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EPA NPS News-Notes

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

Notes on Environmental Education

EDITOR'S COMMENTARY: It is broadly recognized that today's struggle to free our nation from pollution, to control nonpoint sources of water pollution, and to restore ecological balance to our watersheds will require many changes in the way that we do things — behavior modification, as it is referred to in academic circles. It is generally conceded that changing attitudes and habits might just be a bit tougher, or at least different, than designing, financing, and building a sewage treatment plant. We've gleaned a half-dozen encouraging notes about environmental education from our recent mail and readings that we present here in the lead-off section of this issue of *NPS News-Notes*. The final report of Water Quality 2000 (reported on below under the heading of *Reauthorizing the Clean Water Act*) has these important words to say:

> *Encourage Public Education to Promote a Conservation Ethic*
>
> *As a society, we must encourage public education that helps instill in our children and the general citizenry a conservation ethic that applies to materials, water, and energy. Basic societal changes are necessary to eliminate, whenever possible, impairment of water quality and aquatic ecosystems. Such change hinges on promoting pollution prevention as a priority over pollution regulation and short-term economic gains. In the short run, we may have to rely on government regulatory and economic incentives to promote conservation within the context of watershed planning and management. . . . In the long run, however, an intensive public education and awareness campaign is the only way we can equip citizens with the necessary tools for such a basic societal change.*

We are encouraged. Beginnings, looking to basic societal change, are underway.

— Hal Wise, Editor

INSIDE THIS ISSUE

The Conservation Connection: Student Volunteers Do The Job

Imagine an eager, motivated volunteer crew doing quality work on needed projects your agency can't get funded. Sound like the impossible dream? The Student Conservation Association has recently completed several watershed-focused projects for federal agencies and has more planned for 1993.

SCA has been matchmaking successfully for the environment since 1957. The public, nonprofit educational organization provides high school and college students and other adults with the opportunity to volunteer their services for the better management and conservation of our nation's parks, public lands, and natural resources.

Students Work in Chesapeake Bay, National Forest Projects

One of several programs created by SCA is the Resource Assistant Program. In 1992, this program assigned volunteer college students and other adults to work in the Chesapeake Bay Estuary Program, where they helped assess the impact of commercial hydraulic clamming on submerged aquatic vegetation. Other volunteers helped develop an atlas of waterfowl habitat to aid local governments direct growth and land development away from habitats. A third group completed a Chesapeake Bay waterfowl status and trends report.

In addition, one volunteer worked at the Merritt Island Field Station of the National Fisheries Research Center on the Florida coast. This project assisted U.S. Fish and Wildlife Service biologists conducting ecological research and environmental management on estuarine habitats, fisheries, and endangered species.

Two other Resource Assistant projects were with the Forest Service Forestry Sciences Lab of the Intermountain Research Station in Idaho and involved hydrologic studies and erosion control. One was in the rugged headwaters of the south fork of the Salmon River. The other was in the Priest Lake Ranger District in the northernmost part of the panhandle.

On the Oregon-California border, four volunteers assisted with all aspects of a research project investigating the potential impacts of agricultural drainwater on fish and wildlife within the Klamath Basin National Wildlife Refuge Complex.

The approximately 1,000 volunteers with SCA's Resource Assistant Program also participated in backcountry trail patrols, wildlife research, archaeological surveys and forest management. This program also carries out an international exchange of volunteers with Russia.

Training and field experience in this program are designed to advance academic, career, and personal goals. A Resource Assistant alumnus who worked with the Bureau of Land Management in Oregon said, "I think my program with the SCA was the smartest way I could have spent my summer. I learned more in twelve weeks than I would have learned from a whole shelf of books or several classes."

Benefits are a Two-Way Street

Short-staffed conservation and natural resource agencies contract with SCA to recruit and support volunteer work crews to perform various assignments for the agency. The connection benefits both parties; the agency is supplied with eager, motivated, and low-cost work crews, and volunteers get work experience. By working in the field for such agencies as the National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, the Bureau of Land Management, and other public and private agencies, volunteers receive the kind of exposure and experience that has encouraged nearly 70 percent of SCA graduates to seek careers in conservation.

Conceived by Elizabeth Cushman Titus when she was a college senior in the mid-1950's, SCA today manages a number of diverse programs designed to encourage career development and leadership training for youth from a spectrum of socio-economic backgrounds.

Besides the Resource Assistant Program, other SCA programs are

- **The High School Program.** It involves over 400 student volunteers a year in summer work projects such as trail construction and ecological restoration in

The Conservation Connection: Student Volunteers Do The Job (continued)

wilderness areas. The program also coordinates international exchange projects involving students from Mexico and Russia.

■ **The Mexico–U.S. Conservation Leadership Exchange (MUSCLE).** MUSCLE brings together young people from Mexico and the United States for natural resource conservation, leadership training, conservation education, and increased cultural understanding. Intercultural conservation crews participate in outdoor work projects that help protect public lands in Mexico and the United States.

■ **The New Hampshire Conservation Corps.** Trains economically disadvantaged and at-risk youth.

■ **The Henry S. Francis, Jr. Wilderness Work Skills Program.** Provides training in trail work and environmental restoration for SCA high school program supervisors, conservation corps members, and federal agency personnel.

■ **Conservation Career Development Program.** Encourages participation in conservation management by minorities and disadvantaged youth. Unlike the other programs, CCDP pays its participants a small stipend or fellowship.

SCA also produces a magazine called *EARTH WORK* which addresses the career needs and interests of the conservation community.

1993 Project Planned For Mexican and American Students

One MUSCLE project planned for the summer of 1993 will put eight high school students from Mexico and the U.S. to work on watershed protection projects, mostly streambank stabilization, in Plumas National Forest in California. While working, the group will camp in an isolated area of the forest; after completing the projects, the crew take a week-long backpacking trip in the Sierra Nevada Mountains.

Recently, SCA has received the prestigious Chevron Conservation Award and several national and state Take Pride in America Awards for its innovative and effective efforts to involve youth in the stewardship of public lands and natural resources. It has also been designated as a "Point of Light" by President George Bush. Founder Elizabeth Titus, still actively involved with SCA, has received several honors, including the President's Volunteer Action Award.

Being ahead of its time has only strengthened SCA's conviction that, ultimately, the protection of our natural environment depends on the vision, inspiration, and education of an enlightened youth.

[For more information, contact Wally Elton, Resource Assistance Program Director, or Ray Auger, High School Program Director, at SCA, PO Box 550, Charlestown, NH 03603. Phone: (603) 543-1700.]

Alabama's Environmental Education Initiative: Department of Environmental Management Opts for Education

Legacy, Partners in Environmental Education

\ leg-a-cy \ 1: a gift by will especially of money or other personal property.
2: something received from an ancestor or predecessor or from the past

Our legacy to future generations should be a clean, healthful environment. Our natural resources—water, air, and land—can no longer be taken for granted. Whatever we do, our actions have an impact on the environment. The legacy of a clean environment begins with an understanding of our environmental options.

Legacy, Partners in Environmental Education, is a group of people in Alabama who are working together so that our natural resources will be around for generations to come. Legacy's initial focus was to bring together all educational and environmental groups to provide a comprehensive program without duplicating efforts.

Before this program was initiated, several agencies, different groups, and educators were conducting environmental programs. But most people didn't really know where to turn for

Alabama's Environmental Education Initiative: Department of Environmental Management Opts for Education (continued)

resources or information. By bringing everyone together, a comprehensive environmental education program for Alabama can be achieved. Legacy programs will include an environmental curriculum for grades K-12, a citizen's awareness program, and programs to enable industries, corporations, small businesses, and vocational groups to make more informed decisions about Alabama's environment.

The Alabama Environmental Education Initiative

The Alabama Environmental Education Initiative (AEEI) took form in January 1992, with the Alabama Department of Environmental Management as facilitator. It organized Legacy, Inc., a not-for-profit corporation that implements the program. Legacy is working cooperatively with representatives of environmental groups and businesses to provide comprehensive environmental education without duplicating efforts.

The AEEI was developed in response to the National Environmental Education Act of 1990, environmental concerns of citizens, and priorities of the 1989 Alabama Environmental Protection Plan which listed four educational provisions:

1. Environmental education policy, goals, and related plans for the state;
2. Incorporation of environmental education into K-12 curriculum;
3. Networking of environmental information/education to state and community decision-makers, business and industry, and pertinent agencies and organizations; and
4. An on-going program of environmental information/education outreach to the general public.

By bringing an environmental emphasis into courses of study and providing teacher training, the initiative encourages environmental awareness in teachers, students, and parents. Legacy believes this awareness should lead to environmental benefits through responsible actions and better informed decisions, which are not always possible through regulatory programs.

The Alabama Department of Education has indicated its interest in this proposal and its willingness to offer support if the effort is comprehensive and produces material and information that would be useful in K-12 education.

Universities, the public, and some business organizations have offered to assist. The Environmental Protection Agency has also indicated its strong support of this effort in Alabama. Other federal agencies will be invited to participate.

Beginning January 2, 1993, a beautiful special edition environmental state license plate will be available for Alabama cars and trucks for a tax-deductible $50 annual fee. Proceeds above costs from the tags are designated exclusively for Legacy, Inc. Funding will also be solicited from sources other than the general and education funds, including grants from EPA and other agencies, donations, and fund raisers.

[Information is available from Patti Hurley, Alabama Department of Environmental Management, 1751 Congressman W. L. Dickinson Drive, Montgomery, Alabama 36130. Phone: (205) 271-7938.]

The Mr. and Mrs. Fish Water Conservation and Reuse Education Program for Third Graders

EDITOR'S NOTE: We found this inspired new program in the Summer 1992 edition of the *Water Connection*, a newsletter published by the New England Interstate Water Pollution Control Commission (NEIWPCC).

The New England Interstate Environmental Training Center (NEIETC) and NEIWPCC, in cooperation with EPA Region I, have developed the Mr. and Mrs. Fish Water Conservation and Reuse Education Program for third graders. The program is designed to spread the word about why clean water and water conservation are so important and about what people can do to make a difference. To accomplish this, the internationally acclaimed, award-winning duo Jeff and Deb Sandler, known as "Mr. and Mrs. Fish," of Portland, Maine have been enlisted to help develop the program and present it in their inimitable style to third graders throughout Maine.

The Mr. and Mrs. Fish Water Conservation and Reuse Education Program for Third Graders (continued)

Using scripts that are tailored to the location of the presentation, "Mr. and Mrs. Fish" introduce their audiences to characters like "Ebenezer Sewage," who is visited by three aquatic spirits before he learns not to waste water. The "Fishes" explore the question of where the clean water that pours out of their faucet comes from and where it goes after it is washed down the drain. Kids from the audience help play the various components of a wastewater treatment plant and the aquatic animals that either sink or swim depending on the quality of the discharge.

The Sandlers have visited children in more than 20 states and 16 countries, dramatically extolling the wonders of the aquatic environment by successfully blending wit with wisdom. Using a one-hour interactive skit, the program for third graders has proven in its premieres this spring to be an exciting and innovative way of teaching. Students also receive a personal "Certificate of Attendance" that lists conservation practices that children can do. Teachers receive a training package that they can use to help integrate this material into their classroom curriculum.

Although the pilot program is state and federally funded, NEIETC has been working to obtain additional support from private funding sources so the program can move into a "full-steam-ahead," privately/publicly funded phase by fall of 1992. It will then be able to offer more programs to schools throughout New England. The program is offered at no direct cost to school systems, except for any cost associated with busing students from various elementary schools to a central school auditorium.

[For more information, contact Kirk J. Laffin, NEIETC, 2 Fort Road, South Portland, ME 04106.]

SCS to the Rescue

Outdoor Classrooms in Maryland

When the Maryland state budget mandated severe cuts for school science programs, Queen Anne's County Soil Conservation District established outdoor classrooms in five of the district's elementary and middle schools.

Mary Ann Skilling, a soil conservation planner for the Queen Anne's County Soil Conservation District, worked with science teachers at all the district's schools to develop outdoor classroom plans that incorporated wildlife habitat areas, forested areas, flower and vegetable gardens, and site assessment of erosion-control measures. Children at two of the schools noticed a severe erosion problem in the area where they wanted to plan a nature trail. With help from Skilling and Donald Dawkins, SCS soil conservation technician, Annapolis, Maryland, an area design that included a wetland was developed.

SCS field staff have worked for decades with thousands of local schools to help set up outdoor classrooms, and this year they have taken advantage of the enthusiasm of the American people for conserving, protecting, and learning about our natural resources to set a goal of an outdoor classroom on every school site in the country. Also, they now have the assistance of Earth Team volunteers. The Earth Team is a dedicated, seasoned corps of citizens who want to help conserve the nation's soil and water resources. Putting their talents to work in outdoor classrooms looks like a perfect match. The agency is developing a "how-to" packet to assist in establishing outdoor classrooms. The program offers an area for students and teachers to conduct natural resource investigations and provides an inexpensive, immediate "field trip" location.

The Soil Conservation Service is involved in a variety of conservation education projects, many of them planned in conjunction with schools and educators, and others designed by county soil conservation districts for the use of children and adults.

Program Emphasizes Interdependence

A group of educators, conservationists, and agricultural leaders developed a curriculum project called "Food, Land, and People" to address gaps in environmental and agricultural education.

Food, Land, and People had its origins in 1988 at a national goals workshop. Educators, conservationists, and agricultural leaders talked about how naive many school children are today concerning the interdependence of food, land, and people. They identified several gaps in environmental and agricultural education:

- Missing links and relationships between the environment and agriculture
- Agriculture's role in modern society
- Cultural and societal impacts and demands on the local environment and agriculture

They pooled their resources and funding efforts to address these shortcomings through a supplemental curriculum project in environmental education for kindergarten through 12th grade called "Food, Land, and People." It was designed to enhance the outdoor classroom concept and complement the U.S. Department of Agriculture's "Ag in the Classroom" and other youth development programs, such as 4-H and Future Farmers of America. Eight "showcase" lesson activities underwent pilot testing in the spring of 1992 in five states—California, Colorado, Montana, New Hampshire, and Texas—and an ambitious list of future lesson activities is waiting in the wings for later pilot testing.

Students Blow Horn at San Miguel Field Day

Tierra y Montes Soil and Water Conservation District sponsors an annual field day in San Miguel County, New Mexico, to bring students closer to the land of their heritage. Six years ago, Soil Conservation Service District Conservationist Elmer Veeder proposed the outdoor classroom concept to the San Miguel County district school board. San Miguel, like many rural counties in the country, had experienced a migration from farms and small villages to larger towns. The board wanted to develop a tangible program that would show results and bring their young people closer to their native country. So they adapted the outdoor classroom concept to a field day. The field day is actually two days at two different sites to facilitate participation from schools across the county's 3 million acres.

Eight learning stations staffed by state and federal agency personnel feature demonstrations and hands-on sessions on natural resources. Topics include wildlife management, predator control, soil and water conservation, forestry, and fire fighting.

Two favorites are the sheep-shearing demonstrations and the State Park and Recreation Division's patrol boat that has a warning blast that students can sound. The field day itself has grown into several spinoffs over the years and has resulted in Arbor Day events, Soil and Water Stewardship Week activities, essay and coloring contests, and sponsorship of students at the New Mexico Forestry Camp.

Plains Conservation Center in Colorado

West Arapahoe Soil Conservation District (SCD) owns and runs the Plains Conservation Center, located in Aurora, Colorado, situated on 1,900 acres of rapidly vanishing mixed-grass prairie that once covered almost 40 percent of the state. The Soil Conservation Service works with the West Arapahoe SCD to develop workshops and day camps at the center, to introduce conservation improvements to the land, to erect structures, and to help children and adults begin to realize the impact humanity has on the fragile prairies ecosystem. "Though many of our programs are geared toward children, I think we also reach many adults," said Fran Branchard, PCC codirector. The Center's educational programs explain the dynamics of the High Plains grasslands, and, more broadly, help visitors develop a personal conservation ethic. "The Center offers seminars on a variety of subjects from use of xeriscapes (water-conserving landscapes) to wildlife photography," noted Tudi Arneil, West Arapahoe SCD board president. High school students along with many members of the Friends of the Plains Conservation Center are volunteers at the Center.

Teachers Are All WET?

Participants in a new nationwide water education program—Project Water Education for Teachers (WET)—are learning how to prepare young people to deal effectively with complex water issues such as flooding, drought, water allocation, and water quality.

Project WET gained recognition as a "model" youth water education program in North Dakota during the mid-1980's. In 1989, the Western Watercourse—a water resources education

SCS to the Rescue (continued)

program at Montana State University—set out to duplicate the success of North Dakota's program and to expand on it. Soil and water conservation districts cosponsor Project WET at the state level, and Soil Conservation Service specialists speak on a variety of water-related topics. The U.S. Department of the Interior's Bureau of Reclamation will fund Project WET nationally. The Western Watercourse and the Western Regional Environmental Education Council will conduct at least five regional writing conferences to create original materials, including the Project WET Science and Math Activity Guide. Especially important in Project WET is helping teachers help students understand how important water is to all users—for example, to municipalities, farmers and ranchers, recreationists, fish and wildlife, power utilities, and various industries—and how essential it is for future social and economic prosperity.

Teaching the Teachers

In Georgia, Columbia County Soil and Water Conservation District worked with Columbia County Board of Education to organize a teachers' conservation workshop to give teachers the tools, information, and resources necessary to teach natural resource conservation. "Experts on local natural resources can provide new insight and are available in every soil and water conservation district," said Philip Hadarits, Soil Conservation Service district conservationist for Columbia and Richmond counties in Georgia. "And the best way to reach most people is to have the experts teach the teachers," he added. Each day of a typical 5-day workshop for teachers is designed to focus on a different conservation agency or topic, including SCS, the Georgia Forestry Commission, the Georgia Department of Natural Resources, urban conservation, and conservation education.

A survey was conducted between March and June 1991 to determine what Soil Conservation Service employees and conservation district officials and employees think about conservation education. The survey responses concluded that conservation education should be a high priority of SCS, and half of the respondents identified the primary audience for conservation education as students and educators. Almost all agreed on the need to focus conservation education efforts on the importance of soil and water conservation. William Richards, Chief of SCS, says, "Working with teachers and students is an important aspect of SCS's effort, because it passes along an understanding about and a respect for the environment to a new generation of Americans."

[The above information was taken from the Winter 1992 issue of Soil and Water Conservation News. Send inquiries to Editor, Soil and Water Conservation News, Office of Public Affairs, Soil Conservation Service, U.S. Department of Agriculture, P.O.Box 2890, Washington, D.C. 20013-2890.]

High School Coastal Studies and Technology Center In Northwest Oregon

EDITOR'S NOTE: We predict great results from this kind of interaction between schools and communities.

Resource Study and Technology Becomes Curriculum

One hundred twenty-five ninth-grade students are the research staff of a new nonprofit corporation for coastal studies in Seaside, Oregon. Called the Coastal Studies and Technology Center, the corporation has been established at Seaside High School. Students study natural resource, land use, and economic issues that reflect environmental needs in the community; topics are proposed either by the program director or the students.

Since the traditional model that uses schools as the training ground for students to "become" active citizens does not seem to fit the current pace of society, rapid changes in resource use, and an ever-expanding technology, the Center focuses on providing opportunities for young citizens to become active participants now, instead of waiting until graduation. Students participate in the center by becoming student staffmembers, filling important positions in the center and joining a study team. Student staffmembers thus develop important concepts and skills through participation and study that emphasize the development of finished products that contribute to their local coastal community.

High School Coastal Studies and Technology Center In Northwest Oregon (continued)

Neal Maine, Special Projects Director at the Center, says the historic "teacher" position has been changed to "program director" to reflect the move from the teacher-based model that has dominated education for so long. Even the students had to be "deprogrammed" from their traditionally passive role, he said, so they could accept the responsibility of their active roles as research staff.

Studies at the Center are not classified as traditional school subjects; the day-to-day program is driven by relevant, current local issues. Students perform studies and develop finished products with assistance as needed in any discipline. Special attention is given to helping students develop the necessary technological skill and providing access to knowledge that will help them complete the projects in a usable format. Community organizations or interest groups then receive the completed study.

Support for Center From Many Sources

Support for the program is multifaceted; EPA made a $5,000 grant through the Environmental Education Act to hire students as research assistants, and the local school district pays the teachers' salaries. Local businesses, Portland State University, resource-based study groups, local, state, and federal agencies, industries, foundations, and a host of other organizations have made grants and have provided extensive technological support. They also support the active participation of students in the hands-on study of coastal resources and issues.

A wide variety of technical and field equipment is available to the student researchers, including six computer work stations, a remote sensing meteorology station, an ozone monitoring station, and a satellite downlink station for receiving weather satellite data. Students network with 70 other high schools around the world for cooperative studies through the Global Lab Project. Their field survey equipment includes a Global Positioning System and computer-based Graphic Information System to support computer mapping.

Contributions to Community

An ecological framework has been developed to guide the studies and interface with other projects going on the region. Such a framework helps build credibility with the variety of groups and individuals cooperating in studies conducted by the staff. One of the key elements of the center is the organization of student staff and educators to work cooperatively with citizens, resource managers, and researchers on local studies.

A nearby estuary is the site for many of the resource study projects. Some completed or current projects include the following:

- Participating in wetland studies as a part of a World Wetlands Watch Program involving 30 other schools around the world.
- Serving as research assistants in a state-funded study of the impacts of trampling on intertidal areas in the north coast.
- Monitoring created wetlands through cooperative study with EPA Wetlands Division.
- Participating in a two-year cooperative study with National Marine Fisheries on temporal and spacial distribution of juvenile fish in the lower Columbia River.
- Participating in global plot studies in cooperation with 70 high schools around the world through the Global Lab Project. The Center's study plot for the program is located in a newly established salt marsh in the local estuary.
- Studying the ecological impact of a local "spring break." The final report was presented to the city council and study committee. Students now serve on that committee.
- Sponsoring public agency forums and teleconferences for other students and community members.
- Working with a professional film maker to produce a film called "Coastal Change, Past and Future."
- Assisting in a geological study to trace the history of tsunamis in the local area.

High School Coastal Studies and Technology Center In Northwest Oregon (continued)

Students and community members have worked together on a number of projects as well, including

- A summary program to map and inventory estuary islands.
- A drift bird study.
- The cataloging of thousands of dietary remains from a local 2500 year-old Native American residence site.

The Coastal Studies and Technology Center also includes a staff development component where local educators and teachers from the region develop field techniques and upgrade their technology skills. For example, a three-day wetlands ecology project for Oregon teachers was held in cooperation with Portland State University, and next summer, the Center will serve as the study site for the Coastal Wetlands Institute for Educators.

Special Projects Director Maine feels that student participation in projects that make important contributions to the local, regional, and world community makes good sense for the future. Learning effective use of technology in the context of real-world studies also makes the Center a highly useful resource both for young citizens and for their community partners, he said.

[For more information, contact Mike Brown, Seaside High School, 1901 N. Holladay, Seaside, Oregon 97138. Phone: (503) 738-5586. Or contact Neal Maine, Seaside Schools, 1801 S. Franklin, Seaside, Oregon 97138. Phone: (503) 738-5591.]

Notes on Water Quality Management

Relating Land Use and Buffer Areas to In-Stream Water Quality: The Salt Fork Watershed in Illinois

by John Tippett, Research Triangle Institute and
Karen Guglielmone, Tetra Tech, Inc.

Properly sized riparian buffers (or filters) can nearly eliminate the effects of nutrient runoff on a nearby waterbody. Nonpoint source managers have known this for years. But, until now, it has been difficult to prove to land owners and land use planners without long-term, sometimes extensive (and expensive) demonstration projects. Technology—computers, digitizing equipment, geographic information systems, etc.—has changed all that.

Using the Salt Fork watershed in east-central Illinois, researchers for the Illinois State Natural Survey (ISNS) have developed a prototype computer program that allows local decision-makers in the central corn belt plains to evaluate and compare the effects of various land use changes on the quality of local waters, and to see how the use of riparian buffers can mitigate these potential impacts. With this prototype, an operator enters the current land use configuration and the proposed land use changes, and the system estimates the water quality impacts that are likely to occur at any location within the watershed as a result of changes in nutrient loading.

The Study

This project began when the ISNS decided to conduct a study to

1. examine the empirical relationships that exist between the land use/cover patterns in a watershed and in-stream nutrient concentrations, and
2. provide information to assist in the formulation of watershed-level planning and management methodologies.[1]

ISNS researchers chose to conduct their study on the Salt Fork watershed, a 500-square mile drainage to the Vermilion River severely impacted by the nutrients and sediment in urban and agricultural runoff. The watershed is typical of those found in the central corn belt plains.

ISNS set about collecting water quality data from December 1983 through December 1984 at 22 sampling stations throughout the Salt Fork watershed. They measured nitrate-nitrogen, ammonia-nitrogen, nitrite-nitrogen, turbidity, minimum and maximum biweekly

[1] Osborne, L.L., and M.J. Wiley. 1988. Empirical relationships between land use/cover and stream water quality in an agricultural watershed. *Journal of Environmental Management* 26:9-27; and Wiley, M.J., L.L. Osborne, and R.W. Larrimore. 1990. Longitudinal structure of an agricultural prairies river system and its relationship to current stream ecosystem theory. *Can. J. Fish. Aquat. Sci.* 47:373-384.

Relating Land Use and Buffer Areas to In-Stream Water Quality: The Salt Fork Watershed in Illinois (continued)

temperatures, specific conductance, pH, and soluble reactive phosphorus (SRP) and entered the information into a computer database.

The watershed boundaries for each sampling station were digitized from U.S. Geological Survey topographic maps, and stream networks were digitized from EROS High Altitude photos. This information was entered into ARC/INFO geographic information system (GIS).

ISNS also collected land use/cover data on the Salt Fork watershed for use as data layers in the GIS. Using National High Altitude Program aerial photographs, they established five categories of land use/cover (agriculture, urban, forest, lake, and barren land), and digitized the acreage of each category into ARC/INFO. From this, ISNS researchers determined that about 90 percent of the watershed is cultivated in row crops, primarily corn and soybeans, and that the watershed's urban areas—Champaign-Urbana and Rantoul—comprise approximately 5 percent of the overall land area. The cities dominate the watershed's upper reaches. Another 5 percent of the watershed is made up of forested lands, barren areas, and wetlands. ARC/INFO was also used to determine the total area of each land use/cover category within five riparian buffer zones (less than 100 feet, from 100 to 200 feet, from 200 to 400 feet, from 400 to 1,000 feet, and greater than 1,000 feet) around the stream channel.

Next, ISNS developed a series of 40 equations to describe the response of instream nutrient concentrations as a function of land use/cover patterns and location within the watershed. These equations became part of a computer program to demonstrate their potential application to land use/water quality planning.

The first test run, on a 48-square mile subwatershed, proposed converting 100 acres of agricultural land to urban land. The scenario was run for each of the five riparian buffer zones. It is not surprising that the model predicted in-stream nutrient concentrations would increase as a result of this land use change. However, by running the model using the different buffers, ISNS showed that the impact of the land use change could be mitigated. The model predicted an almost negligible change in in-stream SRP and nitrate concentrations when a buffer zone larger than 1,000 feet was maintained; a 30 percent increase in SRP and a 20 percent increase in nitrates when a buffer between 400 and 1,000 feet was maintained; approximately a 78 percent increase in SRP and a 55 percent increase in nitrates when a buffer between 200 and 400 feet was maintained; a 140 percent increase in SRP and, approximately, a 95 percent increase in nitrates when a buffer between 100 and 200 feet was maintained; and almost a 180 percent increase in SRP and 140 percent increase in nitrates with a buffer of less than 100 feet. Obviously, larger riparian buffer zones protected Salt Fork water quality better.

Implications for Watershed Management and as a Tool for TMDLs

The Salt Fork watershed study quantified the benefits provided by riparian buffers. Watershed managers can use this information in several ways.

- Special attention should be paid to waterbodies with minimal riparian buffers when identifying and prioritizing impaired waters. Nonbuffered stream reaches are likely to have substantially higher nonpoint source loadings than stream reaches buffered by as little as 200 feet.
- Special attention should be paid to waterbodies with minimal riparian buffers when locating other types of nonpoint source controls, such as BMPs. It is in nonbuffered areas that BMPs may prove most effective in protecting water quality. By allocating BMPs to nonbuffered areas, states could increase the cost-effectiveness of implementing nonpoint source controls, especially those required to meet the load allocations specified by a total maximum daily load (TMDL). In addition, management measures that involve the protection or creation of riparian buffers may prove invaluable in supplementing other types of BMPs.
- Integrating nonpoint source loading models with the GIS buffering techniques developed for this study could refine predictive capability. Refined models more accurately predict the potential water quality changes associated with implementing BMPs at any location within a watershed. This, in turn, would provide decision-makers with more solid information from which to allocate loads within a TMDL.

[For more information on the Salt Fork Watershed Study contact Lewis L. Osborne, Aquatic Biology Section, Illinois State Natural History Survey, 607 E. Peabody Drive, Champaign, IL 61820, phone (237) 244-2139.]

Water Environment Federation Forms New Water Quality/Ecology Symposium; Conference Sets Record

EDITOR'S NOTE: The following article was submitted by Harvey Olem, Chairman of Water Environment Federation's new Surface Water Quality and Ecology Symposium.

A record 13,000 attendees and 557 exhibitors converged on New Orleans for the Water Environment Federation's (WEF, formerly Water Pollution Control Federation) 65th Annual Conference and Exposition, September 20-24, 1992.

Nearly all major conference activities were staged in the vast New Orleans Convention Center, including 17 preconference seminars, the week's 74 technical sessions, and the final closing session.

On Monday, President Roger J. Dolan highlighted the need for increased communication and information exchange, sentiments echoed by those following him in the opening session. "Environmental protection is a worldwide concern," Dolan said, "Many solutions to correct worldwide environmental concerns will depend on yet undeveloped and communicated scientific and technological knowledge." This increased communication is vital to the Federation's vision, he said.

In his address at the opening session, Poul Harremoes, a professor at the Technical University of Denmark and the winner of the 1992 Stockholm Water Prize, focused on society's role in reducing pollution, especially from diffuse sources. "We can no longer deal with water supply, water runoff, and sewers as separate issues," he said. "The problems of pollution are related to every element of society in the broadest and the basic sense of the word."

EPA Assistant Administrator for Water LaJuana K. Wilcher, stressed the need for environmental stewardship as well as sound, sustainable development policies that carefully manage the earth's natural resources. "We as a world must learn to do more to develop sustainable technology and alter lifestyles so that we live more in harmony with the Earth," she said. Wilcher noted that much progress has been made since the Clean Water Act of 1972, but pollution from wet weather runoff and nonpoint sources must continue to be addressed.

New Surface Water Quality and Ecology Symposium Added

Among the 74 technical sessions presented during the conference were seven sessions making up the newly created Surface Water Quality and Ecology Symposium.

The symposium provides a new and cohesive, high quality technical program, marrying the programs of committees on ecology, marine water quality, nonpoint sources, toxic substances and air quality impacts. The new symposium joins WEF's original six symposia. "Having a symposium devoted exclusively to water quality and ecological issues helps WEF live up to its new name and broad focus on preserving water quality," said Maureen Novotne, WEF staff liaison.

This year, the sessions included topics such as identification, reduction, and management of toxic substances; stormwater impacts; environmental monitoring and assessment; water quality modeling and planning; and nonpoint sources. Most of the sessions were very well attended, averaging 150-200 people. Nearly 40 papers were included in a proceedings distributed at the meeting.

"We were very pleased at the interest in the new symposium and look forward to putting together high quality sessions for the technical program next year in Anaheim," Novotne said. "In fact, the symposium organizers find that more and more colleagues in the water quality and ecology field are looking to WEF to provide leadership in this area."

Next year, the Surface Water Quality and Ecology Symposium hopes to sponsor an additional session on coastal water quality issues. At its February meeting, it will finalize the sessions for next year's Anaheim technical program. A call for abstracts is included in the Datebook section of this issue of *News-Notes*.

[For more information, contact Harvey Olem, 1020 Elden Street, Suite 205, Herndon, VA 22070. Phone: (703) 709-0099.]

Performance of the Ten-Year Rural Clean Water Program Evaluated

EDITOR'S NOTE: The following article was prepared by Judith Gale, a staff member of the Water Quality Group at North Carolina State University. Thank you, Judith.

In September, the North Carolina State University Water Quality Group released a summary report evaluating the Rural Clean Water Program (RCWP), a federally sponsored nonpoint source pollution control program initiated in 1980 as an experimental effort to address agricultural NPS pollution. The evaluation was conducted by the National Water Quality Evaluation Project (NWQEP) at North Carolina State University in cooperation with the U.S. Department of Agriculture (USDA) and the EPA.

The Rural Clean Water Program is one of the few national NPS pollution control programs that has combined land treatment and water quality monitoring to document NPS pollution control effectiveness. Monitoring results have been used to adjust and refine land treatment practices designed to control NPS pollution. The RCWP was administered by the USDA - Agricultural Stabilization and Conservation Service in consultation with EPA. The USDA-SCS and Extension Service and many other federal, state, and local agencies also participated.

With a total appropriation of $64 million, the RCWP funded 21 experimental watershed projects representing a wide range of impaired water uses. Projects were located in Alabama, Delaware, Florida, Idaho, Illinois, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, Oregon, Pennsylvania, South Dakota, Tennessee–Kentucky, Utah, Vermont, Virginia, and Wisconsin. Landowner participation was voluntary, with cost sharing and technical assistance offered as incentives for implementing best management practices. Five RCWP projects received additional federal funding for comprehensive monitoring and evaluation.

The RCWP experience provides valuable information for current and future NPS control programs. RCWP projects have contributed significantly to our body of knowledge about NPS pollution and control technology, the effectiveness of BMPs, and the role of voluntary cost share programs in reducing agricultural NPS pollution. The following are a few of the many contributions and accomplishments of the RCWP projects:

- **Florida:** Fencing, water management, and animal waste management systems in the Taylor Creek-Nubbin Slough RCWP project have reduced phosphorus concentrations in water entering Lake Okeechobee by more than 50 percent.
- **Delaware:** Water quality monitoring in the Approquinimink River RCWP project documented a 60 percent decrease in phosphorus and a 90 percent decrease in sediment reaching impaired waterbodies as the result of conservation tillage and animal waste management BMPs. Improved fertilizer management cut the preproject phosphorus application rate in half.
- **Oregon:** Innovative animal waste management systems installed on dairies in the Tillamook Bay project reduced bacterial contamination of oyster beds in the bay, resulting in the reopening of shellfish beds to commercial and recreational harvesting.
- **Vermont:** The St. Albans Bay project successfully employed a paired watershed study to document the pollutant export reduction associated with changing from the common practice of spreading manure on frozen ground to the manure management BMP. Significant reductions in indicator bacteria were documented in tributaries.

The evaluation of the Rural Clean Water Program is based on the findings from mid- and post-project on-site evaluations of the 21 RCWP projects. Additional information was obtained from a short answer questionnaire completed by project personnel, a telephone survey of farmers in project areas who did and did not participate in RCWP projects, project ten-year and annual reports, and technical assistance provided by NWQEP to the RCWP projects during the past ten years.

The report describes the structure and objectives of the RCWP; articulates lessons learned from the RCWP about the design, organization, funding, management, implementation, monitoring and evaluation of agricultural NPS pollution control programs and projects; and provides a brief synopsis of each RCWP project. The lessons focus primarily on experimental NPS pollution control projects designed to scientifically evaluate the effectiveness of land treatment strategies in improving water quality.

Performance of the Ten-Year Rural Clean Water Program Evaluated (continued)

The evaluation of the RCWP should be of interest to legislators and government officials, federal and state NPS program managers, water quality project personnel, water resource managers and planners, and other natural resource management professionals.

[Copies of the Summary Report: Evaluation of the Experimental Rural Clean Water Program may be ordered from Janet Young, NCSU Water Quality Group, 615 Oberlin Road, Suite 100, Raleigh, N.C. 27605-1126. Phone: (919) 515-3723. Currently, copies are free. Later reprints will be available at cost. A more extensive report on the RCWP evaluation will be published next year.]

Reauthorizing The Clean Water Act

Water Quality 2000 Coalition Calls For Changes In U.S. Water Policy

In November, Water Quality 2000—a unique and diverse coalition of industry, environmental groups, government, academics, and professional and scientific societies—issued its report calling for major changes in U.S. policies and programs to protect water resources.[1] The document, *A National Water Agenda for the 21st Century*, proposes a new, integrated national policy to achieve the Water Quality 2000 vision: "Society living in harmony with healthy natural systems."

The group's deliberative and policy development process, which began in 1989, involved over 80 organizations, often major competing interest groups.

"Implementing the vision will in many instances require fundamental changes in our government institutions, manufacturing or farming practices, and individual lifestyles," said Paul H. Woodruff, chairman of the Water Quality 2000 Steering Committee. Woodruff, president of Environmental Resources Management, Inc. in Exton, Pa., and a representative of the Water Environment Federation, called the report "a significant milestone in the national clean water debate."

He also said, "Our recommendations should be of great value to the new Congress and Administration, as well as state and local officials, business leaders, educators, and others concerned with protecting water resources."

Robert Adler, senior attorney with the Natural Resources Defense Council in Washington, D.C., and steering committee vice chairman, said, "Despite twenty years of notable progress under the Clean Water Act, we still have not met the basic goals of the law—to restore the health of the nation's rivers, lakes and coastal waters. In a remarkable consensus-building process, Water Quality 2000 identified the reasons for our remaining water quality problems and proposed constructive solutions. This agreement proves that by working together, we can reach agreement on the best ways to solve serious environmental problems. But we now face the hard part—we need the resources and commitment to implement Water Quality 2000's wide-ranging recommendations."

"Although much progress has been made in improving the quality of the nation's waters since the first Clean Water Act was passed in 1972, more remains to be done," said John B. Coleman, corporate environmental affairs manager for the DuPont Company in Wilmington, Del., and steering committee member. "The Water Quality 2000 process has been a model for integrating divergent views, and the report provides a framework for meaningful improvements in water quality. DuPont and the other industry members of Water Quality 2000 are committed to doing our part and to working with other groups to bring about the continuous improvement needed."

Watershed Approach Central to Strategies Implementation

Water Quality 2000's new integrated, holistic national policy to provide for improved protection of surface and ground waters is comprised of three interrelated strategies:

- pollution prevention
- increased individual and collective responsibility for protecting water resources
- a reorientation of water resource programs and institutions along natural watershed boundaries

[1] For background on *Water Quality 2000's* earlier Phase II report, *Challenges for the Future*, which identified the problems facing surface water, groundwater, and drinking water, see *News-Notes* #23 (August–September 1992).

Water Quality 2000 Coalition Calls For Changes In U.S. Water Policy (continued)

Chairman Woodruff explained the meaning of key terms he used:

> ***Integrated*** *means a policy that protects surface, ground and coastal waters and aquatic habitat.*
>
> ***Holistic*** *means a policy that considers human health, water supply, and ecological concerns and avoids simply transferring pollution from one medium to another.*
>
> ***Pollution prevention*** *means that we must manage our affairs — how we live, farm, produce, consume, and transport — so that as a society we generate less pollution and manage the wastes we produce better. Our recommendations for pollution prevention include a mix of voluntary and mandatory measures to promote continuous improvement in all sources and sectors. This includes agriculture, manufacturing, land development, energy, transportation, commercial activity, and individual households. Prevention is particularly important as a strategy for controlling runoff from agricultural and urban lands, our biggest remaining water quality challenge.*
>
> ***Increased individual and collective responsibility*** *means we must empower the American people to adopt a heightened sense of responsibility for protecting water resources. It also means that all of us must contribute our fair share to the cost of cleanup and prevention. Responsible behavior—in households, on farms, and in factories—should be encouraged through education, incentives, and yes, sometimes, regulation.*
>
> *Implementation of* ***watershed planning and management*** *is central to all of our other recommendations. One of the biggest institutional impediments to progress is the fact that water programs are typically created and managed along political boundaries. Nature, of course, does not recognize political boundaries. Watersheds are the logical hydrological unit within which to plan, implement, and evaluate our prevention efforts. . . .*
>
> *The watershed approach allows us to make rational decisions concerning the allocation of limited financial resources. For example, whether in a given watershed it would be more effective—in terms of improved water quality—to spend $20 million helping to implement best management practices for agriculture or to spend the same amount for improvements in municipal wastewater treatment plants.*

To support these strategies, Water Quality 2000 offers some 85 specific suggestions for action in the areas of education and public awareness, science and technology, planning, funding, and incentives, legislation, and regulation. Many of these actions would be implemented locally within an overall watershed management/pollution prevention framework.

According to the report, ". . . solutions based exclusively on a standardized national approach seem unlikely to be successful. The watershed approach may be the only sensible way to address point sources and runoff in an integrated fashion."

A National Water Agenda for the 21st Century was developed over an 18-month period with the involvement of over 100 experts serving on five multidisciplinary work groups. A 20-member steering committee supervised the work group process and production of the final report. The member organizations did not agree on every issue, and several areas of disagreement are noted in the report. "In general," the report states, "differences involved specific actions needed to implement agreed-upon goals."

Publication of *A National Water Agenda for the 21st Century* concludes the latest phase of a three-year cooperative effort by Water Quality 2000 to define the nation's remaining water quality problems, develop consensus solutions, and promote their implementation. An interim report, *Challenges for the Future* , was published in June 1991.

In the next phase of its work, Water Quality 2000 plans to use the latest report to encourage discussion and implementation of the recommended solutions at all levels of government and in the private sector.

Woodruff said, "We are at a crucial juncture, where decisions we make today will determine the quality and quantity of water available to our children and grandchildren. These recommendations, developed with input and participation from a wide variety of disciplines and interests, will be of tremendous value to all of our organizations as we make these decisions."

Water Quality 2000 is supported by grant funding and contributions from member organizations. Major financial supporters have included U.S. EPA, the U.S. Department of

Water Quality 2000 Coalition Calls For Changes In U.S. Water Policy (continued)

Agriculture Soil Conservation Service, the William and Flora Hewlett Foundation, the George Gund Foundation, the Johnson Foundation, and the Water Environment Federation.

[Copies of A National Water Agenda for the 21st Century can be purchased from Water Quality 2000, 601 Wythe Street, Alexandria, VA 22314-1994. The cost is $25 per copy, plus postage and handling. Call 800-666-0206 and specify order number TT02. For further information, contact Tim Williams or Nancy Blatt at the above address. Phone: (703) 684-2418.]

American Farm Bureau Federation Assesses the Economic Issues For Farmers in the Rewrite of CWA

EDITOR'S NOTE: An October conference, *Clean Water and the American Economy,* held in Arlington, VA, was sponsored by EPA and Resources For the Future. American Farm Bureau Federation Chief Economist, John K. Hosemann, gave a speech entitled: *Economic Issues for Farmers in the Rewrite of the Clean Water Act.* Below are excerpts of his talk, covering the main points made in his presentation.

Introduction

Sorting out the economic issues to be dealt with in the rewrite of the Clean Water Act is a humbling experience. The approach in this paper is to focus on some fundamental economic issues. Should the fundamental economic issues get swept aside, there are obviously still many serious issues with which farmers must struggle.

Issue #1 — Property Incentives

The first major economic issue that all farmers now worry about is the right to own property and to use it efficiently.

The confusion about federal wetland delineations among at least four federal agencies, the passage and now implementation of the Coastal Zone Management Act (CZMA) amendments, endangered species, FIFRA, and Senate Bill 1081 to rewrite the Clean Water Act all have command-control regulations for farm activities and have added to the risk and uncertainty in the U.S. farming business.

Issue #2 — Science Missing

A second economic issue in the Clean Water Act rewrite is the fact that we simply cannot prove the cause/effect linkage between specific farm level activity and water quality. Broad generalizations, allegations, and nonscientific monitoring (Clean Water Act, Section 305B State Reports to EPA) are not sufficient to make policy recommendations for widespread changes in farm practices. We must do better.

Issue #3 — Diversion of Human Capital

The regulatory pressures of wetlands, clean water, endangered species, coastal zone management, and the antitechnology media hysteria that currently drives the policy debate are already imposing costs on farmers in terms of the human intellectual capital that is now diverted to unproductive regulatory activity.

Issue #4 — Lower Asset Values

Constraints on farm resource ownership and uses will sooner or later translate into a lower income stream as land uses are restricted. With income potential reduced, asset values will surely decline. This economic issue poses substantial considerations for farm financial institutions, rural schools and other institutions dependent on the tax base. Rural development will be penalized in the process of more federal water quality micromanagement.

Issue #5 — Zero Must Go

Extending the technology-based, command-control policy and regulatory regimes to nonpoint source problems raises the fundamental economic issue of zero pollution. Zero pollution is simply an uneconomical and impractical policy goal.

In a forthcoming paper "The 1991 Clean Water Act: Reauthorize, Reform, or Repeal?" Meiners and Yandle write:

> *Scientific evidence about the consequences of pollution tells us that we can stop short of zero discharge for many pollutants, but that we should strive for zero for certain toxic materials. The old fixation on zero pollution is a barrier to effective, lower cost control. If ambient quality standards are set for receiving waters, or the amount of pollutants that may be discharged are established, decision-makers can solve the resulting problem. They know where they are headed; they must then find the most effective way of getting there.*

American Farm Bureau Federation Assesses the Economic Issues For Farmers in the Rewrite of CWA (continued)

The overall environmental debate and the water quality debate seems to have matured beyond the naive notion that zero pollution is a workable policy goal. The debate seems to be refocusing not on the "either/or" questions, but rather the "how" question.

Issue #6 — Cost and Environmental Effectiveness

The Coastal Zone Management Act amendments made very detailed management recommendations for farmers for grazing, erosion, nutrients and pesticides, irrigation, and confined animal facilities. These measures and practices are well on their way to becoming the "farming law" in the states impacted by the CZMA. Policymakers are likely to extend these rules to the rest of the nation via the Clean Water reauthorization. At least two points need to be made.

First, it is not enough to look at the "macro" impacts of the proposed changes in farming practices in CZMA states. Totaling up the aggregate costs of best management practices will in all likelihood mislead policymakers to believe that CZMA will not "cost very much." The real cost of the CZMA regulations of land and water used in farming will be the cost imposed on the farm (firm) level of decision-making. Secondly, the environmental effectiveness of the proposed regulatory measures have not been proven.

Issue #7 — Risk Assessment

It has been said before but it is worth noting again that once the links between water quality and nonpoint source problems have been identified in site-specific terms; the next step should be to determine what the risks are to both human health and to well-defined environmental values. Simply put, farmers cannot stay in production if zero remains the federal policy goal of acceptable risk for humans, plants, and animals.

Issue #8 — Economic Impact/Implications for New Entrants

Those who fail to accept the globalization of the U.S. economy and particularly of U.S. agriculture will insist on extending the command-control technology-based prescription to nonpoint source contamination problems. Absent scientific proof of the cause-effect linkages between site-specific farm-level activities and production practices, such a generalized approach will penalize those farmers who, for whatever the reasons, are already at or below commonsense acceptable discharge levels. If this happens, one can expect the cost of production to rise unnecessarily for those who are already doing a "good job."

Issue #9 — Rural Development

A regulation-induced reduction in farm numbers will surely translate into reduced opportunity off the farm in rural areas and communities. Larger farm units are not as likely to do business locally. These units will be large enough to buy direct from input suppliers, bypassing the services of local farm input suppliers. Maintaining the competitive family farm structure through a new focus on water quality standards would not have this negative impact.

Concluding Comments

The real agenda in the national water quality debate is that the cost of further restrictions on point sources is very high relative to potential environmental gains and, therefore, it will be "cheaper" to impose restraints on agricultural activities (nonpoint sources). This naive assessment could produce substantial unintended economic consequences and little water quality improvement if policymakers fail to account for the importance of fundamental economic issues for the typical farm enterprise.

[For further information, contact the American Farm Bureau Federation, 225 Touhey Ave., Parl Ridge, IL 60068.]

News from the States and Localities, Where the Action Is

Olympia, Washington, Wants To Make Clean Water Work For You

EDITOR'S NOTE: The following article is from a press release that came across our desk the other day. We think its a neat idea, so we pass it on to our readers. Everybody has a role to play in the quest for clean water. Pollution Prevention begins at home and in the workplace.

Thurston County construction, landscaping, janitorial, auto, and equipment repair businesses are invited to a free workshop to learn ways to prevent water pollution and manage wastes.

Olympia, Washington, Wants To Make Clean Water Work For You (continued)

The workshop will be on Tuesday, February 9, 1993, from 7 to 9:30 p.m. at the Tyee Hotel in Olympia, Washington. There will be four break-out sessions—one for each business type—and the training will be provided by professionals working in each of the business areas.

The workshop is sponsored by Operation: Water Works, a voluntary education project developed to provide technical assistance and community recognition to businesses with the potential to contaminate the county's water resources.

Initiated in 1991, the project is sponsored by the cities of Olympia and Lacey and Thurston County and funded through a Department of Ecology Centennial Clean Water Fund grant. It focuses on auto and equipment repair, construction, landscaping, and janitorial businesses.

Interested businesses complete a self-assessment identifying areas where they can improve the way they manage wastes, educate and train employees, prevent erosion, and protect streams and shorelines. Next, they prepare their own unique Pollution Prevention Plans which address how they work on areas where they could do better.

These two steps qualify them as an Operation: Water Works participant. This means they have educated themselves on Best Management Practices (BMPs) for protecting water quality. It does not shield them from potential enforcement action—but such action may be less likely if they've learned about BMPs.

Participants receive a recognition sticker, mention in the project's publications and advertisements, and public congratulations for their efforts to become educated. This year, the project ran four quarter-page ads with photos in the *South Sound Business Examiner* recognizing business participants.

During 1992, over 60 local businesses attended four free workshops—one for each business group—and learned about the BMPs for their typical business activities. So far, 20 participants have completed Pollution Prevention Plans and received Operation: Water Works decals. So if you work in one of the identified business areas, get involved. Attend the February workshop. If you think you are already "doing the right things" but would like some help figuring out what you can do better, the project is there to help. As a consumer, make Operation: Water Works part of a *new* New Year's resolution to shop smarter. Look for the Operation: Water Works decal. Tell your contractor, mechanic, landscaper, or house cleaner about the program.

[For more information, contact Eva Shinagel, City of Olympia Water Resources Program, 900 Plumk Street, P.O. Box 1967, Olympia, Washington 98507-1967. Phone: (206) 753-5457.]

Virginia Cooperative Extension Establishes Residential Water Quality Demonstration Project

The Virginia Cooperative Extension Service, Prince William Unit, has received a grant from the United States Department of Agriculture Extension Service, to develop a statewide model for public information programming on residential lawn care practices and alternative septic systems impacts on water quality in the Chesapeake Bay watershed. The grant will allow expansion of an innovative residential program initiated two years ago by the Prince William Unit in the residential planned community of Lake Ridge, Va.

"This program is possibly the first attempt by USDA to use residential field days and demonstration lawns as a method of assessing what motivates homeowners to adopt recommended water quality BMPs for home landscapes," said Dr. Waldon Kerns, water resources economist with Virginia Tech, and overall grant coordinator. "Reports continue to document that waters in the Chesapeake Bay and its tributaries contain unacceptable levels of pollutants; we know that they are not all coming from farms," added Kerns.

Extension Agent Marc Aveni, who is in charge of the program, believes that the residential overuse of fertilizers and pesticides can be a significant source of nonpoint source pollution to both ground and surface water. "A typical homeowner probably applies more fertilizer and pesticide on a per acre basis than any farmer I know of," said Aveni. Aveni stressed that the objective of the program is to educate homeowners on the correct usage of fertilizers and pesticides. "We are not antichemical," said Aveni, "We simply want people to know what they are doing before they get out on their lawns with bags of nitrogen fertilizer and bug spray."

Plans call for a high profile program that uses residential field days in various locations throughout the county. The events center around the topics of soil testing, fertilizing in the fall, leaf recycling, mowing and pruning, composting, use of native plants, and integrated pest management. The events also feature individual demonstration lawns that adopt the

Virginia Cooperative Extension Establishes Residential Water Quality Demonstration Project (continued)

recommended practices over a one-year period. A leaders handbook, will be developed and made available at the end of the two-year grant period. The book will contain all the technical information, programming materials, and evaluation tools needed for another locality to conduct a residential public information program on water quality. It will also focus on what motivates a typical homeowner to adopt BMPs for home landscapes.

[For more information on the program, contact Marc Aveni at the Prince William Cooperative Extension Service, 8805 Sudley Road, Suite 200, Manassas, VA 22110-4796. Phone: (703) 792-6285.]

Tennessee and National Park Service Join To Clean Up Polluted Abandoned Mine Lands

Six hundred eighty-nine acres of unreclaimed land, strip-mined for coal in 1973 and remined in 1977, in north-central Scott County, Tennessee, is currently a high priority area targeted for cleanup and for very good reasons.

The site is located in the Bear Creek watershed, which flows north into Kentucky where it joins with the Big South Fork of the Cumberland River, designated by Kentucky as a Wild and Scenic River. The National Park Service currently has the Big South Fork National River and Recreation Area, which encompasses 73,748 acres in Tennessee and 30,430 acres in Kentucky, under development.

The site itself is outside the national park area; however, the Bear Creek drainage enters the Big South Fork just upstream of a fresh-water mussel bed that contains numerous species, two of which are federally listed as endangered. The little-winged pearly mussel *(Pegias fabula)* numbers in this bed are the highest in the world, according to the U.S. Fish and Wildlife Service. This small mussel inhabits cool, clear, high-gradient streams.

In addition to the strip-mined areas, the site includes a number of unmapped deep mines, numerous abandoned oil and gas wells, and an 80-acre industrial dumping site where contamination of groundwater is suspected. A 70-acre abandoned surface coal mine is characterized by heavily eroding spoil banks and acid mine drainage. Other water quality impairments include heavy metals, sediment, decreased dissolved oxygen, and color changes.

About 100 families use groundwater for their water supply in this area. Test data for pollutants other than coliforms are practically nonexistent. There is a high potential for health hazards associated with contaminated groundwater in the area, according to the county extension service and local officials.

The Tennessee Department of Environment and Conservation (TDEC) houses two important actors in this reclamation drama: the state's nonpoint source program and the abandoned mine lands (AML) program. They will cooperate to rehabilitate the Bear Creek watershed.

The NPS program will direct all water quality monitoring on the project, including mapping of potential groundwater use areas with follow-up monitoring at selected well sites. The National Park Service will receive a special $15,000 grant from the U.S. Fish and Wildlife Service to monitor water quality near the endangered mussel habitat. The NPS program monitoring team will monitor water quality both pre- and post-BMP implementation. In addition, the state's lab services will monitor five sites for variations in the aquatic biological community as a sign of improvement to the target watershed. The AML program will provide special water quality sampling for heavy metals, pH, and acidity during BMP construction. The Kentucky nonpoint source program is also assisting with water quality evaluation.

The AML program has studied the site and has proposed BMPs and reclamation action, initially calling for reshaping approximately 120 to 160 acres to establish controlled drainage. Also on the reclamation agenda is the installation of subsurface limestone drains (anoxic limestone trenches) and the creation of buffer wetlands through which to route acid mine drainage. The anoxic trenches are used to raise the pH of acidic runoff (pH = 2.5) to between 6.0 and 6.5. The buffer wetlands enhance the aquatic community and assist with increased oxidation of metals as well as increase the pH. This same procedure will be followed on various other sites to be identified in the upper watershed during the next two years of funding.

The project has been partially funded with 319(h) dollars, an average of $30,000 for each year. The majority of the funding has been supplied by the state's Abandoned Mine Lands program, which has spent from $75,000 to $140,000 each year. With increased 319(h) appropriations

Tennessee and National Park Service Join To Clean Up Polluted Abandoned Mine Lands (continued)

during the past two years, the project budget's 319(h) share will increase to approximately $80,000 per year for the next five years. The state's AML program will match these funds.

[For further information, contact Tim Eagle, Director, Division of Land Reclamation, TDEC, 2700 Middlebrook Pike, Suite 230, Knoxville, TN 37921. Phone: (615) 594-6203, or Dave Turner, Environmental Specialist, Surface Mining, Division of Water Pollution Control, TDEC, 2700 Middlebrook Pike, Suite 220, Knoxville, TN 37921. Phone: (615) 594-6035.]

South Carolina's Clean Water Farming Awards Program

Von P. Snelgrove of the South Carolina Land Resources Commission, described the objectives of the state's new Clean Water Farming Award Program to the Fourth Annual Tri-Regional Nonpoint Source Program Conference, held in Charleston, S.C., early in September. He said,

> *One of the challenges facing us today is how to encourage more people to voluntarily implement measures that will improve our water quality without additional regulations. With this in mind, the [South Carolina Land Resources] Commission set out to develop a program that would recognize individuals who protect on-site and off-site water quality by reducing the release of pollutants including nutrients, pesticides, sediment, and animal waste.*

He further commented on how they see the program working:

> *This program recognizes producers who have implemented outstanding best management practices in their operations. Experience has shown that individuals will follow the example of peers who have been recognized for specific accomplishments. Individuals will also implement BMPs when they have been clearly demonstrated to be successful. This takes a lot of risk out for individuals who do not have the financial resources to invest in new and innovative methods that have not been proven. In addition, publicity about water quality improvements has proven to be very informative to the general public regarding what the impacts of nonpoint source pollution can be on their health and way of life.*

To expand the Clean Water Farming Award Program, the Land Resources Commission is working on the Clean Water Certificate Program. There are three steps in the certification process. The first step is a self-evaluation by the farmer. Then the local soil and water conservation district board of commissioners review the farmer's operation. If the farm operation meets the standards, the farmer is recommended for Clean Water Farming certification.

Cooperating in the program are the S.C. Land Resources Commission, S.C. Conservation Districts, S.C. Department of Health and Environmental Control, S.C. Forestry Commission, USDA Soil Conservation Service, USDA Agricultural Stabilization and Conservation Service, and the Clemson University Cooperative Extension Service. U.S. EPA has provided financial assistance to the program with a grant from Section 319 funds.

Snelgrove told the 18 state delegates at the conference that the program is currently undergoing a final review by the cooperating agencies, and he anticipates implementing it this year.

[For further information, contact Von Snelgrove, Division of Conservation Districts, Land Resources Conservation Commission, 2221 Devine Street, Suite 222, Columbia, SC 29205. Phone: (803) 734-9317. FAX: (803) 734-9200.]

News of the Coastal NPS Pollution Control Program

EDITOR'S NOTE: EPA's Office of Wetlands, Oceans and Watersheds is pleased to announce the introduction of a new *News-Notes* column on Coastal Nonpoint Source Pollution, which will be a continuing feature.

Greetings and Salutations

The purpose of this regular column, cowritten by EPA and NOAA's Office of Ocean and Coastal Resources Management, is to provide information on the Coastal Nonpoint Source Pollution Control Program required by section 6217 of the Coastal Zone Act Reauthorization Amendments of 1992.

It is our hope that this column will be used not only to provide updates on the status of the guidance documents and state program development but also to provide a forum for exchanging information on issues relating to this new program.

Please let me know what issues you would like to see addressed in this column as well as sharing what's happening in your coastal area. Our addresses and phone numbers are listed below.

—- Ann Beier

Status of Guidance Documents

EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* and EPA and NOAA's *Guidance for State Coastal Nonpoint Program Development and Approval* were submitted for Office of Management and Budget (OMB) review on October 26, 1992. We expect that the guidance will be released shortly and, of course, we will announce it here along with details on how to obtain it.

Information Needs and Ways to Communicate and Get Answers

Both EPA and NOAA recognize that states are faced with some major challenges in designing their coastal nonpoint programs but we also think there are many opportunities associated with 6217. One of the major opportunities relates to exchanges of information and ideas. We at EPA and NOAA would like to foster such exchanges and this column provides a tool. Another tool for communication on coastal nonpoint source issues is EPA's *NPS Electronic Bulletin Board System (NPS BBS)* Use the COUPON in the back of this issue to order the *BBS Users' Manual.*

Contacts at EPA and NOAA

EPA and NOAA staff would like to provide support to states in developing their new coastal nonpoint programs. Key contacts in the two agencies are:

NOAA — Marcella Jansen, Office of Ocean and Coastal Resource Management, NOAA, 1825 Connecticut Ave., NW, Washington, DC 20235. Phone: (202) 606-4181.

EPA Headquarters — Nonpoint Source Control Branch (WH-553), U.S. EPA, 401 M St., SW, Washington, DC 20460. Phone: (202) 260-7085. FAX: (202) 260-7024.

Management Measures:

- **Rural Sources** (Agriculture, Forestry): Steve Dressing, Acting Chief, Rural Sources Section;
- **Urban Sources** (Urban, Marinas, Hydromodification, Wetlands, and Vegetated Treatment Systems): Rod Frederick, Chief, Urban Section;
- ***Additional Staff Contacts*: Forestry**, John Cannell; Urban, Robert Goo; **Hydromodification/Wetlands,** Chris Zabawa.

Program Implementation:
Stu Tuller, Chief, Program Implementation Section; Ann Beier.

EPA Regions — Contact your Regional NPS Coordinator. (Note: The states listed below include only those within the coastal zone. Non-coastal zone states and regions have not been included.)

Region I
CT, ME, MA, NH, RI, VT
Bob Moorehouse,
NPS Coordinator
Water Management Division
U.S. EPA, Region I, WQB2103
John F. Kennedy Federal Building
Boston, MA 02203
(617) 565-3513

Region II
NJ, NY, PR, VI
Mack Henning,
NPS Coordinator
U.S. EPA, Region II (2WMWSP)
26 Federal Plaza, Room 813
New York, NY 10278
(212) 264-2059

Region III
DE, DC, MD, PA, VA
Hank Zygmunt,
NPS Coordinator
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-3429

Region IV
AL, FL, GA, MS, NC, SC
Mary Ann Gerber,
NPS Coordinator
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-2126

Region V
IL, IN, MI, OH, WI
Tom Davenport,
NPS Coordinator
U.S. EPA, Region V
77 West Jackson Street
Chicago, IL 60604
(312) 886-0209

Region VI
LA, TX
Brad Lamb,
NPS Coordinator
U.S. EPA, Region VI
1445 Ross Ave., 12th Floor
Dallas, TX 75202-2733
(214) 655-6683

Region IX
CA, HI, GU, TT, AS
Jovita Pajarillo,
NPS Coordinator
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105
(415) 744-2011

Region X
AK, OR, WA
Elbert Moore,
NPS Coordinator
U.S. EPA, Region X
1200 Sixth Avenue
Seattle, WA 98101
(206) 553-4181

Notes on Riparian & Watershed Management

Forest Service and Extension Service Establish A Watershed-Ecosystem Management Center in Wyoming

EDITOR'S NOTE: Recent mail brought to *News-Notes* editors an announcement from Laramie, Wy., the University of Wyoming's Cooperative Extension Service, that we cheerfully report here. The idea of the Forest Service and Extension joining together to focus on "watershed and ecosystem management on public lands in Wyoming" is first-rate news. Congratulations.

The USDA Forest Service established a field unit of the Rocky Mountain Fish Habitat Relationships (FHR) on the campus of UW through an interagency agreement with USDA Extension Service. The position is housed in the College of Agriculture, Department of Range and Watershed Management.

Objectives of the cooperative venture are to

- exchange information and resources related to watershed and ecosystem management on public lands in Wyoming,
- coordinate natural resource education opportunities, and
- work toward mutual interests in natural resource sustainability.

In addition, other activities that will evolve from this arrangement include development and implementation of seminars, workshops, and training sessions pertaining to water quality and riparian and fisheries habitat issues for forested and rangeland programs.

Robert "Nick" Schmal, a Forest Service fishery biologist is staffing the FHR position. Nick has 13 years of public land management experience in Oregon and Wyoming. Prior to joining the Forest Service, he worked for both the Wisconsin Department of Natural Resources and an environmental engineering firm.

[For further information, contact Robert Schmal, Forest Service, Box 3354, University Station, Laramie, WY 82071. Phone: (307) 766-3957.]

In Northern California, Riparian Restoration = Economic Development

EDITOR'S NOTE: This article is reprinted from *Pacific Mountain Network News*, a service of the Rural Community Assistance Corporation, 2125-19th Street, Suite 203, Sacramento, CA 95818. The work of the Plumas Corporation was first reported on in *News-Notes* Issue #9 (December 1990) in an article entitled *Recreating Wolf Creek, a tributary of the Feather River.* We're pleased that this creative work is continuing and expanding. Congratulations, Plumas Corporation, John Sheehan and Leah Wills. (Issue # 9 can be retrieved and downloaded to your PC from the *News-Notes* database on the *NPS Electronic Bulletin Board System.* See page 26 for instructions on contacting the *NPS BBS.*)

By John Sheehan, Executive Director, Plumas County (California) Community Development Commission

The Feather River, as its waters collect behind northern California's Oroville Dam, provides nearly 30 percent of this precious fluid for the thirsty Central Valley agricultural interests and the teeming cities of the "south state." The watershed, which the river drains, is a mountainous landscape whose soils produce some of the nation's finest timber. But this soil's properties include high erodibility in the volcanic and granitic types. The North Fork of the Feather River also has a number of hydroelectric dams whose power output is equivalent to that of a nuclear generator.

Accelerating erosion rates, now approaching 3 tons per acre per year, threaten all the downstream users: timber holders, recreationists, utility companies, farms, ranches, and the urban populations eventually receiving the water.

To combat this threat, a unique alliance of ranchers, timber operators, wildlife and environmental groups, educators and resource agencies of local, state and federal

In Northern California, Riparian Restoration = Economic Development (continued)

governments have since 1985 combined their perspectives, expertise, and money to carry out an ambitious, wide-ranging erosion control and stream restoration program.

The entire effort has been coordinated by Plumas Corporation, the local, nonprofit economic development corporation serving the county for which it was named. "Plumas Corporation is the perfect group to orchestrate such an effort," says John Schramel, a local county supervisor who has been involved from the beginning. "They represent a neutral entity whose goal is to provide good jobs for residents in this economically depressed county. Further, they encourage and achieve cooperation between disparate and often conflicting interest groups."

The entire program, called Feather River Coordinated Resource Management, has repaired dozens of stream miles and regenerated hundreds of acres of wetlands while bringing in millions of dollars of outside investments for use toward the improvements.

The results speak for themselves. On Red Clover Creek, the first demonstration area, wildfowl production has increased over 600 percent since 1985, and trout populations have expanded by over 200 percent in the project area versus downstream control areas. A dozen different private and public entities contributed to this initial venture, an investment network that has since broadened further. An unparalleled aspect of the project has been the development of curricula at the local high schools and a degree program at the local community college to both monitor and improve the watershed through hands-on application.

"This program isn't a philosophical forum," said Leah Wills, who coordinates the project at Plumas Corporation. "We come up with solutions on the banks of the individual stream reach that are backed up by deliberative science. Each of the investors must completely buy in to the specific project and its ongoing maintenance. We're evolving a method to resolve resource conflicts and problems outside of the courtrooms that provides present and future jobs for local citizens."

The project uses investments from Pacific Gas and Electric Company, the federal Clean Water Act, state fishery and forestry programs, U.S. Department of Agriculture forestry and soil conservation programs, rancher management agreements and donations, federal job training and antipoverty funds, labor from local logging and other contractors, and help from volunteer groups such as the Isaak Walton League and Audubon Society. The individual projects range from $5,000 to $750,000 each.

The methods employed focus on using locally-available materials such as logs with attached root wads and boulders. Techniques used include fish ladders, check dams, revegetation, riparian fencing, stream meander restoration, road drainage improvements and, in some cases, simply agreed-upon resting of the damaged area.

"It may take us a generation to prevent this area from desertifying," said Wills, "but our and our children's future depend upon it."

[For further information, contact John Sheehan or Leah Wills, Plumas Corporation, P.O. Box 3880, Quincy, CA, 95971. Phone: (916) 283-3739.]

Reviews

Video on Water Quality Standards on Indian Tribal Lands

EPA's Office of Science and Technology (Office of Water) has released a new video entitled *Water Quality Standards on Indian Lands.*

The video covers the criteria that must be met for an Indian Tribe to qualify for treatment as a state in the EPA water quality standards program. It also discusses the issue dispute resolution mechanisms that are used to resolve any unreasonable consequence that may arise when an Indian Tribe and a state adopt different water quality standards on a common body of water.

[This video is available on loan and may be obtained by calling the Office of Science and Technology and Office of Groundwater/Drinking Water Resource Center at (202) 260-7786.]

Handbook Offers Local Governments Help Protecting Sensitive Areas

EPA's Oceans and Coastal Protection Division has produced a wonderfully readable hands-on guide to help folks protect their wetland and coastal resources in the face of increasing development pressures. Readable? Hands-on? Is this the EPA we know? The one in D.C? Yes, readers, that same lovable federal agency well-known for detailed technical reports now brings you a clear, concise, and useful handbook for protecting sensitive areas.

Written for local planners, elected officials, and concerned citizens, *Protecting Coastal and Wetland Resources: A Guide for Local Governments* contains a comprehensive review of the resource management and planning tools available to communities. The manual covers zoning ordinances, land acquisition, covenants, deed restrictions, and development rights transfers. Nineteen case studies and many short examples illustrate how communities across the country have applied these tools.

There are a lot of lists in the book. Most of them detail "how to's": how to create a land trust; how to create a zoning ordinance; even how to select from the many management techniques presented in the guide.

Refreshingly well-written, the book avoids bureaucratic style and obscure acronyms. Definitions accompany nearly all unfamiliar technical terms. Best of all, complex and weighty subjects like taxes are tackled crisply, never straying far from the wetland/coastal focus.

The guide's final chapter presents a table comparing the effectiveness, public acceptance, cost, and complexity of the tools discussed in the preceding chapters. The five appendices and the bibliography are valuable enough to stand on their own merit. Appendix D, for example, contains "A Layman's Guide To the Takings Issue"—key reading material for managers of nonpublicly owned areas.

Protecting Coastal and Wetland Resources is essential reading for conservationists and real estate developers, local elected officials and volunteer planning commissions—anyone involved in aquatic resources protection. Although its title refers to coastal areas and wetlands, most of the growth management and planning techniques outlined in the handbook will be useful in protecting other types of sensitive areas as well.

[To obtain single copies free of charge, send a written request for Protecting Coastal and Wetland Resources: A Guide for Local Governments, EPA document #842-R-002 to US EPA, 11029 Kenwood Rd., Bldg. 5, Cincinnati, OH 45242.]

Clean and Green — The Water Quality Action Manual for Greenhouse and Nursery Operators

EDITOR'S NOTE: When a trade association or professional society provides its members with this type of high-quality technical guidance and sends such a strong message to its members about water pollution control and prevention, we have to feel that the message about individual behavior as the solution to environmental pollution is getting through. No treatment-plant mentality ("let the experts design a single, mechanistic solution for all of us—but don't regulate me") can take the place of individuals operating their piece of the planet in an environmentally sensitive fashion. [See also *News-Notes* #24 (October 1992) for the remarks of Bob Wayland, Director of EPA's Office of Wetlands, Oceans and Watersheds, at the annual meeting of the American Association of Nurserymen.]

by Susan V. Alexander, U.S. EPA, Region VI

The Horticultural Water Quality Alliance has produced an excellent water quality protection guide for greenhouse and nursery growers that merges pollution control and prevention, economics, worker safety, and public relations into one easy-to-read manual.

The manual was developed because the Alliance "recognizes that clean water is a limited resource that must be conserved and protected if greenhouse and nursery businesses are to survive and succeed." The Alliance, made up of the American Association of Nurserymen, the Society of American Florists, the Professional Plant Growers Association, and Roses, Inc., clearly states in this straightforward document, "It would be easy for us to bide our time and wait until federal, state, and local governments start to scrutinize our operations and take action before we do anything . . . but it would be shortsighted, irresponsible and bad for business." The manual then provides growers with concise, factual information about how pollution can occur; its potential effects on human and ecological health; and ways to prevent

Clean and Green — The Water Quality Action Manual for Greenhouse and Nursery Operators (continued)

it through changes in management; installation of structural and vegetative controls; and what to do if pollution occurs as a result of a spill.

Written in an informal style, the manual guides the reader through an environmental audit. Subsequent sections describe BMPs designed to reduce groundwater and surface water pollution from runoff, leaching, spills, leaks, and improperly constructed water wells. It includes sections on wells, underground storage tanks, pesticides, fertilizers, runoff from irrigation and rain, and subirrigation. Each section begins with a good overview of potential problems and explains how pollution can occur, then concludes with recommendations for pollution prevention and control. The manual also includes sample recordkeeping forms to assist producers in keeping track of pesticide and fertilizer applications, a list of resource persons, and a glossary.

There are a few places where the document might benefit from some additional explanation. The environmental audit, while quite thorough, does not point out potential problem areas to producers as simply as it might. Most questions are phrased as BMPs ("Do you collect, treat and reuse runoff for irrigation?"), so a "yes" answer indicates a pollution prevention practice is in place; however, a "yes" answer to some questions points out a problem ("Do you mix fertilizer or pesticides within 150 feet of a wellhead?"). Unless the reader is aware of this format, he or she might unknowingly (unless they read the entire text of the rest of the manual) believe everything is fine when it is not. As another example, the section on pesticides discusses vulnerable soil types and pesticide persistence in depth but fails to caution growers to use extra precautions in areas underlain with fractured limestone (karst topography). The same caution would strengthen the section on fertilizer management.

The most important aspect of this manual, however, is that it trains growers to think for themselves in a manner similar to that of a water quality specialist. By helping producers look at normal and existing practices for their potential to pollute, the manual assists growers in inventing modifications to prevent such contamination from occurring. Once such a way of looking at production practices is established, growers can go beyond the material included in this manual and devise an environmental management plan for their own operations that can grow and change with their business.

[The Water Quality Action Manual for Greenhouse and Nursery Operators (in a three ring binder with tabs) is available for $85.95 through AAN Publications, 1250 I St., NW, Suite 500, Washington, DC 20005. Phone: (202) 789-2900 or FAX: (202) 789-1893. Members of the Alliance can receive a copy as a member service for $6.00.]

Announcements

Correction

In issue #24's article on the Indiana Ecoregion Study, we mistakenly included Thomas Simon's old telephone number. His new telephone number in EPA Region 5's Water Division is (312) 353-8341.

University of California Wildlife Extension Developing a List of Consultants

University of California Wildlife Extension is developing a new list of consultants and consulting firms providing services in wildlife subject areas in California. The list, which will include information on personnel expertise, examples of past and present projects, and services offered, will be made available to public agencies, private businesses, and individuals as an aid in selecting an appropriate consulting firm. To be included on the list, request a questionnaire from D. E. Lee Fitzhugh, Wildlife Extension, University of California, Davis, CA 95615.

How To Use The NPS Electronic Bulletin Board (BBS)

Nonpoint Source Electronic Bulletin Board System — (NPS BBS). The *NPS BBS*, through the user's personal computer, provides timely, relevant NPS information; a nationwide forum for open discussion; and the ability to exchange computer text and program files. Special Interest Group Forums (mini-bulletin boards) are dedicated to specific topics and have all the features of the main *BBS*.

To access the *NPS BBS*, you will need • a PC or terminal • telecommunications software (such as Crosstalk or ProComm) • a modem (1200 or 2400 baud) • a phone line.

The *NPS BBS* phone number is (301) 589-0205.

For a copy of the user's manual, complete *THE COUPON* on page 27 and mail or fax it in.

Datebook

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

Meetings and Events

1993

January

10-13 — *The Development of Soil and Groundwater Cleanup Standards for Contaminated Sites*, Washington, DC. Contact: Dr. Eileen O'Neill, Water Environment Federation, 601 Wythe St., Alexandria, VA 22314-1992. Phone: (703) 684-2400. FAX: (703) 684-2492.

19-20 — *Stormwater Management and Combined Sewer Overflow Technology Transfer Seminar*, Contact: Ms. B. Pasian, Conference Secretary, Wastewater Technology Center, PO Box 5068, Burlington, Ontario L7R 4L7. Phone: (416) 336-4588. FAX: (416) 336-4765.

February

1-2 — *2nd Meeting of State/EPA Workgroup To Improve and Expedite Award of Section 319 NPS Grants*, Washington, DC. Contact: Anne Weinberg, NPS Branch, U.S. EPA. Phone: (202) 260-7107. Open meeting.

4-6 — *Managing Riparian Areas: Common Threads and Shared Benefits*, Albuquerque, NM. Contact: Water Resources Center, University of Arizona, 350 N. Campbell Ave., Tucson, AZ 85721. Phone: (602) 792-9591. Cosponsored by USFS, SCS, American Rivers, EPA, Council of Energy Resource Tribes, Bureau of Reclamation, BLM, and University of Arizona.

14-19 — *Expanding Partnerships and Continuing Successes: 46th Annual Meeting of the Society for Range Management*, Albuquerque, NM. Contact: Jerry Schwein, SRM, 1839 York St., CO 80206. Phone: (303) 355-7070.

23-26 — *International Erosion Control Association 24th Annual Conference and Trade Exposition*, Indianapolis, IN. Contact: IECA, PO Box 4904, Steamboat Springs, CO 80477-4904. Phone: (303) 879-3010. FAX: (303) 879-8563.

24-26 — *Western Water Law and Policy—Implications for Wetland and Riparian Ecosystems*, Lakewood, CO. Contact: Douglass Owen, U.S. Geological Survey, MS 939 DFC, Denver, CO 80225-0046. Phone: (303) 236-1533. Sponsored by the Rocky Mountain Chapter of the Society of Wetland Scientists.

26-27 — *Sustainable Agriculture Conference*, Greeley, CO. Contact: Sustainable Agriculture Conf., Central CO Water Conservancy, 3209 West 28th St., Greeley, CO 80631. Phone: (303) 330-4540. Topics: federal regulations, survival of conventional farming, reducing chemical use and still making a profit, farm economics, farm wives' perspectives.

March

2-3 — *Wisconsin Controlled Grazing Conference*, Wisconsin Dells, WI. Contact: Carl Fredericks, SWFRN Coordinator, (605) 437-4395. Topics include: getting started with controlled grazing, grazing sheep and beef, New Zealand-style calf raising, streambank management and cost sharing, fencing and watering systems, pasture establishment and management, etc. Cosponsored by the Southern WI Farmers Research Network, Lafayette County Rotational Grazers Network, Agri-View, DATCP Sustainable Agriculture Program and the WI Rural Development Center. Cost is approximately $25 per person, meals and lodging not included.

2-4 — *Symposium on Ecological Restoration*, Chicago, IL. Contact: Jodi Sproul, Terrene Institute, 1717 K Street, Suite 801, Washington, DC 20006. Phone: (202) 833-8317. FAX: (202) 296-4071.

9-11 — *Implementing Integrated Environmental Management*, Blacksburg, VA. Contact: John Cairns, Jr., Virginia Polytechnic Institute and State University. Phone: (703) 231-5538. Case studies of integrated environmental management followed by panel discussions will cover practical applications and present lessons for environmental science, education, laws and regulations, planning and management. Registration: $150.

11-13 — *NALMS 2nd Annual Southeastern Lakes Management Conference:Forging Partnerships for Lake and Watershed Management*, Chattanooga, TN. Contact: NALMS, 1 Progress Blvd., Box 27, Alachua, FL 32615-9536. Phone: (904) 462-2554. Organized by North American Lake Management Society; cosponsored by U.S. EPA and Tennessee Valley Authority. Objectives are to exchange ideas, promote local action, and improve communication between management agencies and lake/reservoir users.

14-16 — *The Next Generation of U.S. Agricultural Conservation Policy*, Kansas City, MO. Contact: SWCS, 7515 Northeast Ankeny Rd., Ankeny, IA 50021-9764. Phone: (800) THE SOIL. Supporting the conference are USDA SCS, Extension Service, and Economic Research Service; USFWS; EPA; Pioneer Hi-Bred Int'l; Deere and Company; Monsanto Co.

14-18 — *Symposium on Geographic Information Systems and Water Resources*, Mobile, AL. Contact: AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192. Phone: (301) 493-8600.

15-18 — *Riparian Ecosystems in the Humid U.S.: Functions, Values, and Management*, Atlanta, GA. Contact: Nancy Barron, Riparian Ecosystems Conf., U.S. EPA, 345 Courtland St., NE, Atlanta, GA 30365. Phone: (404) 347-2126. FAX: (404) 347-3269. Sponsored by EPA Region 5, USDA-SCS, USFS, NACD, the Agricultural Research Service and other agencies.

17-18 — *Nebraska Water Conference*, North Platte, NE. Contact: The Water Center, Environmental Programs, University of Nebraska, 101 NRH, Lincoln, NE 68583-0844. Phone: (402) 472-3305. FAX: (402) 472-3574. Celebrating 100th anniversary of the founding of Nebraska State Irrigation Association.

1993

March

17-19 — *Rural Nonpoint Source Pollution in the Upper Midwest: Exploring Local-Level Initiatives and Effective Partnerships,* La Crosse, WI. Contact: Linda Schroeder, Conf. Manager, Nonpoint Source Conference, 282 77th St., SE, Delano, MN 55328. Phone: (612) 972-3908. Sponsored by the Zumbro/Root Rivers Joint Powers Board, EPA Region V, SCS, MN Pollution Control, MN Dept. Agriculture, MN Extension Service, IA State Univ. Extension, Univ. Wisconsin Extension, WI DNR, WI Dept. Agriculture, Trade & Consumer Protection.

21-24 — *Watershed '93: A National Conference on Watershed Management,* Alexandria, VA. Contact: WATERSHED '93, c/o Terrene Institute, 1000 Connecticut Ave., NW, Ste. 802, Washington, DC 20036. Phone: (202) 833-8317. FAX: (202) 466-8554. Sponsored by U.S.Army Corps of Engineers, BLM, EPA, FHA, FWS, USGS, Forest Service, SCS, Council on Environmental Quality, and NOAA in cooperation with six national and local agencies and organizations. Watershed-based management can provide a framework for meeting natural resource use, protection, and restoration needs while allowing for sustainable economic growth and development. WATERSHED '93 will bring together people who are involved or interested in natural resource use and management, pollution prevention and control, and planning and development for the public and private sectors.

28-4/1 — *National Conference on Aquifer and Wellhead Protection,* Coeur d'Alene, ID. Contact: Robert S. Turner, Coordinator, National Wellhead Conference, North 811 Jefferson, Spokane, WA 99260. Phone: (509) 456-3600 or 6024. FAX: (509) 456-4715. Sponsored by EPA and hosted by Spokane County, Washington, North Idaho's Panhandle Health District, and Idaho Division of Environmental Quality. Topics include methods of protecting groundwater/drinking water supplies (particularly the Spokane/Rathdrum Aquifer) and administering new federal mandates for wellhead protection. Conference will feature reports on successful programs from all across the country.

30-4/1 — *Water Quality Data Assessment Seminar,* Bandera, TX. Contact: Paul Koska/Henry H. Holman, U.S. EPA, Region 6, Environmental Analysis Section, 1445 Ross Avenue, Suite 1200, Dallas, TX 75202-2733. Phone: (214) 655-2289. Conference will be held at the Mayan Ranch Conference Center. Theme: Innovations in field techniques and ambient water monitoring. Presentations will address the following areas: biological, hydrological, physical/chemical monitoring, and related topics.

April

4-8 — *25th International Symposium on Remote Sensing and Global Environment Change,* Graz, Austria, Contact: Nancy Wallman, ERIM, Box 134001, Ann Arbor, MI 48113-4001. Phone: (313) 994-1200. FAX: (313) 994-5123. Sponsored by Consortium for International Earth Science Information Network, Environmental Research Institute of Michigan (ERIM), and Joanneum Research.

20-22 — *National Agriculture Nutrient Management Conference,* St. Louis, MO. Contact: Lyn Kirschner, CTIC, 1220 Potter Dr., Room 170, West Lafayette, IN 47006-1383. Phone: (317) 494-9555. Plenary sessions will lay groundwork for nutrient management; concurrent sessions on program and technology aspects; workshop on nutrient management plans. Sponsored by the Conservation Technology Information Center with U.S. EPA and USDA SCS.

May

15-21 — *2nd USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology,* Arlington, VA. Contact: Helen Klose, American Inst. of Hydrology, 3416 University Ave., SE, Minneapolis, MN 55414-3328. Phone: (612) 379-1030.

August

14-19 — *International Symposium on Soil and Plant Analysis,* Olympia, WA. Contact: Benton Jones, Jr., 183 Paradise Blvd., Suite 108, Athens, GA 30607. Phone: (706) 548-4557. Sponsored by the Council on Soil Testing and Plant Analysis.

9-13 — *Prairie Ecosystems: Wetland Ecology, Management and Restoration,* Jamestown, ND. Contact: Dr. Ned Euliss, U.S. Fish and Wildlife Service, Northern Prairie Res. Center, RR 1, Box 96C, Jamestown, ND 58401.

22-25 — *Association of State and Interstate Water Pollution Control Administrators Annual Meeting,* Des Moines, IA. Contact: ASIWPCA, 750 First St., NE, Ste. 910, Washington, DC 20002. Phone: (202) 898-0905.

September

20-24 — *First International IAWPRC Specialized Conference on Diffuse (Nonpoint Source) Pollution: Sources, Prevention, Impact, and Abatement,* Chicago, IL. Contact: Dr. Vladimir Novotny, IAWPRC Conference, Dept. Civil & Envir. Engineering, Marquette University, 1515 West Wisconsin Ave., Milwaukee, WI 53223. Phone: (414) 288-3524. FAX:288-7082.

Calls For Papers — DEADLINES

1993

February

1 — *4th National Pesticide Conference: New Directions in Pesticide Research, Development, Management, and Policy,* November 1-3, 1993, Richmond, VA. Contact: Dr. Diana Weigmann, VA Polytech, VA Water Resources Res. Center, 617 North Main St., Blacksburg, VA 24060-3397. Phone: (703) 231-5624 / 703/231-6673. Sponsored by the VA Water Resources Research Center, Research Division of VA Polytechnic Institute and 17 cosponsors.

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

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