



## 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

## Commentary

### Trade Offs

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

A recent symposium in Chicago on ecological restoration (see pages 7-8 for some highlights of the symposium) was preceded by a workshop on urban watershed management. Nancy Phillips, of U.S. EPA Region 5, led participants through a hands-on experience analyzing the data on a specific watershed and arriving at a group decision on recommendations to restore and protect its various natural resources from urban development. Tom Schueler of the Center for Watershed Protection presented lessons learned from recent urban watershed studies that raise serious questions about our current approaches.

Watersheds or catchments with as little as 15 percent impervious surfaces can render our current BMPs ineffective in protecting water quality in those segments of the stream. These segments will not, in most cases, meet water quality standards. This vexing issue indicates the contradiction between our increasing desire for sprawl (e.g., our own home on an acre of land) versus a need for greater concentration of residential areas and malls. This conflict must be addressed if we are to meet our water quality goals. Part of this issue is our current over-design

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All issues of *News-Notes* are stored in downloadable files on the *NPS Electronic Bulletin Board System*. Additionally, the *NPS BBS* contains a searchable database that allows the user to search for and retrieve *News-Notes* articles on specific topics. To access the database from the main menu, type OPEN. See page 31 for log-on information.

of highways, streets, and parking areas for the convenience of drivers. We need new approaches and designs, but, in the meantime, we must look at our choices and be clear about our values.

Will members of the public be willing to sacrifice some of their convenience to accept narrower streets, or to queue up at stop signs and smaller parking lots in order to have aesthetic, higher quality streams running through their neighborhoods — streams that have a better chance to meet water quality standards? These choices are not likely to be popular subjects at future town meetings, but they are at the heart of urban ecological restoration.

We can't have it all. The environmental sell becomes more difficult as we begin to look more at what each of us individually may have to give up, especially our convenience in getting to work or to the mall more quickly. It's not the others now, but us!

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## **Notes on the National Scene**

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### *House Passes Bill to Reauthorize Clean Water Act*

On the third day of heated deliberations, May 16, 1995, with a 240 to 185 vote, a revision of the Clean Water Act sponsored by Representative Bud Shuster (R-Penn) passed the U.S. House of Representatives. The measure now goes to the Senate, but the Senate has not put forward a bill of its own.

The House measure (H.R. 961) had bipartisan support led by Congressman Shuster, and bipartisan opposition led by Representative Norman Y. Mineta (D-Calif.) and Sherwood L. Boehlert (R-N.Y.)

The reauthorization would change a number of point source and stormwater regulations. In the nonpoint source realm, the proposed legislation would require states to develop management plans for nonpoint source pollution, give them 18.5 years from the date of enactment to make reasonable progress toward achieving water quality standards, and allow them to rely on voluntary measures.

Additionally, the revisions do not require mandatory programs for agricultural runoff.

H.R. 961 would make significant changes to the federal wetlands regulatory program under Section 404 of the Clean Water Act. It would require the U.S. Army Corps of Engineers to classify wetlands in order of ecological importance; then tie land use regulations to the classification. A new set of criteria is proposed for wetland delineation. Owners' compensation would be strictly required if property values decline because of wetland regulations; a property would have to be bought outright if its value decreased more than 50 percent.

A series of steps are proposed relating to cost-benefit analysis and risk assessment. The revisions would require, among other things, that EPA conduct risk assessment and cost-benefit analyses on any standard that would have an economic impact of \$25 million annually; that technical factors and the availability of substitutes be considered when standards are set relative to toxic chemicals; and that water quality standards for streams in arid western regions take into account that such streams may not support aquatic life year round.

And finally, the proposed act would authorize \$3 billion in grants to the states' revolving loan fund for water pollution prevention and control.

An amendment to revoke the Coastal Nonpoint Pollution Control Program, enacted under section 6217 of the Coastal Zone Management Act Reauthorization of 1990, was removed just before the vote.

### *Where Do We Go From Here*

Following its passage through the U.S. House of Representatives, the Clean Water Act Revisions of 1995 now goes to the Senate where it will be taken up by the Committee on the Environment and Public Works, chaired by Senator John H. Chafee (R-R.I.), who has spoken in favor of the current statute. The schedule for the measure's passage through this committee is uncertain at this time.

The measure may also face a presidential veto. The Administration has raised concerns regarding the bill's wetlands provisions and its abandonment of efforts to curb agricultural and urban nonpoint source pollution.

Secretary of Agriculture Dan Glickman presented the President's Farm Bill guidance to the House Committee on Agriculture on May 11. The proposal — developed with input gathered from farmers, ranchers, researchers, and rural communities — contains a number of recommendations extending and simplifying current conservation programs while putting more control in the hands of states and localities.

The proposed program changes are designed to protect agricultural producers from undue financial stress (but not further burden taxpayers) and give farmers incentives to adopt environmentally beneficial practices.

Glickman said that overall, the proposal offers farmers greater decision-making and more flexibility and shifts more authority to state and local officials in targeting conservation and other programs.

Highlights of the proposed Farm Bill include

- A Conservation Farm Option (CFO) that could guarantee producers a program payment in exchange for voluntarily implementing a whole-farm conservation plan.
- The Conservation Reserve Program would be reauthorized, extending current contracts and targeting new enrollments of the most environmentally sensitive land.
- The Wetlands Reserve Program would be maintained at the goal of 975,000 acres by the year 2000, and its administration would be made more efficient.

Both the CRP and WRP would encourage more local participation in establishing local priorities.

Other recommendations:

- Conservation Compliance/Sodbuster provisions for highly erodible lands would be made more effective in reducing erosion and more flexible for farmers.
- The Swampbuster Program's focus would be shifted to conserving and restoring "significant function and values" on a watershed basis, creating and using wetland mitigation banks.
- Conservation assistance would be coordinated to develop site-specific plans for farms and ranches in a particular area (such as a watershed). The plans could be used to meet other federal or state requirements.
- Consolidating existing programs or authorities would simplify cost-share tools.
- Conservation challenge grants would be authorized to match federal funds with local and state funds to achieve conservation goals in priority areas.
- A National Natural Resources Conservation Foundation would be established to educate and bring together the public and private sectors to develop, fund, and implement conservation solutions.
- The Grazing Lands Conservation Initiative developed by landowners, producers, and conservation and environmental groups to help landowners voluntarily protect and improve private grazing lands would be supported.

### *Senate Action*

In the Senate, the Agricultural Resource Conservation Act of 1995 (S. 854) was introduced in May. It calls for an annual cap of \$2.1 billion, with \$1.2 to \$1.8 billion for the Conservation Reserve Program, \$150 million for the Wetlands Reserve Program, and \$150 to \$750 million for other conservation programs through 2005.

The Conservation Reserve Program would put 4 million acres into buffer strips by 2000 and protect the most highly erodible cropland.

A new program would combine existing cost-share and incentive programs and make both structural and management practices eligible for cost share. Fifty percent of the funding would be directed to livestock producers.

The Secretary of Agriculture would designate Conservation Priority Areas, such as the Great Lakes, where agricultural practices pose a significant threat to water resources. These areas would be eligible for enhanced assistance.

## Section 319 National Monitoring Program

Ten nonpoint source projects designed specifically to document project effectiveness have been selected for inclusion in the Section 319 National Monitoring Program (NMP). An eleventh project will document groundwater pollution prevention.

NMP projects comprise a small subset of NPS pollution control projects funded under Section 319 of the Clean Water Act as amended in 1987. Currently, most of the projects focus on stream systems, but EPA plans to include groundwater, lakes, and estuaries. Eventually, the program will support 20 to 30 watershed projects.

Projects are nominated by EPA regional offices, in cooperation with state lead agencies. EPA Headquarters reviews all proposals, negotiates with the regions and states regarding project details, and recommends that regions fund acceptable projects using a regional 5 percent set-aside of Section 319 funds.

Each project must meet a minimum set of project planning, implementation, monitoring, and evaluation requirements. Among the criteria for project selection are

- Documentation of the water quality problem in a well-defined critical area, including identification of the primary pollutants, their sources, and their impact on designated uses of the water resources.
- Quantitative and realistic water quality and land treatment objectives and goals.
- Clearly defined NPS monitoring program objectives with effective monitoring designs to document changes in water quality associated with the implementation of land treatment.
- A watershed implementation plan that uses appropriate systems of best management practices, each designed to reduce a specific NPS problem in a given location.
- Effective information and education and technology transfer programs.

### Section 319 National Monitoring Program Projects: 1994 Summary Report

**S**ection 319 National Monitoring Program Projects: 1994 Summary Report (Osmond et al., 1994) profiles NMP projects. Prepared for EPA by the North Carolina State University Water Quality Group and by the Oregon State University Water Resource Research Institute, the report may be ordered (free) from NCEPI, P.O. Box 42419, Cincinnati, OH 45242. Phone: (513) 489-8190; Fax: (513) 489-8695 (please refer to EPA-841-S-94-006 when ordering).

Copies are also available from NCSU Water Quality Group, 615 Oberlin Road, Suite 100, Raleigh, NC 27605-1126 (please refer to WQ-88 when ordering).

A shorter overview of the program is also available as a 16-page brochure that summarizes the program and describes the 11 current projects. Order this free booklet, *Section 319 National Monitoring Program, An Overview*, from NCSU at the above address.

### Section 319 National Monitoring Program Projects

- |                              |                                       |  |
|------------------------------|---------------------------------------|--|
| ■ Elm Creek, Nebraska        | ■ Morro Bay, California               | ■ Sny Magill, Iowa                       |
| ■ Lake Champlain, Vermont    | ■ Oak Creek Canyon, Arizona           | ■ Sycamore Creek, Michigan               |
| ■ Lake Pittsfield, Illinois  | ■ Otter Creek, Wisconsin              | ■ Snake River Plain, Idaho (groundwater) |
| ■ Long Creek, North Carolina | ■ Pequea and Mill Creek, Pennsylvania |  |

The Warner Creek project in Maryland is pending Section 319 National Monitoring Program project approval.

## National Forum on NPS Pollution Marks a Beginning

Nearly 16 months after they first convened, members of the National Forum on Nonpoint Source Pollution have announced the results of the Forum's intensive efforts to find ways to, in their words, "supplement regulatory approaches with educational programs, voluntary initiatives, and economic incentives."

In a "Letter to the American People," which introduces the Forum's report, the chair and cochair, Governors John Engler (Michigan) and Howard Dean (Vermont) observe that "government is tackling nonpoint pollution, but the task is too big to do alone. Imagine policing every backyard, every parking lot, every farm. Stopping nonpoint pollution is everybody's job."

*Water — A Story of Hope*, the executive summary of the Forum's final report, summarizes the Forum's thrust in urging new approaches to build on our past success in cleaning up water pollution. The Forum urged,

- Use watersheds, rather than political boundaries, as the framework for action.
- Prevent pollution: it's less expensive than cleaning it up.
- Act through collaboration rather than confrontation.
- Change our behavior by committing for the long haul.
- Build leadership to create the right partnerships.

The Forum made 17 recommendations:

1. Learn about the environmental, health, and financial impacts of nonpoint pollution.
2. Learn our watershed address.
3. Industry can lead the nation.
4. Share information.
5. Encourage voluntary initiatives.
6. Clarify our national water quality mission and identify barriers to improving water quality.
7. Focus policy and budget activities on nonpoint pollution.
8. Improve water management on public lands.
9. Organize water management along watershed boundaries.
10. Ensure that effective programs are targeted where they are most needed.
11. Stakeholders must have a voice in community water planning.
12. Evaluate the impacts of our actions on water quality.
13. Incentives can encourage land and water stewardship.
14. Entrepreneurs can find new solutions.
15. Discover innovative approaches.
16. Obtain better data.
17. Develop new technologies.

The Forum gave examples of specific current projects that support these recommendations — 25 demonstration projects in all, many of which have been profiled in *News-Notes*. Others will be featured in future issues.

Several members of the Forum have agreed to participate in an informal extension of the Forum's mission by overseeing and encouraging work in the private and public sectors to implement these recommendations in specific situations.

*[The Forum's full report, Taking a New Tack on Nonpoint Water Pollution, will be available in August and may be obtained from Terrene Institute for \$14 (\$15 to include a copy of the executive summary). Write to Terrene Institute at 1717 K Street NW, Suite 801, Washington, DC 20006; E-mail: Terrene@E2B2.com. Phone: (202) 833-8317. Copies of Water, A Story of Hope (the executive summary) are also available for \$5 from Terrene, or may be accessed electronically on E2B2 Environmental Online Service, modem (913) 897-1040.]*

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## States to Gain Increased Flexibility in Using 319 Funds

An update to U.S. EPA's 319 grant guidelines gives states a new opportunity to take a long look at their nonpoint source management programs. The object of such introspection is to evaluate progress and ensure that the highest priority water quality problems are being addressed. The update, effective in fiscal year (FY) 1996, expands funding eligibility, and gives states more flexibility in the use of their grants.

"The guidance reflects the fact that the nonpoint source program has matured," says Bob Wayland III, director of EPA's Office of Wetlands, Oceans, and Watersheds. "States have made significant progress during the past five years in demonstrating effective technical and institutional solutions to nonpoint source problems. It is appropriate to take stock at this time of both past progress and the need for future state program changes."

#### *Funding to Have Broader Scope*

The new guidelines enable states to use 319 monies not only to conduct nonpoint source control activities, but also to evaluate and revise state programs. States will be able to use the funds to clarify their priorities, establish measures of progress, determine the most effective practices, build partnerships with other agencies and institutions, and perform compliance monitoring. According to EPA, a state could, for example, use 319 grant money to delineate ecoregions, refine NPS-specific biometrics and biocriteria, or create NPS data management tools. Monitoring and assessment, crucial to the process of identifying and prioritizing NPS problems, also fall within the new, broader scope of funding.

Beginning in FY 96, EPA will permit states to devote up to 20 percent of their Section 319(h) funds, or \$250,000, whichever is less, to these program-strengthening efforts.

#### *Minimum Funding Levels Dropped*

A second element in the updated guidance loosens requirements that have, in the past, compelled states to dedicate 25 percent of their 319 allocations to particular areas. Now EPA has recognized that greater flexibility in determining the best uses of their 319 monies will enable states to efficiently target funds to their highest priorities. The agency, while continuing to support groundwater solutions, National Monitoring Program projects, and restoration activities, will no longer specify minimum funding levels for them.

"Our mutual goal is to provide for the greatest environmental gains that can be achieved with the significant federal, state, and local resources available, while achieving this progress in the most efficient and flexible manner possible. We continue to believe that this goal is best achieved through balanced state programs that provide for both the improvement of waterbody quality through watershed projects, and the institutionalization of long-term statewide nonpoint source programs," Wayland said.

*[For a copy of Section 319 Grant Guidelines and the update, write to U.S. EPA, Nonpoint Source Control Branch (4503F), 401 M St., SW, Washington, DC 20460.]*

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## *Poll Takes Public's Pulse on Conservation Issues*

Adapted from the May 1995 issue of *Water Protection Conservation Management*, published by the Agricultural Extension Service at the University of Tennessee Institute of Agriculture.

USDA's Natural Resources Conservation Service conducted a Gallup poll recently to learn about the general public's perceptions concerning the conservation of natural resources on private lands.

Highlights of the poll were presented in a March 14 hearing of the Senate Committee on Agriculture, Nutrition, and Forestry:

- The public gives farmers the highest rating as caretakers of the environment when compared to other groups like manufacturers, homeowners, lawn services, and the petroleum industry.
- Water-related issues are tagged as the most important natural resource issue by 40 percent of the people surveyed.
- A voluntary approach with incentives and assistance is the best way to achieve conservation.
- Of those surveyed, 80 percent said that the laws protecting wetlands are adequate or need to be strengthened. Only 15 percent felt the laws were too strict.

*[For further information, contact George F. Smith, Extension Agricultural Economics and Resource Development, University of Tennessee Institute of Agriculture, P.O. Box 1071, Knoxville, TN 37901-1071.]*

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# Notes on Restoration

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## Ecological Restoration — Some Thoughts

by Jim Meek, former U.S. EPA Liaison to the USDA

In mid-March, I attended a national symposium in Chicago on “Using Ecological Restoration to Meet Clean Water Act (CWA) Goals.” Clearly, solutions to our water quality problems, particularly from nonpoint sources, require an increasingly broader view if we are to meet our goals. The conference focused on the importance of ecological restoration, its complexity and the urgency for greater inclusion of the ecological process and concepts in the expanding emphasis on watershed management.

With these issues in mind, the symposium, cosponsored by the U.S. Environmental Protection Agency, USDA Natural Resources Conservation Service, DOI Bureau of Reclamation, and the Northeastern Illinois Planning Commission, was necessary. It helped EPA and states to focus more closely on how (within the limits of our current knowledge) the CWA goals are to be met.

U.S. EPA Watershed Branch Chief Don Brady, whose leadership helped make the symposium possible, noted that “in remediating our problems that now exist, we must do three things, — clean it up, restore it, and protect it for the future.”

Several of the principal symposium speakers have provided highlights from their presentations for this issue. These presentations were provocative. Words are important, they said, and *rehabilitation* is a better term than *restoration* since it’s basically impossible to bring a stream or riparian area back to its original state. Likewise, they made clear that efforts toward rehabilitation require long-term commitments and the politics of patience. We need to build community involvement and ownership in all projects so that individuals making these choices can understand what they are giving up — and for what benefits to the community at large.

We also need continued adjustments to stay ahead of population growth and sprawl, and certainly, we need to augment engineering solutions with ecological ones. The Clean Lakes Program was held up as a successful process and the model to follow for ecological rehabilitation in water resource management.

Numerous case studies presented at the symposium illustrated the range of current approaches to ecological rehabilitation at the state and local level. Some of the case studies demonstrated how homes could be clustered to maintain large open spaces; how localities can build toward community action and responsibility; how to make the best use of economic benefits; and how to obtain local funding.

I was struck by the sheer number of ongoing projects in so many different localities — and by the enthusiasm of those at the symposium. Ecological restoration — rehabilitation — needs to protect and increase riparian areas and to consider migratory patterns and habitats. These various needs stress the importance of the time-honored approach of beginning with local ownership.

We, as technicians, must show the cost and the promise of various solutions, and how we benefit from each option. Where there are good community involvement and open institutions, the goals of the Clean Water Act will most likely be achieved. Where we do not have such conditions, the public at large will need to decide.

Tom Davenport of EPA Region 5 was responsible for organizing this timely symposium, and he ended it with a unique feature that allowed participants to divide into geographical clusters to identify the challenges they face and ways they might foster ecological restoration when they returned home. The group I was in faced the following challenges:

- competition for people’s energy and time among the many demands of family, work, and extracurricular activities;
- conflicting priorities and incentives from federal and state agencies;
- untested techniques for ecological restoration;
- the complexity of these ideas; and
- how to reach people and hold their attention.

The same group determined to work on

- learning from mistakes and allowing failures (i.e., taking risks even when success may not be certain);
- bridging disciplinary traditions;
- developing realistic expectations for projects;
- reducing uncertainties with better communication;
- managing projects to reduce risks, not to ensure success (i.e., not going for short-term successes at the cost of long-term benefits — what we are about is a long-term effort).

At the symposium's end, Don Brady noted the strength gained from the diversity of disciplines, groups, agencies, and people represented at the meeting; the sense of partnership that emerged from efforts to address the political, social, and economic issues; and the recognition that it's not so much a money issue as a people issue — or the important role that education plays in reaching people. "If you get 'em by their streams and lakes," he said, "their hearts and wallets will follow!"

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## Ecologists Explore Meaning of Restoration

*Ecological restoration is not a "repair" of some place in nature to meet a human value or use, nor is it aimed at a single species or process or any other fragment of an ecosystem. The terms "mitigation," "clean up," or "reclamation" are not synonymous with ecological restoration, nor are additions of game fish or desirable plant species to a habitat, or attempts to remove exotic or undesirable species.*

So ecologists William Jordan III and G. Dennis Cooke told the audience at March 1995's national symposium on ecological restoration. Jordan and Cooke defined *ecological restoration* as the "process of compensating for novel influences on an ecosystem so that it can resume acting, or continue to act, as if those influences were absent."

Jordan, editor of the journal *Restoration and Management Notes*, and a founding member of the Society of Ecological Restoration, calls them "RE-words" — *restoration, rehabilitation, reclamation, and recovery*.

■ **Restoration**, Jordan has said, is the keystone in a series of terms that describe a special kind of environmental manipulation. "The reason I assign [restoration] central importance — make it really the sovereign term of the family — is the same reason managers have been a bit wary about adopting it: it is so much more explicit than softer-edged terms such as 'rehabilitation,' or 'management,' or 'stewardship' — and it promises so much," Jordan wrote in *Land and Water*, November–December 1992.

■ **Reclamation** is often used to describe the work done on surface-mined areas, where few remnants of a natural system remain. Reclamation may restore a function such as hydrological cycle or a system component like vegetation, but uncommitted to an entire historic ecosystem model, it leaves many gaps. While reclamation, according to Jordan, may make a site more useful or attractive, it is only a "first step toward restoration."

■ **Recovery** is not restoration, Jordan says, though it describes the system repairing itself after the causes of degradation are eliminated. Recovery is *how* the system restores itself, but in restoration, that process is set in motion by well-laid plans and targeted toward a specific historic ecosystem model. Jordan points out that what results from recovery without such actions may be unpredictable and far from a natural or historic system. The capacity for recovery, though, is an important part of restoration.

■ Even **rehabilitation**, according to both Jordan and Cooke, is not necessarily the same as restoration. It refers to restoring certain aspects of a system, but lacks the holistic and historic intent of restoration. Cooke compares rehabilitation of an ecosystem to rehabilitation of a human after an injury. Essential structural and functional features are recovered, although the rehabilitated patient may never be exactly as before. Similarly, Cooke says, rehabilitation of an ecosystem means the "repair and protection of ecosystem-level structure and function."



While restoration represents the ideal we strive for, rehabilitation may be the practical, cost-effective application.

Cooke explains, "The National Research Council's Committee on Restoration of Aquatic Ecosystems . . . defined *restoration* as 'the return of an ecosystem to a close approximation of its condition prior to disturbance.' This goal is not likely to be achievable in most cases, in part because we do not know what predisturbance conditions were, and because an absence of continued disturbance in any ecosystem is unlikely. Further, there is an element of chance in the development of ecosystems. How can we ever re-create the exact conditions which led to the development of the original ecosystem?"

Jordan agrees, acknowledging that true restoration is an ambitious goal. But, he says, it is still valid as a model for managing ecosystems that must co-exist with human society.

Cooke has proposed a national ecosystem rehabilitation program, housed in one agency. Such a program would have to have an ecologically coherent basis, be stable, and contain all federal rehabilitation projects. A program to rehabilitate estuaries, for example, should be part of a river and watershed rehabilitation project.

On the ground, what does restoration look like? Jordan and Cooke look to the least disturbed, but similarly structured and functioning ecosystem in the ecoregion for a model. Three features distinguish restoration from the other "RE-" efforts:

- it is an active effort, although it may use natural recovery to accomplish some aspects;
- it is holistic, involving an entire ecosystem; and
- it uses an existing or historic ecosystem of high quality as a model.

Jordan has written that "this adds up to a tremendous challenge and an immense responsibility." But defining the terms and establishing a common language at least provides a starting point for communication about ecological restoration.

". . . Ultimately," he says, "our words, and the way we define them, shape the landscapes we inhabit."

*[For more information, contact William Jordan III, University of Wisconsin Arboretum, 1207 Seminole Hwy., Madison, WI 53711-3726. Or contact G. Dennis Cooke, Department of Biological Sciences, Kent State University, Kent, OH 44242.]*

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## *Ecological Restoration in the Platte River Basin*

What does grass do? That's not an idle question in the Platte River Basin where extensive grasslands have traditionally been the habitat of sandhill cranes, waterfowl, and more than 200 other species, while also serving as an important water resource.

Over the last 125 years, agricultural development, gravel mining, and sandpit housing developments have jeopardized the habitat — as have decreased river flows related to upstream water uses. Collectively, these changes have decreased the biological diversity of the ecosystem, degraded the river channel, lowered the water table, and generally made the land drier.

But the grasslands survive, in miniature, to show observant resource managers the possibilities — the wild abundance, natural beauty, and scientific interest — that abide in this portion of the Great Plains. When both biodiversity and water quality and quantity goals are considered, the stakes are high, even if the acreage is low.

### *Restoring the Grasslands*

High-diversity grassland restoration along the Platte River began small. In the 1980s, the Prairie Plains Resource Institute (PPRI) planted a series of small, private restorations as part of a greenways now known as the Lincoln Creek Parkway project. PPRI, an educational land trust located in Aurora, Nebraska, was founded to do prairie preservation, restoration, and environmental education.

The Lincoln Creek Parkway Project included planting six small sites — most of them less than an acre — with more than 70 grass and forb species.

A decade later, PPRI, in cooperation with the Platte River Whooping Crane Habitat Maintenance Trust and The Nature Conservancy (TNC) Platte/Rainwater Basin Project Office, supported by the U.S. Fish and Wildlife Service and an EPA 319 water quality funding grant engaged in a project to plant more than 300 acres of Platte Valley land to high-diversity grassland.

As PPRI's early plantings mature, so does the technical experience of the planters. PPRI has developed nine objectives related to grasslands restoration and techniques, which are now being tested in the larger Platte River project. In addition, the Nature Conservancy's Wood River cropland conversion to grassland complements these technical objectives with objectives related to land use and culture.

Technical objectives include

- developing a mobile seed harvester,
- testing methods of seedbed preparation,
- determining the efficacy and cost of wetlands creation or enhancement,
- establishing seasonal routines for monitoring and for harvesting seeds,
- securing seed cleaning equipment,
- founding a greenhouse for seedlings propagation,
- maintaining a series of plantings with increased quantities each year,
- documenting each project, and
- engaging and training volunteers and other citizens.

Objectives specific to TNC's Wood River project and related to land use and cultural benefits also have application to grasslands restoration in general. The Wood River goals are to

- convert 150 acres of cornfields now dependent on agricultural chemicals to native grasslands;
- compare a low-diversity mix of six commercial grass species with a restoration based on PPRI's high diversity nontraditional plantings (splitting the acreage 50-50);
- discontinue irrigation permanently, and use recyclable windmills to enhance water quantity;
- enhance the quantity of groundwater and surface runoff by enjoining the use of agricultural chemicals;
- slow runoff and enhance water retention by restoring the grasses and mechanically enhancing the historic slough channel;
- manage the grasslands through grazing; and
- begin long-term research on soils and soil organisms, water quality, and ecological dynamics of the restoration site.

The benefits of restoration cannot be enjoyed immediately. Success is long term precisely because ecosystems are open ended. But however much in progress, and however small these efforts are, they are useful. "The way forward," says William S. Whitney of the Prairie Plains Resource Institute, "is to keep going on. It's to show that if a few hundred acres can be restored; why, then, so can thousands."

Over the years, agriculture and commerce, urban sprawl, and a string of dams upriver have all made claims on the grasslands. An integrated corridor planning paradigm is needed, Whitney says, to outline acceptable land uses and work with the rural economic development process, while we proceed on an even greater scale with grasslands restoration.

*[This article was based on a presentation from, and an interview with, William S. Whitney. For more information, contact him at the Prairie Plains Resource Institute, 1307 L Street, Aurora, NE 68818. Phone: (402) 694-5535.]*

# Notes on Riparian and Watershed Management

## *Clinch River Farmers and Nature Conservancy Keep Cows Out of Clinch River Habitat*

Fred Kiser, a farmer in the watershed and a director of the local Soil and Water Conservation District, has found a new way to run a profitable cattle operation while cleaning up the creek that runs through his property.

With funding from The Nature Conservancy and the state of Virginia, Kiser installed a pasture pump to water his grazing cattle. The pasture pump lets livestock pump their own water from the creek into a trough away from the streambank. Requiring no electricity, the pump relies on the pressure of the cow's head against a lever to begin operation. Each push of the head yields about a pint of water.

Some of The Nature Conservancy's most effective work lies in balancing the needs of the environment and the local economy. In this project, with the help from the Virginia Department of Conservation and Recreation and the U.S. Fish and Wildlife Service, the organization helps farmers establish alternate water sources for cattle. It also restores native vegetation to streambanks in Virginia's Clinch and Powell river drainage and funds the building of fences that keep cattle out of streams. Streambank fencing protects water quality for people and for several species of endangered freshwater mussels while enhancing farm productivity.

The Nature Conservancy, a nonprofit conservation organization dedicated to preserving habitat for rare and endangered species, has targeted the watersheds of the Clinch and Powell rivers as part of an ambitious ecosystem conservation program called "Last Great Places: An Alliance for People and the Environment." The Clinch Valley Bioreserve encompasses the watersheds of the Clinch, Powell, and Holston rivers, extending more than 2,200 square miles across seven southwest Virginia counties and into Tennessee.

Kiser described what happened to his creek when his cattle watered in it directly: "The whole bank had been eroded down . . . over a period of time they just tramped down the whole side of the stream and the creek bank."

That erosion not only dirtied the cattle's drinking water, but also fouled the runoff flowing into a nearby cave system and ultimately into the Powell River, a critical part of the Clinch Valley Bioreserve. Kiser pointed out, "What's occurring in all these little streams is important farther on down."

The Clinch and Powell rivers are the last remaining undammed and unspoiled headwaters of the Tennessee River system. Their watershed is, according to the Conservancy, the most

### *EPA's Updates the Watershed Protection Approach*

EPA recently published its latest report on the watershed protection approach. The document summarizes the agency's 1993 and 1994 watershed protection activities and describes more than 130 watershed projects in which EPA participates. Each project involves local residents, government agencies, and the private sector striving to

- examine problems and solutions at the local, site-specific level;
- include the people most likely to be concerned and most able to take action;
- solve the problems in a comprehensive, integrated manner, balancing concerns for the environment, public health, and the local economy; and
- evaluate progress and process.

The projects range from the Chesapeake Bay's 64,000-square-mile watershed, teaming stakeholders from six states and the District of Columbia, to the 4-square-mile Alcyon Lake watershed in New Jersey's Gloucester County. Project objectives range from the massive task of planning the cleanup of the Ashtabula River's contaminated sediments to a cooperative, two-state effort to reduce nutrient loadings threatening 14 natural lakes in Dickinson County, Iowa. Equally diverse are the often innovative solutions these watershed projects have employed. Each project has put together its own customized toolkit, which may include elements such as education, restoration, BMPs, and local ordinances.

*[The Watershed Protection Approach: 1993/94 Activity Report (EPA840-S-94-001) may be obtained from NCEPI, 11029 Kenwood Road, Building 5, Cincinnati, OH, 45242. Phone: (513) 891-6561; Fax: (513) 891-8695.]*

ecologically diverse region of Virginia and contains hundreds of rare species. The Virginia Chapter of The Nature Conservancy is currently enacting a comprehensive conservation strategy for the region that includes land acquisition, research, economic development, and community needs.

[For more information contact Bill Kittrell, Clinch Valley Bioreserve Project, 102 South Court Street, Abingdon, VA 24210. Phone: (703) 676-2209.]

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## Volunteer Groups Help Clean up the Nation's Water

Across the country, public-spirited, environmentally minded citizens are pulling soggy trash from lakes, streams, coasts, and wetlands. Some of the trash washes into waterbodies with stormwater; some is dumped there on purpose.

Why are so many people willing to spend their time doing hard, dirty, and even dangerous work to clean up after others? Volunteer groups around the country may have the answer.

■ **Russian River.** Mendocino County, California's local volunteer organization, Russian River Unlimited, is planning its 5th annual cleanup and float. Its members are also beginning to fight back against the scofflaws, collecting the license plate numbers of anyone caught in the dumping act. To reduce dumping, they have created a brochure and video for distribution and showing in schools.

The video teaches recycling, which the organization itself also practices. Scrap metal is sent to China for reprocessing, then sold to Japan; and rubber tires are burned as fuel in a cement plant. The ash can even be added to the cement.

For more information, contact  
Rebecca Kress, Russian River  
Unlimited, P.O. Box 760,  
Hopland, CA 95449.  
Phone: (707) 744-1874.

The founder and chairperson of Russian River Unlimited is Rebecca Kress. She said, "I was driving along East Side Road — I also float the river often — noticing the awful garbage and things in the river and I asked a friend of mine, 'Why doesn't someone do something about it?' and he said, 'Why don't you?' So I did."

■ **Lake Lois, Washington.** The people of Lacey are working to preserve habitat for birds and other animals living in or near Lake Lois. They have received grants to develop an environmental education site, build nature trails, and construct bird boxes for wood ducks. The lake normally covers about 10 acres within the city of Lacey, a town of 24,000 adjacent to Olympia. Fed by creeks with intermittent flow, by the end of a hot, dry summer, the lake level is very low. Stream Team volunteers, sponsored by the city of Lacey Public Works Department, wait until the water level drops and then they walk the lake bottom and pick up accumulated trash. Even with much mud to contend with, it is easier to remove debris when most of the water is gone. The volunteers rig up hooks with long handles to reach items that are still underwater or stuck in the mud.

In October 1994, more than 20 volunteers in addition to Lacey Stream Team members, pulled more than a ton of trash from the lake and its feeder, Woodland Creek. Enthusiasm for the project ran so high that students from a local high school volunteered to watch-dog the lake to keep it clean.

For more information, contact  
Jared Burbridge, Lacey Stream  
Team Coordinator, P.O. Box B,  
Lacey, WA 98503.  
Phone: (360) 438-2687.

■ **Adena Brook.** As part of a general study and renovation project in the Adena Brook Watershed Project, in Columbus, Ohio, 53 parents and students of Clintonville Academy turned out on Sunday, June 5, 1994, to get the litter out of the brook and off the nearby highway.

With the help of the Ohio Department of Natural Resources and Ohio State University, students developed and distributed a survey for residents in the watershed. The survey can be used to design educational materials and projects to protect Adena Brook and the Overbrook Ravine.

The school has received grants from Phillips Petroleum Institute and the U.S. Environmental Protection Agency to develop brook protection strategies. The students' efforts received enough media attention that the city of Columbus is undertaking stormwater mitigation studies to protect the ravine from further erosion. The city is also developing a restoration plan for that part of the stream that runs through a city park.

According to authorities at Clintonville Academy, the project provides many opportunities for students to acquire new skills as well as to use skills they have already learned in school. They also learn a great deal about their own neighborhood environment and, maybe best of all, feel an immediate sense of accomplishment.

For more information, contact  
Jerry L. Wager, Ohio  
Department of Natural  
Resources, Fountain Square,  
Building E-2, Columbus, OH  
43224. Phone: (614) 265-6619.

This year, the cleanup expanded to include the entire community and several other ravines in the Clintonville area.

■ **Chattahoochee River.** On September 12, 1994, in Atlanta, Georgia, U.S. EPA Administrator, Carol Browner, kicked off a three-year project to rehabilitate the Chattahoochee River. The Greater Atlanta Community Corps, a nine-year-old nonprofit organization, is working in partnership with AmeriCorps and the EPA.

"Help the Hooch Day" was May 20. Many volunteers came together to remove tons of litter from 12 miles of the Chattahoochee and its feeder tributaries. Continuing plans include conducting biological surveys, stabilizing eroding riverbanks, testing water quality, and building riverbank nature trails, with funding for such activities from EPA, the National Park Service, and Fulton County. The city of Atlanta donates office space.

For more information, contact  
Karen Wood, Atlanta Community  
Corps, Phone: (404) 522-4222.

■ **International Coastal Cleanup.** Every fall thousands of volunteers converge on beaches around the world to pick up litter. In the United States, cigarettes, paper, plastic, and glass are the objects most collected. In 1994, as many as 140,000 volunteers in 35 states and territories took part in the cleanup. In just three hours, they scoured 5,131.62 miles of waterways and collected a staggering 2,919,298 pounds of trash at 3,069 sites. The inclusion of inland states demonstrated just how much the Cleanup has expanded its focus from coastal beaches to inland waterways, rivers, lakes, and streams.

The Center for Marine Conservation commented: "Every one of the volunteers, in all the states, walked away from the Cleanup a changed person. Trash will never look the same to them, and their concerns will radiate to families and friends, expanding the circle. Pond ripples become turning ocean tides, changing forever the face of this ocean planet."

The next annual cleanup is  
scheduled for September 16,  
1995. If you would like to get  
involved in the International  
Coastal Cleanup, call  
1-800-CMC-BEACH.

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## Salvaged Native Plants Thrive in Riparian Areas

Vegetative buffers along streams and wetlands in Thurston County, Washington, offer home ground for thousands of native plants.

The plants, displaced from areas scheduled for development, are salvaged by county residents and replanted on sites where water quality has been compromised. The program, a pilot project funded by the Puget Sound Water Quality Authority, involved 106 people and nearly a thousand plants its first year.

Plants were taken from a golf course, a timber harvest site, and a construction site. Salvage sites were found through the county planning office, where applications for planned construction projects are filed. Permission to salvage the plants was the first step. Then the cuttings were made, and the plants overwintered in holding beds at a Master Gardener demonstration site. Their replanting in new locations followed in the spring.

### Where Have All the Flowers Gone?

The riparian area of a salmon run provides a new home for some of the plants, which will keep sediments and pollution from a nearby freeway from entering the stream. Other plants ended up as part of a wetland buffer to filter runoff from neighboring pastures, and a residence was landscaped with the remaining native plants.

The residence, selected as a demonstration project to encourage inhabitants to use native plants in landscaping, received hazelnut, vine maple, red flowering current, and bald hip roses.

Fifteen local organizations collaborate to sponsor the Native Plant Salvage Project. About 330 volunteers attended training to learn to identify, salvage, and use native plants successfully and responsibly in their landscapes. Attractive native plants protect water quality, improve wildlife habitat, and reduce landscape maintenance cost and effort.

[For more information, contact Gina Suomy or Kit Paulsen, Native Salvage Project, 6128 Capitol Blvd, Olympia, WA 98501. Phone: (360) 786-5445.]

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## Notes on the Agricultural Environment

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### *Chesapeake Bay States and Others Eye Private Consultants to Help Write Nutrient Management Plans*

States are looking to the private sector to help reach their nutrient management goals. State legislation authorizing certified private consultants to draw up nutrient management plans is already on the books in the Chesapeake Bay states of Maryland, Pennsylvania, and Virginia. In the Midwest, Wisconsin has implemented a unique pilot program.

■ **Maryland.** The 1993 authorization of a program training and certifying private consultants to write nutrient management plans for farmers has helped put the Maryland Department of Agriculture nearly halfway to its tributary strategy goal, according to Fred Samadani, director of the state's nutrient management program. Helping to make such progress possible was the writing of plans for nearly 126,500 acres in the year ending June 30, 1994, by about 50 private consultants who had completed the state's new certification and licensing program. By contrast, the state's 21 Cooperative Extension Service consultants developed plans for 86,000 acres. In all, 212,500 acres were covered by plans last year.

By April 1995, some 600,000 acres were protected under state-approved plans designed to curb nutrient runoff from farm fields, according to Samadani. In addition, plans were updated on nearly 86,000 acres during the year. Plans covered lands cropped for corn, soybeans, small grains, alfalfa, hay, pasture, and vegetables.

Maryland's nutrient management program helps farmers manage nutrients from animal waste, commercial fertilizers, and urban sludge. Its aim, says Samadani, is to make certain that crops get the right amount of nutrients at the right time in the growing season to prevent excess nutrients from polluting groundwater and streams.

Of the 103 individuals who took Maryland's first certification test this year, 66 passed, bringing the state's total number of certified consultants to 285. Sixty percent of those are in the private sector, Samadani reports. Maryland also licenses over 50 companies that provide nutrient management services through certified consultants.

This year for the first time, the training and certification of nutrient management consultants in Maryland will be coordinated with the Certified Crop Adviser (CCA) program administered by the American Society of Agronomy (see box).

*For more information, contact Fred Samadani, Director, Nutrient Management Program, Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401. Phone: (410) 241-5863; Fax: (410) 841-5914.*

### *Certified Crop Advisers Receive Training for the Job*

In only two years, the American Society of Agronomy's Certified Crop Adviser program has certified more than 3,000 individuals. The CCA program has been developed in cooperation with agribusiness, retail dealers, cooperatives, manufacturers, state and national trade associations, the USDA, and independent consultants. The program is open to anyone who provides crop management recommendations to farmers.

Tom Hall, Assistant Vice President, American Society of Agronomy, reports that 5,600 registered for the exam held in February 1995. Exams are planned for each February in 40 states. Certified Crop advisors must pass the state and national exams and meet educational and experience requirements.

[For additional information on CCA, contact Tom Hall, Assistant Vice President, ASA, 677 South Segoe Road, Madison, WI 53711. Phone: (608) 273-8080. Fax: (608) 273-2021.]

## Other Bay States Gear Up

Private consultants are expected to start playing a bigger role in Pennsylvania and Virginia, the other states with tributaries to the Chesapeake Bay. The general assemblies of both states have approved legislation to establish training programs that allow private consultants to be certified to write nutrient management plans that meet state specifications.

■ **Pennsylvania.** Pennsylvania's 1993 nutrient management law calls for farm plans to address problems from barnyards and other manure sources as well as seek the proper balance of nutrients on croplands.

As of this writing, the Pennsylvania regulations for the training and certification program have been drafted, but not formerly adopted, according to Nutrient Management Coordinator Melanie Sayers of Pennsylvania's Department of Agriculture. When adopted, the state will certify both private consultants and individuals who want to draft nutrient management plans for their own operations.

*For more information, contact:  
Melanie Sayers, Nutrient  
Management Coordinator,  
Department of Agriculture,  
2301 N. Cameron St.,  
Harrisburg, PA 17110.  
Phone: (717) 772-5218;  
Fax (717) 783-3275.*

■ **Virginia.** In Virginia, regulations for a training and certification program for nutrient management planners are also being developed. Russ Perkinson, manager of the nutrient management program in the Virginia Department of Conservation and Recreation, has high hopes that the private sector help "will increase nutrient management assistance beyond our own staff."

According to Perkinson, Virginia's program will target sewage sludge land application contractors, fertilizer retailers, and soil fertility consultants as well as state, local, and federal government employees. Virginia's program will differ from those of other states, since non-agricultural uses of nutrients will also be addressed.

*For more information, contact:  
Russ Perkinson, Nutrient  
Management Program  
Manager, Department of  
Conservation and Recreation,  
203 Governor St., Richmond,  
VA 23219. Phone: (804)  
786-2064; Fax: (804) 786-1798.*

## Going West

■ **Wisconsin.** Meanwhile, Wisconsin is piloting a unique project that pays for soil tests and nutrient management plans made by private consultants. Farmers in targeted areas of 27 Wisconsin counties participate in a voluntary program to help producers use fertilizer more efficiently and keep it out of the state's waterways. Under the program, private crop consultants are taking soil tests and preparing nutrient management plans for individual farmers. Testing and consulting fees cost about \$6 an acre.

More than 700,000 acres of cropland in 22 state priority watersheds are eligible for the pilot project. Administered by county and land conservation departments, the program is funded under the Wisconsin Priority Watershed Program out of the state Department of Natural Resources, and the costs of the testing and planning service are paid by state funds from the Wisconsin NPS pollution abatement program. The state Department of Agriculture and the USDA NRCS are cooperators in the program.

State officials view the pilot project as a new approach to improving water quality—one that uses the private sector to give producers tailored nutrient management plans that save fertilizer and labor costs on the farm while maintaining crop yields and protecting the environment.

Leonard Olson, a watershed planner with the Wisconsin Department of Agriculture, said the nutrient management pilot program has three goals:

- to introduce large numbers of farmers to nutrient management planning;
- to explore the private sector's ability to help farmers manage nutrients; and

*For information on the  
Wisconsin pilot program,  
contact Terence Kafka, Bureau  
of Water Resources  
Management Department of  
Natural Resources, P.O. Box  
7921, Madison, WI 53707.  
Phone: (608) 264-9229;  
Leonard Olson, Wisconsin  
Department of Agriculture,  
P.O. Box 8911, Madison, WI  
53708. Phone: (608) 224-4613;  
or Jim Enlow, USDA NRCS,  
6515 Watts Rd., Suite 200,  
Madison, WI 53719.  
Phone: (608) 264-5334.*

- to help state agencies and counties obtain critical data needed to develop sound plans for protecting water quality in priority watersheds.

Crop consultants must have a certificate from the Registry of Environmental and Agricultural Professionals, CCA, or the Federation of Certifying Boards in Agriculture, Biology, Earth and Environmental Sciences to receive payment in the program, or have a certified consultant approve the nutrient management plan via a signature, according to Terence Kafka of the Department of Natural Resources. The state Department of Agriculture and the University of Wisconsin Extension Service provide training for consultants throughout the state.

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## *A Conservation Agency for the 21st Century — Changes in Motion at NRCS*

The NRCS, responding to the USDA's Reorganization Act of 1994 and to other demands on its attention — especially the increasing demands for environmental assistance, complex technological assistance, and the need to reach out to the underserved — has completed a Reorganization/Reinvention Plan that will guide it through the first phase of reinvention.

The Natural Resources Conservation Service, created by the Act as it abolished the Soil Conservation Service, will be responsible for all SCS programs, and

- the Wetlands Reserve Program,
- the Colorado River Basin Salinity Control program,
- the Water Bank program,
- the Forestry Incentives program,
- the Farmers for the Future program, and
- others, as delegated by the secretary.

Some former Agricultural Stabilization and Conservation Service and Farm Home Administration programs have also been assigned to NRCS.

Other streamlining changes include closing or consolidating field offices and reducing personnel on a two-to-one basis between headquarters and staff.

### *Regional Offices May Relate to Ecoregions*

The NRCS Reinvention/Reorganization Plan will change the NRCS organizational structure and approach. Among its key features are plans to

- reduce and restructure its national headquarters,
- establish regional offices,
- consolidate administrative functions, and
- increase the proportion of staff at the field level.

One feature of the plan is the consolidation of 52 separate regional locations into six, each staffed by 25 to 30 people.

Major considerations in developing the six regional boundaries include their relation to ecoregions, major land resource areas, and hydrologic units; their ability to accommodate special multistate initiatives, social and cultural differences, and management considerations.

The six NRCS regional offices will be located in the East, at Beltsville, Maryland; the Midwest, at Madison, Wisconsin; the Southeast, at Atlanta, Georgia; the South Central, at Fort Worth, Texas; the Northern Plains, at Lincoln, Nebraska; and the West, at Sacramento, California.

To meet National Performance Review targets, staff at headquarters will be cut by half — from 530 employees in 1993 to 258 when the plan is fully implemented. A greater percentage of staff will be employed at the field level.

### *Looking Ahead*

The next phase of the NRCS reinvention will deal with the field delivery systems and program reinvention. Forums held throughout the country during 1994 and into April 1995 collected important employee, customer, and stakeholders' input on how the field delivery system and program reinvention should proceed. These forums will be a key part of the next phase.



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## Paying for BMPs at the Farm Level

by David Faulkner, USDA Natural Resources Conservation Service

Certain concerns are always in the minds of natural resource economists as they work to assess and communicate the economic consequences of a particular course of action. Questions about whether and how much to fund agricultural best management practices involve a complex range of technical and economic issues. The feasibility criteria are especially pertinent.

### *Technical Skills and Readiness Factors*

Before an investment is made, we must consider the project's technical feasibility and assess the farmer's knowledge level:

- Can the problem be solved and which approaches make the most sense from the technical and practical points of view?
- Does the farmer have the skill and knowledge needed to implement and maintain a BMPs successfully?

Knowledge gaps that prevent widespread adoption and diffusion of conservation technology are common and are part of the reason we need technical assistance and technology transfer components in our conservation programs.

### *Basic Economic Considerations*

Every proposed BMP involves two major factors: economic feasibility and financial feasibility. The distinction between these factors — and the importance of both factors for anyone interested in the control of nonpoint source pollution — is captured in two questions:

- Do the expected benefits accruing from investment in a BMP exceed the anticipated cost?
- Does the farmer have sufficient cash flow to pay for the investment in implementing the practice (provided the expected benefits exceed the investment and operational costs)?

The first question concerns *economic* feasibility; the second, *financial* feasibility. Most private conservation investments will eventually pay for themselves, but the costs usually accrue first, followed by the benefits. So although the economics of BMPs are positive, the time lag often creates a financial hurdle that can make private investment in them impossible for the farmer. Then the use of public funds to share the costs of new BMPs becomes important.

Sociological and attitudinal considerations must also be understood:

- Will the farmer make the investment in conservation BMP technology, even if the answers to all other questions are yes?

The answers to these questions are interrelated and site-specific. What will work at one site or under certain conditions won't always work under other conditions. Farmers' finances are also highly varied, often subject to great changes over short periods of time, and always dependent on the weather and market conditions.

### *Making It Work*

Research and practical experience demonstrate that conservation and good farm management do go together. Indeed, the dynamics of competition in the food and fiber supply industry are in place for market forces to support the adoption of BMPs. Yet the process of technological innovation occurs over the long term and often involves obstacles and setbacks resulting from market price variability, institutional impediments, private perspectives, and land-user values. Identifying these issues realistically allows us to assess feasibility and target our outreach.

Effectiveness in promoting BMP adoption means sensitivity to the issues of our private farmer clients. Understanding that economic and financial considerations can create cash cost hurdles is essential for achieving success in public and private partnerships to reduce nonpoint source pollution and improve water quality.

[For more information, contact David Faulkner, USDA NRCS, 1606 Santa Rosa Rd., Richmond, VA 23229-5014.]

## Water Quality Assistance for Farmers and Ranchers — USDA Program Funds 65 Projects

In fiscal year 1995, the USDA will provide \$15 million in financial and technical assistance to farmers and ranchers participating in Water Quality Incentive Projects. The program, consisting of 65 separate water quality projects in 28 states, makes incentive payments to producers who reduce their agricultural nonpoint source pollution while maintaining an efficient and economical farm operation. Projects include pesticide and nutrient management planning, animal waste application reductions, and improved irrigation water management.

[For additional information, contact Clayton Furukawa, Program Specialist, USDA-Consolidated Farm Service Agencies, 14th and Independence Avenue, Washington, D.C. 20250. Phone: (202) 690-0571; Fax: (202) 720-4619.]

## Nationwide Turbidity Testing in Australia

by Terry White, Australian Waterwatch Advisory Committee

This article is excerpted from the *Volunteer Monitor's* "Monitoring a Watershed" issue, vol.6, no. 2, fall 1994. For a free copy of that issue send a self-addressed stamped (\$.75) 9 x 12 envelope to *The Volunteer Monitor*, 1318 Masonic Avenue, San Francisco, CA 94117.

### *Too Thick To Drink, Too Thin To Plough*

Here in Australia, we live in one of the world's driest continents—but when the rains eventually come, they cause havoc, eroding river banks and washing huge amounts of sediment into streams. In my home state of Victoria, the Yarra River gets so turbid that people say it "flows upside down" or that it's "too thick to drink, too thin to plough." The effect of all this sediment and organic matter is to raise the cost of water treatment, block the light needed for growth of aquatic plants, reduce the visibility fish need for feeding, and smother bottom-dwelling aquatic life.

### *Monitoring Turbidity*

In 1991, Noel Morgan made the first Aussie attempt to get a cheap and accurate turbidimeter into the hands of the people most likely to do something about the problem — farmers. As a farmer himself, a former water quality chemist, and chairman of his regional watershed committee, Morgan was aware of the way soil loss on farms contributes to the turbidity of streams. He also knew that monthly turbidity records from the few government monitoring sites in the watershed were seriously misrepresenting the turbidity problem because 90 percent of soil loss and erosion damage occurs during rainfall.

Morgan reasoned that involving the farmers themselves in widespread turbidity monitoring exercises before, during, and after storm events would quickly pinpoint those areas where turbidity problems were severe and where farm management changes were most needed. It would also be the strategy most likely to result in on-the-ground action. We change our behavior more as a result of insights arising from our own actions than from any amount of external urging.

Farmer friends across the watershed were ready and willing to take samples. The challenge was to find a cheap and accurate method of measuring turbidity. Conventional methods wouldn't work in the situation, being either unsuitable for environmental conditions, too expensive, or not practical. So Morgan invented the "Morgan Bottle Turbidimeter" — simply a plastic soft-drink bottle, 1.5 or 2-liter size, on the bottom of which Morgan drew a standard symbol with black felt-tip pen and white paint. Using a nephelometer as a standard, Morgan calibrated each bottle and marked the sides in NTUs (nephelometer turbidity units) with the felt-tip pen. He distributed these gadgets to farmer friends. With a calibrated bottle always available in the back of the pickup, farmers found it relatively easy to take a series of turbidity readings in local creeks during heavy rains. Once problems were identified, the farmers could often trace the cause—such as bank collapse or poor farming practices.

### *A Snapshot of Turbidity in Australia*

Morgan's initiative and ingenuity triggered a series of events which ultimately led to a nationwide "snapshot" of turbidity across Australia. In August 1994, representatives of community-based water quality monitoring groups from around the country met together and

decided to have 700 turbidity tubes manufactured here in Australia, at a cost of approximately \$15 (U.S. \$11) each, for use nationwide during National Water Week, held October 23-29. (Similar turbidity tubes are commercially available, but at a cost of about \$100 each, they are beyond the reach of most community groups.)

Morgan's bottles were accurate, but because of their height they could register only highly turbid waters. The model manufactured for Water Week was 2 feet long and made from polycarbonate tubing (1.5-inch diameter) with a white plastic base glued on to the bottom. A black symbol was painted on the base, and the tubes were calibrated using a standard Formazin solution (the same standard that is used to calibrate nephelometers).

During Water Week, over 1,000 school and community groups used the locally manufactured turbidimeter to monitor creeks and rivers. Each state is now putting together a publication called "Snapshot," including photographs, comments, and watershed maps depicting volunteers' results.

[For more information, contact Terry White, 36 Lambeth Pl., St. Kilde, Victoria 3182, Australia.]

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## Water-Quality Friendly Nutrient Management — Using Sensors, Chips, and GPS

Space-age technology is the farmer's newest and perhaps most important tool for applying fertilizer, seed, and pesticide in amounts specifically calculated for particular locations.

Until recently, farmers have based fertilizer applications on conventional soil testing, computing the amount needed on the basis of field-size averages. Now, farmers are beginning to use precision or prescription farming based on soil samples that are matched to precise locations via orbiting satellites in a program called a global positioning system (GPS).

The satellites send precise location information to operators in the field, allowing more accurate soil sampling, fertilizer application, and yield data for specific portions of each field. The result? Environmentally sound and profitable nutrient management planning that avoids over-application and reduces the potential for nonpoint source pollution.

Using new computer software, farm managers analyze the geo-referenced information and display it as management maps. Computers use the maps to change fertilizer rates and blends automatically during application. Variable rate seeding, variety changes, and starter fertilizer can be adjusted for different soil properties and productivity. Crop scouting also benefits from the new technology, which helps pinpoint areas where the level of pest damage justifies the expense of control.

### *A Revolution?*

Writes K. Elliot Nowels, editor of *Dealer Progress*: "Agriculture, as it is conducted out on the ground across the country, will never be the same, and that probably qualifies precision agriculture, or site-specific farming as a revolution" (January 1995 special issue on precision farming).

Farmers in Ohio are taking part in that revolution, testing new nitrogen application equipment called the Soil Doctor. The Soil Doctor analyzes soil nitrate levels as it moves through a field and varies nitrogen application rates accordingly. A March 1995 issue of *Ohio Farmer*, says that the Soil Doctor can adjust the nitrogen application rate as often as every 6 inches based on information from its sensors.

The Wood County, Ohio, Soil and Water Conservation District tested the Soil Doctor on six farms last year. Although they found no significant yield difference between strip plots where the Soil Doctor was used and strip plots where flat nitrogen rates were applied, significant differences did appear in the units of nitrogen applied per acre.

Dave Petteys, who participated in the tests, has been using the Soil Doctor to farm 1,200 acres near Bowling Green, Ohio, for two years. Petteys says his Soil Doctor cost about \$10,000, and has reduced his nitrogen costs by \$6,600 in two years. "It's paying for itself, and I'm putting less nitrogen on. That's got to be an environmental benefit," he notes.

"Within the next three to five years, a large percentage of the top U.S. producers will be using this technology to help them be better managers," predicts Harold Reetz, Jr., Midwest Director of the Potash and Phosphate Institute. "Agronomic decisions will be made with better information than ever before. Data showing within-field variability in soils and past crop yields,

will be included in the analysis. Economic impact will be worked out in more detail. Environmental decisions will be integrated into the process. The detailed records of inputs and responses will become part of the resource base of each field."

Several issues are still to be investigated. For example,

- How well does the equipment work under different moisture conditions?
- How economical is the equipment and how it will affect nitrate levels in field runoff?

### *Pioneer Expects Increases in Precision Agriculture*

"I expect precision agriculture to significantly increase," said Bill Holmes, a Missouri farmer and pioneer in the development of software that integrates GIS and GPS data with field records. Holmes serves as a consultant to fertilizer dealers who work to incorporate variable rate technology (VRT) on equipment and to apply materials based on soils data.

Dealers are a critical link between farmers and technology, Holmes says, because they advise and counsel crop producers. He reports that farm service dealers in several states have also shown interest in developing more tools to serve the demands for VRT.

In July 1993, *NPS News-Notes* #31 reported on a prescription farming demonstration project in which Holmes participates. The project has now integrated GIS with field records on about 10,000 acres involving 12 farms planted to corn, soybeans, wheat, cotton, and grain sorghum.

About 80 percent of the 2,500 acres on the Holmes farm are harvested with yield monitors aboard harvest equipment. Holmes considers monitors an essential component in the system because they can help check the accuracy of responses to site-specific management.

### **Site-Specific Nutrient Management — Glossary of Key Tools**

- **Grid Soil Sampling.** A matrix or network of lines used to demarcate specific areas on a map or photograph before soil samples are collected.
- **Global Positioning System (GPS).** The use of satellites orbiting the earth to send precise location information to operations in the field, allowing more accurate soil sampling, fertilizer application, and yield data for specific portions of fields.
- **Geographic Information Systems (GIS).** Computer systems that present, analyze, and interpret data graphically. GIS link management information and records to specific points within a field.
- **On-the-go Yield Monitors.** Mounted on harvest equipment, these monitors track high and low yield areas within a single field.
- **Variable rate technology (VRT).** This term describes fertilizer and seeding equipment that can vary application rates based on a grid map and other factors.
- **Crop scouting.** Field observations of the kind and numbers of pests and crop performance. The data can also be keyed to specific grid locations for improved interpretation.

### *Farmers Advised to Start with Current Tools and Resources*

The Potash and Phosphate Institute's Reetz advises interested farmers to start slowly, looking first at their current operations and resources. "What is the first piece of this technology that is going to help solve a problem that you have?" Reetz asked in an interview in *Dealers Progress*. "Don't try to do it all at once. Adopt those that don't cost any money first. Take advantage of what you can do with the tools and resources you have."

This advice corresponds to the observations of Kenneth A. Sudduth, Agricultural Engineer at the Cropping Systems and Water Quality Research Unit, USDA Agricultural Research Service, who says, "A lot of folks have a high degree of interest in various bits and pieces of site-specific management." This interest has been stimulated, says Sudduth, from the environmental standpoint as well as the economical. He considers site-specific management as "more a philosophy or management system than a practice."

[For additional information, contact Bill Holmes, RR 2, Oran, MO 63771. Phone: (314) 262-3474; Fax: (314) 262-2290; Kenneth A. Sudduth, Agricultural Engineer, Cropping Systems and Water Quality Research Unit, USDA-ARS, 245 Agricultural Engineering Bldg., University of Missouri, Columbia, MO 65211. Phone: (314) 882-4090; Fax: (314) 882-1115. E-mail: aeken@muccmail.missouri.edu.; or Harold F. Reetz, Jr., Midwest Director, Potash and Phosphate Institute, RR #2, Monticello, IL 61856-9504. Phone: (217) 762-2074; Fax: (217) 762-8655. E-mail: hreetz@uiuc.edu.]

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- Dealer Progress, Vol. 25, No. 7, January 1995. Clear Window, Inc., St. Louis, MO. Phone: (314) 527-4001
- Ohio Farmer, Vol. 291, No. 5, March 1995. Farm Progress Companies, Inc., Carol Stream, IL. Phone: (614) 486-9637

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## Study Shows High Failure Rate of Barnyard Filter Strips

Adapted from *Keeping Current*, the University of Wisconsin Extension's periodic update on water resources programs and issues.

A 1993 study of barnyard filter strips in eastern Wisconsin has shown that fewer than half remain functional 10 years after their installation. The study raises important questions about farmer attitudes toward barnyard waste management systems and the need for strategies to ensure that systems be maintained over an extended period of time.

According to the study, "dismangement," or the deliberate misuse or destructure of part of a manure management system, was the primary cause of the failure of filter strips. This situation was found at 11, or 46 percent, of the observed failed filter strips. The primary types of dismanagement were overloading caused by broken out retaining walls and the pasturing of the filter strips. The study also found that wood walls generally appeared to be a poor design for barnyard manure management systems. Of the systems that included wood walls, the wood in over 70 percent of these systems was either broken or rotted. Damaged wood walls generally had not been repaired and treated wood appeared to be unreliable for a 10-year period. The study also found sieve walls were generally not successful designs because they plugged up during rain events and farmers reported getting fed up with the constant attention they required after rain storms. Filter strips with spreaders or similar structures that served to evenly distribute runoff across the filter strip also had a relatively high functional success rate.

Rock Anderson, the field specialist who conducted the study, offered several observations about the study's findings,

*Systems which are difficult to operate and manage don't get managed and have a poor chance of being effective for their functional life-span. I would like to see a follow-up study of systems consisting of concrete walls. It would be interesting to see if a higher percentage of the systems are functional when components are more durable.*

*In general, well designed and well installed systems seem to do a good job of removing solids from the runoff. Whether or not nitrogen is removed is a question that needs to be answered by more technical analysis. If most of the phosphorus is contained in the solids, then the filters are probably doing a reasonable job on phosphorus retention.*

Regarding the configuration of filter strips, Anderson noted, "The length of the strips is more important than the width in determining their degree of function. Even with careful construction, the prevalent flow pattern is a shallow, meandering through the area. Adequate length is important to ensure that adequate contact exists. Extra width is seldom valuable in adding to an adequate contact time."

Anderson said that the study's results should not be interpreted as an indictment of the practice. "Any conservation practice can be mismanaged," he said. "While I found that a majority of the [filter strips] were nonfunctional at the time of the study, my conclusions were that filter strips work when maintained according to recommendations."

*[To obtain a copy of the study's findings, contact Rock Anderson, Wisconsin Department of Agriculture, 1011 North Lindale Dr., Appleton, WI 54914. Phone: (414) 734-2061.]*

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## News from the States, Tribes, and Localities, Where the Action Is

### *Enviro-loans Back Killbuck Clean-Up*

Reprinted with permission from *Ohio Farmer*, Tim White, Editor, 1350 West Fifth Ave., Columbus, OH 43212. Phone: (614) 486-9637

A new program providing farmers with low-interest loans is being put to work cleaning up manure runoff, soil erosion, and other kinds of nonpoint source pollution in Ohio's streams and rivers. The Ohio Water Pollution Control's Linked Deposit Program is modeled after the state treasurer's Withrow Plan of Agricultural Linked Deposits which provides low-interest operating loans to farmers.

The WPCLF Linked Deposits Program, administered by the Ohio Environmental Protection Agency (Ohio EPA) and the Ohio Water Development Authority, provides low-interest loans through participating local area banks to farmers for implementing practices to improve water quality. The program has financed more than \$850,000 of improvements in the Killbuck Creek Watershed since it started a little more than a year ago.

In addition to the Killbuck, other watersheds, such as the Stillwater River and Big Darby Creek, will soon be part of this new low-interest loan program. The source of funds to capitalize the program comes from grants Ohio EPA receives through the Federal Clean Water Act's State Revolving Fund Program.

Here's how the program works in Ohio. Farmers whose operations are located in a watershed where the WPC Linked Deposit Program is active and who wish to participate in the program first work with the technical staff in the county soil and water conservation district (SWCD) office. That local office helps the farmer develop a soil and water conservation plan which is similar to the comprehensive farm management plan. The improvements identified in that plan which are related to water quality are then approved for WPC Linked Deposit financing by the county SWCD board of supervisors who issue a certificate of qualification to the farmer.

The farmer then takes the certificate to a participating bank to receive a WPC Linked Deposits loan which is backed by a certificate of deposit the state buys from the bank at a discounted interest rate. These loans are made for terms of up to 20 years at below market rates of interest. Currently, Ohio farmers who participate in this program can receive a loan that is 3 percent less than the bank's normal interest rate.

This is the first time that state agencies have teamed with ag bankers and farmers to fund measures to control agricultural pollution, according to Don Schregardus, director of the Ohio EPA.

"This program is unique in the United States," he told a group of farmers, state officials and media who toured farms in the Killbuck Watershed last fall. "It is an excellent example of state government working with private bankers and their farmer customers to improve our natural environment."

The first of these "enviro-loans" was made to dairyman Doug Billman who was in the process of expanding the family farm near Creston, Ohio. TwinBill Farm is about five miles south of Killbuck Creek in the northern tip of the watershed which runs through Medina, Wayne, Holmes and Coshocton counties. "Virtually all of the water that comes off our land would run towards Killbuck Creek," says Billman.

Based on experience gained in Ohio State University Extension's Dairy Excel program, Billman mapped out an expansion plan using rotational grazing to provide forage during the growing season and a new free-stall barn to house his Jersey cows during the winter. Local conservationists approved the plan and he took it to Dean Falb, assistant vice president and farm department manager of the Chippewa Valley Bank in Rittman, Ohio. With Falb's help, he was able to borrow about \$46,000 to put a roof over his manure pit, fence about 145 acres of pasture, dig a well, and run a water line to 28 grazing cells or paddocks.

"I was fortunate to have a lender who was willing to work with me to set things up," Billman says. His loan was based at about 8.5 percent and he received state help to cut that rate by about 2 percentage points. Although loans can be reduced by as much as 3 points under the program, interest rates were low enough at the time that the bank would have been competing with its own money if it had given the full reduction. Now, rates have increased enough that the full 3 points can be marked down, explains Falb. Billman's loan is based on a ten year repayment, but terms of these types of loans can be up to 20 years depending on the banker and farmer's needs.

### *"Bang for the Buck"*

Falb was one of several bankers in the area who met with Ohio EPA officials two years ago to discuss what could be done to finance farm pollution control measures. "We suggested that they look into the treasurer's linked deposit program," he says. "It makes sense to work through lenders because agricultural lenders already know how to handle loans. Having the local soil and water conservation district approve the conservation practices ensures that they meet regulations and removes the liability from the banks."

Billman's loan approval took about two months, Falb says. Falb has since been able to fund loans for two more customers in about a week each.

"There was some bureaucratic waiting around, probably because we were the first of these loans to be processed," Billman says. "But over all I'd say it was a pretty straightforward process. I'm pleased with the way everyone worked together."

The program is proving to be a very effective way to fund the clean-up of nonpoint source pollution, says Robert Monsarrat Jr., manager of Ohio EPA's Environmental Planning Section in the Division of Environmental and Financial Assistance. "It's a way to get a lot of bang for the buck," he says. "In terms of manure, a modern dairy is the equivalent of a small community. A town might spend \$1.5 million to control waste. The dairyman can get the same control for \$150,000. We put out less money and get a good deal of improvement."

Nonpoint source pollution has been identified as the key contributor to half of the state's water quality problems, Monsarrat says. "We feel the Water Pollution Control Fund has the potential to address all of the state's nonpoint source pollution problems." In addition to manure management, no-till equipment purchases and stream bank restoration, the fund could be used for septic system upgrades, Monsarrat adds.

The Killbuck Creek watershed contains 322 miles of streams and some 145,000 dairy and beef cattle, about 105,000 hogs and sheep and several million chickens and turkeys. In recent years the Ohio Department of Natural Resources has investigated several fish kills which resulted from manure runoff.

*[For more information, contact Robert Monsarrat, Division of Environmental and Financial Assistance, Ohio EPA, P.O. Box 1049, Columbus, OH 43216-1049. Phone (614) 644-3020.]*

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## *Volunteers Spread the Word on NPS*

Although it's acknowledged that outreach is critical to the success of voluntary NPS control, outreach is often the first thing cut when economics start to pinch small local water projects. However, the Holmes County, Ohio, Soil and Water Conservation District solved that problem two years ago with a novel approach to reducing nonpoint source pollution in Ohio's Killbuck watershed.

Modeled after the successful Master Gardener and Master Tree Farmer programs in counties across the country, the Holmes County Master Conservationist Program recruited and trained 44 Master Conservationist volunteers. And while this number may sound like a modest figure, it has what educators dub the "multiplier effect": those 44 volunteers reached an impressive 3,306 people in the highly agricultural watershed.

"We ended up with a variety of people from across the state," said Darla DiFabio of the Conservation District staff. "Our goals were to get the word on conservation out through teachers and to get it onto the land through farmers." The word ended up going beyond that as the general public and public officials became enthusiastic about the training course. One Master Conservationist commented that she now uses the knowledge she gained in her role as county commissioner. Another participant, a bank loan officer, says he shares the information with his clients, many of whom are farmers.

To become a Master Conservationist, farmers, teachers, homeowners, county agents, and even a county commissioner, spent 25 hours getting up to speed on nonpoint source pollution. Each participant received an extensive notebook of resources and a \$50 textbook on resource conservation and management. Speakers from around the state presented lectures on ecology, soil and water science, and conservation techniques. Field trips further whetted the mutual interests of the diverse group. Together, they visited tree farms, viewed conservation practices, monitored streams, and clambered into a pit to study soil structure.

"I planted the seed, and the conservation district carried out the ideas," recalled Richard "Doc" Gerhan, the retired economics professor who conceived the Master Conservationist idea. Gerhan helped write the grant proposal and plan the curriculum, inspired by the knowledge that had been freely passed to him when he began farming 10 years ago. "I wanted to share good conservation practices with others," he said.

With a budget of only \$40,000 and one staff member, the project depended heavily on its Advisory Committee comprised of people from the county education office, state Extension Service, local USDA conservation agency offices, and the state department of natural resources. Other state, local, and university groups collaborated on the project as advisors and speakers, and by providing educational materials.

The bulk of the education was done by the Master Conservationists themselves through classroom activities, field days, helping produce nonpoint source pollution educational materials, working with 4-H, and sharing information with community and professional groups. Some Master Conservationists prefer a more casual approach—talking with neighbors and coworkers about nonpoint sources. Several Master Conservationists reported that the program changed their own thinking and behavior, and many who farm implemented conservation and nonpoint source management practices: planting trees, rotational grazing, establishing riparian buffer strips, and stabilizing streambanks. One said that as result of the program, he planned to plant trees on land formerly stripmined; others noted that they are now more aware of good and bad practices on their land.

The program continued through the winter of 1994-1995 with a winter lecture series for farmers.

[For more information, contact Darla DiFabio, Holmes County Soil and Water Conservation District, 62 West Clinton St., Millersburg, OH 44654-1148; or Richard "Doc" Gerhan, 1701 Township Road 80, Millersburg, OH 44654. Phone: (216) 674-1012.]

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## Cars + Trout = Satisfied Customers All Around

Reprinted from *Keeping Current*, a newsletter published by the University of Wisconsin Extension Water Resources Coordinating Council.

Ken Vance's new car dealership in Eau Claire, Wisconsin, is gaining national attention for the stormwater best management practices incorporated into its design. The dealership sits within the Lowes Creek watershed and serves as a Wisconsin Priority Watershed Demonstration Project designed to improve water quality in the nearby creek. Vance's car lot demonstrates a number of on-site stormwater management practices, including clean water diversion, roof and paved area runoff infiltration beds, grassy drainage swales, and zinc-free roofing. The objectives of most of these practices are to maximize stormwater infiltration while keeping water that does run off to Lowes Creek as cool and clean as possible for the stream's trout. Vance invited a group of 20 car dealerships from across the nation to tour his site. As a result, four other dealers from three states decided to incorporate stormwater management ideas into their new designs.

[For more information, contact Ron Struss, Geology Department, UW-Eau Claire, Eau Claire, WI 54702. Phone (715) 836-5513. E-mail: ron.struss@wisplan.uwex.edu]

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## Olympia High Digs Dirt as Part of City's Impervious Surface Reduction Effort

**EDITOR'S NOTE:** *NPS News-Notes*, #27, featured an article on Olympia, Washington's impervious surface reduction study. That "groundbreaking" story generated scores of responses, according to Coordinator Cedar Wells. Here is an update on this project.

Over the past two years, Olympia has successfully identified several ways to reduce stormwater runoff from pavement, compacted soils, and other hard surfaces. The city's progress, helped by a citizen advisory committee and other local governments, has encouraged even more hard work.

Recently, the study team, concerned citizens, and students from Olympia High School accepted the challenge to reduce runoff from the North Street parking lot that currently flows onto the Henderson Street soccer field.

Their project consists of digging a trench along the edge of the compacted soil-and-gravel North Street parking lot, and replacing the compacted soil with a special mix of soil, rock, and other materials that allow rain to infiltrate. Plastic webbing or "Geoweb" placed in the trench supports the weight of cars and other vehicles using the parking lot, and grass sod placed on top of the trench filters pollutants from the runoff.

Students from Ed Bassett's horticulture class and Sheila Smith's science class play an important role in monitoring the project. Rainfall, grass growth, ponding of water in the field, and other factors are monitored by the students. Over the next year, the study team will analyze the project's costs, benefits, and success at reducing runoff entering the Henderson Street soccer field.



A study report that contains strategies for reducing compacted soils and other impervious surfaces is available from the city's Public Works Department.

Surfaces that allow infiltration include paving blocks, plastic matting, gravel, and bark. They can be used on fringe or overflow parking areas, emergency parking lanes, private roads, service roads, fire lanes, bike paths, walkways, and patios.

[For more information, contact Cedar Wells, City of Olympia, Water Resources Program, 900 Plum Street S.E., P.O. Box 1967, Olympia, WA 98507-1967. Phone: (206) 753-8454, or (206) 753-8598, a 24-hour line.]

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## *Citizen Involvement Influences Flood Control Project on Minnesota River*

A flood control project proposed by the Watershed District for the Lac qui Parle River, a tributary of the upper Minnesota, has been denied on the grounds that nonstructural approaches were not considered.

Four controversial channels were to be cut across oxbows in the river to more quickly drain 840 acres of low-lying farm land in minor flood stage. Opponents said the project would cause pollution and more flooding downstream as a result of rapid runoff. They also cited the irony of spending huge sums of taxpayer money to fight floods along the Mississippi, while simultaneously spending money to drain the land faster.

The Minnesota River, a tributary of the Mississippi, is a heavily polluted river draining the southern portion of Minnesota. In 1992, the Minnesota Pollution Control Agency convened the Minnesota River Citizens' Advisory Committee to provide advice to the agency as it develops strategies for rehabilitating the river. A comprehensive four-year study, the Minnesota River Assessment Project, had been started earlier, in 1989.

The Citizens Committee, a diverse group of 30 people selected by organizations and agencies across the Minnesota Basin, set to work on a plan for the river. Because of media attention to the work of the Committee, other citizens became aware of the problems of the river and interested in helping solve them. So when Department of Natural Resources (DNR) Commissioner Rod Sando convened a public hearing on the flood control project in October 1993, a small grassroots organization called Clean Up Our River Environment (CURE) provided testimony along with state agencies opposing the project.

Judge Allan Klein recommended that DNR deny the permit on grounds that the proposal did not meet the requirements of two state laws, the Minnesota Environmental Rights Act, and the Minnesota Environmental Policy Act. Klein found that if constructed, the floodways would likely have an adverse effect on fish and wildlife habitat, and that prudent and feasible alternatives exist. In addition, Klein stated that the watershed district did not adequately consider nonstructural alternatives such as land retirement programs and controlled grazing alternatives.

Although Judge Klein's decision was appealed, it was upheld by the Minnesota Board of Appeals in January 1995.

CURE's director, Patrick Moore, hopes the unsuccessful appeal will lead to the reevaluation of several other projects proposed for the Minnesota River basin that he believes are questionable from both an environmental and economic standpoint.

"This case signals the beginning of a new era," said Moore. "The watershed districts on the Minnesota River Basin must begin to let rivers be rivers and listen to what scientists, taxpayers, and downstream landowners are saying."

CURE member Del Wehrspann hopes the ruling will increase interest in innovative and less-costly approaches to floodplain management. Wehrspann recently served on the Minnesota River Citizens' Advisory Committee, which issued a series of recommendations to clean up the river.

Chief among them was a recommendation that landowners voluntarily enroll row-cropped floodplain and riparian lands in conservation programs. Such action could save taxpayers millions of dollars in crop and property damage payments, and reduce flooding and pollution problems, according to the report.

"The sheer existence of the Minnesota River Assessment Project and the Minnesota River Citizen's Advisory Committee has raised the awareness of citizens in the watershed so that a grass roots movement is taking place to restore the river. Five years ago most people either

denied there was a problem or had little interest in it," said Lynne Kolze of the Minnesota Pollution Control Agency. "The action of the committee received enough publicity that attention was focused on the problem. While some still deny a problem, they are in any event involved in discussion about it. It has gotten people talking and given them ideas."

[For more information about the Minnesota River Project, contact Pat Engelking of the Minnesota Pollution Control Agency, 520 Lafayette Road North, St. Paul, MN 55155-4194. Phone (612) 297-3825.]

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

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### *Education Makes a Difference — Children's Groundwater Festival Inspires Change*

A lot of time, effort, and money goes into putting on a Groundwater Festival. Just ask Susan Seacrest, founder and president of the Groundwater Foundation. Is it really an educational experience, or is it just a fun day away from school for the kids?

To answer this question, the Groundwater Foundation and the Rensselaerville Institute, a development center in upstate New York, with funding from the U.S. Geological Survey, designed and conducted a year-long study of students who had, and had not, attended the Nebraska festival. The study sought to observe whether the festival had made any difference in the students' water protective behaviors.

#### **Water Festival How-to Manual**

The water festival concept is an enormously popular way to educate adults and children about water. The Nebraska Groundwater Foundation's "Making Waves: How to Put on a Water Festival" provides direction and ideas for organizing a successful school, county, or state event.

Individual copies are available for \$12 plus \$3.95 from the Groundwater Foundation, P.O. Box 22558, Lincoln, NE 68542-2558. For information about ordering multiple copies or for other information, phone (800) 858-4844.

#### **Water Festival Workshop: Priming the Pump**

A workshop for festival organizers and teachers interested in water education will be held at the Lied Conference Center in Nebraska City, Nebraska on September 22-23, 1995. For more information, contact the Groundwater Foundation.

They found that, after attending the festival, students did adopt new behaviors, such as turning off the water faucet while brushing their teeth, taking shorter showers, and refrigerating water rather than running the tap to get it cold. Some students are still practicing those behaviors six years later!

Teachers who attended the festival also changed their habits. Some said they changed their classroom curriculum to include information and additional field trip experiences about water. Others talked about how they had installed water-saving sprinkler systems at their homes. Other teachers were motivated to return to graduate school to learn more about the environment so that they could more effectively teach it in their classrooms.

Perhaps most significantly, students who had attended the festival were concerned about water quality and what they could do about it, while control groups were unable to name any environmental issue of concern to them and perceived their community and state as a place "not having any water problems."

As festival participants, children also inspire parents to make behavior changes. However, the study found that parents and teachers are key to maintaining environmentally friendly behavior changes. The single most important predictor of sustained behavioral change in both study and control focus groups was parental role modeling for such everyday practices as recycling.

[For more information, contact Susan Seacrest, President, The Groundwater Foundation, P.O. Box 22558, Lincoln, NE 68542-2558. Phone (402) 434-2740.]

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### *Nonpoint Source Activities Help Children Learn English*

Dramatization of the process of lake pollution is teaching Spanish-speaking students in Arizona about lake eutrophication and helping them learn English at the same time. The University of Arizona created the unique nonpoint source pollution curriculum with a grant from the Arizona Department of Environmental Quality.

The curriculum employs the visual and performing arts to bring home the pollution prevention message to students not yet fluent in English. Students wear masks that identify them as fish,

plants, algae, soil particles, leaves, water drops, wind, or bacteria. As the teacher tells a story of how a pond gets polluted, students act it out, with the wind swirling through dust and leaves, and runoff carrying soil into the pond. Following the script, algae and bacteria grow and soon sicken the plants and fish. A person comes to the edge of the pond, surveys the water, and decides not to go in.

The activity was pilot-tested in an English-as-a-second-language (ESL) fourth grade class in Nogales. The class's teacher commented, "They really got the point; especially the human disgust at the end! The masks were beautiful and the motivation was inherent. The monolingual Spanish speakers got it!"

The nonpoint source curriculum is a part of Arizona WET. National Project WET (Water Education for Teachers) helps teachers bring water programs to their students. Nonpoint source pollution is one topic in the WET program. (See *NPS News-Notes* #26, 32, and 35.)

Another activity in the Arizona WET NPS curriculum helped a kindergarten class understand the effect of water pollution on fish by putting sponges cut in the shape of fish into a container with clean water. Students added pollutants to the water and generated a list of words as they talk about what is happening to the fish. The teacher who piloted this activity in Nogales had 30 children in her class, 10 of whom spoke English as a second language. "What worked in the activity?" she said. "Everything! This was a really well thought out activity. It works especially well for young learners as it stresses vocabulary—exactly what we do a lot of in both kindergarten and ESL classes. The kids loved the hands-on part of the activity and it worked out to be just the right length to hold their attention."

Other Arizona WET activities target higher grades. Older students, for example, can make their own illustrated dictionaries by defining and illustrating environmental terms using their own words and art. A sixth grade class reads a series of site descriptions with pollution problems and discusses possible sources of pollution in each situation, determining if the pollution is point source or nonpoint source. The concluding activity asks students to interweave blue paper strips representing water with pictures of land activities, also cut into strips, to illustrate the interconnectedness of land activities and water pollution.

"The site descriptions worked very well; the students enjoyed that they were Arizona-specific. During the lesson, they even tried to guess where the sites were located. This exercise really helped students focus on point and nonpoint contamination," said the sixth-grade teacher who piloted this lesson.

*[For more information, contact Lin Stevens-Moore, Water Education Coordinator, University of Arizona, Water Resources Research Center, 350 N. Campbell Avenue, Tucson, AZ 85721. Phone: (520) 792-9591.]*

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## *Local Waters a Scene of Crime? Youthful Detectives Check it Out*

Young detectives playing the Streamwalk Game developed by the Portland, Oregon, Department of Environmental Services are taking to local waterways to investigate.

In the *Murky Water Mystery*, the lives of beaver, trout, ducks, wood rats, salamanders, turtles, and insects are disrupted by a mysterious source of pollution in their neighborhood stream. Checking off "clues" as they go, these elementary-school student detectives observe the stream and its surroundings, then assemble a report on the condition of the stream. The game demonstrates monitoring techniques and teaches, along the way, what people can do to improve the stream's health.

If streamside monitoring is not an option, the game adapts to a classroom, with students drawing an imaginary stream on the wall.

Once the investigation is complete, the students send their report to the Environmental Services Department and each one receives an official Streamwalk Detective badge.

The game is based on the adult version of the Environmental Protection Agency's Region 10 Streamwalk lay monitoring program (See *NPS News-Notes* #8 and #28).

*[The Streamwalk Game is available to all Portland schools, community groups, and organizations at no charge. Groups outside the Portland area can purchase it for the cost of printing. For more information, contact Ivy Frances, Portland Department of Environmental Services, 1020 SW 5th Avenue, Suite 400, Portland, OR 97204-1972. Phone: (503) 823-7740.]*

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# NPS Electronic Bulletin Board News

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This portion of *News-Notes* is prepared for the benefit 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 ANSII graphics off and go through the Gateway to NPS-BBS, or command D 79.

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## Reviews and Announcements

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### *Streambank Restoration Handbook*

A detailed guide for streambank restoration has been published by the Izaak Walton League's Save Our Streams (SOS) Program. This 111-page book written by SOS Director Karen Firehock, teaches citizens about stream ecology, assessing watershed pollution problems, enlisting technical assistance, and designing a stream restoration project.

According to Firehock, "America's streams have been diked, dammed, channelized and piped underground — destroying critical fish and wildlife habitat. *A Citizen's Streambank Restoration Handbook* provides alternatives to these destructive practices." The book teaches citizens how to plan an effective restoration project that uses vegetation and natural stream forces to improve habitat and water quality and restore aesthetic values. Also included are project budgeting information, case studies of successful SOS restoration projects, and an extensive bibliography.

The handbook is a product of the SOS Stream Doctor Project. Stream Doctor teaches citizens to diagnose stream problems, write a prescription for the stream's recovery, and institute emergency and long-term care for the stream.

[To order, send a check for \$15 payable to the Izaak Walton League of America, 707 Conservation Lane, Gaithersburg, MD 20878-2983 or call (800) Bug-IWLA for more information.]

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### *Water Conservation: Turning Off the NPS Tap*

Having long emphasized pollution prevention through control of nonpoint source pollutants, EPA has recently published a manual that comes at the problem from a different angle—water conservation. *Cleaner Water Through Conservation* tells us that the United States withdraws 407.6 billion gallons per day from surface and groundwater supplies. Irrigation alone takes 40 percent of that, and households take 7.5 percent.

Aside from providing an intriguing array of statistics about how we Americans use, and abuse, our abundant water supply, *Cleaner Water* contains many examples of states, tribes, and communities that are saving water and money and reducing problems, such as altered stream flows and habitat damage, saltwater intrusions into coastal aquifers, and pollutant runoff from irrigation and landscape maintenance.

Developed as a resource and guide for state and local officials, the document also outlines how excessive water use impacts nonpoint source pollution and describes technical and programmatic approaches to reducing water use.

[To obtain a copy of *Cleaner Water Through Conservation* (EPA 841-B-95-002), contact NCEPI, 11029 Kenwood Rd., Bldg. 5, Cincinnati, OH 45242. Fax: (513) 891-6685.]

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## Conservation Planning Tool Being Developed

Farmers today are faced with multiple challenges as they make decisions on crop rotations, nutrient management and economic returns, while trying to conserve the resource base. Making these decisions is further complicated by varying soil types and other site characteristics.

In an effort to meet this challenge, a computer program is being developed to assist farmers. The Comprehensive Resource Planning System (CROPS) is a cooperative effort that will help farmers achieve their production objectives while also meeting sustainable agricultural goals. CROPS can help farmers produce alternatives and final plans that will meet whole-farm production and tillage needs, farm production and economic goals, and nutrient and pesticide leaching and runoff considerations. It also helps farmers meet resource conservation objectives and minimize reliance on purchased inputs.

CROPS produces a resource conservation plan that includes crop rotation and tillage recommendations, soil conservation recommendations, pesticide and nutrient management recommendations, graphic display of farm plan and income projections/comparisons.

CROPS is a joint project of the Virginia Polytechnic Institute and State University, USDA Natural Resources Conservation Service, USDA/EPA Southern Region Sustainable Agriculture Research and Education Project, Virginia Division of Soil and Water Conservation, Pennsylvania Association of Soil and Water Conservation Districts, Inc., and Virginia, North Carolina, and Pennsylvania farmers. A prototype is currently in place in the Harrisonburg, Virginia, field office of NRCS. The system is being field tested by farmers and field staff.

[For more information, contact David Faulkner, CROPS Coordinator, USDA NRCS, 1606 Santa Rosa Rd., Richmond, VA 23229-5014.]

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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. 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**

**July**

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- 16-22 *Coastal Zone 95-Spotlight on Solutions*, Tampa, FL. Contact: Jaime Doubek, CZ 95 Conference Coordinator, c/o Florida Coastal Zone Management Program, 2740 Centerview Drive, Tallahassee, FL 32399-2100. (904) 922-5438. FAX (904) 487-2899 or Matt Menashes, CZ 95 Conference Coordinator, Office of Ocean and Coastal Resource Management, NOAA, 1305 East-West Highway N/ORM 4, Silver Spring, MD 20910. (301) 713-3086 ext. 105.
- 23-26 *The Fourth North American Agroforestry Conference*, Boise, ID. Contact: Dr. John Ehrenreich, Conference Chairman, College of Forestry, Wildlife, and Range Sciences, (208) 885-7600. For land managers, policy makers, agroforestry researchers, extension specialists, and academics. Topics include soil and water management issues.

**August**

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- 1-4 *Design of Stormwater, Sediment, and Erosion Control Systems*, Stillwater, OK. Contact: George Collington, Oklahoma State University, Engineering Extension, (405) 744-9223. Fax: 744-5369. Presented by Bill J. Barfield, C. T. Haan, J.C. Hayes, and Michael D Smolen.
- 10-11 *Science, Innovation and Stewardship. Sixth Annual Environmental Education Conference*, Arlington, VA. For more information, send a mailing label to DEQ, External Affairs, P.O. Box 10009, Richmond, VA 23240-0009, or call Jean Cahen (804) 762-4570. Conference is geared toward Virginia educators and issues are centered around the Chesapeake Bay.
- 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 US 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.

Datebook (Continued)

29-30 *TNRCC Tenth Annual Ground Water Protection Seminar*, San Antonio, TX. Contact: Community Support Programs Section, Texas Natural Resource Conservation Commission, P.O. Box 13087, Austin, TX 78711-3087. (512) 239-4720. Topics include Wellhead Protection Area Delineation; Nonpoint Source Best Management Practices; Ground Water Fundamentals; and Grant Opportunities for Local Governments. Optional field trip August 30 through Edwards Aquifer Region.

29—9/1 *Healthy Watersheds and Clean Water: Coexisting with limited resources and competing values*, Cedar City, UT. Contact: Jack Wilbur, Utah Dept. of Agriculture, 350 N. Redwood Road, P.O. Box 146500, Salt Lake City, UT 84114-6500. E-mail address: asposupt.agmain.nhardman@email.state.ut.us

**September**

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.

20-21 *EASI Leadership Conference*, Chevy Chase, MD. Contact: EASI, 8733 Old Dumfries Road, Catlett, VA 22019. (703) 788-EASI. For those interested in opportunities for older persons to conserve and protect our nation's environment.

**October**

9-11 *Local Solutions to Pennsylvania's Pollution. First Annual Pennsylvania Nonpoint Source conference*, State College, PA. Contact: Nicki Kasi, Nonpoint Source Program Section Chief, PA DER-Bureau of Land & Water Conservation, P.O. Box 8555, Harrisburg, PA. (717) 787-5259. Features lessons learned from PA's Chesapeake Bay Program and strategies for statewide Nonpoint Source Program.

16 *Water Quality Workshops to precede First Annual EPA Region VI Nonpoint Source Conference*, Tulsa, OK. Contact: Dr. Mike Smolen, Oklahoma State University, Stillwater, Oklahoma. (405) 744-8414. Workshops include Design of Sediment Control Systems; Know Your Watershed; Urban IPM; Biological Monitoring in Urban Streams; and Farm-A-Syst.

17-19 *First Annual EPA Region VI Nonpoint Source Conference*, Tulsa, OK. Contact: Otis Bennett, Cherokee County Conservation District, 1009 S. Muskogee Ave., Tahlequah, OK 74464. (918) 456-1919. Fax: (918) 456-3147. For managers, technical people, decision makers and the general population on nonpoint source pollution management.

23-27 *WEFTEC '96: The Water Environment Federation's 68th Annual Conference and Exposition*, Miami, FL. Contact: Water Environment Federation, 601 Wythe Street, Alexandria, VA 22314-1994. (800) 666-0206.

**November**

5-9 *AWRA 31st Annual Conference & Symposia*, Houston, TX. Contact: Mark L. Loethen, P.E., Symposium Chairperson, Pate Engineers, Inc., 13408 Northwest Freeway, Suite 160, Houston, TX 77040. Water management in urban areas, advances in model use and development in water resources, North American water resources.

**December**

4-6 *Second Annual Acid Mine Drainage Workshop*, Cincinnati, OH. Contact: Lisa Grayson, Terrene Institute, 1717 K Street NW, Suite 801, Washington, DC 20006. (202) 833-8317. Fax: (202) 296-4071. Sponsored jointly by Terrene Institute and U.S. EPA, Region 5

**Calls for Papers—Deadlines**

**1995**

**August**

1 *AWRA Summer Symposium '96*, Syracuse, NY, July 1996. Contact: Dr. Jeffrey J. McDonnell, Program Technical Chairperson, SUNY College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY 13210. (315) 470-6565. Fax: (315) 470-6956. Abstract deadline is August 1, 1995. Call for paper, poster, video or software demonstration. Submit abstract of 200 words or less.



*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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NONPOINT SOURCE

## *News-Notes*

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