperative Extension program, has been actively helping Mason County restaurateurs deal with conditions and management needs that sometimes contribute to septic system failures. Participating restaurateurs see the program as an opportunity to save money while protecting the environment.

### *Facing the Challenge*

Mason County is underlain by impermeable glacial till soils and plagued by heavy rainfalls and high seasonal water tables, a combination that promotes septic system failure and consequent nonpoint source pollution. Septic systems connected to food establishments are especially vulnerable because they receive heavy volumes of high temperature wastewater containing food, oil, and disinfectants. Such inputs can lead to blocked pipes, clogged drain field soils, and incomplete wastewater treatment.

The university offered the *Business in Blue* program to 100 food establishments in the area. Twenty-five restaurants, most of them located on waterways and at the greatest risk for system failures and surface water pollution, chose to participate. Each took part in a free on-site training workshop.

### *Customizing the Solution*

Extension's Dick Burleigh visited each facility to assess kitchen practices and sewage system management. He inspected plumbing systems, evaluated water conservation practices, reviewed menus to determine oil usage, checked cleaning compounds and concentrations, and interviewed the facility manager. Burleigh then tailored a workshop to the needs of the individual facility.

Follow-up visits usually yielded a number of system management improvements. Typical improvements included more frequent inspection and cleaning of grease traps, the installation of strainer baskets, decreased amounts of food in wash water, better water conservation practices, use of less-toxic cleaning agents, and a better understanding of septic system principles and maintenance.

One restaurateur, Nancy McConaghy, switched from a caustic deep-fat fryer cleaner to a noncaustic version, a change that saved her \$400 the first year in pumping costs. "After just six weeks on the program," she said, "our septic tank was operating so efficiently that our pumping company reduced our pumping schedule from four times a year to three. And over time, it might be reduced to only twice a year — a potential savings of \$800!"

Although most restaurateurs have not seen such immediate results, they do expect to save on septic maintenance costs over time. Kristy Rutledge, manager of Spencer Lake Resort, foresees a "long-term cost savings because the need for pumping will be reduced, as will the probability of drain field failure."

Rutledge pointed out that employee education is the key to the program's success and consequent cost savings: "The program was very helpful for passing along information to employees." Rutledge proudly emphasized that Spencer Lake Resort employees are very conscientious about adhering to recommended food disposal practices. "The employees, as well as the surrounding community, want to keep their waterway clean," she said.

### *Extending Community Outreach*

In addition to assisting food establishments on a one-to-one basis, *Business in the Blue* successfully reached out to the community by advertising through local newspapers, local radio stations, professional journals, newsletters, and display booths. Goals of the advertising campaign included recognizing the participating establishments, attracting other clients, and raising public awareness about the importance of on-site system maintenance.



*Business in  
the Blue  
(continued)*

As a result, additional food establishments inquired about training materials. Public awareness of on-site system maintenance was significantly enhanced, as documented by telephone inquiries, Extension office visits, and the amount of literature (over 150 bulletins) picked up by homeowners at public displays.

### *Building on Success*

Business in the Blue recently received a public involvement and education contract from the Puget Sound Water Quality Action Team. This contract will facilitate the program's expansion to the entire Hood Canal watershed, which includes portions of Mason County, Jefferson County, and Kitsap County. In addition, the program is increasing its outreach efforts to the public and will sponsor at least 12 homeowner presentations. Judging by past success, the Hood Canal watershed and its on-site systems will benefit greatly from these efforts.

*[For more information, contact Robert Simmons, Extension Faculty, Regional Water Quality Education Program, Washington State University Cooperative Extension, N. 11840 Highway 101, Shelton, Washington 98584. Phone: (360) 427-9670; fax: (360) 427-7264; email: simmons@wsu.edu.]*

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## *Business Partners for Clean Water — Technical Assistance Provides a Formula for Success*

Business Partners for Clean Water is moving businesses and industries in Waukesha, Wisconsin, above and beyond the requirements of Wisconsin's Stormwater Permit Program by giving them the technical assistance they need to comply with water quality laws.

Part of Water Wauk, a countywide effort to involve all citizens in cleaning up the area's waterways, Business Partners for Clean Water helps participating businesses develop effective stormwater pollution prevention plans. Its tools are a combination of free workshops, self-guided assessments, water quality manuals, and on-site consultations. Because the program uses nonregulatory agencies (e.g., the Department of Parks and Land Use) to provide the information and on-site visits, businesses and industry get the assistance they need to comply with regulations without incurring the risk of enforcement actions.

### *Participant Profiles and Pilot Project*

Business Partners for Clean Water targets any business in Waukesha County whose activities may contribute to surface water quality. Its potential audience includes manufacturing and other industries, retail businesses with heavy traffic, restaurants, grocery stores, gas stations, car dealerships, automobile mechanics, construction companies, landscapers, nurseries, carpet cleaners, roofers, pressure washing companies, and property managers.

#### **First Partners in the Business Partners for Clean Water Pilot Program**

Accurate Products Manufacturing  
Industrial Clutch, Navistar  
Instant Mailing Services  
M&W Industrial Equipment  
SuperSaver Food Store  
Wisconsin Centrifugal  
Wisconsin Coach Lines

The program began with a pilot program conducted in the Frame Park subwatershed of Waukesha in 1996. The city had recently completed a stormwater management plan for all residential and commercial properties in the area and Wisconsin's Department of Natural Resources was distributing permit packets to businesses operating in this area.

Eight businesses completed stormwater pollution prevention plans during the pilot program — the SuperSaver Food Store among others.

As part of its stormwater pollution prevention plan, SuperSaver Food Store employees began cleaning shopping carts in a semitrailer using a high-pressure steam cleaning process. The wastewater was then

taken to a nearby treatment facility. The chain's former practice was to wash the carts in the parking lot with a high phosphate cleaner and let the polluted water flow directly to stormwater intakes.

To reduce the costs of the new practice, SuperSaver instituted the practice in all its stores, thereby getting the service in bulk. To maximize its efficiency, the stores also posted signs to

discourage individuals from dumping substances such as motor oil in the parking lot. And the chain, which has always cleaned its parking lots monthly, now also cleans the catch basins twice a year. This action prevents leaves, cigarettes, and other trash from washing into the Fox River. SuperSaver has received positive public recognition and was honored by the mayor and county executive at an awards luncheon along with seven other local businesses.

Business Partners for Clean Water is sponsored by the Waukesha County Department of Parks and Land Use, Land Conservation Division, City of Waukesha, UW-Extension, Waukesha Area Chamber of Commerce, Fox River Development Board, and Wisconsin Department of Natural Resources. It was adapted from a program developed in Bellevue, Washington, to fit Wisconsin's stormwater pollution prevention requirements. It addresses both regulated and unregulated industries.

The Department of Parks and Land Use held another round of workshops in August, preparing for a countywide program that may include up to 50 businesses. One of the companies that has already successfully completed the program will host the workshops at its facility.

*[For more information, contact Denise LaBott, Conservation Specialist for the Department of Parks and Land-Use, Land Conservation Division, Waukesha County Administration Center, 1320 Pewaukee Road, Room 260, Waukesha, WI 53188. Phone: (414) 896-8308.]*

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## *Water-Wise Gardeners — Extension Service Cultivates a New Species*

Many homeowners have a high level of interest in establishing and maintaining attractive landscapes on their property. Some have even elevated lawn care to an art, if not a religion. Unfortunately, too few realize that their landscaping activities make significant contributions to nonpoint source pollution. The Virginia Cooperative Extension has developed the Water-Wise Gardener Program and handbook to educate lawn fanciers about practices that benefit both lawns and water quality.

Created with special funding through the Cooperative State Research, Education, and Extension Service at USDA, the Water-Wise Gardener is a multifaceted extension program targeted to reduce homeowner contributions to NPS through their participation in a progression of educational experiences on proper landscape management. This program brings traditional Extension teaching methods, like field days, volunteer and demonstration sites, and one-on-one interactions with volunteers, to urban and suburban clientele, making them partners in the protection of natural resources. Water-Wise Gardener seminars cover topics such as Integrated Pest Management, how to plant to avoid problems, proper fertilization techniques, and backyard composting.

Mark Aveni, a water quality extension agent, says, "We have about 700 homeowners participating in the program, with 200 demonstration lawns throughout Northern Virginia's multicounty area. We are looking to expand the program to other states. Right now we are working with Extension agents in Clemson, South Carolina, and Alabama."

*The Water-Wise Handbook* includes sections on planning, implementation, data evaluation and reporting, as well as examples of surveys, impact sheets, and marketing materials that have been successfully used in public education. The 52-page handbook, based on five years of Extension experiences with the Water-Wise Program, comes in a sturdy, three-ring binder and includes an extensive listing of the Cooperative Extension and other water-quality related resources from across the United States.

To order copies of *The Water-Wise Gardener Handbook*, send a check or money order for \$15 payable to Treasurer, VA Tech, the Water-Wise Gardener, Office of Consumer Horticulture, 407 Saunders Hall, Blacksburg, VA 24061-0327.

*[For more information, contact Mark Aveni, Virginia Cooperative Extension Agent at Virginia Cooperative Extension, Prince William County Office, 8033 Ashton Avenue, Suite 105, Manassas, Virginia 22110-8202. Phone: (703) 792-4632; fax: (703) 792-4630; email: ex153@vt.edu]*

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## Green Development Resource Document

EPA's Office of Wetlands, Oceans, and Watersheds recently produced a literature summary and analysis of the costs and benefits associated with alternative development approaches. *Green Development Literature Summary and Benefits Associated with Alternative Development Approaches* is a compilation of examples, case studies, and issues related to urban development. Developed in response to cities' continuing sprawl into new suburbs and rural areas, the Green Development framework promotes better approaches to development through the use of alternative management approaches to site planning, zoning, grading, natural resources protection, site layout, and stormwater management.

Green Development seeks a balance between economic growth, quality of life, and environmental protection. Elements of the approach include townhouses that create a "street-wall" effect, apartments above retail stores, outbuildings, alleys, gridded streets, cluster development, planned open spaces, minimal impacts on predevelopment hydrology, and mixed-use neighborhoods that provide housing, shopping, employment, and recreation all within walking distance. Advocates hold that these objectives can be achieved through such practices as flexible zoning and subdivision requirements, comprehensive and integrated site planning, reductions of impervious surfaces, pedestrian-friendly development, and respect for agriculture and natural resources preservation.

The Village of Woodsong in Shallotte, North Carolina, is highlighted in the report to illustrate different elements that can be used to reduce site imperviousness and the amount of runoff that reaches surface waters. The village incorporates rooftop cisterns as a means of capturing stormwater runoff for reuse; separations between outbuildings and primary dwellings; and a narrower street design which serves to reduce both stormwater runoff and traffic speeds [For more information on Woodsong, see *News-Notes* (October/November 1995), pp. 9-11].

[For more information or to request a copy of the *Green Development Literature Search*, contact Jessica Cogan (MC-4504F) or Rod Frederick (MC-4503F) U.S. EPA, 401 M Street SW, Washington, DC 20460. Email: frederick.rod@epamail.epa.gov.; cogan.jessica@epamail.epa.gov. Or see the Internet Web Page: [www.sustainable.org](http://www.sustainable.org).]

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## News From the States, Tribes and Localities

### *A Picture Perfect Delaware River Basin, Again?*

Citizen monitoring organizations in the Mid-Atlantic region celebrated Earth Day 1997 by grabbing every Secchi disc and sample bottle they could get their hands on and participating in Water Snapshot '97. The event, an organized collection of water quality data by volunteers from New York, New Jersey, Pennsylvania, and Delaware, took place the week of April 19 to 27 on the Delaware, Susquehanna, and Allegheny rivers.

The volunteers measured everything from air and water temperature, transparency, dissolved oxygen content, nitrate and phosphate levels, and pH to biological parameters and habitat. The results will be publicized and will, organizers hope, increase citizens' environmental awareness and active participation in pollution prevention efforts. Says Pennsylvania Department of Environmental Protection Secretary James Seif: "With the participation of these volunteer groups, we will be able to increase public awareness of water quality issues through the entire river basin, as well as open the door to greater communication among monitoring groups."

#### *A History Worth Repeating*

The first Water Snapshot, in 1996, monitored only the Delaware River basin. More than 70 organizations, including schools, watershed groups, government agencies, and private companies, plus various individuals, sampled 174 individual waterways at 335 different locations in the basin. Analysis of the data they collected indicated that a fairly healthy environment for aquatic life prevails in the basin.

#### **Water Snapshot '97 Sponsors**

U.S. EPA Region 2  
U.S. EPA Region 3  
Delaware River Basin Commission  
Delaware Department of Natural Resources  
and Environmental Control  
Jacobsberg Environmental Center  
Windgap  
Pennsylvania Department of Environmental  
Protection

According to Teresa Halverson, the Delaware's Water Snapshot '97 coordinator, the program made a special effort to maintain a high quality of data, asking participating organizations to submit a formal description of its monitoring project and information on the type of equipment it would use in the process. Last year's data are available on the Internet in a searchable downloadable database at

[www.dep.state.pa.us/dep/deputate/watermgt/WC/GENERAL/snap\\_database.htm](http://www.dep.state.pa.us/dep/deputate/watermgt/WC/GENERAL/snap_database.htm).

Data from 1997 will be available soon.

[For more information or a copy of the report, contact Peter Weber, U.S. EPA Region 3 (3WP13), 841 Chestnut Street, Philadelphia, PA 19107. Phone: (215) 566-5749; fax: (215) 566-2301]

## Save the Swales

They may not be a majestic symbol of environmental action, but the Florida Department of Environmental Protection's Stormwater/Nonpoint Source Management Section is trying to keep swales from becoming an endangered species. "Save the Swales" is the catchy motto developed to rivet public attention on this useful, but underappreciated stormwater control tool.

Swales, or wide shallow ditches used to temporarily store, route, or filter runoff, are a very effective and affordable treatment technique. By slowing runoff and allowing it to pond for 24 to 36 hours, swales give water enough time to soak into the soil, reducing runoff volume and pollutants. Vegetation in the swale acts as a filter, removing sediments, heavy metals, and hydrocarbons.

One obstacle confronting the construction of new swales in Florida is that most people, including public officials, don't understand their benefits. Some localities even have regulations that prohibit them.

"A lot of people just want to get rid of runoff quickly and use conventional curb and gutter systems," says Eric Livingston, administrator of the state's Stormwater/Nonpoint Source Management Section. "Some people are worried that if water ponds for over 24 hours, mosquitos will breed and become a nuisance. But, actually, mosquitos will breed only when water is allowed to pond for over 72 hours, while a properly managed swale will hold water for no more than 36 hours."

The campaign encourages landowners to construct swales as an alternative to conventional curb and gutter systems on newly developed land and promotes the use of swales generally. Save the

### What Makes a Swell Swale?

Many cities and counties now require biofiltration as a standard approach for controlling stormwater runoff.

Swales are less expensive to construct, easier to maintain, and often require a smaller land area than other BMPs. The vegetation in a swale reduces the flow rate, promotes sedimentation and infiltration, and filters out contaminants.

Most swales are bowl-shaped — broad and shallow with relatively flat side slopes so that ponding will not exceed 72 hours. Swales should be deep enough to handle peak flow events. The standard swale length is 200 feet, but may vary depending on soil conditions. If the soil type in the area does not allow rapid water infiltration, a longer swale will

compensate by increasing the area over which infiltration occurs.

Vegetation in a swale should be at least as tall as the depth of the expected flow. The best types of vegetation include grasses and wetland plants that can be established quickly, are drought resistant, and are tolerant of wet conditions. In many cases, rocks placed in the swale will help reduce runoff velocity.

Swale maintenance involves periodic mowing, reseeding, and sediment and litter removal. Grass clippings should also be removed from the swale before they decay and reintroduce nutrients and pesticides to the system.

[Based on Water Quality Swales, a guidebook prepared by the Puget Sound Water Quality Authority's Public Involvement and Education Project in conjunction with the National Association of Industrial and Office Parks. For copies of this guide, contact the Washington Chapter of the National Association of Industrial and Office Parks, P.O. Box 2016, Edmonds, WA 98020-9516. Phone: (206) 382-9121; fax: (425) 771-9588.]

Swales also emphasizes proper swale management, such as regular mowing, trash and yard clippings removal, and soil aeration. The latter helps restore percolation rates and maintain good grass growth. Other management actions include alerting local officials when ponding problems occur and reducing the amount of fertilizers, pesticides, and herbicides applied to lawns and gardens.

[For more information, visit the EPA Region IV web page: <http://www.epa.gov.region4/reg4.html>, or contact Eric Livingston at the Florida Department of Environmental Protection, Stormwater/Nonpoint Source Management Section, 2600 Blairstone Road, Tallahassee, FL 32399. Phone: (904) 921-9918.]

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## Maumee River Project Succeeds — Achieves Dramatic Loading Reductions

The Maumee River NPS Project, carried out between 1991 and 1994 with the enthusiastic involvement of the Maumee River's largest farm operations, dramatically exceeded the phosphorus and sediment reduction targets that had been set for it.

As the single largest contributor of phosphorus and sediment to Lake Erie, the Maumee River watershed accounts for 46 percent of the lake's phosphorus load and 37 percent of its sediment, while providing only 3 percent of the inflow. Part of the Ohio Phosphorus Reduction Strategy for Lake Erie, the Maumee River NPS Project used BMPs to reduce these pollutants. When, in October 1991, U.S. EPA awarded the Ohio Environmental Protection Agency \$641,000 in section 319 funds for the project, the proposed reduction goals were 301,100 pounds of phosphorus and 229,470 tons of soil.

### Widespread Participation

A total of 525 farmers from all corners of the watershed participated in the project and contributed more than \$5.5 million of their own money as matching funds. Every federal dollar allocated to the project was backed by a \$7-to-\$10 local commitment to pollution control. According to Mark Wilson, agricultural specialist at Ohio Environmental Protection Agency, "The high number of farmers volunteering to participate and the large amount of local matching funds for this project indicates that farmers are willing to shoulder more of the costs of pollution prevention programs."

Adding "bang" to the "buck" was the fact that the participating farmers operated farms nearly three times larger than the average farm in the area. The farmers received funds for buying new conservation tillage equipment or retrofitting their existing equipment. Several enterprising participants used the equipment to farm additional land for their neighbors, nearly doubling the pollutant load reductions projected in the plans. Over the three-year project period, 545,736 pounds of phosphorus and 431,683 tons of soil were saved.

"This project demonstrates that a limited supply of federal dollars can be used to focus the resources of many farmers on a common goal, such that significant water quality improvements can be achieved," said Wilson, who credits local project ownership as the key to success. Ohio EPA gave local soil and water conservation boards the latitude to design specific programs addressing local concerns, so long as these concerns were appropriate to the broader project. Thus, each program had to target critical areas, using approved residue enhancing equipment and land treatments, and adhere to cost-share limits and acreage requirements. The creation of a joint advisory board for the entire Maumee River helped balance individual agendas with the larger goal of improving water quality for the entire watershed, Wilson said.

Farmers in the Maumee River basin proved to be a determined and resourceful lot, an integral component in the success of the project, which can serve as a model for other voluntary agricultural NPS projects.

[For more information, contact Mark Wilson, Agricultural Specialist, Office of the Director, Ohio Environmental Protection Agency, P.O. Box 1049, Columbus, Ohio 43216-1049. Phone: (614) 644-2782.]

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## *Partnership in Utah Rescues Mill Creek — Benefits Accrue to Community and Natural Resources*

National parks and forests are popular retreats for recreationists, but too many visitors can love nature to death. That is what almost happened in Utah's Mill Creek Canyon before a local/national partnership came to the rescue. Now the once degraded and eroding area is blossoming again.

The canyon, located east of Salt Lake City, or less than an hour's drive from a million people, is one of the most heavily used recreation areas in the National Forest system. It hosts about 700,000 visitors annually, primarily for picnicking and hiking. The canyon has nine picnic areas and 10 trail heads that provide access to another 161 picnic sites and 35 miles of hiking trails.

Averaging 1,917 visitors per day in 1991, Mill Creek Canyon faced extensive degradation: 70 percent of its picnic sites were in poor condition; riparian areas were trampled and disturbed; and vandalism was draining 10 percent of the maintenance budget. In addition, the picnic sites were contributing NPS pollution to Mill Creek.

That same year, however, things began to change. To finance protection and restoration, Salt Lake County set up a toll booth at the entrance to the canyon and began collecting \$2.25 per vehicle or \$22 for an annual pass. Salt Lake County and the Wasatch-Cache National Forest signed a memorandum of understanding for the protection and management of Mill Creek Canyon. The understanding calls for an interagency Canyon Management Team to help Salt Lake County implement the fee program and to help the Forest Service manage the area. The tolls are turned over to the Forest Service to use for restoration, maintenance, and security in the canyon.

### *Citizens Link County and National Interests*

Citizens then formed the Mill Creek Canyon Stewardship Committee to advise the county and the Forest Service on all aspects of the partnership program.

The partnership is working well for the public and for the environment. The Forest Service has been able to restore picnic areas, maintain 15 to 20 miles of trails, reseed barren areas, restore stream reaches, rebuild facilities, and beef up security. Much of the renovation has focused on "psychological landscaping." Making the durable areas more attractive draws visitors away from sensitive areas like streambanks.

Frequent visitors to the canyon were initially opposed to the usage fees but have since recognized the benefits. Salt Lake City resident Mary English saw "amazing changes" after the partnership was in place. "True, the picnic areas were improved, but much more has happened. The trails are well maintained, and new trails are reducing erosion. Trail signs are in place now that have been needed for years. In places, the bare, ugly streambanks are coming back green and lovely again. It's nice to see a government program that works and a tax that actually returns as much value as given."

*[For more information, contact Mike Sieg, District Ranger, Salt Lake Ranger District, phone: (801) 943-1794.]*

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## *Vermont and Canada Unite over Lake Memphremagog — Nature's Boundaries Are Apolitical*

Nature recognizes no political boundaries. This basic tenant of watershed management is especially apparent at Lake Memphremagog, situated on the U.S.-Canadian border. Most of Lake Memphremagog (73 percent) is in Quebec, while most of its watershed (71 percent) is in Vermont. Consequently, the lake is most used in Quebec, though most of its pollution originates in Vermont. The resulting dilemma threatens the vitality of Lake Memphremagog and demands cooperation between international neighbors.

Both Canadians and Americans use Lake Memphremagog for recreation, and a number of Quebec municipalities, including the city of Magog, draw their water from the lake. As a result, both countries need to maintain water quality. Pollution first became a concern in 1968, when a massive algal bloom restricted lake uses. When studies revealed that the algae resulted from nutrient enrichment and sedimentation from nonpoint sources in the surrounding watershed, the two countries established an intergovernmental commission to address the problem.

## Cooperation Between Countries

Over the next two decades, despite good intentions, the two countries were unable to cooperate effectively, and their effort on behalf of the lake faltered. In 1989, a new working group was formed to evaluate the possibility of developing a cooperative approach. The working group's final report, issued in 1993, concluded that fundamental governmental differences between Vermont and Quebec, especially in agricultural and municipal authority, made it unrealistic to seek identical legislative frameworks for lake management.

Instead, the working group proposed 50 recommendations to facilitate cooperation beginning with the establishment of an information exchange. This exchange would enhance the coordination of regulations on both sides of the lake, especially those related to solid waste management, agriculture, fisheries management, and on-lake activities. Other principle recommendations were to

- establish a comprehensive, permanent water quality sampling program for the lake and a special nonpoint sources data collection program;
- encourage and help municipalities implement environmental protection measures, particularly in areas of shoreline protection and septic systems; and
- increase awareness among watershed residents regarding the role they can play in controlling nonpoint source pollution.

Since 1993, Canada and Vermont have taken many steps to fulfill these recommendations. Both countries established steering committees to coordinate the efforts of all those involved with the environmental management of the lake, and these committees, in turn, have formed a number of joint task forces that are successfully addressing specific issues.

During the summer of 1996, for example, the Water Quality Monitoring Task Force developed and initiated a comprehensive program to monitor long-term trends in water quality.

In 1995, Vermont devised its Accepted Agricultural Practice Rules, which included prohibition of winter spreading of manure as recommended in the 1993 Quebec/Vermont report. Federal funds were made available in the Lake Memphremagog watershed to decrease the cost-share portion that farmers are required to pay for BMPs.

The Agricultural Task Force is currently providing educational outreach about water quality protection measures and has stepped up dialog between Quebec and Vermont farmers, government administrators, and farm assistance organizations to benchmark the most successful measures.

Citizen participation is also a vital part of the watershed management process. Quebec citizens in the towns bordering the lake have been active in environmental management efforts because they have a direct association with the lake; citizens and towns in the Vermont portion of the watershed find it more difficult to appreciate their role in lake protection, and many remain uninvolved.

Susan Warren, coordinator for the Vermont Steering Committee, observes that the state has increased its public outreach because "we need to develop additional local interest in the watershed to progress further."

The Lake Memphremagog Watershed Association (LMWA) is setting an example for others on the Vermont side of the border. LMWA has launched a project for streambank and in-stream restoration on a major tributary of the Black River, which feeds directly into the lake. With the aid of grant money, the LMWA will stabilize two miles of badly eroded streambank by creating a 10- to 25-foot buffer strip on either side of the tributary. On the same stretch, the LMWA hopes to restore in-stream habitats and thus encourage more landowners in the watershed to take part in similar restoration projects.

In addition to bolstering awareness among landowners in the watershed, Quebec and Vermont are reaching out to those who use the lake for recreation. Quebec has installed boat washing stations at seven locations to prevent zebra mussel infestation. The city of Newport, Vermont, has installed one as well. During the next several years, Quebec and Canada will focus on educating the public about general prevention and control of zebra mussels.

The citizens in the Lake Memphremagog watershed are fortunate. Although the lake is primarily in Quebec, the watershed (and most of the pollution sources) in Vermont, the people of Vermont recognize Canada as a neighbor with whom they share an important resource. By working together and sharing information, the governments and citizens on both sides of the lake can protect and improve the water quality of Lake Memphremagog.

[For more information, contact Susan Warren, Vermont Agency of Natural Resources, Water Quality Division, 103 South Main Street, Center Building, Waterbury, VT 05671-0301. Phone: (802) 241-3794; fax: (802) 241-3287.]

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## Technical Notes

### *Measures of Water Quality in New York*

Stream monitoring data are critical for assessing water quality, but often their usefulness depends on their reduction to a single, comprehensible value. This reduction of complex biological monitoring data allows managers to characterize water quality more readily. Such a mathematical determination, or metric, may be as simple as summing the total number of species present (species richness) or as sophisticated as using complex statistical evaluations to find significant differences between reference and test sites. Bob Bode and his colleagues at the New York State Department of Environmental Conservation have developed two metrics that advance biological monitoring: percent model affinity and impact source determination.

#### *Discerning the Level of Impairment*

Percent model affinity compares a benthic macroinvertebrate community in sampled waters to an ideal, or "model" benthic macroinvertebrate community. The metric is based on the premise that the biological effects of pollutants can be measured by comparing an existing macroinvertebrate community with an expected community, a concept that Bode says most biologists practice intuitively. "We set out to develop a new metric that would determine stream impairment more accurately than some of the other metrics we were using," Bode says, "Margaret Novak [a New York State entomologist] came up with the concept of a model community, and it took us about five minutes to come up with the numbers."

The analysis of data from 108 nonimpacted streams throughout New York State between 1983 and 1989 verified Bode's intuition. Based on the results, a model riffle community in New York consists of 20 percent Chironomidae, 10 percent Trichoptera, 40 percent Ephemeroptera, 5 percent Plecoptera, 10 percent Coleoptera, 5 percent Oligocheata, and 10 percent "other." Percent model affinity is calculated using percentage similarity (developed by Whittaker and Fairbank in 1958) and is very useful in determining the level of impact when a reference stream is not available.

Sites typical of the four water quality assessment categories in New York State determined the ranges for percent model affinity. Streams greater than 65 percent similarity to the model are considered nonimpacted or nonpolluted; between 50 and 64 percent similarity indicates slight impact; 35-49 percent moderate impact; and less than 35 percent severe impact. "What is nice about percent model affinity is that it is closely correlated with the Hilsenhoff Biotic Index and the Ephemeroptera, Plecoptera, and Trichoptera index," says Bode. The HBI is an index that assigns tolerance values to organisms on a scale of 1 to 10, where 0 is the least tolerant to pollution and 10 is the most tolerant to pollution. "Model affinity," adds Bode, "can also reflect water quality changes better than HBI does in some instances of non-organic pollution."

#### *Unearthing the Type of Impairment*

The analysis of benthic macroinvertebrate communities has been quite successful in determining the severity of water quality impacts. It has been less effective in determining the type of pollution causing the impact, so Bode and his colleagues have come up with a second metric for use in this situation. Where model affinity determines the level of impairment, impact source determination (ISD) determines the type of impairment. ISD is also based on community composition, but applies it to ascertain the primary factor influencing stream fauna. The percent model affinity compares the similarity of a test site to an ideal, nonimpacted community; ISD compares test data to model communities impacted by various known impacts.



Bode and his colleagues developed ISD using a large macroinvertebrate database to distinguish seven categories of impact: nonpoint nutrient additions, toxins, sewage effluent or sewage wastes, municipal/industrial, siltation, impoundment, and natural or nonimpacted. The model that exhibits the highest percentage similarity to the test data denotes the likely impact source type.

Percent model affinity and ISD are incorporated into biomonitoring protocols outlined in the Department's *Quality Assurance Work Plan for Biological Stream Monitoring in New York State*. Unlike other metrics that look at certain taxa or functional feeding groups, percent model affinity and ISD take into account the entire macroinvertebrate community and help determine the level and source of impact.

[For more information, contact Bob Bode, New York State Department of Environmental Conservation, 50 Wolf Road, Albany, NY 12233-3502. Phone: (518) 285-5682.]

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## *University of Kentucky Renovates Constructed Wetland to Improve Metal and pH Reductions*

In 1989, a wetland constructed to reduce the effects of acid mine drainage at Jones Branch in the Daniel Boone National Forest in Kentucky looked like a success. The wetland, built by the U.S. Forest Service to carry out a combination of physical and chemical processes, was effectively reducing metal concentrations and acidity. Soon, however, the project failed. The University of Kentucky's Department of Agronomy set out to find out why.

Researchers found that one reason the wetland failed was "insufficient use of the treatment area." Since the wetland was fed exclusively by surface flow, the deeper levels of limestone gravel that should neutralize the low-pH drainage were not functioning.

The other major problem was low detention time. The more time acid mine drainage spends in a wetland, the more it interacts with active surfaces and microbes and the more it is neutralized.

In 1994, these findings led to a \$74,000 grant from the Kentucky NPS Pollution Program to renovate the wetland and improve its function. A carefully planned two-phase project incorporating the use of anoxic limestone drains and a series of anaerobic subsurface drains was the result.

The installation of subsurface flow in the renovation project enhanced the subsurface treatment and use of the wetland's substrate. The renovation improved the wetland's neutralizing capacity by increasing pH and bicarbonate alkalinity production through limestone dissolution and bacterially mediated sulfate reduction. Sulfate-reducing bacteria use organic carbon from residues within the wetland as an energy source to reduce sulfates to sulfides, and, in the process, increase bicarbonate alkalinity, precipitate out heavy metals, and neutralize the acidity in the system.

After the renovation, the pH in the wetland increased from 3.41 to 6.38 and the retention of aluminum, iron, sulfate, and manganese increased significantly. The researchers used a bromide tracer to check the wetland's detention time and found the nearly 94-hour residence time a huge improvement over the two-hour residence time before the renovation.

Monthly performance data now indicate good consistency in the project's treatment efficiency, but the effect of this success is limited. Over 40 other acid mine drainage seeps in the Jones Branch watershed still degrade the stream within a short distance from the wetland. According to A.D. Karathanasis, an agronomy professor at the University of Kentucky, "Unless there is a comprehensive treatment plan, we are not going to see drastic improvements on a watershed level."

Ideally, Karathanasis said, the renovation should function for 15 to 20 years, depending on the toxicity of the acid mine drainage and the size of the wetland. In this particular case, both factors make long term success questionable. The acid mine drainage at the Jones Branch site is very toxic, with a pH of three. In addition, due to topographic constraints, the area of the wetland is limited to 1,022 square meters, about 20 times smaller than it should be. Even with these less than ideal conditions, Karathanasis says, "If all goes according to schedule, the renovation can last six to seven years. And in the process, we saved \$1-2 million in the cost of chemically treating the acid mine drainage."

The project is no longer funded by Kentucky, but Karathanasis hopes that additional funding will come through. "We are submitting a new proposal for the 1998-2000 Kentucky EPA NPS Pollution Program to continue monitoring and maintaining the site, but we do not know whether it will be funded. Between now and then we will be visiting the wetland mainly as a research site."

The U.S. Forest Service is also trying to find funding for use in renovating several other watersheds in the Daniel Boone National Forest that are adversely affected by coal mining. The projects will involve multiple renovation technologies, including wetlands.

*[For more information contact Professor A.D. Karathanasis, University of Kentucky, Department of Agronomy, N-122K Agricultural Science Center North, Lexington, KY 40506-0091. Phone: (606) 257-5925; fax: (606) 257-2185; email: ADKARA00@UKCC.uky.edu.]*

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## **Notes on Education and Outreach**

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### *Connecticut River Organization Depending on Landowner Education Packet*

The Connecticut River Joint Commissions are banking on the success of an educational packet to reduce streambank erosion in the Connecticut River. The Joint Commissions, comprised of the Vermont Connecticut River Watershed Advisory Commission and the New Hampshire Connecticut River Valley Resource Commission, recently published "Living with the River: The Challenge of Erosion in the Connecticut River Watershed" to encourage and educate landowners with riverfront property about practices that will reduce riverbank erosion.

The Commissions drew on the knowledge of 99 experts from many areas, including federal and state transportation, fisheries, planning, water quality, and soil conservation agencies; representatives of the hydropower industry; private nonprofit groups involved in land and wildlife conservation; private landowners (including riverfront farmers); and the U.S. Army Corps of Engineers. Supported by the Rivers and Trails Conservation Assistance Program and the National Park Service, the information was developed into an educational packet for landowners, town road agents, and any other interested parties.

The educational packet explains how vegetation on streambanks can reduce erosion by trapping suspended sediment, protecting streambanks with roots and vegetation, and slowing the velocity of runoff. It discusses restoration of riparian buffers and the implementation of streambank stabilization techniques.

The packet leans strongly toward vegetative stabilization techniques as the most effective and environmentally friendly, and it presents the advantages and disadvantages of a series of streambank stabilization methods, including stone stabilization (riprap), a combination of stone and vegetative stabilization, and vegetative-only stabilization.

A field assessment form included in the packet can help individuals locate and describe factors causing or resisting erosion at a particular site. To assist Vermont and New Hampshire residents who are planning to work near a river or stream, the packet also provides information about required approvals and permits.

Sharon Francis, Executive Director of the Connecticut River Joint Commissions, notes that the packet has put everybody on common ground and has presented a case for vegetative stabilization that is hard to dispute, "Now, those who might believe that riprap is the way to go will have to prove their case against vegetative stabilization."

As with most environmental management concepts, education is the key to success and implementation. The erosion prevention packet is an excellent educational tool that can assist efforts to promote erosion control. Packets are available to the public at no charge from the Connecticut River Joint Commissions, P.O. Box 1182, Charlestown, NH 03603.

*[For more information, contact Sharon Francis, Executive Director, Connecticut River Joint Commissions, P.O. Box 1182, Charlestown, NH 03603. Phone: (603) 826-4800; fax: (603) 826-3065.]*

## Washington Volunteer Monitors Aspire to Better Data

No one knows exactly how many volunteer monitors there are in the United States (the last official count, in 1993-1994, tallied over 340,000), but Washington state has nearly 160 groups with 8,000 volunteers monitoring water alone. All this activity generates a lot of data — and a potential nightmare for quality assurance.

A 1996 survey of the state's volunteer monitors revealed that most are eager to have their data used by state and local agencies, but according to Annie Phillips, a Washington Department of Ecology environmental education specialist, "Different groups use different methods, standards, and levels of quality." This disparity can make it difficult for agencies to use data from volunteers.

The survey, conducted by the Department of Ecology (Ecology) and the Governor's Council on Environmental Education, produced a statewide list of the location of monitoring projects, the parameters measured, and the methods and quality assurance protocols used by the monitors. "It became clear that each of the various groups did things their own way, and therefore, their data were inconsistent and of unknown quality," Phillips said.

To solve this problem, Ecology developed a matrix to characterize the methods and quality of the data collected by volunteers. The agency categorizes data from each volunteer monitoring group according to criteria such as quality assurance/quality control protocols, monitoring methods, and the education and training of the monitors. "We developed the matrix as a kind of ranking system to give a standard description for the quality of data produced for a specific project," explained Phillips.

Level	Quality Assurance/Control (QA/QC) Protocols	Examples of QA/QC Guidelines	Examples of Activities	Desired Education/Training	General uses of Data by Ecology
One	No formal QA/QC plan required	Field observations on standard forms; EPA Streamwalk	General field observations, including the number and diversity of organisms	Volunteer or student with brief orientation	Educational, general awareness
Two	Basic written plan - purpose, parameters, methods, sites, schedule	GREEN field manuals; Color comparator kit instructions	Field sampling; analysis using field kits; observing categorical abundance*** of organisms and identifying them to the order level	Volunteer, student or technician supervised by an expert monitor	Educational; watershed characterization; red flag or early warning
Three	Formal QA plan (i.e. meets 24 requirements of EPA's new Vol. Mon. Guide to QAPP, 1996); all tests needing lab analysis done at an accredited lab	Technical guidelines (e.g., <i>Adopt-A-Stream's Streamkeepers Field Guide, 1995</i> ; <i>Michaud's Citizen's Guide to Monitoring, 1991</i> ; <i>EPA's Volunteer Monitoring Methods Manuals</i> )	Using calibrated meters for field measurements or following the protocols in a current APHA <i>Standard Methods</i> ; collecting and analyzing water samples; identifying benthics to the family level; volunteer portion of Ecology's lake water quality assessments	Trained volunteer (e.g., <i>Streamkeepers</i> ); technician with experience or training or a participant in an established volunteer monitoring program	Screening level information; scoping phase of watershed approach; 305(b) Report*; Best Management Practices (BMP) evaluation data; water quantity/flow data
Four	Follows formal QA plan and documents exactly how it is implemented; sample chain of custody	Ecology technical guidelines (e.g. <i>Cusimano 1994</i> , <i>Coots 1995</i> ); <i>Plotnikoff's Instream Biological Assessment Monitoring Protocols, 1994</i>	Toxic substance sampling; sampling for enforcement purposes; bioassays; identifying benthics to the genus/species level	Professional/Qualified individual with degree and specific training or equivalent experience	Baseline, impact and ambient assessments; action planning/policy development; permitting; compliance/enforcement; 303(d) List**

\*Ecology's 305(b) Report shows whether waterbodies support beneficial uses such as swimming and fishing - or whether these uses are impaired. Contributions of data are solicited from various sources, but must meet high standards (see Level 3).

\*\*Ecology's 303(d) List shows impaired and threatened waters that don't or probably couldn't meet applicable water quality standards. Ecology accepts data for this list from outside sources, but it must meet the highest professional standards (see Level 4). Both are published every two years.

\*\*\*Categories of abundance: absent, rare, present, abundant, very abundant

The matrix influences, but doesn't dictate, the way data is used. For example, Level One data, gathered through general field observations, can be used for general public awareness. Level Four, using technical guidelines for toxic substance sampling, bioassays, and taxonomic classification qualifies for use in impact assessments, planning, permitting, and enforcement.

### **Survey Taps Volunteer Monitors**

[Adapted from *Watch Over Washington Survey Report* (October 1996). Responses to this survey came from 158 groups representing over 11,500 people.]

#### **Volunteer profile**

- ✓ 7,567 volunteers monitor some aspect of water — surface or groundwater, quality or quantity, lakes, streams and rivers, or estuaries
- ✓ 6,258 monitor benthic macroinvertebrates;
- ✓ 6,120 monitor vegetation;
- ✓ 8,620 monitor wildlife;
- ✓ 2,168 monitor wetlands;
- ✓ 6,314 monitor things such as weather, land use, sediments, and/or construction sites. (Most monitor more than one resource.)

Over half the volunteers are students; the rest are members of neighborhood associations or the general public. Of the student monitors, 21% are elementary students, 22% attend middle school, 40% are high school students, and 17% are college or graduate students.

Many classrooms are affiliated with GREEN (Global Rivers Environmental Education Network), NatureMapping, or Adopt-A-Stream; many community groups were trained by Adopt-A-Stream.

The average number of years these groups have been in operation is 4.9. Nearly two-thirds use email.

#### **How credible is their work?**

5,456 monitors collect data at Level Two on the matrix; 2,317 at Level One; 1,894 at Level Three.

#### **Why do they monitor?**

61% education/awareness, 21% to collect baseline data, and the rest checked various reasons — red flag/early warning, enforcement/compliance, research, a specific project, or land use impact.

Using the matrix will "facilitate better, more consistent monitoring," said Phillips. It was also the first step, she says, in achieving recognition by agency scientists. "It was kind of a bargain. If the volunteer group is willing to work *this* hard, we will look at their data for *these* purposes. But if they only want to go *this* far, we will only look at it for *this* purpose."

The matrix has gone a long way toward convincing skeptics that volunteer monitoring can go beyond outreach. Some are even acknowledging that the very highest quality volunteer data could be used for 305(b) reports and the state's 303(d) list, if certain requirements are met.

Washington's volunteers seem more than ready to accept the challenge. Three-quarters of the volunteer coordinators surveyed would like their groups to receive training, and half want to monitor additional resources or parameters. "Our survey showed most volunteers are eager to meet high standards. We want to help the volunteers develop skill levels which will support their needs," said Phillips.

To accommodate the widespread enthusiasm for volunteer monitor training, Ecology is linking volunteers through "Watch Over Washington," or WOW. Using a Web site (<http://www.wa.gov.gov/ecology/wq/wow.html>) as a virtual central meeting place, volunteer monitors can locate other monitoring activities in their areas and access training opportunities. Coordinators of monitoring groups can keep abreast of what other groups are doing and contact each other to combine resources. They can also learn about, and announce, events, resources, tools, new methods, environmental reports, and success stories on the Web site. There will also be a section, or FAQ as it is called, for frequently asked questions about monitoring.

Support for such a citizen monitoring network is overwhelming. Almost three-quarters of the volunteers surveyed indicate that they are very interested in participating. Although new and still fairly informal, a number of contacts have already occurred via the network's roster of members organized by watershed. Phillips is active as a catalyst as well. She explained, "When I learn of a project starting up, I tell them about other projects in the area that might act as mentors or partners. For instance, I recently put two college instructors in the Puyallup River watershed in contact with each other. One was hoping to start up a monitoring program; the other had already established his. I thought they might share equipment and lab services."

[For more information, contact Annie Phillips, Environmental Education Specialist, Washington State Department of Ecology, P.O. Box 47600, Olympia, WA 98504-7600. Phone: (360) 407-6408; fax (360) 407-6574; email: [aphi461@ecy.wa.gov](mailto:aphi461@ecy.wa.gov). Or contact Beverly Isenson, Special Assistant, Governor's Council on Environmental Education, P.O. Box 40900, Olympia, WA 98504-0900. Phone: (360) 407-7317; email: [beverlyi@parks.wa.gov](mailto:beverlyi@parks.wa.gov).]

INTERNET

■ **Educational Directory on Web.** The Committee for the National Institute for the Environment has made the Directory of Higher Education Environmental available on the World Wide Web. Located [www.cnie.org](http://www.cnie.org), the directory contains detailed information on undergraduate and graduate interdisciplinary programs, including the full spectrum of environmental disciplines. CNIE is now in the process of collecting additional information for the directory and is seeking information to assist undergraduate and graduate students in selecting interdisciplinary environmental degree programs.

Administrators, faculty, and staff of degree-granting institutions can submit information through a survey form at the above address. The directory includes degree-granting programs only, not certificate programs or programs that offer a minor with an environmental focus. The committee is asking programs that submit information to consider making a \$100 tax-deductible donation to help defray program operating costs.

*[For more information, contact Allison Lee, Committee for the National Institute for the Environment, 1725 K Street, NW, Suite 212, Washington, DC 20006. Phone: (202)530-5810; email: [staff@cnie.org](mailto:staff@cnie.org).]*

REPORTS

■ **Greenbook '96.** This annual report of the Minnesota Department of Agriculture's Energy and Sustainable Agriculture Program (ESAP) highlights the activities and findings of people willing to try out innovative ideas through the ESAP grant program.

*[For a free copy, contact Wayne Monsen at (612)296-7673; fax (612) 297-7678; email: [wmonsens@mda-ag.mda.state](mailto:wmonsens@mda-ag.mda.state).]*

CATALOGS

■ **Aquatic Plant Drawings.** The very popular Aquatic Plants Information Retrieval System aquatic plant drawings collection is now for sale. As of December 1996 there were 114 loose leaf pages of drawings in the collection, which grows monthly. Purchase of the set allows the purchaser to use the drawings and qualifies him or her to receive updates of new drawings for one year from the time of purchase.

Cost of the package is \$35 plus shipping and handling from: IFAS Publications, University of Florida, P.O. Box 110011, Gainesville, Florida 32611-0011. Phone: (800) 226-1764. Refer to IFAS Publication # SP233.

*[For more information, contact Vic Ramey at (352) 392-1799; email: [varamey@nervm.nerdc.ufl.edu](mailto:varamey@nervm.nerdc.ufl.edu).]*

■ **Catalog of Materials and Publications.** The Water Education Foundation has published a catalog of educational supplies and programs designed to foster a broader understanding of water issues. Videos, slide shows, a groundwater model, maps, and posters are among those resources included, along with educational kits for elementary through high-school-age students.

*[To receive a free copy of the Catalog of Materials and Publications, published in 1996, contact the Water Education Foundation, 717 K Street, Suite 517, Sacramento, CA 95814. Phone: (916) 444-6240.]*

GUIDES

■ **Drinking Water Resource Guide Available.** The National Drinking Water Clearinghouse has developed a drinking water resource guide that lists the name, address and phone number, mission statement, and water-related activities of nearly 75 federal, national, professional, and trade organizations. The guide, entitled *The Outreach Resource Guide: A Directory of Small Community Drinking Water Information*, will help small communities identify the appropriate organization for whatever assistance they might require. It also lists relevant publications of each organization and telephone numbers and addresses of regional, state, and local offices.

*[To receive a copy of the resource guide, call the NDWC at (800) 624-8301 and request item #DWBKGN30. The cost of the publication is \$6 plus shipping and handling charges. It is also available*

for viewing in the "bulletins" section of NDWC's Drinking Water Information Exchange Bulletin Board System (DWIE-BBS) by calling (800) 932-7459 or through the NDWC Web site at: <http://www.ndwc.wvu.edu>.]

■ **Water Efficiency for Your Home.** This 18-page booklet, now in its third edition, is distributed by the Rocky Mountain Institute for \$1 for a single copy and 50 cents each for orders of 10 or more. A \$2.50 minimum shipping and handling charge is applied to each order.

[To obtain a copy, ask for Publication W95-36 from the Rocky Mountain Institute, 1739 Snowmass Creek Road, Snowmass, CO 811654-9199. fax: (970) 927-3420.]

■ **Need a Homeowner's Guide to Reducing the Risk of Pollution?** If so, look at the new publication called *Home\*A\*Syst: An Environmental Risk Assessment Guide for the Home*. Chapters include site assessment, stormwater management, drinking water well management, household wastewater, managing hazardous household products, lead, yard and garden care, liquid fuels, air quality, heating and cooling systems, and household waste. Developed by the National Farm\*A\*Syst/Home\*A\*Syst Program.

[To order (\$11.50), call (607) 255-7654, fax (607) 254-8770, or email [nrase@cornell.edu](mailto:nrase@cornell.edu).]

## VIDEOS

■ **Keeping Soil on Construction Sites.** A new technical video geared toward contractors and construction workers by the Ohio Department of Natural Resources and the Ohio Home Builders illustrates methods of controlling sediment from erosion on construction sites. Topics covered include shallow ponds, phasing, stockpiling, sediment barriers and traps, drop inlet protection, and settling ponds. An illustrated manual is also available.

[The video runs 50 minutes and costs \$10. The manual is \$20. Both may be ordered from Stan Ring, 2625 North Loop Drive, Suite 2100, Ames, Iowa 50010. Phone: (515) 294-8103.]

■ **Improving Water Quality at Godfrey Creek.** In this 27-minute video, farmers, ranchers, and agency representatives describe the improvements made to Godfrey Creek and the process used to make those changes. Godfrey Creek flows through part of Gallatin County in southwestern Montana. Over the span of a century, the water quality in the 10-mile long creek has gradually become degraded from farming and grazing. Several federal and state agencies came together with farmers and ranchers living along the creek in a concerted effort to clean it up.

[The cost of the video is \$14.95, including shipping and handling. To obtain a copy, contact Gene Surber, Montana State University, Linfield Hall, Room 235B, Bozeman, MT 59717. Phone: (406) 994-5560.]

■ **Best Management Practices for Nitrogen and Water Use.** This video provides a general overview of the problem of excess nitrogen in groundwater. The video and corresponding reference book can be purchased for \$20 from the Fertilizer Research and Education Program, California Department of Food and Agriculture, 1220 N Street, Sacramento, CA 95814. Phone: (916) 653-5340.

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## Education and Outreach in Action

### Georgia Students Make a Difference

**EDITOR'S NOTE:** Adapted from Georgia Adopt-A-Stream, January/February 1997.

Students in Sequoyah Middle School in the Atlanta metro area have found they can make a difference in their community. Thanks to alert reporting by the Ecology Club and assistance from the Georgia Environmental Protection Department, a leak in a sewer line was repaired. The Ecology Club also discovered that an office park landlord was allowing office trash, cabinets, carpet, and assorted junk to be thrown over the back fence into their stream. The students wrote to the landlord explaining the importance of keeping streams and creeks free of litter. He responded by cleaning up the mess!

Students also assisted the Upper Chattahoochee River Keepers in cleaning up a tributary of the Chattahoochee above Atlanta in the Fifth Annual River Clean Up Week in October 1996.

### Utah Students Plant Trees

In September 1996, students from seven Utah schools "adopted" a section of the Jordan River in front of the new Rose Park Branch of the Salt Lake City Library by planting trees and other vegetation in steep, rocky soil along the river to help stabilize the river's erosion-prone banks. Pacificorp donated \$2,000 in trees and the Utah Society for Environmental Education instructed the students on how to plant trees.

Because of the river's urban nature, it is a popular attraction for nature lovers and fishermen, who often trample the streamside vegetation and cause even more erosion. The city partially remedied the problem by building a river walk with cobble stone access points and natural stone steps down to the river to discourage people from walking along the river's steep banks. The students laid erosion blankets to help stabilize the banks.

The mayor, Adopt-A-Waterbody coordinators, and other dignitaries gathered at the site with the students when they were finished to celebrate the effort. The executive director of the Utah Department of Environmental Quality thanked the students for being a part of the Adopt-A-Waterbody program. She told them that they play an important role in keeping the river and its surrounding area clean because the government does not have the resources or personnel to do it. The students have continued their interest in the river by patrolling it from time to time and using it as an outdoor classroom.

[For more information, contact Jack Wilbur, Utah Department of Agriculture, P.O. Box 146500, Salt Lake City, UT 84114. Phone: (801) 538-7098.]

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## Reviews and Announcements

### *Stormwater/Wetlands Best Management Practices Guidebook*

Wetlands in urban areas can be dramatically altered by uncontrolled runoff resulting from natural drainage or direct discharge to wetland systems. As a first step toward a framework for baseline protection of wetlands that receive stormwater runoff, the Wetlands Division of the Environmental Protection Agency has released *Protecting Natural Wetlands—a Guide to Stormwater Best Management Practices*. It provides information for decisions regarding the potential benefits, limitations, and appropriate applications of BMPs to protect the many functions of natural wetlands from the impacts of urban stormwater discharges and other diffuse sources of runoff.

The document is available from the Wetlands Hotline: (800) 832-7828.

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### *Section 319 National Monitoring Program: An Overview*

The North Carolina State University Branch Water Quality Group and U.S. EPA's Nonpoint Source Branch recently published an attractive 20-page report explaining the section 319 National Monitoring Program. Illustrated with color photographs, the report features 20 projects in Alabama, Arizona, California, Connecticut, Idaho, Illinois, Iowa, Maryland, Michigan, Nebraska, North Carolina, Oklahoma, Oregon, Pennsylvania, South Dakota, Vermont, Washington, and Wisconsin.

Copies of the report may be obtained free of charge from NCEPI, P.O. Box 42419, Cincinnati, OH 45242. Phone: (800) 490-9198; fax: (513) 489-8695; web: <http://www.epa.gov/ncepihom/index.html>. Mention EPA publication number EPA-841-S-97-003. A copy of the report may be viewed at <http://h2osparc.wq.ncsu.edu/319glossy/index.html> and can also be downloaded in Adobe Acrobat (PDF) format.

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### *New Linear Regression Approach Predicts Water Quality Impacts*

A new EPA fact sheet on using linear regression for nonpoint source pollution analyses is now available. The fact sheet demonstrates an approach for describing the relationship between water quality variables and land uses or hydrologic factors such as crop type, soil type, rainfall, stream flow, and others. The method should allow water quality analysts to predict water quality impacts due to changes in those factors.

To get a copy of the fact sheet, "Linear Regression for Nonpoint Source Pollution Analyses" (EPA-841-B-97-007), contact the National Center for Environmental Publications and Information at (800) 490-9198; fax: (513) 489-8695.

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## *New Award To Recognize Creativity in Water Technology*

The San Diego Foundation's prestigious new Blasker Award for Environmental Science and Engineering will, in its first cycle, target innovations in environmental science and engineering relating to water. Every year, the \$250,000 award will recognize an individual or group of individuals who provide the most creative and innovative original contribution leading toward a solution of a specific environmental problem. The topic for the first award, to be given in 1999, is innovative science and technology achievements contributing to creation or maintenance of sustainable supplies of water to meet a wide range of needs including agricultural, industrial, and domestic use, and the maintenance of natural ecosystems. Applications for the 1999 award must be postmarked between November 1, 1998 and November 15, 1998.

[For more information and a sample application, visit the Blasker Award web site at <http://www.blasker.org>. Or send a request for information to Blasker Award, 1420 Kettner Blvd., Suite 500, San Diego, CA 92101-2431; fax: (619) 239-1710; email: [blasker@sdcf.org](mailto:blasker@sdcf.org).]

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## *Environmental Principles for Golf Courses in the United States*

The Golf and the Environment Consortium, a collaborative research and dialogue process managed by the Center for Resource Management, has published *Environmental Principles for Golf Courses in the United States*. Addressed to developers, designers and others involved in golf course development, and to golf course associations, managers, and golfers, it contains voluntary principles for knowing when, where, and how to develop "new and existing golf courses in a wide variety of geographic areas."

Aware that environmental solutions depend on local issues and conditions, the Consortium describes the guidelines as broadly philosophical in purpose and intent; readers, however, will find them refreshingly practical. They offer guidance for every exigency: for planning, siting, constructing, operating, and maintaining golf courses; and conclude with 10 actions that "every golfer can do to help."

[For more information, contact Paul Parker, The Center for Resource Management, 1104 East Ashton Avenue, Suite 210, Salt Lake City, Utah 84106. Phone: (801) 466-3600; or Sharon Newsome, Associate Director, Commission on Risk Assessment, 529 14th Street, Northwest, Suite 420, Washington, DC 20045. Phone: (202) 233-9533.]

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## *Seminar on Watershed Planning*

The National Association of Counties invites local and municipal officials and other stakeholders at all levels of experience to participate in *Practical Watershed Protection — a state-of-the-art "how-to" for protecting growing watersheds*. The seminar (registration is \$150 for the two days) will be presented by the Center for Watershed Protection, November 20 - 21, 1997, at the Quality Hotel, Silver Spring, Maryland. The agenda and special panel presentations include (1) a variety of ways to reduce the impacts of land development and (2) valuable tips for crafting effective watershed programs to deal with sensitive areas, the importance of imperviousness, and the latest techniques and practices for stormwater management and NPDES Phase II. In addition, the Center's 9 elements of effective watershed protection and 12 elements of effective watershed plans will be followed by presentations on how to implement the plans and balance the budget — the dollars and "sense" of watershed protection.

The Center for Watershed Protection is "a nonprofit organization devoted "to better protection for streams, lakes and estuaries through improved stewardship of the land."

[For more information, contact Whitney Brown at the Center for Watershed Protection. Phone: (301) 589-1890; fax: (301) 589-8745; email: [mrrunoff@usa.pipeline.com](mailto:mrrunoff@usa.pipeline.com).]

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# Datebook

DATEBOOK is prepared with the cooperation of our readers. If you would like a meeting or event placed in the DATEBOOK, contact the NPS NEWS-NOTES editors. Notices should be in our hands at least two months in advance to ensure timely publication. This listing is available online at [www.epa.gov/OWOW/NPS/events.html](http://www.epa.gov/OWOW/NPS/events.html). A more complete listing is available on the NPS Information Exchange World Wide Web Site (see the NPS Information Exchange box in this issue for directions on how to get on).

## Meetings and Events 1997

### October

- 7 *Sources, Transformation, and Fate of Trace Metals in Puget Sound*, New York, NY. Sponsored by the Hudson River Foundation, in Cooperation with the NY/NJ Harbor Estuary Program. Contact the Hudson River Foundation at (212) 924-8290.
- 9 *Hydrology of Wetlands*, Tranquility, NJ. Contact Army Corps of Engineers at (908) 932-9271.
- 19-23 *Annual Conference and Symposium on Conjunctive Use of Water Resources: Aquifer Storage and Recovery*, Long Beach, CA. Sponsored by the American Water Resources Association (AWRA). Contact AWRA, 950 Herndon Pkwy., Ste. 300, Herndon, VA 20170-5531. (703) 904-1225. Fax: (703) 904-1228; email: [awrahq@aol.com](mailto:awrahq@aol.com). WWW Home Page: <http://www.awra.org/~awra>.
- 19-24 *Application of GIS, Remote Sensing, Geostatistics and Solute Transport Modeling to the Assessment of Nonpoint Source Pollutants in the Vadose Zone*, Riverside, CA. Contact Ellyn Grossman, American Geophysical Union, (202) 462-6910, ext. 242; fax: (202) 328-0566; email: [EGrossman@Kosmos.agu.org](mailto:EGrossman@Kosmos.agu.org).
- 22-24 *42<sup>nd</sup> Annual Midwest Groundwater Conference*, Coralville, IA. Contact Paul VanDorpe at (319) 335-1580; fax: (319) 335-2754; email: [pvandorpe@gsbth-po.igsb.uiowa.edu](mailto:pvandorpe@gsbth-po.igsb.uiowa.edu). <http://www.igsb.uiowa.edu/htmls/related/mwggwc.htm>.
- 26-31 *Watersheds '97*, Anchorage, AK. Contact Gregory Kellogg at (907) 271-6328; email: [kellogg.greg@epamail.epa.gov](mailto:kellogg.greg@epamail.epa.gov).
- 27-31 *Indian Agriculture: Roots of our Destiny and Sovereignty, 1997 National Indian Agricultural Symposium*, Chandler, AZ. Contact the Intertribal Agricultural Council at (406) 259-3525.

### November

- 2-5 *National Urban and Community Conservation Conference*, Columbus, OH. For registration and exhibit information contact NACD, 9150 West Jewell Avenue, Suite 102, Lakewood, CO 80232-6469, (303) 988-1810.
- 3-5 *Region 10 Tribal Environmental Conference*, Seattle, WA. Contact Kathy Hill at (206) 553-6220.
- 4 *An Update on the System-Wide Eutrophication Model (SWEM) for the NY/NJ Harbor Estuary*, New York, NY. Sponsored by the Hudson River Foundation, in Cooperation with the NY/NJ Harbor Estuary Program. Contact the Hudson River Foundation at (212) 924-8290.
- 5-7 *Facilitating and Mediating Effective Environmental Agreements*, Berkeley, CA. Cost: \$795. Contact CONCUR at (510)649-8008; fax: (510)649-1980; email: [concur@igc.apc.org](mailto:concur@igc.apc.org).
- 16-19 *International Conference on Advances in Ground-Water Hydrology — A Decade of Progress*, Tampa, FL. Organized by the American Institute of Hydrology (AIH). Contact: AIH, 2499 Rice St., Ste. 135, St. Paul, MN 55113. (612) 484-8169. Fax: (612) 484-8357; email: [AIHydro@aol.com](mailto:AIHydro@aol.com).
- 22-24 *Priming the Pump—Joining Forces: Education and Action for Groundwater*. Water Educators Workshop and Groundwater Guardian Designation Conference. Sponsored by The Groundwater Foundation McDonald's Corporate Campus. For more information, contact Cindy Kreifels or Amy Killham at 1-800-858-4844. Web: <http://www.groundwater.org>.

### December

- 2 *Barriers to Anadromous Fish Migration in the Hudson River*, New York, NY. Sponsored by the Hudson River Foundation, in Cooperation with the NY/NJ Harbor Estuary Program. Contact the Hudson River Foundation at (212) 924-8290.

## December

- 3-6 *17th International Symposium of the North American Lake Management Society*, Houston, TX. Organized by the North American Lake Management Society. Special sessions on NAFTA, restoration of littoral zones, integrated management of rivers and reservoirs, maintaining estuarine health, and flood/drought management will be presented. Contact Dr. Robert Doyle at (972) 436-2215; email: olyler@EX1.wes.army.mil or Dr. Alan Groeger at (512) 245-2284; email: AG11@swt.edu.

## 1998

### January

- 9-10 *Establishing Direction and Embracing Change: Environmental Education in New Jersey*, Trenton, NJ. Contact Tanya Oznovich, NJ DEP, Environmental Education Unit, P.O. Box 402, Trenton, NJ 08625-0402. Phone: (609) 984-9802.

### February

- 10-12 *Managing Manure in Harmony with the Environment and Society*, Ames, IA. Contact Bob Ball, NRCS, Parkade Center, Suite 250, 601 Business Loop 70 West, Columbia, MO 65203. Phone: (573) 284-4370; email: bobb@mo.nrcs.usda.gov.

### April

- 6-7 *First National Mitigation Banking Conference*, Washington, DC. Learn from others' successes — and mistakes — at the nation's first "how-to" conference on mitigation banking. Meet the nation's leading bankers and restorationists — as you exchange experiences and work out problems in interactive, hands-on sessions. Contact the Terrene Institute at (703) 548-5473; email: terrinst@aol.com.
- 15-17 *TEAM WETLANDS: 101 Ways to Win for Wetlands*, Arlington VA. The American Wetlands Month Communities Celebration emphasizes interactive sessions on how to build community wetlands programs and projects. Contact the Terrene Institute at (703) 548-5473; email: terrinst@aol.com.
- 29-5/3 *Rivers: The Future Frontier*, Anchorage, AK. Contact the River Management Society at (406) 549-0514; email: rms@igc.apc.org.

### May

- 3-6 *Watershed'98 — Watershed Management: Moving from Theory to Implementation*, Denver, CO. Sponsored by the Water Environment Federation. Contact WEF at (703) 684-2400; email: confinfo@wef.org.

## Call for Papers

### 1997

#### April

- 15-17, 1998 **Call for Papers Submission Due November 7, 1997.** *TEAM WETLANDS: 101 Ways to Win for Wetlands*, Arlington VA. The American Wetlands Month Communities Celebration emphasizes interactive sessions on how to build community wetlands programs and projects. Contact the Terrene Institute at (703) 548-5473; email: terrinst@aol.com.

## NPS Electronic Information Exchange News

The NPS Information Exchange has evolved from a modem-based electronic bulletin board to a system of Internet resources. Documents, including News-Notes issues 1-48, are now located on the NPS Information Exchange World Wide Web site:

<http://www.epa.gov/OWOW/NPS/npsie.html>.

NPSINFO is the Information Exchange's email discussion group.

To subscribe to this group, send an e-mail message to [listserv@unixmail.rtpnc.epa.gov](mailto:listserv@unixmail.rtpnc.epa.gov).

Include the following information in your message: **subscribe NPSINFO yourfirstname yourlastname**.

After you subscribe, you will receive a welcome message explaining the discussion list and how to post messages to it.



*Nonpoint Source NEWS-NOTES* is an occasional bulletin dealing with the condition of the water-related environment, the control of nonpoint sources of water pollution, and the ecosystem-driven management and restoration of watersheds. NPS pollution comes from many sources and is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural pollutants and pollutants resulting from human activity, finally depositing them into lakes, rivers, wetlands, coastal waters, and groundwater. NPS pollution is associated with land management practices involving agriculture, silviculture, mining, and urban runoff. Hydrologic modification is a form of NPS pollution that often adversely affects the biological integrity of surface waters.

Editorial contributions from our readers sharing knowledge, experiences, and/or opinions are invited and welcomed. (Use the COUPON on page 31.) However, NEWS-NOTES cannot assume any responsibility for publication or nonpublication of unsolicited material or for statements and opinions expressed by contributors. All material in NEWS-NOTES has been prepared by the staff unless otherwise attributed. For inquiries on editorial matters, call (202) 260-3665 or (703) 548-5473 or FAX (202) 260-1517.

For additions or changes to the mailing list, please use the COUPON on page 31 and mail or fax it in. We are not equipped to accept mailing list additions or changes over the telephone.

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NONPOINT SOURCE

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