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#7

Nonpoint Source

EPA News-Notes

A Commentary. . .

It's a Time For New Initiatives and Demonstrations...

We are reporting on three new State initiatives in this issue of NPS *News-Notes*. In each case the State legislature has been an active participant, providing the necessary authorization to proceed and to start something new.

In all three cases, the *financial integrity* (and stability) of nonpoint management is an integral part of the undertaking. Also, local government organizations are key players. Each of these three cases has some new and relatively untried features—so far.

- **Delaware** has broadened its sediment control law to include stormwater and NPS management for the control of water quantity and water quality.
- **Kansas** has created a major fund at the State level made up of specific, indentified, dedicated sources, and provided for NPS management in a broader resource and environmental management context.
- **North Carolina** has tied NPS management control to point source management, taking a watershed approach to necessary nutrient reduction and control actions in both. The question is how to break into the cycle to restore and preserve important fisheries and other resources, and how to equitably pay for nutrient reduction.

It seems to us that these efforts reflect States' increasing recognition of the importance of controlling NPS pollution and the attainment and the maintenance of State water quality standards and a balanced natural environment.

Some might call these new state efforts innovative, or bold, or experimental, or simply demonstrations. Others might say they represent the next logical step in the emerging political science of water quality management. In any event, mid-course corrections will undoubtedly be necessary along the way. They are a part of the search to make nonpoint source management a built-in fixture, a part of the normal way of doing things in each of these States.

And for that we are glad to report on them. Things are happening out there.

Headquarters Notes

National Program Guidance Issued for Development of Biological Criteria as Part of State Water Quality Standards

A National Program Guidance for the establishment of biological criteria in State water quality standards has been issued by EPA's Office of Water Regulations and Standards (OWRS), Criteria and Standards Division (EPA-440/5-90-004, April 1990). Biological criteria describe the biological integrity of a particular body of water necessary to support the established beneficial use or uses to be made of that water.

Biological Criteria (Continued)

The Clean Water Act has as its primary objective the restoration and maintenance of "...the chemical, physical, and biological integrity of the Nation's waters." To date there has been a concentration on chemical and physical criteria; the establishment of biological criteria has generally lagged behind. As the biological criteria document states,

> *... current water quality programs focus on direct measures of chemical integrity (chemical-specific and whole-effluent toxicity) and, to some degree, physical integrity through several conventional criteria (e.g., pH, turbidity, dissolved oxygen). Implementation of these programs has significantly improved water quality. However, as we learn more about aquatic ecosystems it is apparent that other sources of waterbody impairment exist. Biological impairments from diffuse sources [i.e., NPS] and habitat degradation can be greater than those caused by point source discharges ... Although effective for their purposes, chemical specific criteria and whole-effluent toxicity provide only indirect evaluations and protection of biological integrity.*

Many States now integrate biological concerns into their water quality management programs with State efforts ranging from water body assessments to WQ standards. As the report notes, "[t]wenty States are currently using some form of standardized ambient biological assessment to determine the status of biota within State waters. Levels of effort vary from bioassessment studies to fully developed biological criteria programs."

"Several States have led the way for development and adoption of biological criteria," observed Dr. Suzanne Marcy, principal coordinator of the program for the Criteria and Standards Division. She went on to say that

> *Using their valuable work as a guide, we will continue to communicate with State agencies, industry and the general public about the importance of achieving biological integrity in surface waters through adoption of biological criteria in State water quality standards. To do this effectively, however, we must work cooperatively with scientists in States, Regions and the academic community to develop appropriate measurement tools for biological criteria for all surface water types.*

State development of water quality standards is the keystone to the nation's clean water program. State standards programs provide the definitions of *clean water* in water bodies within each State.

Water quality standards are also the point of departure for State NPS management programs. Section 319(a) of the Clean Water Act requires that each State prepare a report that assesses all of its waters and

> *identifies those...waters in the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards.*

A State's NPS Management Programs focus on waters identified in its Assessment Report.

Nonpoint Source **News-Notes**

NPS 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.*

Biological Criteria (Continued)

Water quality standards are called for by Section 303(c) of the Clean Water Act. The current implementing regulations, 40 CFR 131 (November 8, 1988), provide in Section 131.2 that a

> *...water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses.*

The biological criteria document states its case in terms that are of particular interest to State NPS control managers and to those who are concerned with the water quality results of pollution control programs.

> *Biological criteria provide a regulatory framework for addressing water quality problems and offer additional benefits, including providing:*
>
> - *the basis for characterizing high quality waters and identifying habitats and community components requiring special protection under State anti-degradation policies;*
> - *a framework for deciding 319 actions for best control of nonpoint source pollution;*
> - *an evaluation of surface water impairments predicted by chemical analyses, toxicity testing, and fate and transport modeling (e.g., wasteload allocation);*
> - *improvement in water quality standards (including refinement of use classifications);*
> - *a process for demonstrating improvements in water quality after implementation of pollution controls; and*
> - *additional diagnostic tools.*

Each State biological criteria implementation program will have to develop its own specific study design that reflects the real regional differences that exist among the States and quite often within a State. As the Guidance Document says:

> *...because of the diversity of surface waters and the biota that inhabit these waters, significant planning, data collection, and evaluation will be needed to fully implement the program.*

Fully operational biological criteria will enable the State to measure the degree to which subject waters are able (or unable) to support living uses designated as appropriate for those waters. The Program Guidance indicates that State implementation of biological criteria should be developed for the five types of surface waters: streams, rivers, lakes (including reservoirs), wetlands, and estuaries (including near coastal waters where applicable). Implementation should generally proceed in three phases.

Phase I includes the development and adoption of narrative biological criteria describing the uses and supporting natural conditions for each of the five classifications of surface waters.

> Narrative biological criteria are general statements of attainable or attained conditions of biological integrity and water quality necessary to support the beneficial uses for the particular waters as contained in the State's water quality standards. Supporting statements for the criteria should promote water quality to protect the most natural community possible for the designated use. Narratives should be written to protect the most sensitive use and support antidegradation. Initial narrative biological criteria can be developed for all five surface water classifications with little or no data collection.

Phase II includes the development of an implementation plan, necessary to implement biological criteria for each surface water type.

Biological Criteria (Continued)

Because of the diversity of surface waters and the biota that inhabit these waters, significant planning, data collection, and evaluation will be needed to fully implement the program. Phase II provides for this planning for the data collection and its evaluation.

Phase III calls for the application of the Phase II plan, and the full implementation and integration of biological criteria in the State's water quality standards.

This phase uses biological surveys to derive biological criteria for the diverse classes of surface waters and the full range of designated uses. These criteria are then applied to identify nonattainment of designated uses and to make regulatory decisions.

The Criteria and Standards Division will be developing a series of Technical Guidance papers to supplement the Program Guidance. The first Technical Guidance for streams is scheduled tc be developed during 1991, rivers in 1992, and so on. Regional/State workshops throughout th country will be scheduled following the publication of each of the Technical Guidance papers.

The Program Guidance summarizes the steps involved in implementing the biological criteria program:

(1) selection of unimpaired (minimal impact) surface waters to use as the reference condition for each designated use, (2) measurement of the structure and function of aquatic communities in reference surface waters to establish biological criteria, and (3) establishment of a protocol to compare the biological criteria to biota in impacted waters to determine whether impairment has occurred. These elements serve as an interactive network that is particularly important during the early development of biological criteria where rapid accumulation of information is effective for refining both designated uses and developing biological criteria values.

The purpose of the Guidance document is to provide EPA Regions, States, and others with the conceptual framework necessary to implement narrative and numerical biological criteria and to promote national consistency in their application.

At the present time, the Criteria and Standards Division of OWRS is participating in meetings and briefings with EPA Regional staff on the biological criteria document and concept.

EPA's Office of Water is sponsoring a special symposium on the development of biological criteria for all surface water types. The symposium will be held at the Hyatt Regency Crystal City in Arlington, VA, on December 12 and 13, 1990 (for details, see the *Datebook* elsewhere in this issue). The symposium will be divided into five major topics, including

- Using biological criteria in regulations
- Defining habitat variables
- Determining the reference condition
- Designing biological surveys
- Representing biological integrity and evaluating non-attainment

In addition to the regular symposium sessions, high quality poster presentations from the general scientific community are planned on these topics for estuarine, fresh water, and wetland habitats.

[A broad distribution of the biological criteria program Guidance document has been made to EPA Regions and to State water quality agencies. A limited additional distribution is available to the interested public. For more information contact: Dr. Suzanne K. Marcy, U.S. EPA, Office of Water Regulations and Standards (WH-585), 401 M Street, SW, Washington, DC 20460.]

Nonpoint Source Program Status—*Correction*

Virgin Islands	Assessment Program Approved:	December 1989
	Management Program Approved:	January 25, 1990

Notes From The States

Delaware Enacts New Stormwater and Sediment Control Law; Funding of Stormwater and NPS Management Also Authorized

On May 31, 1990, the General Assembly of the State of Delaware enacted new legislation on stormwater management and placed it within a revised framework of the State's sediment control law to emphasize the integral relationship between the two programs. Governor Castle signed the legislation into law at a public ceremony on June 15, 1990.

Several new implementation features were added to the existing sediment control law, including

- An ability to assess a permit fee to assist in program funding
- A certification program for construction review/inspection
- A required education program for contractors
- A set of regulation promulgation procedures
- A set of expanded delegation criteria that recognize the importance of Conservation District involvement while including counties, municipalities, and State agencies in program implementation
- A set of additional enforcement options to ensure proper implementation of necessary controls

Fees may be established and collected to help fund sediment control and stormwater management implementation.

The stormwater component provides for the management of water quantity (flood control) and water quality (NPS pollution control). The Department of Natural Resources and Environmental Control, in cooperation with State and Federal agencies, Conservation Districts, and local governments, will develop a State Stormwater Management Program taking into consideration both water quality and water quantity. The Management Program will be integrated with sediment control and will include regulatory and fee structure elements.

The Department may approve and establish "Designated Watersheds or Subwatersheds" for NPS management and flood control. The purpose of this designation is to promote a watershed plan and provide for implementation of practices to reduce existing flooding problems or improve existing water quality.

Also authorized is the development of stormwater utilities by local governments, Conservation Districts, or the State. Stormwater utilities are seen as an alternative to total funding under the narrower permit fee system. Utility charges are to be "...reasonable and equitable so that each contributor of runoff to the system, including state agencies, shall pay to the extent to which runoff is contributed."

Delaware (Continued)

Utilities may also be developed for Designated Watersheds to fund such activities as long-range watershed master planning, watershed retrofitting, and facility maintenance.

Pursuant to regulations to be issued by the Department by December 1990, Conservation Districts, counties, municipalities, or State agencies may adopt and submit for approval one or more components of a sediment and stormwater program to be applied to the areas within its jurisdiction.

[For further information contact: Earl Shaver, Delaware Department of Natural Resources and Environmental Control, 89 Kings Highway, P.O. Box 1401, Dover, DE 19903. Phone: (302) 736-5731.]

Kansas Dedicates Funds to Water Planning Process Including NPS Pollution Control

State Water Plan Fund Created

The 1989 Kansas State Legislature established a dedicated source of funding for State water planning activities, including NPS pollution control. "Water planning" as the term is used here is quite broad in its meaning, including implementation activities involving design, construction, monitoring and project evaluation, and so on.

The State Water Plan Fund is actually comprised of funds from eight sources, all contributed annually and dedicated to water planning purposes. These sources are, and their projected annual contributions, for legislative planning purposes, were:

Source	Estimates
Transfers from other funds:	
General Fund	$6,000,000
Economic Dev. Fund (State Lottery)	2,000,000
Fees:	
Municipal Water Use ($.03/1000 gals)	3,100,000
Industrial Water Use($.03/1000 gals)	1,400,000
Stock Water Use ($.03/1000 gals)	200,000
Pesticide Label ($100 of a $130 fee for each ag chemical offered for sale)	600,800
Fertilizer Use ($1.40 of a $1.70 per ton fee on all commercial fertilizers)	1,722,477
Environmental Fines:	
Penalties imposed for violations of laws regulating water supply systems and solid and hazardous wastes	70,000
TOTAL	$15,093,277

The water planning process is coordinated through the Kansas Water Authority with the participation of several State agencies including the Division of Water Resources of the Board of Agriculture, the State Conservation Commission, the Department of Health and Environment, the Department of Wildlife and Parks, the Water Office, and the Kansas Water Authority, among others.

Kansas (Continued)

NPS Pollution Control and Environment Share in Fund; Conservation Commission and Health and Environment Department Assigned Roles

To allocate the State Water Plan Fund each year, the Governor recommends and the legislature appropriates monies for specific water-related activities.

The Kansas Department of Health and Environment (KDHE) has been designated by the Governor to lead the development and coordination of the Kansas State NPS Pollution Management Program. The State Conservation Commission is responsible to administer the NPS Pollution Control Fund (appropriated from the State Water Plan Fund), which provides assistance to Conservation Districts for the implementation of Local NPS Pollution Management Plans. The Conservation Commission received an appropriation of $770,750 to be used for these purposes during FY 1991. There are 105 Conservation Districts in Kansas (one for each county).

State Water Plan Fund appropriations for FY 1991 for the State Conservation Commission also include $3,220,000 for land treatment cost-share activities. This appropriation covers State cost-sharing for landowners to establish conservation structures and practices to treat highly erodible land as defined by the 1985 Food Security Act. The funding also addresses recommendations in the State Water Plan. Treatment of erodible land includes the construction of terraces, waterways, sediment basins, and grade stabilization structures. Soil and water conservation practices promoted under this program contribute both by conserving quantities of the water resources and by protecting their quality by limiting run-off of agricultural chemicals.

The Conservation Commission seeks to coordinate the local use of land treatment cost-share funds with the preparation and implementation of NPS Pollution Management Plans as it administers both programs.

The legislature also appropriated $1,958,512 in Water Plan funds to the Department of Health and Environment for environmental aid during FY1991. Of this amount, $141,666 was appropriated for NPS pollution evaluation, data collection, and technical assistance, primarily at the State level. Another $1,798,512 went for grants to local governments (namely county health departments) for the development of Local Environmental Protection Plans. The Local NPS Management Plans initiated by conservation districts are being developed as a part of these Local Environmental Protection Plans. County health departments and conservation districts are encouraged to coordinate the development of their respective plans.

Local NPS Management Plan Requirements

Earlier this year, the State Conservation Commission issued its *Implementation Guidelines and Procedures* for use of the NPS Pollution Control Fund by conservation districts. The Kansas Department of Health and Environment, U.S. Soil Conservation Service, and the Kansas Conservation District Supervisors assisted the Commission in developing these guidelines. Key elements of the guidelines include the following points:

- Conservation districts are designated to provide local coordination in the development of Local NPS Pollution Management Plans and Project Work Plans.

- NPS Management Plans are to be prepared for the protection of individual watersheds or drainage areas rather than on a county basis. Counties sharing the boundaries of a particular watershed or drainage area may develop multiple county Management Plans. Projects that include more than one Conservation District will necessitate the districts working together and designating the district with lead responsibilities.

- Development of Local NPS Management Plans and Project Work Plans should involve the participation of all affected and concerned local, State, and Federal agencies and

Kansas (Continued)

the private sector.

- Existing local, State, Federal, and private sector programs (including financial participation) should be utilized to the fullest extent possible.

- Project Work Plans are to be prepared for work to be done within the overall NPS Management Plan for waters needing either protection or restoration. Work Plans can include such activities as planning, design, monitoring, evaluation, assessment, demonstration projects, and educational programs as well as implementation activities involving construction of NPS pollution control practices. Projects can also include technical and financial assistance to units of local government and the private sector.

- Development of Local NPS Management Plans must consider all categories of NPS pollution, not just agriculturally related pollution.

Local conservation districts have been advised that KDHE has developed criteria for identifying vulnerable water resources and those of exceptional value. Using these criteria, KDHE and other water-related State agencies are identifying and prioritizing problems and potential problems. Districts are urged to contact the Bureau of Environmental Quality of KDHE to get information on the State's NPS Assessment Report and Management Program.

KDHE will provide a technical review of all Local NPS Pollution Management Plans to determine if the Local Plans support the State NPS Pollution Management Plan prepared under the provisions of Section 319 of the Clean Water Act. KDHE will submit its comments and recommendations to the State Conservation Commission.

An Observation on The Kansas Program

When asked to comment on the progress of the new program, Tracy Streeter, Resource Administrator of the Kansas Conservation Commission, observed:

> *"Comprehensive and Innovative" management of NPS pollution is being encouraged at the local level. As one might imagine, Kansas is dealing with primarily agricultural related NPS problems. Controlling agricultural runoff with existing land treatment programs will play a significant role in addressing NPS. However, Local NPS Management Plans must address all categories of NPS which exist in addition to those related to agriculture.*
>
> *Conservation districts have done a tremendous job of initiating the program at the local level. To date, organizational efforts have commenced in nearly 60 of the one 105 county conservation districts in Kansas.*
>
> *The Local NPS Management Plans being developed in these districts are addressing a variety of NPS problems and propose some nontraditional and innovative approaches to attack their problems. We expect to receive a number of these Local NPS Management Plans for administrative and technical review by the end of the calendar year.*

[For more information contact: Tracy D. Streeter, Resource Administrator, State Conservation Commission, Topeka, KA 66612-1299. Phone: (913) 296-3600.]

Iowa State-Wide Rural Well-Water Survey

Between April 1988 and June 1989, the Iowa Department of Natural Resources (DNR) and the University of Iowa (UI) Center for Health Effects of Environmental Contamination conducted a one-time comprehensive sampling called the State-Wide Rural Well-Water Survey (SWRL). This study provided the first State-wide estimates of the extent of ground-water contamination in rural private wells.

Iowa (Continued)

According to the study report, bacterial and nitrate contamination problems are particularly widespread. Nearly 45 percent of wells exhibited the presence of total coliform bacteria. For nitrates, approximately 60 percent of wells showed less than 3 mg/L nitrate-nitrogen, indicating little significant nitrate contamination. However, more than 18 percent of the wells contained nitrate concentrations exceeding EPA's recommended health advisory levels, with more than one-third of all the wells less than 50 feet deep exceeding the EPA drinking water standard.

Nearly 14 percent of the State's wells are estimated to be contaminated with one or more pesticides. The concentration of pesticides detected was generally less than 1 part per billion (ppb). However, on a State-wide basis, 1.2 percent of the private rural drinking water wells were estimated to be contaminated with pesticides exceeding EPA recommended health advisory levels.

[For more information contact: George Hallberg, Iowa Department of Natural Resources, 123 N. Capitol Street, Iowa City, Iowa 52242. Phone: (319) 335-1575.]

North Carolina Develops Watershed Approach to Implement Nutrient Reduction Strategy Through NPS/Point Source Trade-Offs

Tar-Pamlico River Basin Found to be Nutrient Sensitive

The 2,300-mile Tar-Pamlico River System in eastern North Carolina drains some 5,400 square miles in portions of 17 counties before it empties into the Pamlico River estuary and joins Pamlico Sound. The Sound is in turn separated from the Atlantic Ocean by a string of North Carolina barrier islands. The Pamlico Estuary and Sound are part of Albemarle-Pamlico Sound which has been designated an estuary of national significance by EPA and for which a comprehensive management plan is now being developed, funded in part by EPA's Office of Marine and Estuarine Protection. The entire basin and Sound is a single, interconnected water quality system.

Most of the land in the basin is forested or used for agricultural purposes, with a small amount in urban land use. About 20 municipal and industrial waste water treatment plants (WWTPs) with design flows greater than 0.1 million gallons per day (MGD) discharge into the basin's surface waters.

In September 1989, North Carolina's Environmental Management Commission (EMC) formally designated the entire Tar-Pamlico River basin (watershed) as Nutrient Sensitive Waters (NSW). Under the provisions of 15 NCAC 2B.0214, the Commission may make NSW designations when it finds that "such waters are experiencing or are subject to excessive growths of microscopic or macroscopic vegetation...[which will]...substantially impair the use of the water for its best usage...." NSW designation requires the development and implementation of a nutrient management strategy.

The Tar-Pamlico basin has seen recent outbreaks of fish diseases, increased sediment and nutrient loads, algal blooms, and locations with low dissolved oxygen. The loss of aquatic vegetation has had significant impacts on the valuable fisheries of the Pamlico River estuary.

The North Carolina Division of Environmental Management (DEM) has identified nutrient loading to the Tar and Pamlico Rivers as the primary cause of degrading water quality in the Pamlico River estuary. A nutrient budget prepared for the entire basin shows that the bulk of phosphorus (P) comes from point sources (75 percent of total P) related to Texasgulf Industries' phosphate mining operations. However, after renovations are completed at the Texasgulf plant, nonpoint sources will become the larger contributor of P (60 percent of total P). Most of the nitrogen (N) also originates from nonpoint sources (80 percent of total N).

North Carolina (Continued)

Developing a Nutrient Reduction Strategy for Tar-Pamlico

Following NSW designation, the management process involves these issues:

- Identification of nutrient sources
- Establishment of nutrient reduction goals
- Development and implementation of a nutrient reduction strategy

DEM initially proposed interim nutrient reduction goals for point sources that would be achieved by renovations at Texasgulf, continuation of the existing Statewide phosphate detergent ban, and adoption of effluent limits for nutrients to be met by new and expanding WWTPs. DEM also encouraged non-discharge alternatives for WWTPs (pollution prevention). NPS nutrient reduction would be addressed by the state's voluntary Agriculture Cost Share Program which pays farmers 75 percent of the cost to implement appropriate best management practices (BMPs).

In response to the proposed requirement for meeting nutrient limits, environmental groups and a coalition of dischargers in the basin proposed an alternative strategy which provides the option of allowing expanding WWTP operators to meet nutrient load reduction goals by funding the implementation of BMPs for agricultural NPS runoff. DEM agreed to present to the EMC a revised nutrient management strategy using the concept of nutrient trading. On December 14, 1989, the final Tar-Pamlico NSW Implementation Strategy was approved by the EMC as an innovative but experimental approach to addressing the accelerated eutrophication problems in the basin.

Elements of the Nutrient Management Strategy

The four major components of the nutrient management strategy are as follows:

I. *WWTP Evaluation and Modification*

A group of several dischargers, known as the Tar-Pamlico Basin Association, are to perform engineering evaluations of their plants to determine operational or minor capital improvements that could meet nutrient limits. If a WWTP cannot achieve nutrient limits by these improvements, the balance of the nutrient requirement can be met by nutrient trading.

II. *Development and Application of an Estuarine Model*

The Association is also required to provide approximately $400,000 to develop a nutrient model for the Tar-Pamlico basin under the direction of DEM. This model will be used determine nutrient target levels and appropriate management strategies.

III. *Nutrient Trading*

Nutrient trading allows expanding facility operators to achieve nutrient limits by substituting other cost-effective pollutant reduction measures for more costly capital improvements in their plants. Trading provides accelerated BMP money for the existing NPS control program in addition to that which comes from State sources.

Under nutrient trading, the State Division of Soil and Water Conservation and the local soil and water conservation districts will have important roles in the agricultural BMP selection, installation, evaluation, and financial management process as they currently do in the established Agriculture Cost Share Program.

North Carolina (Continued)

The Association will initially provide up to $11.8 million for the agricultural BMP implementation nutrient trading program. This amount is based on 75 percent cost sharing and administration to achieve the original nutrient reduction goal entirely by funding BMPs for three municipalities which are expected to expand their WWTPs prior to 1995. Any additional flow above the current permitted flow to these three facilities, or inclusion in the Association of other municipalities expanding to greater than 0.5 MGD, would require additional BMP funds or further reduction in plant nutrient loadings. New WWTPs do not have the option of using nutrient trading.

The Association is also required to provide $150,000 to the State Division of Soil and Water Conservation to help administer implementation of BMPs under the nutrient trading program.

The Strategy requires dischargers who are not members of the Association to meet nutrient removal requirements when they expand from existing permitted flows to flows greater than 0.5 MGD. Individual nutrient trading proposals may be submitted to DEM for consideration in lieu of meeting the established effluent limits.

If the Association fails to meet any of it requirements, existing dischargers with flows greater than 0.1 MGD must meet nutrient limits within five years from the date EMS determines the Association has not met the necessary conditions.

IV. *The Establishment of an Areawide Section 208 Waste Treatment Management Planning Agency*

The final element of the Tar-Pamlico NSW Implementation Strategy provides for the creation of an Areawide Waste Treatment Planning Agency under Section 208 of the Clean Water Act. The Agency is to include the following types of representatives:

> (1) Municipal and industrial dischargers (WWTP operators); (2) Counties; (3) Soil and water conservation districts; (4) Environmental groups; (5) DEM and Division of Soil and Water Conservation representatives; (6) Representatives of the N.C. Agricultural Task Force; (7) Other State agencies.

The Agency's role will be

- To promote positive public relations and encourage widespread participation in the overall nutrient management strategy
- To provide recommendations for nutrient tradeoffs, BMP targeting, and tracking
- To compete for Federal funding exclusive of Section 319 funds

The Strategy Summarized

The Tar-Pamlico nutrient management strategy uses a basinwide approach with nutrient reductions in both point and nonpoint sources. This innovative strategy accelerates implementation of agricultural BMPs because the majority of nutrients in the basin originate from nonpoint sources. Finally, nutrient trading is significant because nutrient removal by agricultural BMPs is thought to be more cost-effective than removal by wastewater treatment plants.

[For more information contact: David Harding or Beth McGee, Division of Environmental Management, P.O. Box 27687, Raleigh, NC 27611-7687. Phone: (919) 733-5083.]

South Carolina Launches A NPS Newsletter

With the comment, "The purpose of [this] newsletter is to provide information on the recently established state program to reduce nonpoint source water pollution," we were introduced to Volume 1, Issue 1 of South Carolina's brand new newsletter, *The Nonpoint Source*. Shortly thereafter, Volume II, Issues 1 & 2 arrived.

The newsletter is published jointly by the SC Land Resources Commission and SC Department of Health and Environmental Control. We liked the article on their Management Program, which they termed "a cooperative, long term commitment." We quote from that article:

> *In his letter to Governor Campbell approving the state NPS assessment and management plan, EPA Region IV Administrator Greer Tidwell stated that the approval "represents the beginning of an ongoing process," a dynamic program that must remain open to refinement, improvement and updating. He cited the state management program as "the cornerstone for NPS pollution control for years to come," and he stressed the need for agencies to "work together to forge an alliance with the private sector, fellow public agencies, industry and academic institutions."*

We welcome South Carolina, which now joins with those of us who are committed to informing our interested publics about what is going on, "nonpoint-source-wise," and how control of NPS pollution is absolutely essential to clean water and a healthy environment for people and all living things. Also, thanks for including us on your mailing list. We like to read about what you're doing.

[Questions, comments, suggestions and mailing requests should be directed to: Mark H. Corley, Executive Assistant, SC Land Resources Commission, 2221 Devine Street, Suite 222, Columbia, SC 29205. Phone: (803) 734-9100.]

Notes From U.S. DOT

Procedure for Estimating Highway Stormwater Pollutants Announced

A procedure has been developed for estimating impacts to the water quality of a stream or lake from highway stormwater runoff pollutants, according to a Technical Summary describing the research study and report documents released by the Federal Highway Administration, U.S. Department of Transportation (DOT). In addition to determining whether receiving water sites are adversely impacted by highway runoff, the procedure also measures the significance of such impacts and provides guidance to deal with these impacts.

The guidance includes procedures for estimating the effectiveness of mitigation measures. Although the workbook document does not offer designs for specific BMPs, it suggests types of management measures such as grassed swales, wet pond detention, infiltration devices, and overland flow.

The DOT study also evaluated the factors that influence water pollution from highway sources, including climate, highway site, adjacent land use, and traffic and other operational factors. The Technical Summary reported that

> *[e]mphasis was on examining data from pertinent field measurements. Various approaches were evaluated to estimate highway runoff pollutant loads, including regression equations, statistical models (similar to those developed for the Environmental Protection Agency's Nationwide Urban Runoff Program, NURP), deterministic simulation models, and combinations of these.*

The procedure for evaluating the impact of highway stormwater runoff on receiving waters is presented in workbook form in publication No. FHWA-RD-88-006. This is accompanied in publication -007 by a personal computer application of the procedure. The remaining two

U.S. DOT (Continued)

publications, -008 and -009, report on the research study and the data collected for the study.

In summary, the four study report documents are as follows:

1. Workbook, FHWA-RD-88-006, "Volume I: Design Procedure," presents the recommended probabilistic model in a practical, easy-to-use workbook format. This simple, step-by-step procedure provides guidance for evaluating the impact of stormwater runoff from highway sites on receiving waters. It also provides guidance for evaluating the ability of mitigation measures to reduce water quality impacts to acceptable levels in comparison with applicable water quality standards.

2. Computer program, FHWA-RD-88-007, "Volume II: Users Guide For Interactive Computer Implementation of Design Procedure," is described by the Technical Summary as follows:

   To improve the attractiveness and practicability of the workbook, the procedures, data base, and related calculations involved have been assembled in an Interactive User Interface System and placed on microcomputer floppy disks for operation on a personal computer having appropriate peripherals. [A supplemental program, SYNOP, has been adapted for microcomputer use and also placed on floppy disk. SYNOP provides rainfall data for the design procedure from rain gauge records.]

3. Research report, FHWA-RD-88-008, "Volume III: Analytical Investigation and Research Report," examines the basic problems, evaluates technical considerations, and gives analysis procedures to estimate pollutant loadings and receiving water.

4. Report data, FHWA-RD-88-009, "Volume IV: Research Report Data Appendix," presents a summary of stormwater runoff data from 993 separate events at 31 highway sites in 11 States.

[For more information contact: Howard A. Jongedyk, Federal Highway Administration Research, Development, and Technology, Turner-Fairbank Highway Research Center, 6300 Georgetown Pike, McLean, VA 22101-2296. Phone: (FTS/703) 285-2085. Copies of the studies are available as follows:

- *Publication No. FHWA-RD-88-006 can be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Phone: (703) 487-4650. Contact NTIS for availability and cost of these documents. A limited number of copies are also available from the Federal Highway Administration, RD&T Report Center, HRD-11, 6300 Georgetown Pike, McLean, VA 22101-2296.*

- *Publication No. FHWA-RD-88-007, an interactive computer implementation of the design procedure (IBM and Macintosh versions), and SYNOP (IBM version only) are available on floppy disk from:*

  (1) NTIS

  (2) McTrans, 512 Weil Hall, University of Florida, Gainesville, FL 32611

  (3) PC Trans, Kansas University Transportation Center, 3611 Learned Hall, Lawrence, KS 66045

- *Publication Nos. FHWA-RD-88-008 and FHWA-RD-88-009 are available from NTIS only. The data base floppy disks for the series are available in IBM and Macintosh versions from NTIS.]*

Reviews - New and Worth Reading

Environmental Regulation of Coal Mining: SMCRA's Second Decade

An Environmental Law Institute Monograph, James M McElfish, Jr. and Ann E. Beier, April 1990. 282 pp.

The Surface Mining Control and Reclamation Act (SMCRA) became law in 1977. Appropriately, after more than ten years of operations under the Act, this book analyzes the program's successes and failures. It also looks ahead, recommending legal, organizational, and technical solutions to coal mining's most difficult environmental problems in the 1990s. Technological and structural changes within the industry, heightened environmental awareness and regulation, and administrative experience with the reclamation bonding provisions of the Act are all matters that will shape the administration of the Act in the decade ahead.

Chapters on acid producing mines, regulating effluent discharges from coal mining operations, and water loss from underground mining all deal with matters of particular concern to water quality program managers.

The need for increased use of water-quality-based discharge limits (as opposed to technology-based limits) for controlling mining discharges is stressed. The chapter on acid producing mines includes findings such as

> *[The Office of Surface Mining] and the states still allow mining of acid-producing seams if operators agree to treat the resulting acid-producing effluent. Treatment, however, is not effective. Greater emphasis should be placed on preventing acid discharge rather than on remediation. Pennsylvania has the strongest provisions by requiring operators to prevent rather than treat affected waters.*

The chapter also notes that

> *"Phased" release of reclamation bonds is permitted under SMCRA as portions of reclamation are completed. However, it should not be allowed for sites where acid mining drainage treatment is ongoing. Experience in West Virginia has shown that the full reclamation bond is likely to be needed if the operator defaults. Funds for continuing treatment may be needed for decades after mining is completed.*

This book is a very useful tool for anyone concerned with the air, water, and the natural environment in coal mining States. Incidentally, Ann Beier, one of the authors, is currently a member of EPA's Nonpoint Source Control Branch staff.

[For copies of the book contact: Environmental Law Institute, Publications Office, 1616 P Street NW, Suite 200, Washington, DC 20036. Phone: (202) 328-5150. Price: $28 per copy.]

Rural Ground-Water Quality Management: Emerging Issues and Public Policies for the 1990s

Journal of Soil and Water Conservation, March-April 1990.

This issue of the Journal of Soil and Water Conservation looks at ground-water management in rural America from an encyclopedic point of view. In over 50 features, it treats ground water through case studies, commentaries, and research reports. The issue confronts public policy choices, economics and science, NPS water pollution, farming and best management practices, land use planning, liability law, and roles of governments at all levels—local and districts, States, Federal administrative agencies, and the legislative branch.

Rural Ground Water (Continued)

But this is not dull reading. We found ourselves skipping around to sample thoughtful nuggets that were scattered throughout the publication. NPS management is treated in a variety of contexts, all of them important; likewise the movement of contaminants and the interaction of ground and surface waters. As a public policy perspective article observes: "the essential purpose of ground water quality policy is to change water use behavior."

In addition, the September-October 1989 issue of the Journal looks at the Conservation Title of the Food Security Act (the Farm Bill) with its conservation compliance, sodbuster, and swampbuster provisions. Sustainable agriculture, farm policy and water quality, wetland reserves and lots of other related issues and concerns are thoughtfully dealt with. We recommend this issue to you also.

[The Journal of Soil and Water Conservation is available by annual subscription for $30.00 per year. Copies of the March-April issue are $12 per single copy; 10 or more copies are $10 per copy; 100 or more copies are $8 per copy. Postage is extra. For more information contact: Journal of Soil and Water Conservation, 7515 N.E. Ankeny Road, Ankeny, IA 50021-9764.]

Livestock Grazing on Western Riparian Areas

Produced for the United States Environmental Protection Agency by the Northwest Resource Information Center, Inc., Eagle, Idaho, Ed Chaney, Wayne Elmore, and William S. Platts, Ph. D., Authors, July 1990. 45 pp.

This new, attractive publication provides an informative introduction to livestock grazing in Western riparian areas. Riparian areas are lands adjacent to creeks, streams, and rivers where vegetation is strongly influenced by the presence of water. The publication discusses and illustrates the errors and mistakes of historical, destructive grazing practices and sets the stage for the restoration and proper management of such areas under the provisions of Section 319 (NPS control) of the Clean Water Act.

A strong case is made for the universal adoption of proven riparian grazing technology through the application of "... best management practices (BMPs) ... [that] provide a mechanism for protecting" riparian values on both wetlands and non-wetlands grazing areas. As the report states: "The ultimate solution to restoring and maintaining the productivity of western riparian areas is to restore and maintain the productivity of watersheds."

The publication holds promise for a follow-up EPA publication to provide livestock owners, land managers, State regulatory personnel, and others detailed technical guidance for developing grazing strategies to restore and protect riparian areas. Such a publication is needed.

[A broad distribution is planned to EPA Regions, State water quality agencies, and other agencies, individuals and organizations. A limited additional distribution is available for the interested public. For more information contact: Roger Dean, NPS Coordinator, Water Management Division, EPA Region VIII, Suite 500, 999 18th Street, Denver, CO 80202-2405.]

National Directory of Citizen Volunteer Environmental Monitoring Programs

3rd Edition, U.S. EPA and Rhode Island Sea Grant Program, University of Rhode Island, April 1990. EPA 503/9-90-004.

This directory is an important reference tool for anyone interested in setting up a volunteer water monitoring program or in working with existing programs. Funded by EPA's Office of Marine and Estuarine Protection under an interagency agreement with NOAA's Sea Grant and the University of Rhode Island, the directory provides a State-by-State discussion of 133 existing citizen volunteer monitoring programs.

National Directory (Continued)

Each volunteer monitoring program is briefly described, focusing on the program's goals, activities, size, and funding. Telephone numbers and addresses of each program's contacts are provided. The directory also includes descriptions of a number of national volunteer monitoring programs such as the National Marine Debris Data Base, the River Watch Network, and Save Our Streams.

[To receive a copy of the directory, contact Alice Mayio, Assessment and Watershed Protection Division, (WH-553), or Margherita Pryor, Office of Marine and Estuarine Protection (WH-556F), both at U.S. EPA, 401 M Street, SW, Washington, DC 20460.]

Bibliography: Cooperative Extension System's Water Quality Educational Materials

Water Quality Initiative Team, Extension Service. U.S. Department of Agriculture, Washington, DC, July 1990.

The Extension Service/USDA Water Quality Initiative Team has just completed a bibliography of "Cooperative Extension System Water Quality Educational Materials" in use in the States. The bibliography includes over 1100 bulletins, fact sheets, audiovisual materials, and computer software applications. Items are divided by State, category, and audience. Categories include: conservation, drinking water quality, nutrient management, pest management, testing waste management, wells, and others. Audiences include agriculture, general, residential, youth, and others.

The bibliography can be used as a reference tool by specialists to determine what is available nationwide in water quality education. Three copies have been sent to each State Extension Service Water Quality Coordinator.

[Limited additional copies are available upon request. For more information contact: Andrew J. Weber, Extension Service/NRaRD, Rm. 3346-South, 14th & Independence Ave., SW, Washington, DC 20240-0900. Phone: (202) 447-2506. FAX: (202) 475-5289.]

PLANETOR

Farm Planning Computer Application with Environmental Analysis Functions, Extension Service, U.S. Department of Agriculture, Washington, DC.

Environmental problems, including those of water quality, are analyzed in a new farm planning computer application called "PLANETOR," reports Buel Lanpher, National Program Leader in Farm Management, USDA-Extension Service, Washington, DC. PLANETOR was designed by a Cooperative Extension Service (CES) task force of Extension Specialists. The computer program guides farmers in analyzing their crops, livestock enterprises, and production practices, while concurrently assisting them to eliminate or control environmental hazards such as the contamination of bodies of water.

The PLANETOR program is currently in a very early operational stage, according to Lanpher, who has participated in the work of the program development task force. Plans are to field test the program across the country. Lanpher says a number of revisions are expected in this first version of PLANETOR during the next year or so.

The first step in using PLANETOR involves detecting where undesirable environmental aspects exists in a farmer's current crop and livestock enterprises. This requires data on the farmer's fertilizer and chemical use, soils information, machinery and labor availability, and so on. After PLANETOR flags potentially dangerous environmental situations in the current farming system, it then guides the farmer to consider changes in production practices that will eliminate or control these environmental hazards. The computer program will then analyze the impact of these proposed production practice changes from an economic standpoint,

PLANETOR (Continued)

including potential problems such as the need for different types of machinery, labor, and feed balance problems, and their impact on profitability. Further possible adjustments may then be considered in the farmer's whole farming system. The farmer may plan to deal with the identified economic difficulties while at the same time attempting to control environmental problems.

In order for these analyses to be meaningful, data bases must be established for local areas. Local data bases can be developed by interdisciplinary teams of subject matter specialists who are also knowledgeable about the local farming areas.

The Center for Farm Financial Management, University of Minnesota CES, is conducting the programming of PLANETOR in cooperation with a National Low Input Sustainable Agriculture (LISA) project coordinated by the University of Missouri CES. Leaders of the project are Richard O. Hawkins, Extension Farm Management Specialist at the University of Minnesota, and John Ikerd, Extension Economist at the University of Missouri. PLANETOR was planned and developed under the leadership of Hawkins and Ikerd assisted by five other State Extension Specialists and Lanpher.

[For more information contact: Richard O. Hawkins, Center for Farm Financial Management, University of Minnesota Extension Service, 249 Classroom Office Bldg., 1994 Buford Ave., St. Paul, MN 55108. Phone: (612) 625-1964; or John Ikerd, Department of Agricultural Economics, University of Missouri Extension Service, 200 Mumford Hall, Columbia, MO 65211. Phone: (314) 882-6533.]

NPS Information Exchange Update. . .

We're All Part of the Information Network

Here is a Nonpoint Source Information Exchange Checklist:

☑ ***NPS** News-Notes*

An occasionally published bulletin, reporting to you on new developments and techniques in NPS management and control, with names, addresses and phone numbers, for you to get more information.

☑ ***The Coupon***

(See Page 19) Use it to ask for the information you need and to tell us about what information you have that is worth sharing with others.

☑ ***The Datebook***

(Following The Coupon) A listing of times and places where you can meet and participate in the development of new NPS ideas and approaches.

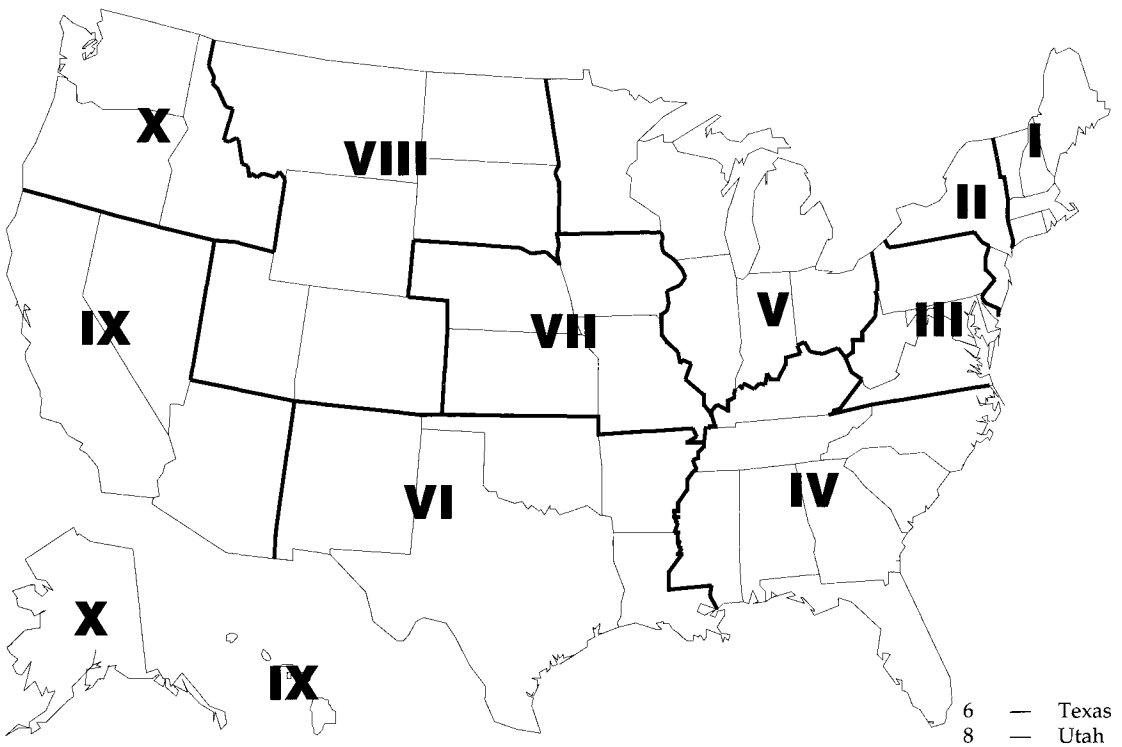
☑ ***The Electronic Bulletin Board***

Being developed now - watch for announcements coming up in a few months. You will be able to get vital NPS information through your PC 24 hours a day.

☑ ***Our Readers***

You ask the questions and provide the answers. Readers are the key parts of the information network.

Directory of EPA Regional Offices



4	—	Alabama	7	—	Iowa	1	—	New Hampshire	6	—	Texas
10	—	Alaska	7	—	Kansas	2	—	New Jersey	8	—	Utah
9	—	Arizona	4	—	Kentucky	6	—	New Mexico	1	—	Vermont
6	—	Arkansas	6	—	Louisiana	2	—	New York	3	—	Virginia
9	—	California	1	—	Maine	4	—	North Carolina	10	—	Washington
8	—	Colorado	3	—	Maryland	8	—	North Dakota	3	—	West Virginia
1	—	Connecticut	1	—	Massachusetts	5	—	Ohio	5	—	Wisconsin
3	—	Delaware	5	—	Michigan	6	—	Oklahoma	8	—	Wyoming
4	—	Florida	5	—	Minnesota	10	—	Oregon	9	—	American Samoa
4	—	Georgia	4	—	Mississippi	3	—	Pennsylvania	3	—	District of Columbia
9	—	Hawaii	7	—	Missouri	1	—	Rhode Island	9	—	Guam
10	—	Idaho	8	—	Montana	4	—	South Carolina	9	—	Northern Mariana
5	—	Illinois	7	—	Nebraska	8	—	South Dakota	9	—	Pacific Trust Territories
5	—	Indiana	9	—	Nevada	4	—	Tennessee	2	—	Puerto Rico
									2	—	Virgin Islands

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The Coupon

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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*.

Meetings and Events

September

5 - 7 *Fourth Annual Montana Riparian Association Workshop*, Big Mountain Ski and Summer Resort, Whitefish, MT. The workshop will focus on the management of riparianforested ecosystems in Montana. Small group field trips are planned with reports and whole group discussion on each trip. Contact: Montana Riparian Association, School of Forestry, University of Montana, Missoula, MT 59812. Phone: (406) 243-2050.

9 - 22 *Environmental Management: A Ticking Time Bomb*, Boston Park Plaza Hotel, Boston, MA. Sponsored by the American Society for Public Administration. Co-sponsored by U.S. EPA and EPA Region I. For hotel reservations contact the hotel directly: 64 Arlington Street at Park Plaza, Boston, MA 02117. Phone: (617) 426-2000. For registration information contact: ASPA Environmental Conference, P.O. Box 96664, Washington, DC 20066-9998. Phone: (202) 393-7878. FAX: (202) 638-4952.

16 - 20 *National Association of Abandoned Mine Lands Programs: 12th Annual Conference*, Breckenridge, CO. Cooperation, coordination, and communication between States, Tribes, and OSM. Technical sessions will include artificial wetlands for AMD treatment and natural wetlands evaluation and accounting. Contact: Colorado AML Program, Mined Land Reclamation Division, 1313 Sherman #215, Denver, CO 80203. Phone: (303) 866-3567.

17 - 22 *Water Laws and Management (American Water Resources Association Annual Meeting)*, Tampa, FL. Contact: Ken Reid at (301) 439-8600.

20 - 21 *Utah Water Quality Conference*, Yarrow Hotel, Park City, UT. Sponsored by the Utah Department of Health and the Utah Department of Agriculture. Plenary sessions will feature State and national leaders. Over 30 work and discussion roundtables will be concerned with many practical aspects of NPS management in Utah. Contact: Roy D. Gunnell, Utah Department of Health, 288 North 1460 West, Salt Lake City, UT 84116. Phone: (801) 538-7179.

23 - 27 *The National Association of State Land Reclamationists Annual Conference*, Gatlinburg, TN. Addresses current reclamation issues and developments from around the country. The conference will also include a field trip to local mines. This conference will be held in conjunction with the Annual Interstate Mining Compact Commission Meeting. Contact: Greg Conrad, NASLR, 459B Carisle Dr., Herndon, VA 22070. Phone: (703) 709-8654.

30 - October 5 *Northern Rocky Mountain Water Congress*, The Copper King Inn and The War Bonnet Inn, Butte, MT. Featuring the 19th Annual Rocky Mountain Ground-Water Conference, 7th Annual American Water Resources Association (Montana) Conference, Montana Symposium on Agri-Chemicals and Ground Water, Montana Water Resources Center Research Symposium, Workshop on Monitoring Well Design and Installation, and the 1990 Mineral and Hazardous Waste Process Symposium. Contact: Northern Rocky Mountain Water Congress, c/o Brenda C. Sholes, Hydrology Division, Montana Bureau of Mines and Geology, Montana Tech, Butte, MT 59701. Phone: (406) 496-4152.

October

1 - 5 *Association of Engineering Geologists: 33rd Annual Meeting*, Pittsburgh, PA. The conference will focus on mine subsidence, slope stability, dams, karst, erosion, and ground water with emphasis on new technology and rehabilitation of existing facilities. Contact: Stan R. Michalski, GAI Consultants, Inc., 570 Beatty Road, Monroeville, PA 15146. Phone: (412) 856-6400.

10 - 11 *Nonpoint Source Pollution, Water Quality, and South Dakota*, Sioux Falls, SD. This statewide symposium will provide local leaders with basic information to begin implementing water quality activities. Topics will include SD waters and sources of contamination, human and animal health problems, public perceptions, the economics of nonpoint source pollution, public involvement and education, sources of assistance, and current project updates. Contact: Angela Ehlers, SD Association of Conservation Districts, P.O. Box 275, Pierre, SD 57501. Phone: (605) 224-0361.

16 - 19 *International Symposium on Ecological Indicators*, Clarion Castle Hotel, Miami Beach, FL. Sponsored by EPA. Contact: Ecological Indicators Symposium, Kilkelly Environmental Associates, P.O. Box 31265, Raleigh, NC 27622.

17 - 18 *FOCUS Conference on Eastern Regional Ground-Water Issues*, Springfield, MA. Contact: Eastern Conference/National Water Well Association, P.O. Box 182039, Dept. #017, Columbus, OH 43218. Phone: (614) 761-1711.

22 - 24 *Florida Acidic Deposition Conference*, Tampa Hilton Hotel at Metrocenter. Sponsored by the Florida Department of Environmental Regulation. A forum to address the current understanding of acid deposition in Florida. Session topics will include atmospheric deposition monitoring, effects on forestry, limnology, and fisheries. Contact: Curtis E. Watkins, Florida Department of Environmental Regulation, 2600 Blair Stone Road, Tallahassee, FL 32399-2400. Phone: (904) 488-0782.

November

4 - 9 *The Science of Water Resources: 1990 and Beyond (American Water Resources Association Annual Conference)*, Denver, Co. Topics include hydrologic trends, legal issues, water resources development, and emerging issues (NPS pollution, urban impacts on water quality, water resources education, radon, hazardous wastes, and biomonitoring). Contact: Jim Loftus, Colorado State University, Rm. 100, Engineering South, Ft. Collins, CO 80523. Phone: (303) 491-7923; or Bob Montgomery, Woodward-Clyde Consultants, 4582 Ulster Parkway, Suite 1000, Denver, CO 80237. Phone: (303) 694-2770.

4 - 9 *Symposium on Urban Hydrology*, to be held simultaneously and in conjunction with *Water Resources: 1990 and Beyond* (see above). Sponsored by AWRA. Contact: Marshall E. Jennings, USGS, 8011 Cameron Road, Austin, TX 78753. Phone: (512) 832-5791.

6 - 10 *North American Lake Management Society's 10th International Symposium on Lake, Reservoir, and Watershed Management*, Springfield, MA. Contact: NALMS, P.O. Box 217, Merrifield, VA 22116. Phone: (202) 466-8550.

12 - 14 *Conference on Application of Geographic Information Systems, Simulation Models and Knowledge-Based Systems For Land Use Management*, Virginia Polytechnical Institute and State University, Blacksburg, VA. Contact: Dr. J. P. Mason, Coordinator, 212 Seitz Hall, VPI & State University, Blacksburg, VA 24061.

December

2 - 5 — *The Environmental and Economic Status of the Gulf of Mexico: The First Biennial Symposium*, Clarion Hotel, New Orleans, LA. Sponsored by U.S. EPA, Gulf of Mexico Program Office; NOAA; Army Corps of Engineers; SCS; and Florida Dept of Environmental Regulation. Full materials fee: $45 ($65 after October 31); Students: $25 ($45 after October 31). Make checks payable to Gulf Symposium and mail to: Judy Sutterfield, Conference Coordinator, P.O. Box 65792, Washington, DC 20035. For more information call (800) 726-GULF.

9 - 12 — *National Urban Conservation Symposium*, Hyatt Regency Hotel, Kansas City, MO. Sponsored by the National Association of Conservation Districts. Symposium will focus on the kinds of programs that conservation districts can assist and implement to manage urban conservation problems. Topics will include water conservation, quantity and quality; urban forestry; waste recycling and reduction; erosion and sediment control; stormwater management; floodplain management; etc. Contact: Lynn Sprague, NACD Coastal and Urban Committee, P.O. Box 260, Dover, DE 19903. Phone: (302) 734-7337.

16 - 19 — *Water Quality Standards for the 21st Century: Second National Meeting*, Hyatt Regency Hotel, Crystal City, Arlington, VA. Sponsored by the Criteria and Standards Division, OWRS, Office of Water, U.S. EPA. The meeting aims to identify scientific, technical, and policy guidance EPA should develop to assist States in strengthening the role of water quality standards in the management of the nation's aquatic resources. Hotel reservations should be made prior to November 9 directly with the Hyatt Regency, 2799 Jefferson Davis Highway, Arlington, VA 22202 (refer to the national water quality standards meeting). Phone: (703) 418-1234. For registration contact: Mark Southerland, Dynamac Corp, 11140 Rockville Pike, Rockville, MD 20852. Phone: (301) 468-2500.

12 - 13 — *Biological Criteria: Research and Regulation*, Arlington, VA. A symposium on the development of biological criteria descriptive of the uses and supporting natural conditions for all surface water types (streams, rivers, lakes and reservoirs, wetlands, estuaries, and near coastal waters) and the integration of such criteria into State water quality standards. To be held immediately following the Water Quality Standards conference (see above) and at the same location. For hotel reservations see above. For registration information contact: Anthony F. Maciorowski, Battelle Columbus Division, 505 King Avenue, Columbus, Ohio 43201. Phone: (614) 424-7575.

1991

January

6 - 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.

28 - 30 — *NPS 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 Schalk at (617) 641-5324. For conference content information contact Dan Murray at (513) 569-7522.

February

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.

March

18 - 21

Practical Sediment Management—Issues and Answers: Fifth Interagency Sedimentation Conference, Las Vegas, Nevada. Sponsored by the Federal Interagency Subcommittee on Sedimentation. This federally sponsored conference is open to State and local government agencies and private sector and academic organizations. Contact: Bob Thronson, Assessment and Watershed Protection Division (WH-553), U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone: (FTS/202) 382-7103.

July

18 - 21

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 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.

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