



# 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

## A Commentary

### Some Observations on Agriculture's Water Quality Efforts

by Jim Meek, former U.S. Environmental Protection Agency liaison to the U.S. Department of Agriculture

Recently, I attended a two-day Water Quality Project Workshop for the North Central region that looked at the successes and challenges of projects in the region.

As background, these particular projects were established five years ago under the USDA's Water Quality Initiative. States in the North Central Region have 10 hydrologic unit area projects, seven demonstration projects, and five management system evaluation area projects. Together, these projects represent some of the most extensive efforts undertaken to address water quality problems, especially the five that are research projects. The backbone of these projects is an unprecedented interagency cooperation and coordination.

As I approached the workshop, my interests focused on two major questions. Is this cooperation really working? And if it is, has it improved water quality in the region?

The answer to my first question is an unqualified yes. The land treatment agencies involved in the projects are working more closely together with fewer turf issues. As a result, a more coordinated focus on making things happen in each of the projects is emerging, leading to the formation of additional partnerships among local agencies, farmers, citizens, and businesses — particularly agricultural retail businesses — in the watersheds. The CTIC's "Know Your

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Watershed" project is helping to form more of these partnerships. This project, supported by USDA, EPA, and others, provides information that local groups, agribusiness, and other agencies can use to organize and assume responsibility for projects in their watersheds.

I find these partnerships especially encouraging since if the federal and state agencies by necessity spend most of their time organizing, scheduling, and pushing the agenda for each project, they have little time left to provide the assistance that they are best equipped to offer. If local agencies and citizens can take charge, the effort to cooperate becomes institutionalized, with greater organizational potential to create a viable structure to continue the work.

The workshop provided signs that this approach is beginning to take hold, particularly in Ohio. Several Ohio projects noted their success in obtaining funding for their work from other local sources (i.e., from The Nature Conservancy; Operation: Future Association; Darby Creek Association, Rivers Unlimited; and Little Darby Creek Preservation Association). Cooperation, coordination, and integration of efforts is most successful where there are local staffs with energy, initiative, and enthusiasm. These efforts can't be mandated, but we can offer an opportunity for such partnerships to thrive — as they are now beginning to do — in more and more watersheds. The workshop clearly demonstrated this point.

But are we improving water quality? We learned from Rural Clean Water Program (RCWP) projects that reductions in pollutant loadings do not immediately translate into better water quality. The vagaries of weather and the hydrology and geology of a watershed make predicting results difficult, and it takes time to dissipate the buildup of past inputs. While we are succeeding in making significant managerial changes in farming, our hydrologic systems have their own time table for change.

Management changes in farming practices are, in a number of cases, significantly reducing inputs through enhanced application of nutrient budgeting and integrated crop management. While these changes may not, in many cases, show up in immediate water quality improvement, they are definitely improving the farmers' management of their resources, efficiency, and stewardship of the land. Today, we cannot say to what extent we are improving water quality, but we do know that we are making progress toward this goal. Riparian areas are improving, nutrient planning is leading to fertilizer savings, and farmers are more aware of the impacts that their activities have on the water.

We still have to work hard to reach the many farmers who are not yet applying the more effective management practices. One project discussed the issues that arise when only 50 percent of the farmers participate in nutrient management program — even though they would show substantial savings from tailoring fertilizer use to needs. What seems obvious to us is not always an easy sell. More trust has to be developed, and trust comes from agencies and private interests collaborating to provide consistent and focused assistance to the farmer.

The workshop was a valuable experience in other areas as well, but for me, it really drove home the point that we need more water quality partnerships in watersheds across the country. This workshop was, above all, a confirmation of the lessons we learned through the RCWP. We must continue to implement these lessons. The workshop is testimony again to the progress that many agencies are making under the water quality initiative.

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## **Notes on The National Scene**

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### *Off-Highway Recreationists Serious About Clean Water*

As a nation of outdoor enthusiasts, increasing numbers of Americans are taking to the back country, and more and more are doing so on wheels. Use of off-highway motorcycles and all-terrain vehicles nearly tripled between 1980 and 1990.

This love affair is not without its price, however. Off-Highway Vehicle (OHV) managers and riders agree that unmanaged use can be detrimental to natural resources. While specially designated OHV trails are engineered to handle wildland traffic, unmanaged use of slopes, streambanks, and stream channels can cause erosion, turbidity, and sedimentation.

Understanding that responsible use minimizes damage, user groups are moving to educate their peers and conserve the resources they prize. Tread Lightly! and the National Off-Highway

Vehicle Conservation Council are leaders in a public/private movement to encourage environmentally and socially responsible outdoor recreation.

"We are a land ethics organization. Our job is to increase awareness of how to lessen the impact of outdoor recreation," says Tread Lightly! Director Lori McNeely. Begun nearly 10 years ago as a U.S. Forest Service program, Tread Lightly! is now incorporated as a nonprofit organization and backed by industry, government, public interest, communications, and user groups.

"We get support from these interests because it is advantageous for a company or organization to participate in the Tread Lightly! program. By encouraging environmentally responsible activity, they advance and enhance the image of various forms of recreation and further their own image as environmentally conscious," said McNeely.

The organization's principles protect water resources by encouraging OHV enthusiasts to reduce erosion by staying on OHV-designated trails, avoiding streambanks and lakeshores, and staying off slopes and out of stream channels. The message: "Defaced roads and trails caused by irresponsible people are often closed. By using common sense and courtesy, what is available today will be there to enjoy tomorrow."

Among the educational materials Tread Lightly! has created for recreationists is a specialty book for mountain bikers to add to an already popular manual on responsible four-wheeling. More books are in the works, each targeting one of Tread Lightly!'s other audiences: snowmobilers, dirt bikers, all-terrain vehicle riders, hikers, cross-country skiers, and equestrians.

Also on the horizon is an exciting program to help manufacturers develop ads demonstrating environmental stewardship. "The public is continually bombarded with advertising that promotes recreation that is destructive to public and private lands. This type of advertising directly affects the image and behavior of vehicle operators, resulting in land closures," McNeely said. She would like to see more advertisements like the Toyota ad "Only animals leave tracks in the wilderness," which exhorts OHVers to respect the land.

Sharing the leading edge of OHV education is the National Off-Highway Vehicle Conservation Council, a non-profit education and communication group that emphasizes environmental stewardship. NOHVCC partners with the National 4-H Council in preparing stories for the "Rider Network News" which goes to approximately 10,000 young all-terrain vehicle riders. The publication fosters the development of responsible, environmentally friendly OHV activities. As a result, some local 4-H chapters adopt environmental stewardship projects doing trail maintenance or erosion prevention. A mentoring program puts the local project in contact with a specialist who can provide pertinent information.

While national organizations sustain long-term goals such as educating user groups and helping to raise a generation of land stewards, local efforts provide on-the-ground improvements. NOHVCC holds "On Common Ground" workshops for adult riders and land managers. One technique taught at the workshop is the installation of structures that divert runoff on slopes and reduce erosion from vehicles.

According to NOHVCC President Randy Harden, the Wayhutta off-highway vehicle area in North Carolina wanted to shut its trail system down because of erosion occurring there. Instead, the Smokey Mountain Off-Road Vehicle Club along with NOHVCC's Glenn Myers and Richard McClure and Melinda McWilliams of the U.S. Forest Service planned and implemented a

### **OHV Users Join Environmentalists Revegetation Project**

Off-highway vehicle enthusiasts and The Nature Conservancy last year teamed up in a revegetation project at the Pismo Dunes State Vehicular Recreation Area (SVRA) on the southern California coast.

Recognizing that nothing was stopping sand blowing from the coastal shoreline into the dunes and Oso Flaco Lake, SVRA instituted a long-range revegetation plan funded by revenues from California OHV registrations. Last year, 13 members of the Santa Maria Four Wheelers Club and other OHVers joined 13 friends of The Nature Conservancy (TNC) for a day planting 900 new native seedlings in the buffer zone north and west of the lake.

Vehicles and camping are allowed in only 1,500 acres of the 4,000-acre SVRA in order to preserve the unique and sensitive natural conditions found there. The state Off-Highway Motor Vehicle Recreation Division last year signed a cooperative agreement that permits TNC to manage the lake and the surrounding natural areas.

reconstruction process that makes this same trail an environmentally friendly, model OHV system. The group also agreed on a monitoring program to collect data that will go into a national network to enhance erosion control on other OHV trail systems.

Says Harden, "To develop relationships with all trail users and others concerned about environmental stewardship, we need to provide a structure that helps us all resolve our differences and work together toward what is best for the land and for the people. We do this by coordinating specific workshops tailored to the situation at hand. Our general curriculum, based on a project of the National Land Use Collaboration, includes members from many diverse backgrounds. By involving those actually affected by an issue (environmental or otherwise), we can talk about our concerns, understand our differences, and work out grass-roots level solutions. The results of these workshops have been nothing short of fantastic!"

[For more information, contact Lori McNeely, *Tread Lightly!*, 298 24th St., Ste. 325-C, Ogden, UT 84401. Phone: (801) 627-0077. FAX: (801) 621-8633. Or contact Randy Harden, NOHVCC, 3005 South 12th St., Sheboygan, WI 53081. Phone: (800) 348-6487. FAX: (414) 458-3666. Or contact Scott Sinclair, Motorized Recreation Manager, Six Rivers National Forest, 1330 Bayshore Way, Eureka, CA 95501.]

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## Federal Highway Erosion Rule Updated

The Federal Highway Administration (FHWA) Department of Transportation has adopted the American Association of State Highway and Transportation Officials' highway drainage guidelines.

These guidelines reflect current state-of-the-art practices and management techniques and meet the requirements of section 1057 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). That act requires FHWA to develop erosion control guidelines for states to follow during federally funded construction projects.

Robin Schroeder of FHWA's Construction and Maintenance Division said that the AASHTO guidelines contain a broad but comprehensive view of the development, implementation, and maintenance of erosion and sediment control plans and appurtenances. They also illustrate examples of some typical erosion control devices that will provide a foundation for states to develop their own erosion and sediment control guidelines.

Schroeder said that state-developed guidelines will be better able to identify and deal with the problems unique to each geographic location. They will allow each state to put greater emphasis on problems and solutions that have been historically identified within each state, he said.

The updated rule is consistent with nonpoint source management programs required under section 319 of the Clean Water Act and section 6217(g) guidance of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990. According to the *Federal Register*, projects located within coastal zone management areas, specified as states with federally approved coastal zone management programs, should use EPA and NOAA's *Guidelines Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters*.

Ed Drabkowski of the EPA's Nonpoint Source Control Branch said that CZARA management measures for roads, highways, and bridges apply to construction projects of less than five acres and to operation, maintenance, and retrofit projects in the defined coastal zone, in addition to the FHWA requirements.

He also noted that while Phase I of the NPDES stormwater program requires a NPDES permit for all highway construction projects of five or more acres, erosion and sediment control from completed coastal zone highway projects would be managed under the CZARA guidance over the long term. The exceptions, Drabkowski said, would be those municipal areas with NPDES stormwater permits.

[For more information, see *Federal Register* Vol. 59, No. 142, Tuesday July 26, 1994, pp.37935-379398. Or contact Robin Schroeder, Office of Engineering, HNG-23, Federal Highway Administration, 400 7th St., SW, Washington, DC 20590. To obtain the AASHTO document, *Highway Drainage Guidelines, Volume III, Erosion and Sediment Control in Highway Construction, 1992*, contact the American Association of State Highway and Transportation Officials, 444 N. Capitol St., NW Ste. 249, Washington, DC 20001. Phone: (202) 624-5800

*To obtain a copy of Guidelines Specifying Management Measures for Sources of Nonpoint Source Pollution in Coastal Waters, contact NCEPI, 11029 Kenwood Rd., Bldg. 5, Cincinnati, OH 45242. For a loose-leaf version of the document, request publication number EPA 840-B-92-002 (A); for the bound copy, use publication number EPA 840-B-92-002 (B). Chapter 4, containing management measures for roads, highways, and bridges in coastal areas is also available for downloading from SIG 8 of the NPS Electronic Bulletin Board System. See page 31 for log-on information.]*

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## **Notes on Riparian and Watershed Management**

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### *International Exchange Catalyzes Change at Home*

Last fall a small group of planners and natural resource experts from Canada, France, the United Kingdom, and the U.S. turned their attention to the issues of three communities located in the Chesapeake Bay watershed. Now their visit, part of the "Countryside Stewardship Exchange" program, is catalyzing newly energized partnerships in Pennsylvania, Maryland, and Virginia.

Last year's Exchange, sponsored by the Alliance for the Chesapeake Bay, focused on each community's vision for sustainable development. The teams pooled their experience, studied each location intensively for one week, then presented their recommendations at public meetings.

#### *Pennsylvania*

In Cumberland County, Pennsylvania, the Exchange provided the first public forum on regional planning and natural resources and discovered widespread concern. The host committee solicited recommendations for creating a regional vision for its 34 municipalities. The Local Organizing Committee, or LOC, is meeting with the governments of other counties in the state to gather examples and identify potential projects that are flexible enough to allow both collaboration and local autonomy. Also being contemplated are a natural resources inventory, river conservation plans, and education for municipal officials.

#### *Maryland*

Over 300 people from the watershed helped bring the Countryside Exchange to Maryland's Chester River Watershed. The watershed communities, containing marshes, farms and higher density residential and commercial areas, were looking for ways to cluster growth and use their natural and rural areas as economic assets. As a result of the Exchange, the LOC has held a series of consensus building meetings, developed a mission statement and implementation framework for a shared vision, and created a bicounty forum to provide the framework. County commissioners from the two counties bordering Chester River met for the first time, voicing support for the LOC's efforts.

#### *Virginia*

Virginia's rural Eastern Shore (a 70-mile stretch of land between the Chesapeake Bay and the Atlantic Ocean) was the Exchange's third geographic focal point. There, the host committee asked for help developing a regional vision and identifying strategies for examining sustainable economic development amid the area's farmlands, forests, and extensive coastal marshes and bays. Issues examined were wastewater treatment, rural character protection, agriculture, and the seafood industry. In the aftermath of the Exchange visit, the peninsula's municipalities are looking for ways to address complex development issues on a regional basis while recognizing the individuality of each town. The counties of Accomack and Northampton have agreed to work together on a "Heritage Trail," an agreement hailed as a significant achievement.

In all three states, representatives of the LOCs are enthusiastic about the activities following the Countryside Exchange. The attention and recommendations of international experts brought new perspectives to old problems and helped spark much-needed discussions among diverse groups. The Alliance for the Chesapeake Bay continues to assist each region as it works to implement team recommendations.

The Countryside Exchange program, initiated in 1986 by the National Park Service and the Countryside Commission for England and Wales, targets a different geographic region each year and so far has conducted almost 30 case studies.

*[For more information, contact Shari Wilson, Alliance for the Chesapeake Bay, 6600 York Rd., Baltimore, MD 21212. Phone: (410) 377-6270.]*

# Notes on the Agricultural Environment

## No-till Edges Up; So Does the Plow

This article was adapted from the November 1994 issue of *Conservation Impact*, the newsletter of the Conservation Technology Information Center.

Farmers are using no-till, an environmentally beneficial planting method, on more acres than ever, but use of the plow is also edging up. According to the 1994 *National Crop Residue Management Survey*, farmers used no-till planting on an additional 4.2 million acres last year.

Conservation tillage, which is any tillage system (including no-till, ridge-till, and mulch-till) that maintains a 30 percent crop residue cover after planting, was used on 35 percent of the United States' nearly 284 million planted crop acres. Five years ago, in 1989, only 25.6 percent on this land was in conservation tillage.

In 1994, for the first time in six years, however, the annual tillage survey also registered an increase in the number of acres planted by traditional methods. In 1994, more than 3.5 million additional acres of ground were heavily tilled or planted without the benefit of crop residue cover.

According to Jerry Hytry, CTIC executive director, the increase in traditional tillage came about partly because heavy rains and flooding in 1993 destroyed crop acreage. Nearly 5 million fewer acres were planted in 1993, compared to the number of acres planted in 1992 and 1994. Most of this land was returned to production in 1994, but rills and gullies on the surface and sand and soil deposit on the bottom lands forced farmers to

### Highlights from the 1994 Crop Residue Management Survey:

- No-till gained significant acres in full season corn, soybeans, and cotton and moderate increases in small grain (such as wheat, rye, and barley) and forage crops. No-till crops are planted in narrow seedbeds and the remaining soil is left undisturbed, except for nutrient injections.
- Ridge-till has gained acreage every year since 1982, especially in the western corn belt and northern plains. Ridge-till crops are planted in seedbeds prepared on ridges, and crop residues are left on the surface between ridges.
- Mulch-till, which had been gaining acreage over the last four years, lost just over 2 million acres in 1994. In mulch-till, equipment is used to disturb the soil, but crop residues are left to protect the surface.
- For the sixth consecutive year, no-till acres planted to full season soybeans increased dramatically. The 1994 no-till total of 13.8 million acres is more than four times the acreage reported in the 1990 survey.

## SOIL & WATER CONSERVATION SOCIETY ENTERS FARM BILL DISCUSSION

Conservation tillage, "the latest and most effective tool available to control soil erosion," is also the most likely management option to "eventually be used on the majority of America's farmland" says *Farming for a Better Environment*, a white paper sponsored by the Soil and Water Conservation Society. The paper was released March 9 to coincide with the opening of congressional debate on the 1995 Farm Bill.

The paper, a scholarly and comprehensive survey, highlights the increasing accomplishments of conservation tillage, especially no-till, and its ability to help farmers unite their efforts for agricultural sustainability and resource protection. The adverse effects of tillage on soil and water quality and wildlife are acknowledged and stand in stark contrast to the effects of conservation tillage, especially no-till.

No-till systems, the paper notes, have been found to reduce erosion by 93 percent, pesticide and water runoff by 70 percent, and phosphate runoff by up to 81 percent — with consequent savings in farm inputs.

[Copies of *Farming for a Better Environment* are available for \$15.00 each (\$12.50 for members) from the Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, IA 50021-9764. Phone: (800) 843-7645.]

till the soil more. Much of the decline in mulch-till, the largest conservation tillage category, is attributed to this scenario.

Another important factor may have been the absence of a government set-aside program in 1994. Hytry speculates that when previously idled acres are returned to production, they are tilled. But, he says, "conservation tillage is here to stay. While the rate of increases may vary, it will continue to grow. I'm confident we will see much greater increases in 1995."

Farmers in Iowa led the nation with 11.1 million acres in various conservation tillage systems. Illinois leads in no-till with 5.5 million acres; and Nebraska tops the ridge-till roster with 1.5 million acres.

The Natural Resources Conservation Service (formerly SCS) assisted CTIC with the survey data collection. Conservation districts, ASCS, CSREES (formerly CES), local farm organizations, and agricultural services contributed to this survey.

[One-page summaries of conservation tillage information from each state are available for \$5 each for CTIC members and \$10 for nonmembers, from CTIC, 1220 Potter Drive, Room 170, West Lafayette, IN 47906. Phone: (317) 494-9555. FAX: (317) 494-5969.]

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## CRP Expiration Begins: Farmers Surveyed on How They Will Respond

Portions of this article are adapted from *The Future Uses of Conservation Reserve Program*.

This year, contracts will expire on the Conservation Reserve Program's first two million acres. More than 15.3 million acres, or 42 percent of all CRP land, are located within at least one mile of a stream, lake, reservoir or waterbody, with 17 percent immediately adjacent to a waterbody, and another 11 percent less than one-quarter mile from surface water.

How the 36.4 million acres now enrolled in the CRP will be used following contract expiration has enormous implications for the economic well-being of farms and the health of agricultural ecosystems across the country, say the authors of "The Future Use of Conservation Reserve Program Acres." Policymakers, they say, need to know what farmers are likely to do with their CRP acres if the program is not extended.

The report by USDA agricultural economists Tim Osborn and Russ Keim, and Max Schnepf, director of public affairs at the Soil and Water Conservation Society, provides this information, comparing 1990 and 1993 surveys of CRP contract holders. The surveys also gauged attitudes of owners and operators toward various policy options that would preserve CRP conservation and environmental accomplishments.

Interestingly, contract holders' intentions have changed substantially in the two years between surveys. Contract holders now intend to return more CRP acres to crop production and keep fewer acres in grass. Contract holders are also lukewarm toward most postcontract policy options, with the exception of contract extensions, according to the report.

The surveys asked contract holders what types of conservation practices they would use on recropped CRP acres. By far the most predominant conservation practice that contract holders expect to use is residue management (frequently called conservation or mulch-tillage), followed closely by crop rotation. Contract holders expect to apply residue management on 53 percent of CRP acres returned to crop production and crop rotations on 52 percent.

CRP expiration will probably mean that filter strips will shrink. According to the report, contract holders anticipate retaining only 25 percent of the 52,000 acres of filter-strips now in place.

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To obtain a copy of the 40-page softbound report, call 1-800-THE-SOIL, or write to SWCS, 7515 NE Ankeny Rd., Ankeny, IA 50021. FAX (515) 289-1227. The cost is \$15 per copy for SWCS members, or \$19.50 per copy for nonmembers; plus \$3.50 for handling and shipping. Survey data summarized in the report, as well as CRP enrollment data, are available in electronic format from the Economic Research Service, USDA, Washington, DC.

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*CRP Expiration  
Begins: Farmers  
Surveyed on How  
They Will  
Respond  
(continued)*

Farmers do have the option to continue conserving land uses, such as haying and grazing, however. Upon expiration of a contract, USDA will reinstate the precontract crop acreage base for which a farmer receives farm commodity payments and extend that base for five years if the farmer chooses not to recrop CRP acres immediately. Although CRP rental payments end, this provision means that producers will not be forced to recrop CRP acres with, for example, corn or wheat, solely to preserve their farm program payments. According to the report, contract holders plan to crop only 20 percent of the CRP acres to which this the option applies. Without this option, as much as 63 percent of these acres may be recropped.

*[For more information, contact Tim Osborn, Economic Research Service, 1301 New York Ave., NW, Room 508, Washington, DC 20005-4788. Phone: (202) 219-1030.]*

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## *Ag Dealers Play Pivotal Role in Expanding Conservation Tillage*

When Ohio's six-county Conservation Action Project (CAP) began in 1989, it cast local agricultural dealers in the dual roles of leader and advisor. Now the project can look back with pride at huge increases in the number of acres in conservation tillage.

CAP originated as an effort by private industries, state agencies, SCS (now NRCS), Extension, and the Ohio Farm Bureau to help reduce phosphorus loading to Lake Erie as part of a Canada-U.S. phosphorus agreement. The technical approach they selected was increased use of conservation tillage. Because farmers usually make their final decisions at the dealers' counter, the dealer was considered the logical choice to fill the pivotal role.

Each of 20 dealers recruited five farmers who were new to conservation tillage. The dealers, already fairly knowledgeable about tillage methods, received additional training enabling them to provide assistance to the farmers. The dealer's information back-up consisted of participating company representatives, county extension agents, Soil Conservation Service tillage technicians, district conservationists, other dealers, and the coordinator of the six-counties.

Conservation tillage, which maintains a 30 percent or more crop residue cover on the soil surface after planting, has increased from an average of 14 percent of the corn acreage in 1989 to 46 percent. The amount of soybean acreage managed under this form of crop residue management system also increased dramatically in the six counties: Defiance, Fulton, Henry, Wood, Lucas, and Williams.

CAP is operated by a independent, nonprofit organization that includes local farmers and agricultural dealers. Thirty-three entities have contributed to the CAP program, including private industry, state government, Ohio State University Extension, Soil Conservation Service, and U.S. EPA Great Lakes National Program.

But what really keeps CAP alive is the local organization, which appears to be thriving. CAP's county farm and shop meetings give farmers an opportunity to learn new skills and exchange conservation tillage and related information. Field days, demonstration plots, tours, seminars and other educational opportunities hosted by CAP expose farmers to leading edge conservation tillage technology.

Five years after its inception, it is safe to say that CAP's unique dealer assistance program has made conservation tillage a success in northwestern Ohio.

*[For additional information on CAP, contact CAP Coordinator Bill Rohrs, Maumee Valley RC&D, 197-1B Island Park Ave., Defiance, OH 43512. Phone: (419) 784-3717; FAX: (419) 784-3717.]*

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## *Eden-Farson Salinity Project Proves Effective*

Adapted from *Wyoming Hydrogram*, Vol. 6, No. 4, December 1994. *Wyoming Hydrogram* is published bimonthly by the Wyoming Water Resources Center, Box 3067, University Station, Laramie, WY 82071-3067.

Farmers and ranchers in Wyoming's Big Sandy Watershed are playing a valuable role in helping preserve North America's water resources. Working with the University of Wyoming Cooperative Extension Service, the Natural Resource Conservation Service (NRCS), and the



Consolidated Farm Services Agency, farmers are successfully lowering the salinity levels in the Colorado River Basin.

In 1973, the United States and Mexico reached an agreement on the quantity and quality of Colorado River water delivered to Mexico, which in effect committed the United States to reduce the salinity level of water delivered to Mexico. High salinity levels lower the water quality and may alter the vegetation communities surrounding the river.

Because flood irrigation contributes a significant amount of salt to the river, the U.S. Department of Agriculture has established a major, voluntary on-farm cooperative salinity control program in the watershed. Of the estimated 150,000 tons of salt per year entering the Big Sandy River, 85 percent is attributed to irrigation return flows. However, this load could be cut by approximately 50,000 tons per year if even 80 percent of the acreage were converted from border dike flood irrigation to overhead low pressure sprinkler systems.

Thus, the USDA's plan for salinity reduction in the Eden-Farson valley consists of a voluntary conversion by landowners from border dike flood irrigation to low pressure overhead sprinkler irrigation — with a participation goal of at least 80 percent. Through use of the sprinklers, farmers are able to produce at least the same crop yield while using dramatically less water. Because less water is used, the amount of water that previously infiltrated through the soil is reduced, which also reduces the salinity in irrigation return flows.

Conversion began in 1988; by 1994, 69 pivots, one wheel line, and one surge valve/gated pipe system had been installed through the program. To date, the program has been more successful than originally planned; numbers indicate that crop yields are up as much as 100 percent and water use on these farms is down by nearly 50 percent.

Total salt savings are estimated at 22,000 tons per year from the 6,700 acres under contract in the program. With 42 percent of the farmland under salinity contracts, it is expected that, with adequate funding, the 80 percent goal (14,000 acres) will be met well within the 10-year program plan.

To participate in the project, farmers must sign a 25-year operation and maintenance agreement in exchange for up to 70 percent federal cost share for their systems. The program also authorizes cost share payments to farmers who voluntarily choose to replace wildlife habitat that may decline or disappear because of the project. Specifically, the irrigation-induced seasonal saline wetlands (formed by return flows) are expected to dry up as water tables decline from reduced water applications. According to Joe Hiller, a water specialist with the University of Wyoming Cooperative Extension Service, several farmers are looking at this component of the program as a way to diversify farm revenues and maintain and enhance local wildlife populations.

Kelly Crane, area Extension agent, notes that after a system is installed, Extension agents and NRCS personnel continue to work with the farmer in determining the amount of water needed to irrigate crops sufficiently. Crane says that by taking notice of both weather conditions and the crops' water requirements, farmers are able to determine the amount of water needed to successfully grow their crops and simultaneously prevent leaching of undesirable salts into the river system.

*[For more information, contact Joe Hiller, Extension Water Specialist, University of Wyoming Cooperative Extension Service, P.O. Box 3354, University Station, Laramie, WY 82071]*

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## Virginia Study Finds Farm Conservation Pays

A recent analysis of farm level economics revealed that whether they run dairy and poultry farms, grow cash grains, or cash grains and vegetables, farmers in Virginia's coastal areas can profit from conservation measures.

The preliminary analysis was prepared for the Virginia Department of Agriculture and Consumer Services by the USDA's Natural Resources Conservation Service (NRCS) and an interagency team.

The report projects favorable on-farm impacts for farmers who implement the kinds of pollution prevention management recommended in EPA guidance issued under the federal Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). This guidance calls on farmers in coastal zones to

- address erosion and runoff from confined animal facilities;
- apply nutrients and pesticides efficiently and in an environmentally beneficial manner;
- address problems on grazing lands; and
- efficiently apply irrigation water.

To begin their study, researchers applied these agricultural management measures to hypothetical farms representing three types of operations in different geographical regions of Virginia:

1. A combination dairy/poultry farm (110-head dairy and 50,000 broilers) in the Shenandoah Valley;
2. A 575-acre cash grain farm on the state's Northern Neck;
3. A combination cash grain/vegetable crops operation (500 acres of small grains and 350 acres of vegetables) on the Eastern Shore.

The dairy/poultry operation needed rotational pasture grazing and a rotational loafing lot system, including a diversion, sod filter strip, and fencing. The projected net economic impact of implementing these practices resulted in a positive gain of \$4,167 per year in average annual equivalents (AAEs), when accounting for noncash cost savings (for example, reduced labor costs) and with 50 percent cost-sharing. If cost-sharing and the savings described above are not included, the net gain in AAEs is \$1,026. However, the report noted that in either case, "upfront costs" could negatively impact implementation of BMPs.

The 575-acre cash grain operation was assumed to need additional nutrient management practices and an anti-backflow device for pesticide applications. The projected net economic impact was a positive gain of \$1,050 each year, mostly from reduction of commercial fertilizer applications.

The third farm, a cash grain/vegetable crop operation, was assumed to need a nutrient management plan on the vegetable crop acres. This farm realized a positive gain of \$3,950 a year from savings on commercial fertilizer.

The analysis reveals the potential economic advantages of implementing management measures for potential pollution sources and demonstrates the necessity of controlling upfront costs that might otherwise discourage farmers' efforts.

*[For more information on A Preliminary Analysis of Expected Farm Level Impacts of the Coastal Zone Act Reauthorization Amendments of 1990 in Three Production Regions of Virginia, contact David Faulkner, USDA NRCS, 1606 Santa Rosa Rd., Richmond, VA 23229-5014. Phone: (804) 287-1664.]*

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## Integrated Crop Management Pays Off for Farmers and Ag Dealers

This article is based on a report issued by the Water Quality Demonstration Project—East River Integrated Pest Management Project.

Times are changing rapidly in Wisconsin's dairy country.

In just two years, farmers participating in a water quality demonstration project known as the East River Integrated Pest Management Project have kept 1,700 tons of unneeded nutrients off their fields and out of nearby Fox River and Green Bay. Farmers in the program save about \$18 per acre — an average savings of \$5,700 per farm, according to their 1993 financial reports. What is more, agricultural suppliers are adapting to the changing market.

Integrated crop management (ICM) is one of the tools used to reduce surface and groundwater contamination. It allows farmers to maintain or improve crop yields while cutting production costs through a variety of nutrient and pest management techniques. Farmers involved in the

program use fewer fertilizers and pesticides, but instead of suffering a loss of business and income, farm suppliers are expanding their services.

With help from the WQDP staff and consultants, producers plan their pest control strategies — some chemical; some not. Consultants work with farmers to calculate the commercial fertilizer needed, after making soil tests and deducting on-site nutrient sources.

Participants learn that good record keeping (of crops, pest management techniques, and fertilizer and manure applications on each field) is one key to success. Another is frequent field monitoring by a professional crop consultant, who recommends treatment only if crop losses will exceed the cost of control. For example, if the cost per acre of spraying for an insect is \$10 and the insect is causing only \$8 in damage, the farmer saves money by not using a pesticide. Many ag businesses are switching from product sales to services such as soil testing, pest scouting, and nutrient management planning. In Brown County, the number of crop consultants has grown from six to nine in recent years.

ICM is improving the economic and environmental vitality of the East River rural community. Says nutrient management specialist Kevin Erb: "Integrated crop management represents a philosophical shift on the part of farmers and farm suppliers. Through ICM, they're taking a stake in the future of the family farm and the rural community with an understanding that ICM heralds the future of agricultural technology in Wisconsin."

*[For additional information, contact Kevin Erb, Nutrient Management Specialist, Water Quality Demonstration Project—East River, 1150 Bellevue, Green Bay, WI 54302. Phone: (414) 391-4620. E-mail: erbk@wisplan.uwex.edu]*

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## **Coastal Nonpoint Pollution News**

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### *NOAA and EPA Add Flexibility to Coastal NPS Programs*

This is a regular *NPS News-Notes* column by EPA and NOAA staffers that highlights development of state coastal NPS programs as provided for in the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). CZARA Section 6217, "Protecting Coastal Waters," requires states and territories with federally approved coastal zone management programs under the Coastal Zone Management Act to develop and implement Coastal Nonpoint Pollution Control Programs. Articles contributed by states are welcomed.

NOAA and EPA have reviewed the progress of most of the coastal states and territories toward completing their coastal nonpoint programs and are taking actions to resolve major outstanding issues. The two federal agencies agreed with the states that changes to the coastal nonpoint program will make it more workable and effective.

- States and territories will now have more time to get full program approval. EPA and NOAA will grant conditional approvals to states that need additional time to complete the development of their programs. States will be free of grant penalties during such extensions.
- Greater deference will be granted to states in determining the geographic area to be covered by the program.
- NOAA and EPA are significantly expanding the kinds of enforceable policies and mechanisms that states can use to help implement management measures. "Bad actor" laws, enforceable water quality standards, general environmental laws and prohibitions, and other existing authorities might suffice to implement coastal nonpoint source pollution management measures.

According to the two federal agencies, the changes provide much-needed flexibility to the development of required state coastal nonpoint programs.

According to Geoff Grubbs, director of EPA's Assessment and Watershed Protection Division: "These are important changes that put this program on a new footing."

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# Notes From the States, Tribes, and Localities, Where the Action Is

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## *New Acid Mine Drainage Cleanup Plant Opens in Pennsylvania*

The Little Toby Creek Limestone Treatment Plant and wetlands mitigation site that opens this month is a milestone achievement, according to Bill Sabatose, president of the Little Toby Creek Watershed Association of Jefferson and Elk counties, Pennsylvania. The site is located in Fox Township, Elk County.

### *A Rare Beginning*

Reclaiming a watershed that was already devastated by deep mine drainage in the 1800s, not to mention later years, can be almost a miracle, says Sabatose, whose membership in the association spans 30 years. "We started in the early 1960s," he said, "when environmental issues were seen in a different light, and even soil erosion laws were unpopular. We've come a long way since then."

The project — and the Little Toby Creek Watershed Association — started when residents called a public meeting to discuss the problem, said Sabatose. And surprisingly, more than 400 people turned out, including industry and some technical types, but also farmers, laborers, bankers, hunters, and anglers. "We were by no means a radical group, except in our determination to act," recalls Sabatose.

"The miracle is that people stayed to see it through. No one in the group was paid. Eventually, we were joined by mine workers, the Western Pennsylvania Conservancy, the Pennsylvania Fish and Boat Commission, and the Pennsylvania Department of Environmental Resources (PADER)."

### **The Little Toby Creek Project — A Brief Review of the Technology**

**T**he main plant on Limestone Run consists of a small stream impoundment and intake facilities, with pipes to transmit flow from two deep mine discharges.

The drainage is neutralized in static limestone beds with backwash capabilities, water-wheel powered limestone pulverizing drums, and associated clarification and sludge handling facilities.

The treated discharge then passes through a polishing pond and aeration process for additional pH adjustment.

Neutralization processes are housed in seven insulated buildings to prevent interference from winter freezing.

A water-wheel powered limestone drum has been constructed on Little Toby Creek, upstream of the Limestone Run plant, to introduce excess alkalinity and further buffering.

Minor access roads will be built to service the intake pipes, and grading and planting activities will help mitigate 0.6 acres of wetlands.

The project cost \$2 million. Construction started in March 1993, and the plant opened this month.

Association members began by gathering data, though no one knew what to do with it. They counted over 125 sources of acid mine drainage in the watershed, but also noted that 12 of these accounted for 90 percent of the load. At Brockway, where Sabatose lives, the pH measured about 3.5, and iron was detected in the water at about 10 parts per million.

Initial efforts included clearing the litter, raw sewage, and industrial waste that had accumulated over the area. Trees (some 2.5 million) were planted, and legislation was sought for backfilling — to replace the lost topsoil. Additional efforts were undertaken to preserve the surface waters above the deep mines, to seal the mines, and to rid the area of coal refuse.

Since then, awareness of the problem and the technical ability to deal with it have developed statewide. Funding for the new treatment plant was secured from the Pennsylvania legislature's Project 500 Bond. This act authorized Pennsylvania to issue bonds in the amount of \$500 million for a land and water conservation and reclamation fund; and it commits PADER to conduct specific types of projects related to acid mine drainage, such as

- preventing, controlling, and eliminating stream pollution caused by acid mine drainage;
- restoring abandoned strip mine areas;
- preventing, controlling, and eliminating air pollution caused by burning coal refuse on public lands;
- preventing subsidence above abandoned mines; and
- controlling and extinguishing surface and underground fires.

The Little Toby Creek project is a full-scale pilot project that will apply new design technology to abandoned and active mine sites. It consists of two facilities: the main plant will treat two deep mine discharges and Limestone Run, a tributary to Little Toby Creek; a smaller facility in the headwaters of Little Toby Creek above the main plant will further neutralize and buffer the stream's lower reaches.

The new plant is designed to use high-carbonate aggregate limestone as the neutralizing reagent for acid mine drainage. Limestone has been used as a treatment in several demonstration projects, but this project establishes the first full-scale operational limestone acid mine drainage plant in existence. The Limestone Run Plant will treat 2,000 gallons a minute; the facility on Little Toby Creek will treat 700 gallons a minute.

### *Evaluating the New Method*

According to project developers, limestone as a treatment agent has several advantages over treatments based on hydrated lime or other manufactured caustics:

- Its purchase and delivery costs are lower, and it is a stable and chemically safe reagent to store and handle.
- It can be stored for an unspecified time, and the receiving streams cannot be overtreated.
- Limestone plants do not require daily operator attention, so they should have lower annual personnel costs.
- Limestone has a faster settling rate and produces a denser and drier sludge cake, so landfill costs should also be reduced.

On the other hand, the project will be monitored carefully to determine whether these advantages bear out in practice. The limestone technology is new and not fully developed; and the equipment must be properly sized to the load because its chemical reactions are slower and more complex than other caustics. Limestone treated drainage may require secondary treatment to remove the metals found in it; and limestone's efficiency per pound may be less than the 100 percent efficiency achieved with other caustics.

On balance, however, the limestone treatment process looks usable for treating about 50 percent of Pennsylvania's acid mine drainage sites.

Will it be worth it? "You bet," says Sabatose, speaking from experience. "We have already restored 13 miles of cold water fishing and cleaned up 43 miles along the Clarion River (into which Little Toby Creek empties). The Clarion is now before Congress, awaiting designation as a Wild and Scenic River. And when we put in fish for the first time, about a thousand people came to the Creek. You bet it's worth it!"

*[For additional information, contact Bill Sabatose, Little Toby Creek Watershed Association, 814/265-8749; A.E. Frederick, Pennsylvania Department of Environmental Resources, 717/787-7669; or Steven Kepler, Pennsylvania Fish and Boat Commission, 814/359-5117.]*

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## *Zuni River Watershed Act — Cooperative and Holistic Conservation Planning*

Increasing the quantity and quality of surface water in New Mexico's Zuni River watershed is a major resource goal of a new partnership of tribal, state and federal agencies and private citizens groups.

The partnership, a model for holistic watershed-based resource protection, exemplifies the cooperation necessary between governments and people within a watershed. It is designed to offer technical assistance that will empower local voluntary action to fulfill the management systems envisioned in the plan.

Authorized by the Zuni River Watershed Act passed by Congress in August 1992, the partners are charged to determine how the natural and cultural resources "within the Zuni River watershed and upstream from the Zuni Indian Reservation" can be managed and protected.

Other potential problems identified in the Act include severe erosion and the reduced productivity of renewable resources in the watershed.

The Work Group, the decision-making body established to carry out the intent of the Act, includes the USDA Natural Resources Conservation Service (lead agency), Pueblo of Zuni, Navajo Nation, Ramah Chapter of the Navajo Nation, USDA Forest Service, USDI Bureau of Indian Affairs, State of New Mexico (the state's Land Office), and private landowners represented by the local Soil and Water Conservation District.

The Work Group is assisted by a broadly representative Advisory Committee, and by 10 technical teams composed of experts in soils, range, forestry, wildlife, agriculture and cropland, hydrology and erosion, Geographic Information Systems, archaeology, social and economic values, and cultural values. A coordinator hired by the NRCS links the technical teams with the Work Group.

The final plan due to Congress by September 30, 1997, will include a watershed survey describing current natural and cultural resource conditions, recommendations for watershed protection and rehabilitation on both public and private lands, management guidelines for maintaining and improving the natural and cultural resource conditions, proposals for voluntary cooperative programs for plan implementation, and a monitoring plan.

Work plans and budgets were developed by each technical team and consolidated into the Work Group's project plan. The natural resources technical teams have developed data collection methods that will be used by an interdisciplinary inventory team at sampling locations selected in each of five subwatersheds. The sampling locations were selected using a stratified random sampling approach based on the distribution of land cover, slope, aspect, and soils within each subwatershed. The inventory will help establish the current condition of the natural resources and determine the types of problems that exist in the project area. The Geographic Information Systems team will compile the spatial data and assist the other teams by providing data layers for analysis.

The cultural values and the social and economic teams are meeting with people in the watershed to identify the concerns and values that might affect how the project recommendations are accepted. They will also review the final plans to ensure that its recommendations are culturally, socially, and economically acceptable to the people.

The Archaeology Team will inventory the types, locations, and circumstances of currently reported sites and use the data to identify conditions that will help alleviate cultural resource problems when the plan is implemented.

*[Further information about the Zuni River Watershed Act project may be obtained by contacting the coordinator, Ellen Dietrich at the project office, 117 North Silver, Grants, NM 87020. Phone: (505) 287-2164.]*

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## Rhode Island Residents

### Learn How to Protect Their Drinking Water Wells

Residents who attend workshops at the Wood-Pawcatuck Watershed Association's headquarters in Rhode Island are learning to practice nonpoint source pollution control on a small scale: in their own homes and yards.

"Many of the participants have moved from an urban area with central water systems to a more rural area," says Water Quality Program Coordinator Alyson McCann of the University of Rhode Island Cooperative Extension. Living next to their drinking water sources prompts homeowners to take an active role in protecting them. "They want to find out how to protect individual wells and learn what is needed to maintain their septic systems," McCann said.

According to McCann, bacteria from malfunctioning septic systems and pet and livestock wastes are the most common pollutants in area wells. However, pesticides, fertilizers, and household and automotive products are also commonly found within the critical 100-foot radius around a well, and these too are potential sources of contamination.

Homeowners and other residents learn how to develop their own personal wellhead protection programs. They use a home and yard survey fact sheet to guide their assessments, and they participate in hands-on training during the workshop by inspecting the grounds of the association's headquarters.

These activities prepare the residents to accomplish four tasks:

- First, they will tour their own property and map such landmarks as abandoned wells, animal pens, septic system tanks, and leach fields.
- Second, they will inventory all chemicals stored on the property, highlighting them on the map.
- Third, they will inspect their wells and the wellhead protection area — all land within a 100-foot radius.
- Fourth, the homeowners will develop their own personal wellhead protection plans.

Finished plans include tests of the well water, maintenance of the septic system, and systems for properly managing pet and livestock waste, checking underground storage tanks, and evaluating pesticide and fertilizer management.

Materials distributed at the workshop become a resource on septic system maintenance and the identification and disposal of hazardous materials. The carry-home packet also contains suggestions for conserving water in and around the home.

The training program, a component of the USDA's Pawcatuck Hydrologic Unit Project to reduce nonpoint source pollution in the watershed, includes follow-up visits by workshop staff to evaluate the adoption of BMPs.

Sixty people attended the two workshops in 1994. This year, McCann has scheduled four workshops sponsored by the Wood-Pawcatuck Watershed Association and Rhode Island's departments of natural resources, health, and environmental management.

*[For additional information, contact Alyson McCann, Water Quality Coordinator, University of Rhode Island, Cooperative Extension, Kingston, RI 02881. Phone: (401) 792-5398. FAX: (401) 798-4561.]*

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## California Almond Growers at Forefront of Sustainable Pollution Prevention

Members of the general farming community and California's \$600 million almond industry are among the diverse players in the Biologically Integrated Orchard Systems Project (BIOS), a program that Project Manager Paul Feder says is achieving substantial reductions in pesticide and fertilizer applications. The program is also attracting support from the California Legislature, the Almond Commodity Board of California, and nationally from EPA and the USDA.

### *A Strategic Enterprise*

BIOS — a model information and technology transfer program for promoting sustainable pollution prevention — is a highlight of California's Central Valley Agriculture Initiative, a program designed to target regional resources that are also high-risk environmental issues, such as on-farm pollution. The initiative resulted from a 1991 EPA strategic planning and risk assessment effort that identified the valley as a priority.

In the fall of 1993, the Community Alliance with Family Farmers Foundation recruited 26 almond growers in Merced County to initiate a move away from dependence on chemical pesticides and fertilizers toward an integrated, biologically based farming system pioneered by a local almond grower. These recruits agreed to manage 20 to 50 acre blocks of their orchards using cover crops, beneficial insects, and other biological practices.

Participating farmers have reduced nitrate applications and eliminated winter applications of organophosphate pesticides to address major regulatory priorities including contamination of surface and groundwater. One corporate farm eliminated dormant season (winter) organophosphate applications on 1,800 acres.

## Structured for Success

Feder says that beyond the on-farm successes, the program's real innovation and greatest success is its local, flexible, and voluntary approach to information and technology transfer. Critical to this success is the BIOS management team, consisting of local farmers, pest control advisors, project/farmer organizers, the local cooperative extension agency, and agricultural scientists. The team oversees the development of a comprehensive farm plan with technical assistance and financial incentives tailored to meet the individual needs of each participating grower.

BIOS's educational programs include farm days and tours, publications, and public education. The program has caught the attention of policymakers, the media, and the farm community.

"The BIOS model appears to be well suited for replication and broad institutionalization," said Feder. "In just one year, this cutting edge model has spread from one commodity in one county to three different commodities (almonds, oranges, walnuts) in five counties."

Plans are underway for even broader expansion. AB 3383, which passed through the California State Legislature with unanimous, bipartisan support, empowers the University of California to establish five county-based programs (30 farmers per program) modeled after BIOS and extended to two more commodities. It also offers farmers incentives for using soil conservation and pesticide reduction practices and tools.

By combining economic incentives, personalized assistance, extensive education, demonstration projects, and interagency cooperation, BIOS has created a strong collaborative model for other programs to build on.

[For more information, contact Paul Feder, Program Manager, Central Valley Initiative, EPA Region 9, 75 Hawthorne St., San Francisco, CA 94105. Phone: (415) 744-2010.]

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## Stormwater Utility in Marquette, MI

Marquette, a city of 23,000 in Michigan's Upper Peninsula, has combined a 319 nonpoint source project with a municipal stormwater utility to address stormwater control and to help protect its unique urban trout stream.

Although much of Whetstone Creek is channelized, and a quarter of it is piped beneath the city's buildings and pavement, locals still fish its flourishing brown trout population. However, urban development has devastated the creek, which flows into Lake Superior. Although the Whetstone Creek watershed covers only a small area (2.2 square miles), so much of the area is impervious surface that stormwater and pollutant loadings have severely impacted the creek's hydrology and habitat.

Richard Beasley of the Marquette County Soil and Water Conservation District reports, for instance, that during a one-inch rain event, it is not uncommon for the creek to rise from six inches to eight feet in depth in less than 20 minutes. Larger storms, he said, have the potential to wipe out portions of the water conveyance system. Sedimentation is the creek's most critical habitat and water quality problem.

The Whetstone Creek Watershed Project was established under section 319 in 1991. Its main emphasis was on water quality BMPs, but project leaders soon recognized the need to incorporate stormwater management issues. In 1993, supported by the Whetstone Creek Watershed Council, the city established a stormwater management utility ordinance. The stormwater utility serves as a management tool for the growing problem of stormwater runoff from impervious surfaces like roofs, parking lots, and driveways. It is also a funding source.

### Utility Charges Based on Runoff Amounts

The utility's billing system charges all developed or undeveloped parcels a fee based on the relative amount of stormwater runoff to the drainage system, their equivalent hydraulic acres (EHAs). The method measures the amount of impervious and pervious areas on a nonresidential parcel, calculates the individual EHAs based on appropriate runoff factors, and then multiplies the EHA by an applicable water quality factor to determine the fee for that parcel.



For example, a developed nonresidential parcel like a parking lot on 0.5 acres (all impervious) has an EHA of 0.48, using a water quality factor of 1.0 for a developed property. The EHA is then multiplied by \$43.80 (the monthly stormwater rate per EHA) to reach a monthly bill of \$21.03 for this parcel. Flat rates are charged for residential parcels (four living units or less) based on three groups: .5 acres or less; .5 to 1 acre; 1 acre to 2 acres. City officials felt that distributing the burden of stormwater management among all landowners within the watershed would be the most equitable funding method.

The stormwater utility provides incentives of up to 50 percent reductions in utility fees to business and industry to manage stormwater. For example, if an existing facility develops storm water retention areas, the facility's utility fee will be reduced comparable to the reduction in stormwater runoff.

The funds generated by the utility help support the operation, maintenance, and construction of stormwater detention areas throughout the city.

Complementing the utility incentives, the Whetstone Creek Project provides partial funding and technical assistance for the installation of stormwater BMPs such as stormwater detention basins and grass waterways. Together the two projects achieve reductions in stormwater runoff quantity and address stormwater quality.

*[For more information, contact Richard Beasley, Whetstone Creek Project Manager, Marquette County Soil and Water Conservation District, 1055 Baraga Avenue, Marquette, MI 49855. Phone: (906) 226-9460]*

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## Georgia Adopt-A-Stream: Local Partnerships

All over Georgia, local governments, businesses, and volunteer organizations are working together to protect streams, rivers and lakes. Under the organizational umbrella of Georgia's Adopt-A-Stream program, partnerships are being formed to adopt community streams. Public utilities or other government agencies offer technical assistance, colleges provide training, and other groups organize volunteers.

Georgia Adopt-A-Stream advocates a unique approach to citizen involvement in the protection of streams, rivers, and lakes. Since its beginning in the Environmental Protection Division in April 1993, this program has enrolled approximately 2,300 volunteers in Adopt-A-Stream activities. It focuses on forming local partnerships to promote local solutions to water quality protection. Georgia Adopt-A-Stream offers coordination between groups, training materials and workshops, and guidance on starting new programs.

Interested parties meet to set goals, choose streams and sites, and organize the training and volunteer support work. Volunteers are recruited, water quality monitoring and watershed evaluation begins, and reports are filed with the appropriate local or state agencies. Volunteers report the problems and trends they discover to those who have the jurisdiction and power to respond.

### *Gainesville/Hall County*

In Hall County, representatives from the City of Gainesville, Gainesville College, Hall Clean Council, and interested volunteers met to plan the Hall County Adopt-A-Stream program. The group plans to monitor 30 miles on three streams that feed into Lake Sidney Lanier, the drinking water supply for the city of Atlanta. Its basic program consists of one watershed evaluation per year, six each of visual surveys and clean-ups, and one community outreach. The county's three streams have been laid out in segments available for adoption by volunteers.

Hall Clean Council will coordinate the overall program. Gainesville College and Gainesville Public Utilities will offer training workshops and technical advice.

### *City of Alpharetta*

A network of water quality stations was set up in the City of Alpharetta. The city's Clean and Beautiful Commission recruited and managed volunteers and held training workshops to teach water quality testing techniques. Volunteers report erosion, dumping, and sewer line leaks to Alpharetta Environmental Services.

Many Clean and Beautiful Commissions across the country began with a concern about solid waste issues and recycling and the slogan, "Keep America Beautiful." They have since moved into support and recognition for water quality issues.

### Gwinnet County

Over the past two years 1,600 volunteers in Gwinnet County Adopt-A Stream have focused on litter pick-up flotillas on sections of the Yellow River. Gwinnet Public Utilities drops off and picks up boats for volunteers and serves a lunch at the completion of the float trips. Among assorted tires and other trash, these volunteers once picked up a Volkswagen and, on another occasion, a kitchen sink.

### Columbus

Three elementary schools and one middle school have developed a joint project to monitor and clean up several tributaries of the Chattahoochee River in Columbus. Students evaluate water quality using biological, visual, and chemical tests. The students have a "River Kids" journal where they record their results as well as thoughts and stories about their adopted stream. Students also draw pictures of aquatic insects in preparation for sampling. All four schools will communicate about the project via the America Online computer network. Teachers received training in water quality evaluation from Georgia Adopt-A-Stream.

Five regional training centers will be established this year to train volunteers, partners, and trainers. Centers will be located at colleges around the state.

[For more information contact Laurie Hawks, Georgia Adopt-A-stream coordinator, Environmental Protection Division, 7 MLK Dr. SW, Ste. 643, Atlanta, GA 30334. Phone: (404) 656-4988.]

A joint study between Georgia Adopt-A-Stream and the United States Geological Survey is being conducted to evaluate the quality of volunteer monitoring. Four teams of volunteers are conducting biological assessments of streams in metro Atlanta. USGS is providing training and equipment for volunteers, while Georgia Adopt-A-Stream is coordinating volunteers, logistics, and data management. The USGS and volunteers will monitor the same stream sites; however, the volunteers will collect data more frequently than the professionals (every two months, compared to annually). The two sets of data will be compared and submitted to the National Association of Water Quality Administrators, Georgia Adopt-A-Stream, and participating volunteers.

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## Three-Way Partnership Trains Contractors in Innovative Septic Systems Installation

April heralds the reopening of New England's only formal training center for innovative septic systems. In its debut last fall, the University of Rhode Island and the state Department of Environmental Management's unique demonstration and training facility graduated 100 people.

The training facility, which serves contractors, designers, and installers of septic systems, and municipal, state, and federal regulators, is supported by a 319 grant to DEM and by labor and products from the septic system industry. Classes are taught primarily by staff from the University's Department of Natural Resources Science Cooperative Extension Program.

Septic systems are an important source of surface and groundwater contamination in the state. Thirty-seven percent of Rhode Islanders depend on septic systems for treatment of household wastes, and 12 of Rhode Island's communities are completely unsewered. Greenwich Bay, one of the state's richest shellfishing areas, is frequently closed to shellfishing, as are more than 1,200 other acres of Rhode Island's salt ponds, tidal rivers, and bays, partly because of failed septic systems. Some of these areas also show signs of nutrient enrichment.

Michael Annarummo, director of DEM, explained that the new technologies are most useful in critical areas like those with poor soils or near sensitive waterbodies because they treat the wastewater more effectively than traditional septic systems. Denitrification systems, for instance, can reduce nitrogen loads by 50 to 70 percent. Excess nitrogen creates algal blooms and decreases the dissolved oxygen in coastal ponds.

"A conventional septic system works fine if the soil is permeable and the water table is low. . . . But as development takes place on more sensitive sites, we need to investigate new

technologies. We are seeing more and more marginal lots where a traditional system would not work well," Annarummo added.

"Training designers and installers is critical to the implementation of new and innovative technologies in Rhode Island," Annarummo said. He explained that the new systems are more complex to construct and need more careful controls during installation. "We are sensitive to the need for innovative systems. But training and monitoring are critical, as is defining the criteria for such systems in our regulations."

The University's training facility showcases a number of working septic systems that are built above ground to show how the systems work. They include pressure-dosed, sand filtration, extended aeration, and denitrification systems.

The project, coordinated by George Loomis, a research soil scientist at the University, is expecting each of this year's classes to accommodate about 50 people. The courses will range from half-day sessions aimed at homeowners and realtors to two-day sessions for septic system designers and installers. The state is currently updating its septic systems regulation, which may require installers of innovative septic systems to be certified through the training facility.

*[For more information, contact George Loomis, Department of Natural Resources Science, Woodward Hall, University of Rhode Island, Kingston, RI 02881. Phone: (401) 792-4558.]*

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## *Partnership Successfully Reduces Nonpoint Source Pollution in the Navesink River*

For the first time in 25 years, it seems likely that the shellfish growing waters of the Navesink River will soon be upgraded to the rank of "seasonally approved." Further, if BMPs are properly strengthened, totally unrestricted shellfish harvesting could return to the area.

These recommendations issue from New Jersey's Navesink River Nonpoint Source Shellfish Protection Program, a partnership between federal, state, county, municipal and private institutions, and local citizens that began more than 10 years ago. Initial funding allocations to support the partnership came from the U.S. Environmental Protection Agency and the USDA's Soil Conservation Service (now the NRCS).

This Navesink River partnership accomplishes more than mutual understanding and cooperation. It also demonstrates, to New Jersey and to other states, that such partnerships are ultimately the way that nonpoint source pollution can be controlled.

New Jersey, like many other states, recognizes a broad spectrum of problems contributing to nonpoint pollution, including urban and suburban development, agriculture, and industrial land uses. The Navesink River partnership is a key element in the state's response to the Clean Water Act. The Clean Water Act requires each state to prepare a water quality management plan to

- identify impaired waters and the nonpoint sources contributing to them;
- set up guidelines for pollution control in these waters;
- identify responsible agencies to administer the controls; and
- implement regulatory mechanisms as necessary.

For its part in this effort, the Navesink River partnership set out to reduce bacterial contamination in the Navesink's shellfish harvesting waters. It also undertook land and water treatment measures to improve agricultural productivity and mitigate nutrient and sediment loading to Monmouth County's major water supply, the Swimming Water Reservoir.

### *Making the Partnership Work*

The first order of business was to discover how to reverse the trend classifying all shellfish-growing waters "condemned for direct harvest and marketing of clams, mussels and oysters." Watershed surveys monitored the tributary and shellfish waters under varying conditions and evaluated such nonpoint sources as septic system overflows, illegal storm sewer connections, boat and marina densities, and livestock concentrations. Local health agencies were contacted to assess these sources and to help with monitoring, and the Freehold Soil Conservation District, the local agency in charge of coordinating nonpoint source agricultural pollution prevention in the watershed, was also consulted.

Letters endorsing the project's goals were collected from 15 agencies — state, county, municipal and private institutions representing environmental, health, and agricultural interests in the watershed. Individual meetings with each agency were followed by joint meetings to define strategy and iron out conflicts. The partnership initially faced problems common to all attempts to control nonpoint source pollution. Namely, some local agencies did not want to get involved with a program that might lead to regulatory action; and each group — whether its interest was boating, agriculture, or urban — believed the other groups to be more at fault. By meeting these problems head-on, a coalition was formed that eventually accepted a common goal.

Finally, in 1986, a memorandum of understanding was signed by the New Jersey Departments of Environmental Protection and Agriculture, the U.S. EPA, and USDA Natural Resources Conservation Service. The understanding formalized the agencies' mutual commitment to the Navesink River Water Pollution Shellfish Protection Program.

### *Coordinating the Effort*

Partnerships that work usually designate a coordinating agency to take the lead in promoting and maintaining open communication between all parties. In the Navesink case, the lead agency

- articulates the common objective,
- divides the objective into manageable, specific tasks,
- determines who is responsible for each task,
- sets priorities, and
- tracks accomplishments.

Similarly, it falls to the coordinating agency to foster and maintain the project's priority in the eyes of all interested parties. Consequently, informing and educating people are important. The Navesink partnership cultivates press coverage, places articles in industry newsletters, holds water quality workshops, and distributes project symbols: for example, the Navesink logo, "Think Navesink" pencils, and a 30-minute documentary video, "Navesink — the Restoration of a River," funded by EPA.

Using the USDA's and other agencies' technical assistance, the partnership recognized early on that identifying the problem and controlling it were two sides of the same coin. Technical assistance also encouraged the use of structural and nonstructural BMPs, and necessitated keeping the governor's office and key members of the New Jersey congressional delegation up to speed on the project. Eventually, a \$1.2 million appropriation was made to NRCS to cost-share soil and water conservation practices in the Navesink watershed.

### *Accomplishing the Goal*

Sources familiar with the program note that the Navesink partnership has achieved or helped to achieve significant water quality improvement — some of the improvements being also the result of long-term farmer cooperation and improved farmland management practices throughout the watershed.

The partnership continues to be vigilant. New developments are subject to tougher rules, especially along the shoreline, and the partnership continues to investigate the feasibility of having "shellfish protection areas" in which consumer products, user fees, or licenses might be applied to certain activities to help raise money to fund nonpoint source pollution controls. The Navesink itself has recently been designated a "Special Water Area" in New Jersey coastal zone management regulations.

The partnership has learned important lessons: we have learned that nonpoint source programs need to be flexible, innovative, and developed on a site-specific basis. To gain institutional and financial support, the program must be created by the very parties that will play an integral role in resource management. The Navesink River Program is an exemplary partnership.

*[For more information, contact Robert Scro, New Jersey Department of Environmental Protection, Marine Water Classification and Analysis, P.O. Box 405, Stoney Hill Road, Leeds Point, NJ 08220. Phone: (609) 748-2000; FAX: (609) 748-2014. For a more detailed and technical review of this project, see Robert Scro and George Horzempa, "Control of Nonpoint Source Pollution in the Navesink River," in Land and Water (July/August 1994.)*

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## **Notes on Environmental Education (and having fun at the same time)**

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### *W.A.T.E.R.SHED Education In California (Watershed Applied Training, Education and Restoration)*

**EDITOR'S NOTE:** See *News-Notes* Issue #29, May 1993, for an article about the beginning of the Adopt-A-Watershed Program. An article on AmeriCorps was published in *News-Notes*, #37, July/August.

Helped by an AmeriCorps grant of \$1.4 million administered by the California Conservation Corps, 12 California counties are working cooperatively with the successful Adopt-a-Watershed program to initiate a variety of water quality protection projects in their schools.

Known collectively as the Watershed Applied Training, Education and Restoration project — or the W.A.T.E.R.SHED Project — these communities are applying or adapting the principles of Adopt-a-Watershed to schools and problems in their area. Although the problems and the participating partners vary in each county, each county designs its program on the same learning process. Adopt-a-Watershed involves students in studying — and remediating — the same stream segment throughout their school years.

Whether they are studying erosion control, field testing urban units, or studying the cultural resources in their watershed, K-12 students gain new concepts, maintain earlier field studies, engage in actual restoration projects, and engage in discussion groups to articulate and share their findings. (Younger students share their involvement with their parents; older students may address community groups.)

Among the California counties included in this year's grant are Trinity, San Diego, Mendocino, and Napa. A selection of each of these counties' unique projects illustrates the success of this program.

#### *Trinity County*

In Trinity County, seven AmeriCorps site coordinators and a regional coordinator are working to implement the Adopt-A-Watershed program throughout the county. Members help teachers facilitate and coordinate the Adopt-A-Watershed curriculum. They work as liaisons between the schools, resource people, and communities. These AmeriCorps members have helped establish some advisory committees who focus their efforts on educational and watershed needs of the community.

One example of a current Adopt-A-Watershed activity in Trinity County is the long-term soil erosion study at Cox Bar Elementary School. The school, with its community volunteers, is using the Adopt-a-Watershed unit, "Significance of Soils." The study includes distinguishing soil textures, understanding soil layers, and restoring erodible areas. The data are collected and shared with other classes by means of an electronic network that enables the comparison of data over time and between different areas.

In measuring and mapping their soils, students and adults become aware of their interdependence with the natural world so they may become "good stewards of the land." Fifty different watershed experiences have been planned for the Trinity County students thus far.

#### *San Diego*

The Daedalus Foundation is the San Diego regional coordinator and facilitator of the W.A.T.E.R.SHED project. There, pilot testing is being done on Adopt-A-Watershed curriculum units adapted to the urban community. The program was designed around the SuperSEED Teacher Training Institute, (a teacher training program sponsored by the Daedalus Alliance for Environmental Education) and the San Diego State University Master's program. Educators in these programs have been involved in curriculum research, development and field testing of the Adopt-a-Watershed urban units as part of these programs.

Daedalus Director Merle O'Neill says, "We believe everything is in place to produce the nation's most outstanding teacher-training program and environmental science curriculum." O'Neill reports two examples of special accomplishments within the urban Adopt-A Watershed program.

Don Hohimer teaches at San Diego's El Cahon Middle School. His classroom of severely emotionally disturbed children initiated a restoration project on a greenbelt area adjacent to a street widening. The class cleared the area and planned 102 tree plantings in this area. The Mayor and a councilman attended the planting session on December 9, 1994.

The school's psychiatrist commented that these students ordinarily find it difficult to learn and rarely have an opportunity to contribute to the community. "This program, he added, "with its new way of delivering education that works for these kids and provides community benefits, has added to the motivation and esteem of this class."

O'Neill's second example — Karen Madsen of the Keiller Middle School — teaches approximately 100 seventh graders per day and reports that this age group often does not want to do anything. With the help of Doug Ruth of the County Parks Department, Karen located a nearby urban creek to adopt. Now her classes are very enthusiastic and can hardly wait to go to work on their project. She further reports that an autistic child in her class has begun to communicate and has even stood close to her and touched her. Under normal circumstances, this student is unable to be near other students.

### *Mendocino County*

Geographically isolated, the Round Valley area of Mendocino County has a population that is 60 percent Native American. The Site Coordinator, Mangus Gallegos, is working with John De Martini, a Humboldt State University professor of biology and authority on ethnobotany, to design some cultural resource programs. They are doing a demonstration project to grow native basket-making plants, and the tribal elders are putting together information for the use, medicinal and otherwise, of other traditional plants. The tribe will cultivate and maintain their plants and work with the agencies to ensure that the plants are not sprayed with pesticides.

### *Napa County*

Napa County Resource Conservation District has included the Adopt-A-Watershed curriculum in its educational program and receives AmeriCorps support for its implementation. However, the educational efforts in Napa are part of a much larger program called Teaching Resource Exchange, T-REX, for short. This unique program involves working with the watershed community as a whole on many projects and in many areas.

Two such projects include Trout 2000, a voluntary land stewardship association established by landowners to enhance salmonid habitat along one of the main tributaries of the Napa River. The second group consists of local grapegrowers who are seeking an environmentally sound method to manage Pierce's Disease, a bacterial infection of grapevines that spreads from riparian areas and threatens the existence of thousands of acres of vineyard in California. These projects provide an opportunity for the technical training of citizen volunteer monitors from the community.

The T-REX program also acts as a community switchboard. It helps increase communication between various levels of government, such as the County Planning Department and the U.S. Environmental Protection Agency. In short, it is a partnership of agricultural industry managers, government agency personnel, citizen interest groups, and local school students that is building a strong coalition within the community to protect and enhance watershed water quality. The long-term effects of this program will be significant in the reduction of nonpoint source pollution through increasing water quality awareness and protection activities in the community. The T-REX program constitutes a bridge between the private and public sectors of the community that will promote more effective and efficient watershed protection.

### *Conclusion*

The W.A.T.E.R.SHED project is well on its way. It is a model of what collaboration can do to get things done in a community.

If you are interested in getting the program started in your area, write Kathy Simpson, Adopt-a-Watershed, Trinity County RCD, P.O. 1414, Weaverville, CA 96093.

For more information about the T-REX program, contact Kathleen Edson, Napa County Resource Conservation District, 1303 Jefferson Street, Ste. 500B, Napa, CA 94559. Phone: (707) 252-4188.

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## *Hands on Save Our Streams: Izaak Walton*

Teachers and students of all subjects and grade levels have an exciting new tool to help them study America's vital surface and groundwater resources. Karen Firehock, program director of the Izaak Walton League's Save Our Streams Program, a 1-12 teacher's manual entitled *Hands On Save Our Streams*. The manual has been field tested for four years in urban, suburban, and rural schools in the District of Columbia and Virginia, and in two summer camps in West Virginia and Maryland.

John Hermesmeir, program director of the Environmental Education Center at Miller School near Charlottesville, Virginia, participated in the field testing at another private school near Charlottesville. His ninth graders were so inspired by the Save Our Streams program that they created and distributed a water education brochure for residents of their watershed and planned a stream monitoring workshop for the public.

The students conducted the workshop themselves by leading sessions on local sediment and erosion control regulations, techniques for mapping a watershed, and the use of kick-seines for collecting macroinvertebrates. They also developed working relationships throughout the school year with organizations, developers, and local officials.

This humble beginning in one classroom has now turned into a communitywide watershed project for the Environmental Education Center at Miller School. This past year, school teachers from the 31 subwatersheds that drain the Rivanna River through Charlottesville and Albemarle were trained in SOS, and many are using the new curriculum. By training teachers and outfitting schools with equipment, a network of watershed teams has been created that will be expanded to include neighborhood associations, civic groups, and other volunteers.

The program was also field tested for two years in Oyster Elementary, a bilingual school in Washington, D.C., by sixth-grade teacher, Gladys Bauder. She said, "It was a good learning experience, and the students were very enthusiastic." She gave high praise to the Izaak Walton League for their support. They sent experts to help with the program and busses to transport the children to Rock Creek in the District and to Prince William County, Virginia, for their monitoring experiences.

The first three chapters of *Hands On Save Our Streams* are centered around activities and field trips that are usable for students in grades 1-12. Chapter 4 has several suggestions for extension activities, and Chapter 5 is an urban case study. The teacher's guide contains a bibliography, a glossary, and appendixes that help with planning field trips, activities, and games. Also listed are names, addresses, and phone numbers of agencies and universities. The manual is designed as a living document that will be updated to reflect suggestions, comments, and new project ideas supplied by its users.

Program Director and Author Karen Firehock says, "Many students want to make a difference in protecting the environment. The SOS curriculum tells students how they can get involved in their own neighborhood and be successful stream savers."

"*Hands On Save Our Streams*" is a publication of the Izaak Walton League of America and is available in a binder for \$15. Send orders with checks made payable to IWLA/SOS to Hands On Save Our Streams, IWLA, 707 Conservation Lane, Gaithersburg, MD 20878-2983. Phone: (301) 548-0150.

[For more information, contact Karen Firehock at the IWLA address.]

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## *Watershed Watch — A program for middle schoolers*

For four years, more than a thousand middle school students in Lake County, Ohio, have been making lab models simulating watershed patterns and working in the field to learn watershed and stream concepts first hand. They are also learning to send and receive data, and to search for additional data on computer networks. They and their teachers are enthusiastic "Watershed Watchers."

*Watershed Watch*  
— A program for  
middle schoolers  
(continued)

The Lake County Soil and Water Conservation District developed Watershed Watch with funding from the Mastin Foundation of Lake County. District conservationists supervise the teachers who have taken special training. The program uses two county rivers and a marsh for the field studies, in which students learn to assess water and habitat quality, thereby enhancing their understanding and appreciation of these county resources as complex and valuable ecosystems.

Data are entered on OHIO NET, a state-wide computer network for math and science teachers. Software for the network is available to every school that has computer capabilities.

### *High Marks from Teachers*

Now in her fourth year of working with Watershed Watch for Middle Schoolers, Gayle Svets of the Phillips Osborne School says, "the program has become the underlying theme of my seventh grade science class." She "worked backward" into it, she says, to relate her entire science curriculum to the program while retaining the regular course of study.

Students are hooked in the fall when they use microscopes to examine microinvertebrates in samples of water they bring in. Then they collect and identify macroinvertebrates found in the stream. Such activities lead naturally to studies on the water cycle, groundwater, acid rain and pollution, chemical water quality testing, and life and earth sciences.

Carol Fleck of J.R. Williams Junior High School in Painesville, Ohio, says this is "the most dynamic, integrated program" she has seen in many years. Her school divides the program into three levels: overview and work on the river in seventh grade, geological aspects and habitat in eighth grade, and biology in the ninth. Fleck says, "Sharing information with other schools on a computer network is an ongoing thread that integrates technology into the classroom."

Dick Swackhamer and Greg Clark, teachers at the Madison Middle School, take a group of seventh grade life science students to the Grand River in Lake County Metro Park twice a year. Their students describe the physical characteristics of the river—rocks, composition of the bed, shape, rate of flow, depth, width, and temperature of the water, and they collect macroinvertebrates using kick-nets. People from the Lake County Soil and Water Conservation District help them identify the organisms they find.

Swackhamer hopes "to light a little fire" under his students. He feels "it gives the kids a tremendous appreciation for the hidden world of nature and for what life scientists do."

February brings the annual Winter Riverfest, when students in the program gather to hear experts speak on water-related topics and to participate in hands-on learning sessions. For example, an art teacher may show students how to make Japanese fishprints (students make a colored imprint of a real fish—a little like doing a brass rubbing), and another teacher may teach fly-tying or geology. The history of Northeastern Ohio Indians is also a popular topic. The students are challenged to imagine the original use of artifacts that are displayed at the fest.

In May, students monitor their streams and send data to the Lake County Soil and Water Conservation District. They attend a student River Congress, where classes put their data together to develop a report that is sent to anyone who might be interested, such as local officials or members of Congress. At times, student reports have been used in zoning hearings or published in the local paper. Remedial action is often taken.

In working on the river, students found previously unknown point and nonpoint sources of pollution. They notified the Ohio Environmental Protection Agency, and the pollution was investigated.

Students are currently concerned that environmental degradation may result if a proposed bridge is built over the Grand River. They are writing letters to those involved in the planning.

Fleck stated that teachers make a point to students that they are only observers, not advocates for any group. Students are taught to report only what they see—they represent no one but themselves.

*[For more information contact John Niedzialek, Lake County Soil & Water Conservation District, 125 E. Erie Street, Painesville, OH 44077. Phone: 1 (800) 899-LAKE.]*



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## New Program for Young People Gives Water a Hand

A new national 4-H program is promoting local environmental stewardship among youth. Developed by the University of Wisconsin—Cooperative Extension, "Give Water a Hand" guidebooks have been distributed across the country to scouts, classes, 4-H chapters, and other youth groups. The guidebooks help groups identify local water quality and conservation issues. In partnership with local natural resource experts, they then evaluate their findings and develop a service project.

After learning about water quality problems associated with farming, one Georgia class chose to study agricultural BMPs in the community. Using the farm/ranch guidebook, they visited three farms that used BMPs, sampling wells and surface waters. Testing revealed that the farms' water quality was within acceptable limits. Not content to stop there, however, the class then proceeded to publicize their findings to the community.

Other youth groups are doing Give Water a Hand Projects using one of the other site action guidebooks for home, school, or community.

[For more information, contact Kadi Row, University of Wisconsin—Cooperative Extension, Environmental Resources Center, 1450 Linden Dr., Rm 216, Madison, WI 53706. Phone: 1 (800) WATER20. To obtain copies of the the leader guidebook and the site action guidebooks, contact your county Cooperative Extension office.]

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## NPS Electronic Bulletin Board News

This portion of *News-Notes* is prepared for the benefit of the ever-increasing number of *News-Notes* readers who are regular users of U.S. EPA's *NPS BBS*.

**Nonpoint Source Electronic Bulletin Board System.** EPA's *NPS BBS*, through the user's personal computer, provides timely, relevant NPS information; a nationwide forum for open discussion; and the ability to exchange computer text and program files. Specific Issue Groups (SIGs or mini-bulletin boards) are dedicated to specific topics. Currently, there are eight SIGs on the *NPS BBS*: Watershed Restoration, Agriculture, Fish Consumption Risk Management, TMDLs, Waterbody System Support, NPS Research, Volunteer Monitoring, and Coastal NPS Control. All articles from all issues of *News-Notes* are stored on the *NPS BBS* and may be retrieved on your personal computer. A searchable *News-Notes* database helps you find the information you need.

To access the *NPS BBS*, you will need • A PC or terminal • Telecommunications software (such as Crosstalk or ProComm) • A modem (1200, 2400 or 9600 baud) • A phone line. The *NPS BBS* phone number is (301) 589-0205. Parameters are N-8-1.

The *NPS BBS* may also be accessed from the Internet by typing TELNET FEDWORLD.GOV. Once on FedWorld, turn ANSI graphics off and go through the Gateway to NPS-BBS, or command D 79.

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## NPS BBS Undergoes Makeover

The *NPS BBS* has a new user-friendly look.

### New Menus

The *BBS* now has new menus that explain the basic functions of the *NPS BBS* in more detail with less jargon. Also included are some new submenus to help users with some of the more flexible functions of the system. For example, users will now see a submenu that allows them to read messages in a variety of ways, such as "all new messages" and "most recent messages first." (As users become familiar with the subcommands, they will be able to use them with the primary command from the main command line.)

### Files and Bulletins Divided by Topic

A few months ago, the *BBS* was reorganized and its downloadable files on the Main Board were put into a number of libraries for easier access. Now the bulletins on the Main Board can also be sorted by topic. A new command, <BU>, will display the list of Bulletin Topic Areas.

NPS BBS  
Undergoes  
Makeover  
(continued)

### *Brief Help Screens Displayed Automatically*

Since many users are relatively new to computing and/or BBS's, more automatic instruction screens now guide users through uploading, downloading, entering messages, reading messages, and searching for specific files, bulletins, and messages.

### *Take the New Features for a Test-drive*

Veteran users should turn off "Expert Mode" (by typing <X> at a Command? prompt) for at least one on-line session to see the types of help now available during routine functions. (Type <X> again to return to Expert Mode.)

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## **Reviews and Announcements**

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### *United States Geological Survey Posters*

School is more exciting than it used to be with educational posters developed by the United States Geological Survey in the classroom.

Every inch of these colorful cartoon format landscapes is used to show the many aspects of water. Scenes vary from coastal estuaries, wetlands, mountains, deserts, and the arctic to towns, industry, recreation, and agriculture. In every case the use or pollution of water is shown. Objects and activities are named on the poster, but the art work so clearly depicts the scene a person can easily understand the flow of water and the uses being made of it.

Printed on high quality, glossy paper the nine posters in the series are designed to be viewed separately or (given sufficient wall space!) all together as one giant mural. Each poster is 35 x 22 inches. Five in the series of nine proposed posters are available at this time.

Each poster is printed in two editions, one for grade and the other for middle school use. The fronts, or picture sides, of the two editions are identical, but the back of each poster outlines classroom activities suitable for the designated level. Activities are demonstrations of a concept illustrated on the poster, such as erosion on a bare field compared with erosion on a field covered with vegetation, or the recharge and discharge of ground water. Background information and definitions also appear on the back of each poster.

Some posters are available in black and white for coloring; others are written in Spanish.

*[A limited supply of color or black-and-white copies can be obtained at no cost from the U.S. Geological Survey, Mail Stop 306, Box 25286, Denver Federal Center, Denver, CO 80225. Phone: (303) 236-7477.]*

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### *Meeting the Challenge*

Meeting the Challenge: The Legacy of the National Forum on Nonpoint Source Pollution is the theme for this year's meeting of the National Nonpoint Source Federation, June 7-9, 1995, at the Doubletree Hotel, Arlington, Virginia.

"We chose this theme to capture the Forum's momentum," explains Charlie Grizzle, executive director of NNPSF, and "members of the Forum's three working groups — Education, Economic Incentives, and Voluntary Incentives — are among those expected to participate."

The National Forum was convened by the National Geographic Society and the Conservation Fund to address voluntary, nonregulatory approaches for solving nonpoint source pollution. Its final report and recommendations will be released shortly before the conference.

Pat Noonan of the Conservation Fund and Mark Suwyn, executive vice president of the Forum and member of the NNPSF Advisory Board, have accepted the NNPSF's invitation to speak at the conference. Invitations to speak have also been extended to Michigan Governor John Engler, co-chair of the Forum; to EPA Administrator Carol Browner; Senate Environment and Public Works Chairman John Chafee; and House Agriculture Chairman Pat Roberts. Conference registration is \$195 for NNPSF members (\$245 after May 1) and \$295 for nonmembers (\$345 after May 1). You may mail your reservation to the NNPSF or register electronically on E2B2: (913) 897-1040.

*[For more information, contact Charlie Grizzle at the National Nonpoint Source Federation, P.O. Box 25, 1400 16th Street NW, Washington, DC 20036. Phone: (202) 797-7720; FAX: (202) 234-1614.]*

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## *Water Quality: Prevention, Identification, and Management of Diffuse Pollution — A Book Review*

by Jim Fraser, Technology and Management Services, Inc., Gaithersburg, Maryland.

Written by Vladimir Novotny and Harvey Olem, *Water Quality: Prevention, Identification, and Management of Diffuse Pollution* (New York: Van Nostrand Reinhold, 1994) is a very large tome — it looks at first glance like “everything you ever wanted to know” on all aspects of nonpoint source water pollution and its potential control and abatement.

The book is written at a technical level geared for environmental science and engineering graduate students or practicing professionals. It reads more like a course textbook than a field handbook in that it contains numerous case studies and practical methodologies that can be applied to nonpoint source pollution problems. Numerous photographs and schematic figures appear throughout the book to help the reader understand various methodologies, issues, and problems.

Many of these pollution control and abatement methodologies focus on environmental solutions that look for a balance between the engineering aspects of pollution control and the desire to maintain the surrounding ecology and environment. This balance suggests the plausibility of a philosophy based on the sustainability of water resources. That is, the environment can absorb some minimal amount of pollution without adverse impact, and cost-effective pollution control and abatement projects do not necessarily require zero pollution discharge.

The text begins with an excellent historical review of the trends in nonpoint source pollution, followed by authoritative chapters on laws and regulations affecting water pollution abatement, hydrologic considerations, atmospheric deposition, erosion and sedimentation, pollutant interaction with soils and sediments, groundwater pollution, urban and highway runoff pollution, toxic pollution, and receiving water impacts. Although most of this information can be found in other guidance and lake restoration manuals and general ecology textbooks, it is compiled here in a fairly concise and logical fashion.

From the viewpoint of a practicing environmental scientist, I thought the chapters on modeling and monitoring diffuse pollution, control of urban nonpoint source pollution, agricultural issues, and construction and function of wetlands provided worthwhile information that could easily be transferred to real world situations. The chapter on modeling provided a very good overview of the types of models available, their usefulness and reliability, and how to apply the different models based on the available data and one's overall objectives.

A very effective description of urban pollution-control measures is provided in the chapter entitled “Control of Urban Diffuse Pollution.” The authors discuss on-site land pollution-control measures, hydrologic modification and land management, reducing the delivery of pollutants in the collection (drainage) system, and end-of-pipe storage and treatment. The chapter on Agricultural Issues contains the usual plethora of information on various Best Management Practices (BMPs), but also a very informative 11-page table — a summary of programs in the United States that can be used to control agricultural nonpoint sources. The chapter on wetlands provides excellent reference material on the types of wetlands; wetland functions, including wastewater inputs and nutrient and other pollutant removal efficiencies; and the design and construction of artificial wetlands.

In sum, this book is an excellent overview of the topic of nonpoint source (diffuse) pollution and available control, abatement, and remediation techniques currently in use. It provides a one-step reference book on the subject and will be helpful to the emerging graduate environmental engineer/scientist or involved professional in dealing with the difficult issue of diffuse pollution.

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### *Recent EPA Publications of Note*

- *A Tribal Guide to the Section 319 (h) Nonpoint Source Grant Program* (EPA #841-S-94-003) 268 pages.

A guide to help tribes develop nonpoint source pollution control programs and apply to EPA for nonpoint source pollution control grants under section 319 of the Clean Water Act. Includes a compilation of existing guidances.

■ *Section 319 Success Stories: A Close Up Look at the National Nonpoint Source Control Program* (EPA 841-S-94-004) 128 pages.

A national report on the successful implementation of EPA's Nonpoint Source Program. All states, three tribes, and three territories are represented by at least one successful nonpoint source project. The projects described range from information and educational programs to highly technical applications of nonpoint source control technology. Almost all of the projects described have had measurable water quality improvements.

■ *Evaluating the Effectiveness of Forestry Best Management Practices in Meeting Water Quality Goals or Standards* (EPA 841-B-94-005) 166 pages.

This publication is intended as a reference for evaluating the effectiveness of nonpoint source pollution controls during forestry activities. Four levels of effectiveness monitoring are included. A selection of existing techniques are presented to assist managers in choosing an appropriate level of monitoring.

[Order (include EPA publication number, please) from NCEPI, 26 Martin Luther King Dr., MS-291, Cincinnati, OH 45268, or FAX: (513) 569-7186.]

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## EPA Solicits Nominations for 1995 Hal Wise Award

EPA's Office of Wetlands, Oceans and Watersheds is now accepting nominations for the 1995 Hal Wise Award. Established in 1994, the award is presented annually to recognize an individual or team that has demonstrated exceptional leadership in promoting the control of nonpoint source pollution or the ecological management and restoration of watersheds. Last year, the award was posthumously presented to Hal Wise for his many accomplishments, including his ground-breaking editorship of *Nonpoint Source News-Notes*.

Individuals or teams may receive the award for a variety of activities, such as establishing or implementing effective education programs for use in schools, developing and leading successful watershed programs or projects, creating new techniques that have widespread applications, furthering scientific understanding of key issues, effectively using print or audiovisual media, or having a long history of activities promoting the control of nonpoint source pollution or the ecological management and restoration of watersheds or both.

Any individual or team is eligible for nomination regardless of the economic or political sector in which the nominee has chosen to work.

Nominations for the 1995 award should be submitted by June 1, 1995, to HAL WISE AWARD, c/o Nonpoint Source Control Branch (4503 F), U.S. EPA, 401 M St., SW, Washington, DC 20460. Nominations should be accompanied by a description, no longer than two pages, of the basis for the nomination. All nominations will then be reviewed and selected by a team of reviewers drawn from both the public and the private sector.

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## Datebook

DATEBOOK is compiled with the cooperation of our readers. If you would like a meeting or event placed in the DATEBOOK, contact the *NPS NEWS-NOTES* editors. Because of an irregular printing schedule, notices should be in our hands at least two months in advance to ensure timely publication. A more complete listing can be found on the *NPS BBS*.

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## Meetings and Events

1995

April

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*Toxic Substances in Water Environments: Assessment and Control*, Cincinnati, OH. Contact: Nancy Blatt, Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994. (703) 684-2400. FAX: 684-2492.

18-20

*Watershed Success in Region 6*, New Orleans, LA. Contact: Watershed Success in Region 6, c/o Terrene Institute, 1717 K Street, NW, Suite 801, Washington, DC 20006. (202) 833-8317. FAX: 296-4071.

**1995**  
**APRIL**

Sponsored by U.S. EPA Region 6, Terrene Institute, the Lower Colorado River Authority, and the Lake Pontchartrain Basin Foundation. Designed for stakeholders involved in watershed protection efforts including local, state, and federal agencies, and tribes.

- 23-26 *Wetlands '95 National Symposium: Watershed Management and Wetland Ecosystems—Implementing Fair, Flexible, and Effective Approaches*, Tampa, FL. Contact: Association of State Wetland Managers, P.O. Box 269, Berne, NY 12023-9746. (518) 872-1804. FAX: 872-2171. Annual meeting of the Association of State Wetland Managers. Goals will be to promote the management of wetlands in a watershed context and the integration of wetlands and other aquatic ecosystem management into broader watershed management efforts including floodplain management, stormwater management, water supply, water quality protection, and recreation.
- 23-26 *Water in the 21st Century: Conservation, Demand, & Supply—American Water Resources Association Spring Symposium*, Salt Lake City, UT. Contact: AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192. (301) 493-8600. FAX: 493-5844.
- 26-28 *Enhancing the States' Lake Management Programs*, Chicago, IL. Contact: Bob Kirschner, Northeastern Illinois Planning Commission, Natural Resources Department, 222 Riverside Plaza, Suite 1800, Chicago, IL 60606. (312) 454-0401, ext. 303. FAX: 454-0411.

**May**

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- 3-4 *18th Annual Conference on the Analysis of Pollutants in the Environment*, Norfolk, VA. Contact: Nancy Blatt, Dave Trouba, Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994. (703) 684-2400. FAX: 684-2492. Sponsored jointly by U.S. EPA and WEF. Conference will feature discussions on a wide range of environmental analytical techniques and related regulatory issues.
- 14-18 *Water Resources at Risk—1995 Annual Meeting of the American Institute of Hydrology*, Denver, CO. Contact: Helen Klose, AIH, 3416 University Ave., SE, Minneapolis, MN 55414. (612) 379-1030. FAX: 379-0169.
- 17-19 *7th Symposium on Artificial Recharge of Groundwater: The Role of Recharge in Integrated Water Management*, Scottsdale, AZ. Contact: Water Resources Research Cntr., University of Arizona, 350 N. Campbell Ave., Tucson, AZ 85719. (602) 792-9591. FAX: 792-8518.
- 20 *Managing Forest Ecosystems: Assessing New Opportunities*, a satellite video-conference with downlink sites across the nation. Contact: Dr. Steven Anderson, Oklahoma State University, Forestry Department, 239 Agriculture Hall, Stillwater, OK 74078. (405) 744-9431. FAX: 744-9693. Participants will be able to ask questions of a studio panel of experts and receive immediate answers. The broadcast is targeted to nonindustrial private forest landowners and natural resource managers in all fields. Topics will include ecosystem management; biodiversity; forest health; sustainability; implications for private forests; showcase examples of cross-ownership management; and suggestions for individual landowners.
- 21-24 *Opening the Toolbox: Strategies for Successful Watershed Management*, Charleston, WV. Contact: National Watershed Coalition, 9150 W. Jewell Ave., Suite 102, Lakewood, CO 80232. (303) 988-1810. Fourth annual watershed conference sponsored by the National Watershed Coalition. Conference will provide information on various watershed and ecosystem planning programs to help you with your own watershed work.

**June**

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- 4-10 *Solutions '95: A Congress & Exposition on Managing the Effects of Man's Activities on Groundwater*, Edmonton, Alberta. Contact: Allen Kerr (403) 429-1472.
- 7-9 *Meeting the Challenge: The Legacy of the National Forum on Nonpoint Source Pollution*, Arlington, VA. Contact: National NPS Federation, 1400 16th St., NW, Box 25, Washington, DC 20036. (202) 797-7720. FAX: 234-1614. The annual conference of the National Nonpoint Source Federation. Cosponsored by U.S. EPA and USDA Conservation Service.
- 25-28 *Water Resources and Environmental Hazards: Emphasis on Hydrologic and Cultural Insight in the Pacific Rim—American Water Resources Association 1995 Annual Summer Symposium*, Honolulu, HI. Contact: Raymond Herrmann, National Biological Survey, Colorado State University, Fort Collins, CO 80523. (303) 491-7825.

**1995**

**July**

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- 16-19 *Interdisciplinary Conference on Animal Waste and the Land-Water Interface*, Fayetteville, AR. Contact: Patti Snodgrass, Arkansas Water Resource Center, 113 Ozark Hall, University of Arkansas, Fayetteville, AR 72701. (501) 575-4403. FAX: 575-3846.
- 17-22 *Coastal Zone 95-Spotlight on Solutions*, Tampa, FL. Contact: Billy Edge, CZ 95 Program Committee, Ocean Engineering Program, Civil Engineering Department, Texas A&M University, College Station, TX 77843-3136.

**August**

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- 14-18 *Second International Conference on Diffuse Pollution*, Brno and Prague, Czech Republic. Contact: Dr. Vladimir Novotny, Marquette University, 1515 West Wisconsin Ave., Milwaukee, WI 53233. USA. (414) 241-8832. FAX: 241-5066. Outside the U.S. and Canada, contact: Ing Vladimir Chour, HYDROPROJEKT, Taborska 31, 140 43 Praha 4, Czech Republic. Fax: 42 2-6121 5191. The conference will provide a forum for an East-West and North-South dialogue and exchange.
- 30—9/1 *16th Annual Utah Nonpoint Source Water Quality Conference*, Cedar City, UT. Contact: Dean Maxwell, Jack Wilbur, (801) 572-9315 or (801) 538-7098.

**September**

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- 10-20 *Karst Waters & Environmental Impacts*, Antalya, Turkey. Contact: A. Ivan Johnson, Karst Symposium '95 Co-Chair, A. Ivan Johnson, Inc., 7474 Upham Court, Arvada, CO 80003.
- 18-20 *Third Thematic Conference on Remote Sensing for Marine and Coastal Environments*, Seattle, WA. Contact: Wendy Raeder, ERIM, P.O. Box 134001, Ann Arbor, MI 48113-4001. (313) 994-1200. FAX: 994-5123. E-Mail Address: raeder@vaxc.erim.org.
- 18-20 *Versatility of Wetlands in the Agricultural Landscape*, Tampa, FL. Contact: Kerry L. Curtis, Manager of Customer Services, Am. Water Resources Assoc., 950 Herndon Parkway, Suite 300, Herndon, VA 22070-5528. (703) 904-1225. FAX: 904-1228. Sponsored jointly by AWRA and ASAE.

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*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.

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