
Nonpoint Source

 **EPA** *News-Notes*

A Commentary. . .

Reducing Risk: Setting Priorities and Strategies For Environmental Protection

A few selected excerpts from the Report of the Science Advisory Board to EPA Administrator William K. Reilly, September 1990, particularly pertinent to the management of nonpoint sources of water pollution.

- Natural ecosystems like forests, wetlands, and oceans are extraordinarily valuable. Those ecosystems contain economically valuable resources that feed, clothe, and house the human race.
- Over the long term, ecological degradation either directly or indirectly degrades human health and the economy.
- National efforts to evaluate relative environmental risks should recognize the vital links between human life and natural ecosystems. Up to this point, they have not.
- [R]educing environmental risk in the future...will entail the control of small, widely dispersed sources of pollution through the use of a wide range of regulatory and non-regulatory techniques. Consequently EPA must have a broader perspective. In solving environmental problems like habitat destruction, indoor air pollution, nonpoint source water pollution, and solid waste disposal, EPA will be only one of a number of Federal and state agencies with important roles to play. Thus EPA should do more to foster the cooperation among governmental entities that will be essential to the national effort to reduce environmental risks in the 1990s and beyond.
- Federal agricultural policies and programs could be revised to reduce or eliminate existing incentives for environmentally unsound farming practices, and to directly support efforts by farmers to control soil erosion and chemical runoff and to make greater use of low-input, sustainable farming practices.
- Environmental economics is a controversial, complex, and rapidly-evolving field. EPA should take the lead in developing methods of analysis that will give fair consideration to investments that will protect the natural resource base for future generations.

[For copies of the full Science Advisory Board report write to: The Science Advisory Board (A-101), U.S. EPA, 401 M St., SW, Washington, DC 20460.]

Nonpoint Source News-Notes is an occasionally published bulletin dealing with the management of nonpoint sources of water pollution. NPS pollution comes from many diffuse sources, generally caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and manmade pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and ground waters. NPS pollution is normally associated with agricultural, silvicultural, mining, and urban runoff. **NPS News-Notes**, Hal Wise, Editor, is published by the Nonpoint Source Information Exchange, (WH-553), Assessment and Watershed Protection Division, OWRS, Office of Water, U.S. Environmental Protection Agency, 401 M St. SW, Washington, DC 20460.

News of Congressional Actions

Congress Appropriates \$51 Million to Implement Nonpoint Source Program

The 101st Congress, after passing a budget/deficit adjustment measure, appropriated \$51 million to implement the nonpoint source program—§ 319 of the Clean Water Act—during FY 1991.

This amount represents an increase of about one-third over the \$37,974,922 that was made available for FY 1990. (This amount resulted after a 5.06% cut from the Congressional appropriation to accommodate requirements of the Graham-Rudman-Hollings Act.)

This year's appropriation specifically earmarks a portion of the appropriated funds for certain NPS activities:

- \$0.75 million for a management program for the Illinois River Basin
- \$1.25 million for a tristate region of Kansas, Iowa, and Nebraska
- \$1.0 million for a Rouge River Basin control demonstration (Region V)

EPA is in the process of preparing guidelines governing the making of § 319 grants to States. Draft guidelines were published in the *Federal Register* on August 28, 1990. The deadline for comments on the draft was September 27, 1990. Some seventy comments were received. Final grants guidelines, including a schedule and timetable for the grants process, are expected to be issued early in January.

Fifty-seven entities, including States, Territories, and the District of Columbia, are eligible to receive § 319 grants. All were funded during FY 1990, with the exception of the Virgin Islands whose Management Program was filed after the deadline. It is expected that all eligible recipients will be requesting funds during FY 1991.

Congress also appropriated \$7,000,000 to continue the Clean Lakes Program.

1990 Farm Bill Provides Opportunities for Linking USDA and EPA Water Quality Objectives

The Farm Bill's Water Quality Provisions

The 1990 Farm Bill, passed by Congress on October 25, 1990, contains strong water quality provisions and offers new opportunities to link USDA and EPA water quality programs in the States. The bill, hailed by many as the most environmentally-sound agricultural legislation ever passed by Congress, builds on existing USDA and EPA efforts and establishes a new Water Quality Incentives Program (WQIP).

The WQIP is perhaps the most promising feature of the new Farm Bill for addressing nonpoint source pollution and supporting State ground-water programs. The program requires USDA to provide technical assistance and up to \$3,500 in incentive payments to producers to develop and implement farm-level water quality plans. An additional \$1,500 in cost share payments is available for some practices.

1990 Farm Bill
(Continued)

Lands identified by States under Section 1428 of the Safe Drinking Water Act (Wellhead Protection Program) and Section 319 of the Clean Water Act are explicitly targeted under the WQIP. The program gives priority to lands on which

...agricultural production has been determined to contribute to, or creates, the potential for failure to meet applicable water quality standards or the goals and requirements of Federal or State laws governing surface and ground water quality, in consultation with State officials....

Other areas targeted are habitat areas for endangered or threatened species, and karst topography.

The farm water quality plans are to contain a description of farm resources, including soil characteristics and proximity to water bodies, quantitative water quality goals (to the extent practicable), water quality protection practices that will assist producers in complying with State and Federal environmental laws, and a timetable for implementing practices. The Act defines an "Agricultural Water Quality Protection Practice" as a "farm-level practice or system of practices designed to protect water quality by mitigating or reducing the release of agricultural pollutants, including nutrients, pesticides, animal waste, sediment, salts, biological contaminants, and other materials into the environment." Producers participating in the program will not have their crop acreage bases or program yields reduced.

In addition to the Water Quality Incentives Program, the Farm Bill contains a program for coordinating USDA programs with State water quality programs, greater planting flexibility to allow crop rotations, new environmental targeting criteria for the Conservation Reserve Program (CRP), an environmental easement provision, and sustainable agriculture research and education programs. Other environmental features include a new wetlands reserve program, modifications to swampbuster, pesticide recordkeeping for certified applicators, and an organic food certification program.

Some News-Notes Editorial Observations

It is proper that the Farm Bill, in its Water Quality Incentive Program, uses essentially the same language used in Section 319(a) of the Clean Water Act where the States are instructed to include in their NPS Assessment Reports

...those...waters...which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of this Act.

In addition, the Wellhead Protection program requires State programs to describe technical and financial assistance and

...implementation of control measures...to protect the water supply within wellhead protection areas....

These statutory references suggest that the implementation of plans under the Farm Bill should be targeted toward achieving specific water quality protection goals under EPA's water quality statutes.

EPA should join with the States and USDA to develop workable processes to employ State water quality standards for guiding program implementation and measuring program success.

1990 Farm Bill
(Continued)

The broad statutory mandates of the Farm Bill will require on-going participation by EPA. Currently, EPA is contributing to newly established USDA inter-agency implementation workgroups to develop national regulations for the Farm Bill. This process is expected to set the stage for participation by State water quality agencies in identifying priority areas for farm water quality plan development. If properly targeted to State priorities, the WQIP, and the CRP as well, should provide effective tools for addressing agricultural nonpoint sources of contamination of ground and surface water.

However, some organizational and coordination issues may impede such possible and desirable implementation. Prioritization will be crucial since the program has a limited enrollment goal of 10 million acres nationally—meaning the effectiveness of the program will hinge on careful selection of areas contributing most to water quality degradation. EPA is currently working with USDA to establish a process that involves State participation to identify eligible lands.

The process will need to include State water quality officials familiar with their States' priority needs. Coordination with the States is also necessary to determine the content of the farm water quality plans. The statute requires that the plans contain a description of practices that will "assist [the] producer in complying with State and Federal environmental laws." The farm plans in each State will have to reflect individual State environmental laws and regulations.

Undoubtedly, other issues will surface. Discussions must be open and continuous, and be conducted in a commonly understood language—in the interest of water quality.

Coastal Zone Reauthorization Contains New State Requirements for Coastal NPS Management; EPA-NOAA Share Federal Coordination

Congress has enacted the Coastal Zone Act Reauthorization Amendments of 1990, which contain a new Section 6217, entitled *Protecting Coastal Waters*, that requires each coastal State (including the Great Lakes States) with an approved Coastal Zone Management Program to develop a new *Coastal Nonpoint Pollution Control Program*. These programs will become amendments to both the State's existing

- Coastal Zone Management Program (prepared pursuant to the Coastal Zone Management Act), and
- Nonpoint Source Management Program (prepared under Section 319 of the Clean Water Act)

The legislation further provides that States' Coastal Zone Management Programs must contain enforceable policies and mechanisms to implement the applicable requirements of the States' Coastal Nonpoint Pollution Control Programs.

Key to the legislation is the requirement that State Coastal Nonpoint Pollution Control Programs will "develop and implement management measures for nonpoint source pollution to restore and protect coastal waters working in close conjunction with other state and local authorities." Guidance "for specifying management measures" is to be prepared by EPA, in consultation with the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce, Interior's Fish and Wildlife Service, and other Federal agencies. The Guidance is to be proposed within six months (early May 1991) and made final not later than eighteen months (early May 1992) after enactment of the statute.

The scope and effect of the Guidance on management measures is far-reaching. Most importantly, the legislation defines "management measures" to mean

economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollution reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.

EPA is to include, among other things, quantitative estimates of the pollution reduction effects and costs of each management measure. Once EPA's Guidance is written, each State's Coastal Nonpoint Pollution Control Program must implement management measures conforming with the Guidance, as well as additional management measures that are applicable to the State's land uses and critical coastal areas.

In addition to the development and implementation of NPS management measures, the Coastal Nonpoint Pollution Control Programs must

- Identify land uses which, individually or cumulatively, may cause or contribute to the degradation of coastal waters
- Identify critical coastal areas adjacent to coastal waters for which additional management measures will be provided
- Provide for the implementation of additional management measures that are necessary to achieve and maintain applicable water quality standards
- Provide for technical assistance to local governments and the public for implementing additional management measures
- Allow opportunities for public participation in all aspects of the program
- Establish mechanisms to improve coordination among relevant State agencies and between State and local officials
- Offer a proposal to modify boundaries of the State coastal zone as the State coastal agency determines necessary to implement recommendations made by NOAA. (NOAA is required to review State coastal zone boundaries and make recommendations to the State within 18 months of enactment of the law [May 1992].)

States are to submit their Coastal Nonpoint Pollution Control Programs to NOAA and EPA not later than thirty months following publication of the final Guidance. Each program will be subject to approval by both NOAA and EPA.

NOAA and EPA are instructed to withhold progressively increasing amounts of their program funds (up to 30 percent) from States that fail to develop approvable Coastal Nonpoint Pollution Control Programs within five years (i.e., beginning with FY 96 funds). Withheld funds will be made available to States with approved programs.

In addition, the two Federal agencies are to provide technical assistance to coastal States and local governments, including help on methods and land use controls

- To assess water quality impacts associated with coastal land uses
- To assess the cumulative water quality effects of coastal development

- To predict and assess the effects of coastal land use management measures on coastal water quality and designated uses

NOAA and EPA will also maintain, and periodically revise, an inventory of model ordinances and provide other assistance to coastal States and local governments in identifying, developing, and implementing pollution control measures.

On October 26, 1990, Congressman Gerry Studds (D-MA), manager of the measure, clarified the intentions of Congress on the floor of the House. His explanation included the following key observations:

- Section 6217 is drafted as a free-standing provision of law, rather than as amendments to the Coastal Zone Management Act or the Clean Water Act.
- Its central purpose is to strengthen the links between Federal and State Coastal Zone Management and water quality programs and to enhance State and local efforts to manage land use activities that degrade coastal waters and coastal habitats. In this connection several points should be made:
 - First, the responsibility for developing and implementing land use management measures rests solely with the States, not with NOAA or EPA.
 - Second, the management measures are required—at a minimum—to conform to and comply with guidelines established by EPA.
 - Third, both the program and the management measures are to be integrated closely with other Clean Water Act and Coastal Zone Management programs. Thus, the new program will not and ought not to bear the full burden of restoring and maintaining coastal water quality, but will operate instead in conjunction with controls on point sources established under the Clean Water Act and associated State programs.
- States are to identify land uses and critical areas potentially affecting water quality. In these cases the law requires States to implement additional measures to achieve and maintain applicable water quality standards and to protect designated water uses beyond those required in the core program. These additional measures will be developed by the individual States, tailored to the specific problems they must solve, and built upon technical Guidance provided by EPA and NOAA.

[For more information contact: Ann Beier, Assessment and Watershed Protection Division (WH-553), or Kathy Minsch, Office of Marine and Estuarine Protection (WH-556F), both at U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phones: Beier—(202) 382-7107, Minsch—(202) 475-9552; or Laurie J. McGilvray, Office of Ocean and Coastal Resource Management, NOAA, 1825 Connecticut Avenue, NW, Washington, DC 20235. Phone: (202) 673-5130.]

GAO Reports to Congress on EPA's NPS Program

The United States General Accounting Office (GAO) has just released a report on EPA's management of nonpoint sources of water pollution. The report was prepared upon request of the then Chairman and Ranking Minority Member of the Subcommittee on Investigations and Oversight of the House Committee on Public Works and Transportation.

Dated October 1990, the report is titled "**WATER POLLUTION—Greater EPA Leadership Needed to Reduce Nonpoint Source Pollution [GAO/RCED-91-10].**" Its four brief chapters cover

1. Introduction, Objectives, Scope, and Methodology
2. Barriers Impeding State Efforts to Control Nonpoint Source Pollution
3. Addressing Nonpoint Source Pollution by Coping With Sensitive Land Use Issues
4. Strengthening EPA's Efforts to Control Nonpoint Source Pollution

The report makes a series of recommendations to the Administrator of EPA:

To address the nation's water pollution in a manner that better reflects the risks posed by nonpoint source pollution, we recommend that the Administrator, EPA, identify appropriate funding levels that will allow the agency to pursue key objectives of an effective nonpoint source agenda that have heretofore made little progress under existing funding constraints. Specifically, the Administrator should set funding levels that will allow the agency to accelerate its efforts to

- *Resolve problems arising out of conflicts between the policies of federal agencies and water quality goals;*
- *Develop nonpoint source pollution criteria so the states can develop and implement nonpoint source water quality standards;*
- *Develop monitoring techniques to help states determine the extent of their nonpoint source pollution problems and the effectiveness of corrective actions; and*
- *Develop its [EPA's] program to educate the public about the health and environmental impacts of nonpoint source pollution.*

The report is available from GAO. The first five copies are free; additional copies are \$2 each. Send order to the address below, accompanied by a check or money order (if necessary) payable to the Superintendent of Documents. Orders for 100 or more copies to be mailed to a single address are discounted by 25 percent.

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877

Orders may also be placed by calling (202) 275-6241.

Some Agricultural Notes

A Quick Soil Test for Nitrogen

A new, quick approach to soil nitrogen (N) testing has been developed and implemented for use on corn in some northeastern and midwestern States, according to Francis Thicke, National Program Leader, Soil Science, USDA-Extension Service, Washington, DC. The Pre-Sidedress Soil N Test (PSNT) promises to be a useful tool to help farmers avoid overapplications of nitrogen fertilizers that could lead to ground-water contamination. The PSNT was pioneered in Vermont, where University of Vermont soils specialists say it is a key to economical, environmentally sound nitrogen fertilizer use. In Iowa the Extension Service calls it "the late-spring soil test for N availability."

Quick Nitrogen Testing
(Continued)

The PSNT requires sampling for nitrates to a shallow soil depth soon before applying sidedress N, necessitating a fast sampling/analysis turnaround. The test has been characterized as an *in situ* N mineralization test and an index of N availability. The breakthrough promised is an accurate prediction of how much N is needed, beyond which additional N is not utilized.

A total of 756 plots were evaluated in Iowa during 1985 and 1986. This research was reported by A.M. Blackmer, et. al., Department of Agronomy, Iowa State University. Across all data collected, the evaluations showed that nitrate concentrations could explain 82 percent of the variability in the relative corn yields. These findings indicate that this soil test offers great potential for improving N management in the Corn Belt.

According to Thicke, the PSNT is currently recommended only for corn between 6 and 12 inches tall, to be used after the period of rapid formation of nitrate and after the major losses of nitrate that often occur during the spring. This is still early enough to allow more N sidedressing if needed. Therefore, the PSNT serves as an index of the capacity of soil to supply nitrate during the corn growing stage.

Vermont Extension Soils Specialist Bill Jokela recommends taking representative soil samples to a depth of 12 inches. Several States' testing instructions reveal that most of them send samples to laboratories for testing. Iowa and Pennsylvania instructions note that farmers can administer the test themselves if they use the proper soil testing kit developed for this test.

The PSNT has been adapted for routine use by the northeastern States of Vermont, Connecticut, Pennsylvania, Maine, and Rhode Island, as well as by Iowa in the midwest, Thicke says. Michigan is using a soil N test that determines the residual N in the soil and credits this N against the crop N fertilizer needs. Wisconsin and Missouri have developed pre-plant soil nitrate testing procedures. Minnesota, New York, Ohio, Wisconsin, Maryland, and Virginia are currently researching the PSNT.

Bert Bock, Senior Project Leader, Tennessee Valley Authority, states that the PSNT is superior to laboratory incubation procedures evaluated so far and to the early-season basal stalk nitrate test. A problem, Bock says, can occur with excess precipitation just before soil sampling: such precipitation can move N out of the top foot of soil, but not out of the root zone. The PSNT is most reliable with high test levels.

Overall, many say the most important use of the soil test may be to reduce excessive applications of N fertilizer by showing when additional N is not needed.

[For further information contact: Francis Thicke, National Program Leader, Soil Science, USDA-Extension Service, Rm. 3346-S, Washington, DC 20250. Phone: (202) 447-5369; or Bert Bock, Senior

Three Mid-Atlantic States Initiate Nutrient Management Programs

Three mid-Atlantic States—Maryland, Pennsylvania, and Virginia—have initiated nutrient management programs to assist in reducing agricultural NPS pollution to Chesapeake Bay.

Although these programs primarily focus on water quality improvement, not agricultural production, effective nutrient management is also good economics, having proven profitable for many farmers. Authorities say that farmers often use more fertilizer than is necessary and apply it at a less-effective stage of plant growth. Nutrient management will help farmers effectively manage crop nutrients and reduce pollution potential.

Nutrients, in particular phosphorus and nitrogen, are major components of agricultural NPS pollution. Waterbodies can tolerate a certain level of nutrients. In fact, life within rivers,

Nutrient Management Programs (Continued)

streams, lakes, and bays could not exist without nutrients. But too much nutrients causes ecological problems and harms aquatic life. Calculations indicate that 67 percent of the nitrogen and 39 percent of the phosphorous entering Chesapeake Bay originate from nonpoint sources, with agricultural cropland producing a large portion of the pollutant load.

The three State programs help farmers manage crop nutrients effectively. The Chesapeake Bay Agreement of 1987 established an overall target of a 40 percent nutrient reduction entering the mainstem of the bay by the year 2000. The nutrient management programs will help the Bay States meet this goal.

Maryland's Nutrient Management Program

The agricultural portion of Maryland's Statewide NPS nutrient management program is administered by the State Department of Agriculture. This agency has a contract with Maryland's Cooperative Extension Service (CES) to provide assistance to farmers to develop nutrient management plans. One CES program manager and 15 nutrient management consultants (extension employees) are assigned to county CES offices throughout the State.

The program has been in operation since June 30, 1989. To date Maryland has seen the preparation of 748 plans, covering 49,966 acres of cropland. During the first year of the nutrient management program, plans were prepared for any farmer seeking such assistance. However, starting in June 1990, the first priority will be to prepare the required management plans for those farmers applying for State cost sharing funds for all animal waste storage BMPs, e.g., animal waste lagoons and poultry waste storage structures.

As a second priority, CES staff will also prepare nutrient management plans for any farmer requesting such planning assistance outside of the cost sharing program.

Nutrient management plans developed under Maryland's nutrient management program include the following components:

- A manure test for total nitrogen (N), ammonium (NH_4^+), phosphorous (P_2O_5), potassium (K_2O), and 8 micronutrients
- Soil analysis—university laboratory tests for P_2O_5 and K_2O , organic matter soil texture, pH, and starting in 1991 a nitrate [N] test to adjust N side dress recommendations
- A crop history summarizing previous and current crops and manure management
- Comments, notes and guidelines
- Documentation for a Statewide nutrient management data base
- Personalized service and attention from consultants to every interested producer in the State

Nutrient Management Program in Pennsylvania

Since 1985, Pennsylvania has been administering a State cost share program funded in part by EPA's Chesapeake Bay Program. C. Victor Funk, Chief, Division of Chesapeake Bay and Agricultural NPS Programs, Pennsylvania Department of Environmental Resources, Bureau of Soil and Water Conservation, notes that these funds support the installation of agricultural BMPs. Cost sharing is not available throughout the State, but rather within selected priority watersheds responsible for the most nutrient inputs to Chesapeake Bay (28 counties). Within these watersheds, landowners must design and implement nutrient management programs in order to receive cost share payments. Such nutrient management programs are covered by

contracts entered into by the landowner and the conservation district and are required to be followed for the life of the BMPs installed (up to 10 years).

Included in these nutrient management programs are

- A manure and waste summary (the amount of manure to be land-applied)
- A standard manure test done at commercial laboratories for N, P, and K content in the manure
- Soil tests done at commercial laboratories for P and K and a “quick N test” during the growing season
- A recommended nutrient application summary
- Provisions for documentation to verify nutrient and pollution reductions

Technical assistance in developing nutrient management plans is provided by conservation districts with Chesapeake Bay funds. A major educational program funded in Pennsylvania is the mobile nutrient laboratory, providing rapid analyses of soils, water, and manure.

The lead agency for the NPS program in the Commonwealth of Pennsylvania is the Department of Environmental Resources.

The February 1990 issue of *NPS News-Notes* (#3) carried a report on Pennsylvania’s Manure Management General Permit Program.

Virginia Adds Pest Management To Nutrient Requirements

A new law enacted in the Commonwealth of Virginia, the Chesapeake Bay Preservation Act, requires farmers in the 13 coastal plain counties to include pest management as well as nutrient management plans.

Russ Perkinson, Nutrient Management Program Manager, Virginia Division of Soil and Water Conservation, says that nutrient management plan requirements are implemented through three mechanisms:

- Since January 1989, nutrient management plans have been required of individual farmers Statewide seeking State cost sharing funds to install animal waste BMPs
- A tax credit law passed in early 1990 allows tax credits for purchases of specified farm equipment, e.g., manure and pesticide spreaders; to qualify for the tax credit, farmers must have nutrient management plans approved by their local conservation district
- The Chesapeake Bay Preservation Act, effective September 20, 1990, requires farmers in the coastal plain counties to develop “water quality management plans” with
 - Integrated pest management plans
 - Conservation plans
 - Nutrient management plans

Perkinson says Virginia is currently testing the “quick N soil test” developed in Pennsylvania and in Iowa. (Ed Note: This is the same test as the PSNT discussed in the preceding article.)

[For more information contact: Maryland—Mitch Woodward, Coordinator, Nutrient Management Program, University of Maryland CES, 1103-B H. J. Patterson Hall, College Park, MD 20742. Phone: (301) 405-1319, FAX (301) 314-9041; Pennsylvania—C. Victor Funk, Chief, Division of Chesapeake Bay and Agriculture Nonpoint Source Programs, Department of Environmental Resources, Bureau of Soil and Water Conservation, P.O. Box 855, Harrisburg, PA 17105-8555. Phone: (717) 540-5080; Virginia—Russ Perkinson, Nutrient Management Program Manager, Department of Conservation and Historic Resources, Division of Soil and Water Conservation, 203 Governor St., Suite 206, Richmond, VA 23219. Phone: (804) 371-0061.]

Wisconsin and Minnesota Prepare Farmstead Assessment Worksheets; States Evaluating System for Pilot Use

Wisconsin and Minnesota have prepared pilot versions of worksheets to assist farmers in assessing the effectiveness of farmstead practices in protecting drinking water, according to Susan A. Jones, U.S. EPA and University of Wisconsin-Extension, Madison.

Some agricultural practices can result in high risk to ground water and drinking water supplies, while others present low risk—or even no risk at all. Jones indicated that some of the information that farmers enter into their worksheets will be reassuring and some of it may encourage modification of practices. “Either way,” she says, “farmers will have the information they need to do the best possible job of protecting the ground water they depend on for their family’s drinking water supplies.”

The Farmstead Assessment System (Farm-A-Syst) is a series of 12 worksheets each covering distinct farmstead structures and/or practices. When completed, the worksheets can provide farmers with an accurate, firsthand assessment of how their own practices, such as pesticide storage and livestock yard management, might be affecting their drinking water.

Accompanying each worksheet is a separate publication with recommendations on modifying practices to minimize farmstead pollution risks, and suggested sources for additional information.

According to Jones, ten of the worksheets help assess the ground-water pollution potential of individual farmstead structures and activities:

1. Drinking water well condition
2. Pesticide storage and handling
3. Fertilizer storage and handling
4. Petroleum product storage
5. Hazardous waste management
6. Household wastewater treatment
7. Livestock waste storage
8. Livestock yards management
9. Silage storage
10. Milking center wastewater treatment

A separate site evaluation worksheet (#11) helps farmers assess how their own soil and geologic features affect ground-water pollution potential. The overall evaluation worksheet (#12) combines the results of the other worksheets, allowing farmers to look at each potential source of contamination in light of particular site conditions and then to compare potential contamination sources to see where improvements are needed most. Farmers can then determine where to spend time and money most effectively to protect the ground water that provides farmstead drinking water supplies.

Farmers should plan to spend about 15-30 minutes to complete each worksheet, Jones says. Worksheets #11 and #12 will take additional time, as will reading the management information provided with each assessment worksheet.

Tom Davenport, Region V NPS coordinator, Chicago, notes that Farm-A-Syst is a cooperative project of the University of Wisconsin-Extension, Cooperative Extension and the Minnesota Extension Service. Partial funding was provided by EPA Region V and EPA Great Lakes National Program Office. The Wisconsin Department of Natural Resources and the Minnesota Pollution Control Agency also provided funding support.

Pilot versions of Farm-A-Syst are being evaluated in Wisconsin and Minnesota. Use of Farm-A-Syst is also being incorporated into USDA national water quality demonstration and hydrologic unit projects in both States, according to Jones.

[For more information contact: Susan A. Jones, U.S. EPA and University of Wisconsin-Extension, Environmental Resources Center, Agriculture Hall, Room 216, 1450 Linden Drive, Madison, WI 53706. Phone: (608) 262-2031.]

USDA Establishes Water Quality Information Center at the National Agricultural Library

*Janice Kemp is the Coordinator of the newly established **Water Quality Information Center (WQIC)** located in Beltsville, MD. She sent News-Notes an announcement and outline of their intended services and asked us to contact them if we were interested.*

Our immediate answer was "yes." We have arranged to get together to begin what promises to be a long and fruitful dialogue and collaboration.

We herewith pass on to our readers some of the information she supplied to us.

What is the Water Quality Information Center?

The WQIC is part of the National Agricultural Library (NAL)....The Center was established in FY 1990 as a part of USDA's coordinated plan responding to the Presidential Initiative on Water Quality. WQIC anticipates serving as a focal point in the dissemination of information related to water quality and is seeking ways to facilitate communication among interested professionals, organizations, and members of the general public.

What can WQIC do for you now?

Although some services are still in the design stage, the Center staff can help you in a variety of ways. For example, they can

- Assist you in finding information on a specific topic related to water quality. This may include performing brief, complimentary searches of computerized databases or more exhaustive searches on a cost recovery basis.
- Refer you to organizations or experts in the field who can provide additional information.
- Identify current research and applied projects conducted by USDA and other agencies.
- Determine the status of pending legislation related to water quality.
- Connect you to others interested in water quality through the water quality conference on NAL's electronic bulletin board.

How can you help expand WQIC services?

Because this Center is in its formative stages, it is an opportune time to share your ideas about what kind of information is needed, who needs it, and in what format it would be most useful. If you have information needs that are not currently being met, please share these with us. If you are an information provider, we are interested in exploring how we can work together to disseminate existing information to those who need it. Call or write to us at

**Water Quality Information Center
National Agricultural Library, Room 1402
Beltsville, MD 20705
(301) 344-4077**

We at NPS News-Notes urge you to contact us here and to contact Janice Kemp directly at WQIC concerning your needs and thoughts. We'll let you know of new developments and services as they occur.

Notes on Ground-Water/Surface-Water Interaction

Polluted Ground Water Can Cause Polluted Surface Water

Ground water is a significant mechanism for carrying nonpoint source contamination to surface water. According to the U. S. Geological Survey, 40 percent of the average annual streamflow nationwide is from ground water. In humid areas such as the eastern seaboard and north central region, ground water may contribute as much as 90 percent of streamflow during some seasons.

This high degree of interaction means that contaminated ground water can discharge into and contaminate surface water, including streams, lakes, and wetlands. Because of this danger, EPA Deputy Administrator Hank Habicht, in an introduction to EPA's *Ground-Water Protection Principles*, declared, "Ground water should also be protected to ensure that ground water that is closely hydrologically connected to surface water does not interfere with the attainment of surface water quality standards, which are designed to protect the integrity of associated ecosystems." Unless this ground-water contribution is recognized, management strategies and Section 319 projects and assessments done in support of waste load allocations intended to correct surface water problems may be ineffective.

To assist the Nonpoint Source Program and the States, EPA's Office of Ground-Water Protection has prepared a summary of methods for measuring ground-water discharge to surface water. Only tested methods that have been used in a variety of settings throughout the United States are included. These methods include:

- The use of seepage meters or mini-piezometers to measure ground-water discharge to surface water through the stream or lake bed
- Hydrograph separation, regression analysis, or mass balance approaches to estimate the contribution of ground water to stream flow
- Ground-water quality sampling and measurements of ground-water flux to estimate loading of contaminants to surface water
- Geophysical techniques (seismic waves, electrical charge, conductance)
- Numerical models of surface-water/ground-water interactions
- Empirical functions estimating ground-water non-point source loading to surface water for various land use types
- Environmental isotopic methods to estimate the contribution of ground water to stream flow

Many of these methods can also be used to measure or estimate surface-water recharge of ground water.

A limitation common to all the assessment methods is the high degree of uncertainty inherent in quantifying ground-water discharge. Aquifer hydraulic conductivity and other hydrogeologic parameters can vary significantly over small distances. In addition, if different methods are used to measure hydraulic conductivity, the resulting estimates may vary significantly. Errors inherent in using current ground-water measurement techniques can be greater than 50 percent. Nevertheless, the estimates obtained are useful in screening for more extensive investigation and analysis.

Groundwater
(Continued)

Hydrograph separation and ground-water monitoring techniques are two methods that require low to moderate resources. These methods may be thought of as "first tier" approaches for conducting nonpoint assessments to provide an overview of the magnitude of pollution within a watershed. These methods may then be supplemented with more resource-intensive techniques either to add to the data set characterizing the watershed or to gather more site-specific information. EPA's Office of Ground-Water Protection is presently developing training for the States on how to use these two methods. Training courses will be held at various locations in the U.S. during mid-1991. Times and places will be announced in future issues of *NPS News-Notes*.

[For more information contact: Chuck Job or John Simons, WH-550G, Office of Water, U.S. EPA, 401 M. St., SW, Washington, DC 20460.]

Notes from the States and Localities (where the action is)

Milwaukee River South Declared a Priority Watershed in Wisconsin

Together, Wisconsin's Department of Natural Resources-Southeast District and Ozaukee County recently have pointed out that the Milwaukee River still has serious water quality problems. Although upgraded treatment systems have greatly reduced point source pollution from industrial discharges and sewage treatment plants, the river and many of its tributaries still do not meet water quality standards for swimming and fishing. Much of the remaining pollution comes from runoff from streets, construction sites, industrial storage piles and farm fields.

The river has been designated as one of Wisconsin's Priority Watersheds funded by the State's Nonpoint Source Water Pollution Abatement Program, which helps landowners and local governments correct nonpoint source pollution problems.

The Milwaukee River South Watershed Plan provides that

...urban and rural areas must work together to restore water quality and fish and wildlife habitat in the river and its tributaries. The goal set for sediment and heavy metal reduction is an ambitious 50%. The goal set for nutrient (phosphorus) reduction is an even more ambitious 50% to 70%. To achieve these goals, the plan recommends cleanup programs for existing cities and farms and preventative programs for new development.

The Plan's two elements are labeled the City Cleanup Program and the Farm Cleanup Program, both clearly interdependently related to the overall goal of a clean, fishable, and swimmable Milwaukee River.

The City Cleanup Program has four elements:

- Local controls on construction erosion
- Improving stormwater management
- Better urban housekeeping
- Streambank erosion

Similarly, the Farm Cleanup Program also has four elements:

- Practices to control eroding farm fields
- Controlling manure runoff

Milwaukee River South
(Continued)

- Nutrient and pesticide management
- Streambank repair and fencing

A recent newsletter for citizens and local governments explained the problems and proposed solutions under each of the Plan element headings. To illustrate the approach taken, here is a select portion of what was said about urban construction:

Construction is Leading Sediment Source

Eroding construction sites deliver more sediment to streams in the Milwaukee River South Watershed than any other source including farm fields. About 16,000 tons per year or 62% of the sediment comes from construction sites, compared to 3,000 tons or 13% from cropland. The 16,000 tons of soil from construction sites would fill 800 dump trucks.

Similar problem statements for each of the Plan's elements were set forth: "Street Runoff Can be Toxic," "Increased Urban Runoff Scours Streams," and "Eroding Cropland Smothers Fish Spawning Sites," for example. Control program possibilities and desired solutions are then outlined, and the effectuating entities and their roles identified.

Editor's Observation

This outstanding example of the *watershed* approach to nonpoint source management

- Starts with understanding of the condition and problems of the watershed's receiving waters
- Develops action programs and control goals aimed directly at the individual problems identified
- Assigns responsibility for implementing the programs to an entity or level of government best able to communicate with the actors involved and to effectuate the control programs

Importantly, the Plan illustrates the necessity of involving all segments of the watershed community, and an understanding that all groups of players are interdependent in improving river water quality. Thus, community-wide ownership of the troubled river is assured and successful solutions hastened.

[For more information contact: Jim D'Antuano, Wisconsin DNR-Southeast District. Phone: (414) 263-8707, FAX: (414) 263-8483; or Andy Holschbach, Land Conservation Department, Ozaukee County, Wisconsin. Phone: (414) 284-9411.]

In California, They're Recreating Wolf Creek

Debra Caldon, who until her recent move to the private sector was Nonpoint Source Coordinator with EPA's Region IX in San Francisco, has passed on the following information on a major public-private, water quality and ecological restoration project in northern California's Plumas County.

According to the *Sacramento Bee*, Wolf Creek, a tributary of the Feather River in the lower reaches of the Sierra-Nevada Mountains and a "sadly rutted stream nearly barren of fish and plant life," is being recreated through renovation and rebuilding.

The *Bee* reported in early October that the creek had fallen victim to

...nearly a century of upstream mining and cattle grazing, logging and road building....With each passing season the current carried more sediment away from mountain meadows, sharpening the creek's knifelike force and cutting deeper into its banks. Efforts to slow the erosion by straightening the channel and riprapping the banks only increased the erosion downstream.

*Wolf Creek
(Continued)*

"This watershed project represents the 'state of the art' for the restoration of our environment," commented Caldon. "The project combines community grass roots involvement with innovative 'small' technology to repair the results of past thoughtless and uncontrolled nonpoint source runoff." She continued to say that "by restoring important habitats, including mountain wetlands, we can begin to undo yesterday's hydrological modifications that have upset nature's ecological balance. This is a clean water project in the best sense of the word."

The \$400,000 watershed undertaking is being funded and otherwise assisted by a significant variety of public and private entities. According to Caldon, the State Water Resources Control Board has supplied \$90,000 in Nonpoint Source Management Funds provided through Clean Water Act Section 205(j)(5) monies. The California Department of Water Resources provided an additional grant of nearly \$100,000 to the Greenville Community Services District. Pacific Gas and Electric Company donated \$80,000 for design, construction, and administration costs. Other funding sources include USDA's Plumas National Forest and Soil Conservation Service.

The undertaking is designed to re-establish the creek's natural channel and restore it to permanent good health. "We're breaking every bone in its body to fix it, but we're fixing it" said Leah Willis, an economic development specialist with Plumas Corp., a non-profit economic development entity coordinating the work.

In addition to the number of cooperating agencies, the Wolf Creek improvements have attracted a broad base of community support. According to the Sacramento *Bee* story

[L]oggers felled the trees which were donated by the U.S. Forest Service. Gold miners donated the rocks which were hauled to the site by a local unit of the Army National Guard. Local high school students are reseeding the creek banks; they will also conduct pool riffle surveys and measure channel widths in a 10-year monitoring program.

Dave Rosgen, termed a "maverick Colorado cowboy-turned-hydrologist," conceived and designed the project. The *Bee* reported that

Rosgen's goal on Wolf Creek is to lengthen the channel by building back its natural bends. Boulders strategically placed across the channel are designed to dissipate the creek's erosive energy and roll the current from bank to bank. Rosgen has also built in floodplains to give the water someplace to go during high flows.

"This is the first time that people have pooled their money and energy to solve a common problem in a creek that no individual could do alone," said Rosgen. "They will end up creating their own strong river ethic, and having an ownership in Wolf Creek."

[For more information contact: Leah Wills, Plumas Corp., P.O. Box 3880, Quincy, CA, 95971. Phone: (916) 283-3739.]

Murray, Utah To Reestablish Ecosystem Along Jordan River, South of Salt Lake City

Murray, UT is a thriving suburb of 31,000 people a few miles south of Salt Lake City. It is located along the Jordan River and its floodplain, a long-neglected and abused piece of real estate. The Jordan River is only about 40 miles long, largely in Salt Lake County. Its watershed is both urban and rural, lying between Utah Lake and Great Salt Lake along the Wasatch Front.

Urban Open Space Complex To Be Created

The State of Utah's Nonpoint Source Water Pollution Control Management Program is participating, along with the City of Murray and other public and private groups, in the execution of a unique, long-range urban open space plan to reestablish the structural, functional, and visual characteristics of the Jordan River riparian and wetland ecosystem that existed prior to settlement.

*Jordan River, Utah
(Continued)*

When completed, the Jordan River Parkway will provide Murray residents with a 120 acre continuous open space corridor, over 2.3 miles long, linked together by a network of trails (note that in Murray, the term "parkway" is open space and not a highway). Wetlands are planned to become key elements in the compliance with stormwater discharge standards. Reopening the wetland to seasonal flooding during periods of high flow in the Jordan River will provide flood retention basins. Restoration of the complex native plant communities that once existed along the river will bring biological stability to the remnants of the floodplain, including the parkway area.

The corridor consists of seven segments. Plans for each of these recognize the present configuration of the corridor in relation to existing structures, taking advantage of remaining riparian, floodplain, and wetland features and the potential for their further reestablishment.

Within the parkland complex, a wide range of uses are planned. In addition to wetland and terrestrial wildlife habitat, a trail and boardwalk system (for walking, running and cycling—separated from equestrian trails) will connect limited areas developed for picnics, play, and exercise. There will be observation blinds and a nature center as well as boat launching and docking facilities.

Parkway Began With A Golf Course

In 1973, Murray's then recreation director, Lynn Pett, had plans for a golf course. Yet the city had no property, no money, and no water rights. So, to start, a grant was obtained from the U.S. Department of the Interior's Land and Water Conservation Fund, which assists in local public recreation facilities development. At the same time, land along the Jordan River was donated. Help also came from Utah's Department of Transportation, which needed to eliminate 500,000 yards of dirt, as well as storm and ground-water in connection with the construction of a nearby segment of the interstate highway system. What was to become a 150-acre golf course was underway.

To remediate the loss of wetlands on the golf course and to meet Corps of Engineers requirements, five ponds and wetlands were constructed. The highway dirt was used to contour the golf course and to direct runoff. The wetlands and ponds filter highway stormwater and nutrient runoff from golf course irrigation before the water enters the Jordan River.

Since its opening in July 1986, the golf course has been the busiest in Utah, averaging 112,000 nine-hole rounds per year. Operation and maintenance costs average about \$450,000 per year, while 1989 gross revenues were close to \$900,000.

Lynn Pett is now Mayor of Murray City. This year golf course profits provided the backing for a new \$1.5 million city bond issue to buy and restore additional land in the planned Jordan River Parkway.

Meanwhile, more land has been donated and modest additional funding has been committed from the private sector by the local Jordan River Parkway Foundation, the National Association of Industrial and Office Parks, and the Riverway Enhancement Fund. In addition to the local bond issue the State has provided some funds through its Federal Section 319 Nonpoint Source Management Program and from mitigation fees collected by the State. Of \$12,000 awarded to Salt Lake County when pollutant materials leached into the Jordan River, Murray's share came to \$7,500. These funds are being used for stabilization of about 1,000 feet of streambank; this action, in turn, provides part of the local match for the EPA Section 319 grant to the project.

Community Pitches In

Students recently joined the Murray Rotary Club in cleaning up and planting wetland plants in one of the Parkway segments. Several nurseries have donated planting materials to reestablish streambank vegetation.

"We've become the model project for wetland restoration along the Jordan River," Mayor Pett explained. He hopes to get other youth and community groups involved. "We want everyone to come down and see for themselves just how clean the Jordan River really is," he said.

Mayor Pett hopes that implementation of Murray City's Master Plan will be the impetus that motivates other communities along the Jordan River to rediscover the river and undertake similar restoration projects.

Karen Hamilton is EPA's nonpoint source program coordinator for Utah, working out of Region VIII in Denver. She told *News-Notes*:

I am pleased that EPA was offered the opportunity to participate in a project which has such strong community support. Riparian and wetland functions which have largely been unrecognized since settlement have been severely degraded throughout the West. The many important values a healthy riparian corridor offers a community have not only been recognized, however, by the people of Murray City, but the community is working to restore and protect them. This town should be applauded for its leadership efforts.

[For more information contact: Mayor Lynn Pett, Murray City Municipal Building, 5025 South State Street, P.O. Box 57520, Murray City, Utah 84157-0520. Phone: (801) 264-2600; or Karen Hamilton, 8WM-SP, U.S. EPA, Region VIII, 999 18th Street, Suite 500, Denver, CO 80202-2405. Phone: (303) 293-1576.]

Minnesota Conducts Wildlife Contaminant Study with Help from State Hunters and Trappers

The Minnesota Pollution Control Agency (MPCA) is currently conducting a Statewide study to determine the concentration of PCBs, pesticides, and heavy metals in resident and migratory wildlife. The accumulation of contaminants in the tissues of animals can be used as an index to measure both the amount of environmental contamination and the potential hazard to these animals.

MPCA began conducting preliminary wildlife studies in the early 1980s. Data collected from the analysis of loons, turtles, and river otters indicated that some wildlife species are exhibiting signs of environmentally-induced stress. One hundred ninety-five loons have been collected for mercury (Hg) analysis (liver and feather samples) by MPCA since 1984. Some loons had levels exceeding 20 ug/g of Hg, which the U.S. Fish and wildlife Service (USFWS) has found to be detrimental to mallards. Liver Hg levels ran from 0.08 to 83.0 ug/g, and feather Hg levels ranged from 0.05 to 29.0 ug/g. Two female adult loons had liver Hg levels of 69.0 and 83.0 ug/g, and one juvenile male and juvenile female had liver Hg levels of 45.0 and 26.5 ug/g respectively. Fur samples collected from river otter at Voyageurs National Park had Hg levels as high as 75 ug/g. In addition, elevated levels of PCBs were found in the fat of Mississippi River snapping turtles.

The results of these preliminary studies, along with significant contaminant levels in wildlife found by other States and the USFWS, led the Legislative Commission on Minnesota Natural Resources to fund a two-year Statewide survey on contaminants in Minnesota wildlife. Wildlife species included in the study (which began in 1989) were waterfowl (diving and dabbling ducks), upland game (pheasant and ruffed grouse), big game (deer), furbearers (mink, river otter), and non-game (loons [found dead] and bald eagles [blood samples only]).

MPCA has appealed to the State's hunters and trappers for help in collecting wildlife specimens for the study. Those who volunteered to help were asked to register with the Agency's study coordinator and biologist, Keren Larson, who mails them instructions and materials.

"The response from the hunters and trappers was incredible," Larson said. She continued,

These people want to know what possible effects contaminants may have on these wildlife species. The first hunting season I asked for whole carcasses of pheasants. I had no idea what type of response I would get. Pheasant hunters in the State donated 108 pheasants that year! We have had cooperation from special interest groups such as Pheasants Forever, the Minnesota Trapper's Association, the Minnesota Deer Hunter's Association, State and Federal agencies such as the USFWS, MDNR, Wisconsin DNR, the Minnesota Department of Health, and the University of Minnesota. The broad response to our request for assistance will help us obtain an accurate Statewide sampling of these species in order to determine not only what contaminants are present and to what extent, but also to evaluate the potential of contaminants limiting wildlife reproduction or survival.

[Preliminary results of the study, Contaminants in Minnesota Wildlife 1989-1991, will be available in January. A final version is expected by summer 1991. For more information contact: Keren Larsen, Wildlife Contaminant Study Coordinator, MPCA, 520 Lafayette Road, St. Paul, MN 55155. Phone: (612) 296-6074.]

New York City Advances Watershed Protection Regulations to Protect Drinking Water From Nonpoint Source Pollution

The City of New York supplies high-quality drinking water to almost half of the population of New York State, including approximately eight million people in the City plus almost one million residents of upstate counties. This drinking water flows from a watershed area of over 1,900 square miles into three reservoir systems:

- The **Croton** system in Westchester, Dutchess, and Putnum Counties
- The **Catskill** system in Ulster, Greene, Delaware, and Schoharie Counties
- The **Delaware** system tributary to the Delaware River in Delaware, Ulster, Schoharie, and Sullivan Counties

The City has proposed to regulate land use activities within the reservoir watersheds that lie in the Counties listed above, "to prevent contamination or deterioration of the water and so to protect the purity of the drinking water supply and the health of those dependent on it."

Officials at the New York City Department of Environmental Protection's Division of Water Quality Planning commented to *NPS News-Notes* that

the proposed regulations are intended to ensure that the City's drinking water will continue to meet, well into the future, not only the Federal government's new very stringent standards as defined in the Environmental Protection Agency's Surface Water Treatment Rule and other regulations being issued under the Federal Safe Drinking Water Act of 1986, but also whatever drinking water standards the New York State Department of Health promulgates.

The proposed regulations would apply to any individual undertaking certain specified "regulated activities." The principal regulated activities include

- Construction of sewage disposal systems
- Construction activities that alter stormwater runoff

*New York City
Drinking Water
(Continued)*

- Storage or disposal of hazardous, pathogenic, or petroleum-based materials
- Application of pesticides, herbicides, and road salt
- Certain agricultural activities

Many of the provisions include thresholds. For example, storage of hazardous materials only over a specified volume is regulated; therefore various activities related to individual homes and homeowners are exempt.

The regulations specify that such activities must both

- a) Avoid causing the violation of water quality standards for water in the reservoirs, reservoir inflows, or controlled lakes
- b) Meet specific requirements (such as siting limitations) or process restrictions (such as nutrient removal in sewage disposal systems)

The burden will be on the person wanting to conduct a regulated activity to demonstrate that the standards will not be violated.

Regulated activities fall into four categories:

- Those which are prohibited or otherwise restricted in the watershed, such as the disposal of pathogenic or hazardous material or the siting of certain activities within specified distances from reservoirs or streams
- Those which require review and approval by the City, including sewage disposal and collection; stormwater runoff and drainage control plans and structures; certain applications of herbicides, pesticides, and aquatic herbicides; and the use of certain road deicing substances
- Those about which the City's Department of Environmental Protection must be notified—most notably oil spills and the storage of hazardous materials, pesticides, petroleum products, and deicing substances
- Those occurring on reservoirs and city-owned lands in the watershed

In addition, the regulations implement an anti-eutrophication policy relating to the maintenance of existing water quality, including the maintenance of phosphorus levels in waters receiving runoff at less than a specified "critical" level.

The City was granted the authority to promulgate and enforce these regulations by Article 11 of the New York State Public Health Law and Section 24-302 of the New York City Administrative Code, which was enacted by the State Legislature and therefore also has the effect of State law.

The "discussion draft" of the proposed regulations has been prepared by the City's Department of Environmental Protection and is currently being circulated for informal public review and comment, including review by the State of New York's Departments of Health and Environmental Conservation. The City hopes to conclude the informal review process by the spring and to issue final regulations later in 1991.

[For more information contact: Geoffrey Ryan, Office of Intergovernmental Relations and Public Affairs, New York City Department of Environmental Protection, 2454 Municipal Building, New York, NY 10007. Phone: (212) 669-2850.]

Arkansas River Headwaters Are Targeted for Cleanup From Hardrock Mining Nonpoint Source Runoff

Condition of the Headwaters

Above 13,000 feet on the Continental Divide in Colorado's Gunnison National Forest, snowmelt forms the headwaters of the Arkansas River, which becomes part of the Mississippi about one-third of a continent away after moving through major sections of Colorado, Kansas, Oklahoma, and Arkansas.

Several miles downstream from its commencement, before the river water passes through the town of Leadville at 10,000 feet, molybdenum mining has torn away half of an entire mountain, severely altered the stream channel, and introduced heavy metals into the water column.

Throughout the headwaters basin are innumerable other, now inactive, silver and gold mines which once contributed to the financial base of Denver and San Francisco. The legacy of hardrock mining is most apparent in huge piles of waste rock and tailings upon which mountain towns are and were built and through which streams flow, in countless smaller piles from exploratory shafts and smelter slags, and in mine drainage. Snowmelt, seeping into these honeycombed mountains, the piles of waste, and associated aquifers, are thus exposed to and leach enormous areas of mineralized rock containing heavy metals. It is no wonder that runoff from the piles and drainage from the mines forms an acid brew of heavy metals and iron sediment locally called "yellow boy." Thousands of stream miles are stained yellow and orange. Aquatic communities are depleted from acute and chronic exposure to mine runoff.

Use of the Headwaters Today

The upper Arkansas River Basin, a watershed bounded by some of North America's tallest mountains, contains 3,715 square miles of stunning scenery. The river provides drinking water to about 55,000 valley residents in Colorado and, through trans-mountain diversions, to a large part of the population in the Denver and Colorado Springs areas. Historically, the people were miners and ranchers, but recreation has today become increasingly important economically.

The Gold Medal Trout Fishery designation of the upper Arkansas River was lost because chronic heavy metal exposure limits the growth and reproduction of the brown trout population. Nevertheless, recreational use of the river continues to grow. On June 2, 1990, the State of Colorado and Interior's Bureau of Land Management entered into a unique agreement to jointly manage the upper Arkansas River Recreation Area.

Two mine drainages with high concentrations of heavy metals enter the Arkansas River near Leadville:

- **Leadville Drain:** The Bureau of Reclamation is spending about \$5 million to build an active treatment plant for Leadville Drain water
- **California Gulch:** This ravine receives drainage from Yak Tunnel, a Superfund site.

Chalk Creek, which enters the Arkansas River about 35 miles downstream from Leadville, is the focus of Colorado's first mining demonstration project under the State's Nonpoint Source Management Program.

On May 14, 1990, EPA, the Bureau of Reclamation, and the Colorado Departments of Natural Resources and Health signed an Upper Arkansas River Basin Water Quality Restoration Initiative Memorandum of Understanding (MOU). The goal of the MOU is to restore the brown trout fishery by improving water quality. The agencies have agreed to coordinate their efforts and cooperate on water quality projects in the headwaters basin.

Chalk Creek NPS Section 319 Demonstration Becomes a Model For Mine Cleanup; Project is Expanded

In the meantime, the State of Colorado's FY 1990 NPS Management Program includes the Chalk Creek mining demonstration project to consolidate, move away from the creek, and stabilize three large tailings piles left over from abandoned mining operations. Initial participants in the State project are the Colorado Mined Land Reclamation Division (MLRD), the Colorado Division of Wildlife, Colorado Geological Survey, Chaffee County, and the Colorado Department of Health (the State's NPS/clean water lead agency). EPA, with its approval of the State's NPS Management Program, is a party to the project and has provided Federal Section 319 NPS funding (with a required 40 percent State match).

The Chalk Creek project has now attracted the attention of other programs for several reasons:

- The project has strong institutional arrangements. With the Basin Restoration Initiative MOU and a detailed project plan in place, other interests find it easier to become involved.
- The site is not as environmentally complex as some others, although it certainly presents technological challenges. Hardrock mining problems can be particularly difficult to resolve due to the complicated interrelationships between surface and ground water.
- The site is not a Superfund site, which would add additional administrative complications, yet it is very similar to several Superfund projects.
- The creek is not a source of drinking water. Because the remediative measures for hardrock mining are often untested, it is advantageous to be able to demonstrate them where human health would not be a complicating consideration.
- In the past, during surges in the creek, there have been young trout fishkill episodes at a hatchery 10 miles downstream from the mining demonstration site. The presence of the hatchery has significantly contributed to the goal of restoring the creek. The hatchery also provides one of the quantitative goals for cleanup.

For all of these reasons, and probably more, the original project has become enlarged:

- The U.S. Forest Service, although not originally involved, has now offered to support the project with \$100,000 and habitat restoration efforts. (The project site is surrounded by the Pike-San Isabel National Forest.)
- EPA's Mining Waste Team, operating out of EPA's Office of Solid Waste (OSW)¹ in Washington, identified four priority action items:
 1. Multi-program integration
 2. Cyanide heap leach
 3. Superfund mining site guidance document
 4. Mine drainage tailings seepage sites (Chalk Creek)

OSW made a grant to the Colorado Department of Health in the amount of \$130,000. \$30,000 is for geographic information system development and data, while the remaining \$100,000 is to fund work to be developed under the four points outlined above.

- The U.S. Bureau of Mines (BOM) has agreed to contribute technical expertise, geophysical analysis, drilling equipment and operators, and is analyzing the baseline groundwater, seep, and wetland samples.

Hard Rock Mining
Nonpoint Source
(Continued)

- Within EPA's Region VIII itself there have been some changes. In addition to the nonpoint source staff originally committed to the project, additional EPA Regional Office staff have become actively involved from the ground-water, drinking water, and water quality standards programs.

Because drainage from the abandoned mine at the demonstration site may also be an important source of heavy metals (in addition to the leaching from tailings piles), and data is insufficient to understand the geohydrological system, one new goal of the Mining Waste Team's contribution to the nonpoint source project is to define and describe the geohydrological baseline. This information will be used to

- Develop a conceptual model that describes the geohydrological system controlling ground-water movement and discharge through the mine and tailings and then into Chalk Creek
- Refine the final design of the Chalk Creek nonpoint source demonstration project
- Assist in evaluating the effectiveness of the nonpoint source project and additional remediative measures

The EPA Mine Waste Team provides technical assistance both in the field and the lab as part of the grant it has contributed to the Chalk Creek project. MLRD continues to manage and coordinate the enlarged project for the State.

Now, because of the contributions to the baseline assessment phase of the project by BOM, more of the grant from the Mine Waste Team can be used to implement further pollution controls. Examples of controls to be considered are adjustable bulkhead for surge control and passive treatments using wetlands, "Bio-Fix," lime neutralization, or combinations of these remedies.

EPA Region VIII Administrator James J. Scherer has offered his comments on this innovative undertaking:

Participation by people from many programs and agencies has created an exciting project. We hope it will describe the environment of a site affected by hardrock mining so that the solutions can be predicted, and cost-effective measures implemented. We expect that the approach of this project will be used to develop a basin-wide strategy for water quality restoration of the entire upper Arkansas River Basin. We value the Arkansas River as a resource and it is apparent from the local, regional, and national participation that others share these values.

[For more information contact: Camille Meyer, Colorado Mined Land Reclamation Division, Department of Natural Resources, 1313 Sherman Street, Room 423, Denver, CO 80203. Phone: (303) 866-3567; or contact either Rob Walline, Mine Waste Program Coordinator (8WM) or Karen Hamilton (8WM-SP), both of U.S. EPA, Region VIII, Water Management Division, 999 18th Street, Suite 500, Denver, CO 80202-2405. Phones: Walline (303) 293-1694 and Hamilton (303) 293-1576.]

¹Editor's Note: The Western Governors' Association (WGA) has received funding from OSW to coordinate State participation and to begin strengthening State mining waste programs. Twenty-one States, including those with diverse mining operations such as Florida and Nevada, are participating. The States will be responsible for implementing the mining waste program.

Notes on Lawn Care

Dane County, Wisconsin Conducts a Lawn Care Field Day and Walking Tour

Lakes Monona, Waubesa, and Wingra are the pride of the 85-square-mile Yahara-Monona Watershed in Dane County, Wisconsin. This region is a State-designated *priority watershed* because of the importance of controlling nonpoint source pollution inputs to improve and protect its water quality.

One of the major threats to the water quality of these lakes is stormwater runoff from the residential areas and neighborhoods in the watershed—from front and back yards, roofs, driveways, sidewalks, and streets. To educate and enlist everyone's help in fighting this pollution problem, a Field Day and Walking Tour were held on September 16, 1990, focusing on *Lawn Care Alternatives*—"Protecting Water Quality in Your Own Backyard."

Dane County includes the City of Madison, the State's Capitol, and the University of Wisconsin, an area replete with dignified, tree-covered yards and lawns.

The event was coordinated by Dane County Extension, University of Wisconsin Nutrient and Pest Management Program, and Dane County Lakes and Watershed Commission. Funding was provided by a grant from the State's Department of Natural Resources to the Dane County Regional Planning Commission.

The Project Log, written by Karen Jankowski, one of the project coordinators, tells what goes into planning and conducting a highly successful neighborhood awareness campaign. We now unabashedly borrow (and somewhat paraphrase) from Karen's log to inform our readers about the steps involved in what sounds like a very useful and fun exercise:

- The Westmorland neighborhood was chosen because DNR (Wisconsin Department of Natural Resources) has firm data showing nonpoint pollution in the sedimentation pond below the neighborhood, including elevated bacteria counts, heavy metals, sediment, nutrient levels, and pesticide residues. Residential yards are a likely source for some of these contaminants.
- The Westmorland Neighborhood Association was contacted early on in the process, was very supportive and interested, and worked with the coordinators on publicizing project events.
- The University of Wisconsin (UW) Arboretum is less than three miles away, and its staff expressed warm enthusiasm for hosting a Field Day and providing an Exhibit.
- The coordinators (Mindy Habecker, Pamela Porter, Lloyd Eagan, and Jim Schroeder) walked through the neighborhood identifying obvious nonpoint pollution sources, i.e., "problem yards." Problems observed included slopes eroding into gutters, pet waste in the yards, downspouts directed towards streets and stormdrains, loose soil and poor vegetation cover failing to hold soil in place, over-fertilized and over-treated turf, heavy traffic areas and worn spots providing runoff channels to sidewalks, undermined sidewalks from soil wash outs, and others. Had it been autumn, leaves in gutters would have been singled out as well.
- Forty homes were chosen based on severity of problems. Each homeowner received a flyer describing the project and asking for homeowner volunteers to participate in the demonstrations. They were offered free expert advice from UW and Extension, technical consulting, and the services of a demonstration coordinator to facilitate implementation of mutually decided-upon changes. In turn, homeowners agreed to demonstrate hands-on water quality improvement techniques in their yards to several hundred visitors, to provide access to the media to widely publicize the Priority Watershed Project and homeowner involvement in water pollution abatement, and to host experts who would explain the demonstrations to the public on multiple Field Days.

*Lawn Care
(Continued)*

(An invaluable side benefit was for coordinators and project personnel to observed first-hand the effectiveness of the published suggestions for improving water quality in residential areas, and using this experience to publish an accurate, practical, and useful manual for residential water quality protection in the Yahara-Monona Priority Watershed. The manual, central to the project, will be widely disseminated to the public throughout the watershed.)

- Seven homeowners responded and four of these were chosen as participants, based on the severity and range of problems present. Three of these four decided to continue with the project and their yards became the three demonstration sites. They are within five houses of each other, an easy walk on the Walking Tour.
- Each homeowner was very enthusiastic and supportive of the project, and each had a separate vision of what they wanted their yard to look like and which of the equally effective options available to them they were willing to see applied to their yards. Incorporating the homeowners' ideas and preferences in the choices and options turned out to be of central importance in deciding upon the actual demonstrations.
- Additional written materials were prepared, including
 - A sign for homeowners lawns
 - A promotional flyer
 - A self-guided tour map
 - A program brochure
 - Identification placards (to place at each exhibit table and demonstration)
 - An educational booklet entitled "Better Lawns and Gutters: A Homeowner's Guide to Protecting Water Quality"
- To coordinate the Field Day on a very tight budget, plants, mulch, and other materials were obtained free (from the city or county) or at cost (from local commercial suppliers). Volunteers (from garden clubs and commercial contractors) generously installed the demonstrations and the homeowners agreed to cover all of the other costs of the demonstrations.

Field Day activities demonstrating how to protect water quality were held at UW Arboretum. The brochure highlighted the activities, including over a dozen experts answering questions, a Walking Tour of lawn care alternatives, exhibits about lawn care and water quality, and refreshments.

The *Walking Tour*, headlined with "you can make a difference and help reduce nonpoint pollution around your home," utilized the three demonstrations as follows:

- Home #1
 - Creating a pet waste free zone
 - Solving yard waste problems (composting, mulching, mulching mowers)
 - Revegetating hard-to-grow areas
 - Redirecting stormwater to reduce erosion and runoff
- Home #2
 - Reducing pesticide and fertilizer inputs with prairie plantings
 - Revegetating with native woodland plants
 - Proper pesticide use and disposal
 - Land use practices to protect ground water

Lawn Care ■ Home #3
(Continued)

- Soil testing and interpreting results
- Applying fertilizers properly
- Growing healthy turf with limited or no chemical inputs
- Household hazardous waste management

Pamela Porter, UW Extension and one of four overall project coordinators, commented on the experience.

We estimate that over 300 people attended the Walking Tour and at least 225 came to the Field Day exhibits. The greater numbers who attended the Walking Tour is a point of interest. It may be that a significant number of people learned about the Field Day and Walking Tour from neighborhood hear-say (at church, shopping, seeing the lawn signs and all of the yard work being done), giving credence to the use of demonstrations. People clearly enjoyed the Walking Tour; the opportunity for talking one-on-one with experts and seeing the practices in a "real yard."

Karen Jankowski's Project Log reported that

[t]he event received coverage in the Isthmus (front cover, lead-in), the Capital Times (page three story), the Wisconsin State Journal (story on front page of Look section). Descriptions of the event appeared twice on the evening news (Channel 3, WISC TV). The educational booklet, the Priority Watershed Project, and the sponsoring organizations received very favorable coverage, due both to careful planning by the coordinators I worked with, well-organized structure of the project events, and due to the importance and timeliness of the project.

To implement future Field Days will be rather simple, now that all of the pieces have been assembled. All of the demonstrations are in place and will look even better by next season. Future Field Days will be "turn-key" operations, requiring much less cost and effort than the first one.

[For more information contact: Pamela A. Porter, University of Wisconsin-Extension, Nutrient and Pest Management, 1575 Linden Drive, Madison, WI 53706. Phone: (608) 262-5200, FAX: (608) 262-7743.]

Reviews: Videos, Volunteers & Rural Clean Water Program

"Conservation on Your Own" Video for Farmers

Farmers like getting information from videotapes and prefer being able to watch them in their own home, according to a recent cooperative study by the National Association of Conservation Districts (NACD) and the USDA Soil Conservation Service (SCS). The study featured an educational videotape, "Conservation On Your Own," which instructs farmers in eight of the more common conservation practices found in Food Security Act soil conservation compliance plans. The videotape is now being distributed nationally.

Following extensive showings throughout Iowa, a survey of viewers indicated that while only 29 percent of those surveyed borrowed the tape intending to learn how to do conservation, 78 percent said they were going to try to do some of their own conservation work after viewing the tape.

The study indicates a trend toward using videotapes to get information to farmers. An overwhelming 97 percent said video was a good way to get information; 95 percent said they

Farmers Video (Continued) would use a similar how-to videotape if it were produced. Sixty-six percent said they most preferred watching a videotape at home and 88 percent least preferred watching the tape in a large meeting of more than 10 people.

Iowa was chosen for the study because NACD and SCS had implemented a test outreach distribution program there in which 30 copies of the videotape were made available in each county. Farmers could choose from up to 20 locations where tapes were available on a free loan basis. Records indicate that 3,300 Iowans borrowed the tape between January and March of 1990.

The videotapes are sold at cost through NACD's Service Center. Of the survey participants, eight percent owned a copy of the tape, but 30 percent indicated they would prefer to own rather than borrow the tape—indicating as well that both options should be available.

[Copies of the "Conservation On Your Own" videotape are available at \$7.50 each plus about \$3.00 postage from the National Association of Conservation Districts. For more information contact: Ron Francis, Communications Office, NACD, P.O. Box 855, League City, TX 77574. Phone: (713) 332-3402; or Colleen Weinzetl, USDA Soil Conservation Service, 693 Federal Bldg., 210 Walnut St., Des Moines, IA 50309. Phone: (515) 284-4262.]

Izaak Walton League Issues Water Quality Monitoring Video

Save Our Streams (SOS), the river protection program of the Izaak Walton League of America, has developed a simple way to sample, identify, and record macroinvertebrates to determine general water quality conditions. Their new video guide covers stream monitoring issues and techniques including

- Stream pollution problems
- Stream sampling
- Identification of stream organisms
- Use of the stream survey
- General information on adopting a stream in the SOS program and becoming its active guardian

Citizens and organizations interested in volunteering or in developing a volunteer monitoring program of their own should consult with their State water quality agency (or with U.S. EPA) to learn about the State's program, its methods, and needs.

EPA has developed two documents (reviewed in this issue and issue #7 [August] of *News-Notes*) that are of particular value: "A Directory of Volunteer Monitoring Organizations" and "A Guide on the Planning and Implementation of Volunteer Monitoring Programs."

[To order copies of the Save Our Streams Water Quality Monitoring Video send a \$15 check payable to The Izaak Walton League of America to: Izaak Walton League of America, SOS Monitoring Video, 1401 Wilson Blvd., Level B, Arlington, VA 22209; or phone: (703) 528-1818.]

Volunteer Water Monitoring: A Guide for State Managers

U.S. Environmental Protection Agency, Office of Water, Washington, DC 20460. 78 pp. EPA 440/4-90-010, August 1990.

EPA's Assessment and Watershed Protection Division of the Office of Water, through a grant to the Alliance for the Chesapeake Bay, has developed a new document aimed at encouraging State water management agencies to use volunteers to collect high quality monitoring data. Entitled *Volunteer Water Monitoring: A Guide for State Managers*, this 80-page publication should also prove useful to anyone interested in starting a new volunteer program or improving the effectiveness of an existing program.

*Volunteer Water
Monitoring (Continued)*

A number of States already manage volunteer monitoring programs. In addition to fostering a sense of stewardship for our shared water resources, these programs generate credible, cost-effective data that can be used in State decisions. This guide synthesizes the experience of several of these successful volunteer programs.

The basic premise of the guide is that a well-planned and properly maintained volunteer monitoring program can yield good data. State managers are given hints on how to plan and organize projects, maintain volunteer interest, and ensure that data of known quality are produced. In addition, the guide discusses how to manage and analyze the generated data, and briefly addresses cost and funding issues.

The key findings of EPA's managers' guide boil down to seven basic "ingredients for success:"

- Develop and articulate a clear purpose for the data volunteers will be generating
- Prepare a quality assurance plan if you want volunteer data to be used by water quality managers
- Keep in mind that working with volunteers is cost-effective, but it isn't free: dedicated professional staff support will be a continuous need
- Thoroughly train and re-train volunteers
- Give volunteers lots of encouragement and feedback, keep lines of communication open, and help volunteers "grow" with the program
- Use the data volunteers collect
- Finally, be flexible and honest about your program—start small, keep expectations realistic, and share your experiences with other programs to learn new ways to handle obstacles

[For copies of the report contact: Alice Mayjo, U.S. EPA, Assessment and Watershed Protection Division (WH-553), 401 M Street, SW, Washington, DC 20460.]

*Rural Clean Water Program: Lessons Learned from a
Voluntary Nonpoint Source Control Experiment*

**U.S. Environmental Protection Agency, Nonpoint Source Control Branch, Washington,
DC 20460. 29 pp. EPA 440/4-90-012, September 1990.**

The Rural Clean Water Program (RCWP), a fifteen year Federal experiment, began in 1980 with three major objectives: 1) improve water quality and beneficial uses in the most cost effective manner possible consistent with the production of food and fiber; 2) help rural land owners and farmers practice nonpoint source pollution control; and 3) develop and test programs, policies, and procedures designed to control agricultural nonpoint source pollution.

Twenty-two RCWP projects, representing a wide range of pollution problems and impaired uses around the country, provide the basis for this report that describes how the RCWP has worked so far and synthesizes its successes and failures *into lessons that can help State and local managers put together their own management programs for controlling agricultural nonpoint source pollution.*

The lessons learned are grouped around the following areas:

- Best Management Practices: How Effective for Water Quality?
- Voluntary Plus Cost-Sharing: Does it Work?
- Federal State and Local Agencies: Can They Get The Job Done?

The RCWP is administered by the U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service in consultation with the U.S. Environmental Protection Agency.

[For copies of the report contact: NPS News-Notes, NPS Information Exchange (WH-553), U.S. EPA, 401 M Street, SW, Washington, DC 20460; or use the COUPON on the facing page.]

Datebook

This DATEBOOK has been assembled with the cooperation of our readers; *Conservation Impact*, the newsletter of the Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906-1334; and *NWQEP NOTES*, the newsletter of the National Water Quality Evaluation Project, North Carolina Agricultural Extension Service, North Carolina State University, 615 Oberlin Rd., Suite 100, Raleigh, NC 27605-1126. Their cooperation is appreciated. If you have a date you want placed in the DATEBOOK contact the editors of *NPS News-Notes*.

1991

Meetings and Events

January

4 - 5

Puget Sound Research '91, Washington State Convention and Trade Center, Seattle, WA. The latest in basic and applied research on the Sound and the problems it faces. Sponsored by Puget Sound Water Quality Authority, Washington State Department of Ecology, and U.S. EPA Region X. Contact: Diana Perl, Conference Coordinator, Puget Sound Water Quality Authority. Phone: (206) 284-2441 or (206) 464-7597. FAX: (206) 464-6188.

5 - 8

Farm/Ranch Expo '91, Phoenix, AZ. Contact: Show Management—Farm/Ranch Expo '91, 600 Talcott Road, Park Ridge, IL 60068. Phone: (708) 823-1010.

29 - 31

29-31NPS Watershed Implementation Workshop, Clarion Hotel, New Orleans, LA. This EPA-sponsored workshop will present a wide range of tools and approaches for successfully implementing nonpoint source management practices and programs in watersheds. The workshop will effectively combine presentation and workshop formats and encourage the sharing of ideas and experience among NPS professionals involved in the day-to-day implementation of watershed projects. For registration information contact Kate Shalk at (617) 641-5324. For conference content information contact Dan Murray at (513) 569-7522. (Note: this meeting had been listed in previous DATEBOOKS for January 28-30. The dates shown above are correct.)

February

6 - 7

Interagency Progress and Perspectives on the President's Water Quality Initiative, Holiday Inn Crowne Plaza, Arlington, VA. Sponsored by USDA, USGS, and EPA. Conference will explain goals, programs, and activities in achieving the objective of a healthy agricultural sector and uncontaminated ground water. Contact: Renee Morris, (301) 495-0387.

20 - 23

International Erosion Control Association: 22nd Annual Conference, Orlando, FL. Conference will cover effective control methods and how they relate to improved environmental quality. Contact: Ben Northcutt, Executive Director, International Erosion Control Association, P.O. Box 4904, 1485 S. Lincoln, Steamboat Springs, CO 80477. Phone: (303) 879-3010. FAX: (303) 879-8563.

24 - 28

Surface and Ground-Water Quality: Pollution, Prevention, Remediation, and the Great Lakes (AWRA Symposium), Cleveland, OH. Topics include wetlands management, agricultural impacts on water quality, basinwide water quality management, behavior and mobility of water contaminants, and data acquisition/management. Contact: Aaron Jennings, Department of Civil Engineering, University of Toledo, 2801 W. Bancroft St., Toledo, OH 43606. Phone: (419) 537-2476.

25 - 27

Science '91 Symposium: Science in the Nation's Estuaries, Sarasota, FL. Sponsored by EPA and NOAA. Topics include research on nonpoint source controls, ecological risk assessment, coastal ecosystem and water quality monitoring, measurements to assess improvements, and science as a tool in estuary management. Contact: Tom Armitage, OMEP (WH-556F), U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone: (202) 475-7378.

March

18 - 21

Fifth Federal Interagency Sedimentation Conference, The Riviera Hotel, Las Vegas, NV. Subjects include sedimentation as an NPS pollutant, reservoir and stream modeling, transportation and deposition, yield and sources, aquatic ecology, sampling and analysis, and trend assessment. Contact: G. Douglas Glysson, USGS, 417 National Center, Reston, VA 22092. Phone: (703) 648-5019.

March

19 - 20 Georgia Water Resource Conference, Athens, GA. Contact: Institute of Natural Resources, Ecology Building, Room 13, University of Georgia, Athens, GA 30601. Phone: (404) 542-1555.

20 - 21 *Nonpoint Source Pollution: the Unfinished Agenda For the Protection of Our Water Quality*, Tacoma Sheraton Hotel, Tacoma, WA. Sponsored by the Alaska, Hawaii, Idaho, Oregon and Washington Water Research Institutes and the Water and Energy Research Institute of the Western Pacific (Guam), U.S. EPA, U.S. Geological Survey, and Washington State Conservation Commission. For more information contact: William Funk or Diane Weber, State of Washington Water Research Center, Washington State University, Pullman WA 99164-30002. Phone: (509) 335-5531, FAX (509) 335-1590.

April

9 - 11 *Cover Crops for Clean Water*, West Tennessee Experiment Station, Jackson, Tennessee. Sponsored by the Soil and Water Conservation Society. Contact: SACS, 7515 N.E. Ankeny Road, Ankeny, IA 50021. Phone: (515) 289-2331 or 1-800-THE-SOIL.

17 - 18 *Environmentally Sound Agriculture*, Orlando, FL. The conference objective is state-of-the art technology for sustaining an environmentally sound and productive agricultural industry in the urbanizing southeastern United States. Topics include NPS control, point sources on farms, air pollution, wildlife and habitat preservation, and the urban/agricultural interrelationship. Contact: Department of Agricultural Engineering, University of Florida, Gainesville, FL 32611. Phone: (904) 392-8535.

24 - 27 *Resource and Public Land Use Section, Western Social Science Association*, Reno, Nevada. Annual Meeting of WSSA. For program information on the Section meeting contact: Nina Burkhardt or Jonathan Taylor, c/o Fish and Wildlife Service, National Ecology Research Center, 4512 McMurray Avenue, Fort Collins, CO 80525-3400. Phone: (303) 226-9445.

May

28 - 31 *Third Annual National Coastal Programs Conference: "Uncommon Solutions to Common Problems,"* San Diego, CA. Annual conference of EPA's National Estuary Programs and Near Coastal Waters Programs. Program will feature presentations and discussions on innovative and fresh ideas for addressing problems common to coastal programs. Contact: Karen Helm, American Management Systems, Inc., 1777 North Kent Street, 7th Floor, Arlington, VA 22209. Phone: (703) 841-6212.

June

19 - 22 *History of Agriculture and the Environment: A Symposium*, National Archives Building, Washington, DC. The symposium will be interdisciplinary in nature, covering the history of agriculture and the environment as broadly conceived. Sponsored by the Agricultural History Society, the American Society for Environmental History, and the agencies of the U.S. Department of Agriculture. Contact: Douglas Helms, National Historian, Soil Conservation Service, P.O. Box 2890, Washington, DC 20013. Phone: (202) 447-3766.

July

8 - 12 *Coastal and Ocean Management: The Seventh Symposium*, Hyatt Hotel, Long Beach, CA. Sponsored by the Coastal Zone Foundation, the American Shore and Beach Preservation Association, U.S. National Oceanic and Atmospheric Administration, Port of Long Beach, and the American Society of Civil Engineers. Themes include Coastal and Marine Policy, Institutional Relations; Global Environment; Public Participation, Information, and Access; Environment and Information; Development and Resource Management; and International Issues. Contact: Orville Magoon/Gail Oakley, Coastal Zone '91, P.O. Box 279, 21000 Butts Canyon Road, Middletown, CA 95461. Phone: (707) 987-0114.

September

24 - 26 *Third Annual EPA Tri-Regional NPS Conference*. Sponsored by the NPS Coordinators of EPA Regions III, IV, and VI for States in those Regions. Hosted by Region III. As arrangements are finalized, the DATEBOOK will report.

Positions Available Working With Nonpoint Source Pollution

EPA Region IX: Monitoring Coordinator—San Francisco, CA

Wanted: A scientist/program manager Monitoring Coordinator to direct surface water monitoring program for the Region.

Qualifications: Master's or Ph.D. in applicable science area (chemistry, biology, ecology, etc.), program manager experience, excellent oral communication and writing skills, enthusiasm for life (including work).

Scale: GS 12/13.

Contact: Send SF 171 or resume to: Laura Tom, Chief, Monitoring and NPS Section (W-3-2), U.S. EPA Region IX, 75 Hawthorn Street, San Francisco, CA 94105. Phone: (415) 744-2006, (FTS) 484-2006.

NCSU Water Quality Group—Raleigh, NC

Wanted: Two extension specialists to work with interdisciplinary WQ Group that analyzes and evaluates nonpoint source pollution control programs and watershed projects nationwide and produces educational and technical guidance materials on water quality issues.

Qualifications: M.S. in agricultural or environmental engineering, environmental science, water resource management, or related water quality field. Coursework or professional experience in nonpoint source, hydrology, and/or water resource management preferred; math, agriculture, biology, or physical sciences also desirable. Ability to write and communicate effectively essential.

Scale: Non-tenure track but all benefits of Extension faculty. Salary commensurate with experience.

Contact: Send resume, transcripts, and names of three references to: Jean Spooner, Interim Director, NCSU Water Quality Group, Department of Biological and Agricultural Engineering, North Carolina State University, 615 Oberlin Rd., Suite 100, Raleigh, NC 27605-1126. Phone: (919) 737-3723.

NPS NEWS-NOTES
Nonpoint Source Information Exchange
Assessment and Watershed Protection Division
Office of Water (WH-553)
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

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