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Nonpoint Source News-Notes

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

Commentary

A New Water Quality and Agricultural Information Age

by Jim Meek, former U.S. Environmental Protection Agency water quality specialist

A recent conference focused on opportunities for farmers and ranchers to manage and enhance their natural resource base — voluntarily — through planning. For me, this conference was a link between watershed and farm level approaches and an exploration of how farmers can use new technology and data to better manage their farms for economic and environmental benefit.

We are crossing an information-age threshold into more complete understanding of causes and sources of pollution that will improve decision making at all levels, including the farm. And, while we appear to be making considerable progress in organizing for watershed activities, we seem to have stalled getting farmers to participate more in reducing agricultural NPS.

Farmers themselves have identified several obstacles to greater involvement. Some fear losing autonomy over their own farms and investments. Some worry that the results of nonpoint source assessments will be used against them. Others believe that the water quality problem or their contribution to it has not been adequately demonstrated. They also want to maintain confidentiality and control over how to correct the problems they do find. And, as always, farmers' time is at a premium; many hold other jobs, and the burden of paperwork and red-tape can be numbing.

Tools and opportunities presented at the conference offered solutions to these obstacles. Speakers provided example after example of information and data now being assembled and integrated for use in Geographic Information Systems, models, and emerging technologies like remote sensing and global positioning systems.

Inside the Agriculture Issue

All issues of *News-Notes* are accessible on the *NPS Information Exchange* on EPA's World Wide Web Site: <http://www.epa.gov/owow/info/newsnotes/index.html>. See page 28 for log-on information.

This evidence of the increasing availability of data was, for me, the most exciting aspect of the conference. The focus on resource management planning for the individual farm takes on more significance given this increase and accessibility of information. Success in applying the data could reduce our need for the often tedious and complex formal approaches we set up when we are uncertain of the facts. The data ensure a more complete and accurate picture of our watersheds and sources of pollution; they also lead to greater fairness and equity in our solutions.

The Natural Resources Management Planning Conference was held in New Orleans from June 24–26. It was sponsored by the Conservation Technology Information Center and the National Association of State Departments of Agriculture. More than 200 people attended the conference.

For example, TMDLs will be most effective if the success of agricultural BMPs is measured, not simply assumed. Everyone — public and private land owners, farmers and nonfarmers — must show that they are reducing their contribution to pollution to the extent required.

"Farmers' success," one farmer commented, "will be based on how well they manage the information relating to their farm and its operations." Success will come, not from how much you know, but from what you are learning, what you gain from your failures, and how this learning can be applied in the field.

Another farmer cautioned, however, that these advances may create a false sense that we are in control when, in fact, unforeseen factors — at the very least, the weather — often interfere with our plans and schedules. Though based on science, farming is an art, and we must learn what techniques to use and when to apply each available technology. Others remind us that if our tools are too complex, they will not be readily applicable. Every farm is different, and every farmer manages the land according to a unique set of conditions. Our approach, as with anything, needs balance. Above all, we must be open and not hold blindly to our past ways of doing things.

The need for, and willingness to embrace, change is, indeed, reflected in many of the stories you will read in this issue of *Nonpoint Source News-Notes* — an issue that revolves around agriculture and clean water.

The question asked of those at the conference was "Are we ready? Can we adjust to this new environment?" That is a question for all of us. The Conservation Technology Information Center and the National Association of State Departments of Agriculture have started us on this path by sponsoring this conference. Now we must apply our energy and determination to make greater farmer participation a reality.

What Is a Farm and Who Is a Farmer?

a further reflection by Jim Meek

Most of us think of a farm as a place where a rooster greets the dawn, where livestock graze in a pasture, where the farmer produces crops that are either marketed or fed to livestock. But today, most eggs are produced in high population "egg factories," roosters are seldom seen on a modern farm in this age of artificial insemination, and livestock are likely to be confined to some kind of feedlot. On some farms, no crops are grown. The question is, which such operations are "farms," and which operators are "farmers."

The crucial point relating to nonpoint source pollution may well be whether the farm generates more by-products (e.g., sediments, crop residues, and animal wastes) than it can use in an environmentally responsible manner. This surplus is especially likely in an era of vertical integration in which the farmer becomes primarily a laborer. The integrating company provides the inputs or the crop (e.g., chicks, feeder cattle, seed, fertilizer, and consultants) and tells the farmers precisely what to do — what is to be marketed, when, and at what predetermined price. Company field staff visit the contracting laborer to provide advice (and perhaps to inspect for compliance with company policies). The farmer must comply or lose his market. Alternative markets are seldom available, and the farmer pays the company for the animals and probably the feed that has been used to grow them.

What Is a Farm and Who Is a Farmer? (continued)

Vertically integrated production contracts account for more than half of all production of vegetables, citrus, potatoes, sugar, seed crops, eggs, broilers, and turkeys. Plant breeders are diligently generating new crop strains with more protein, oil, starch, and amino acids or better cooking and manufacturing characteristics that will entice other producers to jump on the vertical integration bandwagon.

So is this a farm? Are these operators farmers, or simply independent contractors providing labor?

No matter how we answer these questions, it seems likely that the "industrialization" of agriculture described here is not reflected in our approach to environmental protection and compliance. Who is responsible for agriculture's environmental impact? What assurances does the public have that the residues of production will not pose subsequent environmental problems? How are these materials managed?

Perhaps a farm should be defined as an agricultural production system that uses the by-products, the wastes generated in the production of crops or animals, in an environmentally compatible, or even productive, manner. It also seems reasonable to suggest that a farmer not only owns or operates a farm, but has substantive inputs into the management decisions associated with the farm and its production system.

Formal definitions would help us identify various agricultural production systems and develop appropriate expectations and compliance strategies for them.

Then, too, the concept of stewardship is so inextricably associated with our idea of farming that it must somehow be incorporated in the definition, at least in an environmental context. Indeed, stewardship may be the final critical factor in determining, when all else is equal, who is a farmer.

Notes on the National Scene

Conservation Buffers to be Established Nationwide — USDA and Agribusinesses Work Together

The USDA's unprecedented National Conservation Buffer Initiative is set to install conservation buffers along 2 million of the nation's 3.5 million riparian miles by 2002.

The initiative, which integrates and pulls together a wide variety of existing conservation incentive programs, has its own incentive: $1 million pledged by the National Conservation Buffer Council, a group of agribusinesses committed to protecting sensitive riparian areas. The Council also provides leadership and business expertise to educate, encourage, and enable farmers to take advantage of programs like the Farm Service Agency's new continuous sign-up provision of the Conservation Reserve Program (CRP) and other programs.

Conservation Reserve Program Updated

The continuous sign-up provision allows farmers to enroll land in CRP throughout the year, rather than only at certain times. With fewer requirements than the general program, continuous CRP sign-up applications are automatically accepted if the land and the landowner meet eligibility requirements. Under the CRP, the Farm Service Agency pays farmers rent in return for converting highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as native grasses, wildlife plantings, or trees. The payments are based on the soil's productivity and the comparable local rent.

According to Max Schnepf, National Conservation Buffer Initiative Coordinator, "Farmers have considerable flexibility in the size of the buffers they install." Filter strips, for example, can be up to 100 feet in width, on average, along their entire length. At their narrowest point, however, they may not be less than the minimum width specified by each state's regulations. The national minimum is 20 feet. This flexibility frees farmers from the constraint of making an all-or-nothing choice about putting their land in the CRP; they can crop the best farmland and buffer the rest. Schnepf says that "making narrower buffer strips eligible for federal compensation will encourage more farmers to create buffer areas on their farms."

The Farm Service Agency also provides incentive payments for specific types of buffers in addition to the annual rental payments under the continuous CRP signup. Farmers earn 20 percent of the annual rental payment by installing filter strips, riparian buffers, grassed

Conservation Buffers to be Established Nationwide

waterways, or field wind breaks. An additional 10 percent incentive is offered to those who install buffers in EPA-designated wellhead protection areas. The Farm Service Agency also provides a cost-sharing program that pays up to half the cost of buffer installation.

Major Participants in the National Conservation Buffer Initiative

Federal Agencies

National Oceanic and Atmospheric Administration

U.S. Environmental Protection Agency

U.S. Department of Agriculture

- Agricultural Research Service
- Cooperative State Research, education, and Extension Service
- Economic Research Service
- Farm Service Agency
- Natural Resources Conservation Service

U.S. Department of Interior

- Fish and Wildlife Service
- Forest Service

Industry Interests (including among others) Cargill, ConAgra, Farmland Industries, Monsanto, Novartis Crop Protection, Pioneer Hi-Bred International, and Terra Industries

Environmental Groups and Trade Associations (as many as 75 are helping to promote the Initiative, including among others) Trout Unlimited, The Nature Conservancy, American Farm Bureau Federation, Environmental Defense Fund, Izaak Walton League of America, National Association of Conservation Districts, National Corn Growers Association, National Rifle Association of America, Society of American Foresters, and Water Environment Federation

Wildlife Habitat Incentives Program

Other incentive programs provide technical and financial help for establishing buffers. The Wildlife Habitat Incentives Program (WHIP) gives financial assistance to private landowners who develop habitat for fish and wildlife on land that is not enrolled in the CRP. Mutual agreements are usually set up for at least 10 years.

Wetlands Reserve Program

The Wetlands Reserve Program helps landowners establish conservation easements or cost-share agreements with the USDA for restoring wetlands with the USDA. USDA pays participating landowners for the agricultural value of the wetlands and 75 to 100 percent of the costs for restoring them, depending on whether a cost-share arrangement has been made and whether the easement is permanent, or limited to 30 years.

Environmental Quality Incentives Program

Other eligible farmers and ranchers can use the Environmental Quality Incentives Program (EQIP) to establish buffers. This program provides technical, educational, and financial assistance that landowners need to address soil, water, and related natural resource concerns on their lands. EQIP offers 5- to 10-year contracts to help farmers implement conservation plans that include structural, vegetative, and land management practices on eligible land.

The variety of programs available to landowners benefits many different types of agricultural operations, and, by protecting sensitive environments, these programs produce a wide range of economic benefits. For example, USDA economists estimate that in its first 10 years (1985 to 1995), the general CRP helped increase net farm income from $2.1 billion to $6.3 billion, reduced the damage from wind-blown dust by $0.3 to $0.9 billion, and provided $3.3 billion worth of timber resources.

Although money plays a large role, it isn't the only incentive farmers have for installing buffers on their farms. In addition to water quality, buffers help protect livestock from harsh weather and buildings from wind damage, reduce noise and odor, and serve as a turn row for tractors at the edge of a field. Buffers also reduce wind erosion.

Larry Harper, a Missouri walnut farmer, finds conservation buffers more than a useful tool to help maintain a productive farm. He enrolled a riparian buffer in the CRP a decade ago with a planting of walnut trees and forage plants. The buffered stream, Harper says, doesn't dry up as often as it did in the days when there were no buffers along its banks. But even more important,

Maryland's CREP Approved for Funding

As part of its stepped-up efforts to divert runoff from the Chesapeake Bay and its tributaries, Maryland has offered its farmers incentives worth about $250 million dollars to protect sensitive areas along the shore. The money is available through Maryland's participation in the new Conservation Reserve Enhancement Program (CREP).

The enhancement program will protect [illegible] acres in Maryland — [illegible] CREP any state can submit an enhancement plan for specified purposes. Maryland's plan is the first to be approved by the Farm Service Agency. It will establish [illegible] and grass filter strips, [illegible] 5,000 miles of shoreline by 2002.

CREP differs from the CRP in that it coordinates CRP enrollments with the goals and funding of the state. It is limited to land within the states whose programs have been approved, and it accepts only riparian buffers, highly erodible lands, and wetland restorations. While CREP offers higher incentive payments, the state must provide resources to supplement the federal funding (from 25 to 30 percent of the overall project cost). Landowners can be enrolled for up to 15 years. Similar proposals are pending from Illinois and Minnesota.

from Harper's point of view, the program helped him get started in a business with an extended start-up period. "I could not have established the buffers on my own," he said. "The CRP provided me with an income for the 10 years it took for my walnut trees to mature."

[For more information, contact Max Schnepf, National Conservation Buffer Initiative Coordinator, USDA Natural Resources Conservation Service. Phone: (402) 437-4081; fax: (402) 437-5165).]

EDITOR'S NOTE: The Chesapeake Bay Program recently launched a similar initiative with a goal of restoring 2,010 miles of forest buffers along its streams by 2010. Representatives from the Bay Program believe that the National Conservation Buffer Initiative can help them achieve the 2,010-mile goal. Maryland and Pennsylvania have each pledged 600 miles of the goal. Virginia has pledged 610 miles and the remaining 200 will be restored on federal lands and in the District of Columbia. See *Nonpoint Source News-Notes* #48.

*Study Shows Farm*A*Syst's Benefits Are Economic and Educational*

EDITOR'S NOTE: Adapted from the newsletter *Focusing on Farm*A*Syst and Home*A*Syst*, July 1997.

A two-year study of the Farm*A*Syst program in Louisiana demonstrated that funds invested in the program are dollars well spent. Increasing the farmer's knowledge and changing attitudes and behaviors is Farm*A*Syst's primary goal, but measuring the impact of the program is equally important to maintain program funding support. Louisiana's cost-benefit study not only established its pollution prevention credentials, but also proved that the program is cost-effective with long-term economic and educational benefits.

For the study, 134 farmers volunteered to conduct groundwater assessments and agreed to be surveyed before and after using the Farm*A*Syst assessment packet. Results showed that Louisiana Farm*A*Syst produces benefits-over-costs of at least $2.4 million and up to $15 million over a 10-year period.

"With today's tight budgets and strict laws of accountability, the impacts of government-funded programs must be identified — preferably in terms of costs and benefits to society," commented Robert Moreau of the National Farm*A*Syst/Home*A*Syst office.

Nearly one-third of the farmers in the study made, or planned to make, 66 pollution preventing changes in their farming practices as a result of using Farm*A*Syst materials. The farmers invested a total of $91,437 (approximately $682 per farmer) to make these changes. Farmers' time — which was valued at an average of $12 per hour — accounted for one-third of the total cost.

The changes covered a wide range of investments; however, the vast majority required no direct cash outlay. These changes generally involved management decisions such as the decision to move the pesticides mixing area a proper distance from the well or to recycle used oil and antifreeze. Other changes required out-of-pocket expenditures such as installing backflow valves in well pumps or pulling a leaking underground storage tank.

Changes in High-Risk Areas

Farmers tended to make changes where high risks were identified. For example, 47 percent of the farmers surveyed found high risks of nitrate and/or bacteria problems, and 44 percent of their later investments targeted that area. Petroleum product storage, pesticide storage and

*Study Shows Farm*A*Syst's Benefits (continued)*

handling, and hazardous waste management were other high-risk issues revealed by the assessments.

Other Benefits

The survey showed that farmers using Farm*A*Syst assessment materials increased their knowledge and awareness of the potential effects of farming practices on groundwater. For example, the number of "Don't Know" responses on the postassessment survey decreased by 73 percent, compared to the preassessment survey. The farmers' responses to hypothetical problems also improved. When asked what action they would take if their water supply was polluted, a significant number of respondents in the postassessment survey said they would find the source of nitrates and correct the problem rather than simply install a water-treatment system or look for a new water supply.

Reaching the Farmer

The Farm*A*Syst study explored two methods of program delivery: one-on-one delivery through AmeriCorps volunteers based in NRCS offices, and group workshops by the state Cooperative Extension Service, where the assessment packets where simply handed out. Echoing the results of earlier studies, this one also found that one-on-one delivery was the most effective method; 98 percent of the hand delivered assessment forms had been completed when an AmeriCorps volunteer returned in 60 to 90 days for the postassessment survey.

In a related finding, the Farm*A*Syst study also showed that providing cash incentives can increase the number of changes farmers are willing to make and the amount they are willing to spend on pollution prevention. A small portion of participants (five of 134) received $150 from the Water Quality Incentive Program — of which, $75 was earmarked to help pay for water tests. Three of the participants made, or planned to make, six changes costing approximately $3,370 per farmer, compared to the approximately $578 per farmer planned by the other 129 participants in the study.

Costs of the Farm*A*Syst program in Louisiana total approximately $165,000 per year in federal, state, and local funds.

Farm*A*Syst/Home*A*Syst Moves to the Winner's Circle

Farm*A*Syst/Home*A*Syst is one of five winners of the first-ever MVP^2 Awards. Presented by the National Pollution Prevention Roundtable, the Most Valuable Pollution Prevention, or MVP^2 Award, honors the most innovative and successful pollution prevention programs in the country.

"Farm*A*Syst is a good example of pollution prevention in action," says Martin Spitzer, executive director of the President's Council on Sustainable Development and speaker at the awards ceremony. "It is a wonderfully integrated approach to pollution prevention."

"The success of our national Farm*A*Syst/Home*A*Syst network depends on the initiative of state and local programs," says Liz Nevers, national Farm*A*Syst outreach coordinator. "This award is the result of dedicated individuals and committed agencies and organizations across the country. They are all MVPs!"

A distinguished panel of 11 representatives from the public and private sectors judged entries. Panelists represented a wide-range of organizations, including the U.S. Department of Energy, President's Council on Sustainable Development, the states of Maryland and Virginia, U.S. Environmental Protection Agency, Environmental Defense Fund, World Resources Institute, American Petroleum Institute, and the AFL/CIO. Applicants were judged on a variety of criteria, including innovation, measurable results, transferability, level of commitment from the parent organization, and whether they made optimal use of available resources.

Other recipients of the award are the Lower Colorado River Authority's Pilot Pollution Prevention Program — first place; the Texas Natural Resource Conservation Commission's Texas Pollution Prevention Partnership — second place; and the New Jersey Department of Environmental Protection, and the Radiance Services Company — a three-way-tie for third place with Farm*A*Syst/Home*A*Syst. The Montana Pollution Prevention Program, headed by Home*A*Syst author Mike Vogel, received an honorable mention for excellence in innovation and excellence in commitment.

*Study Shows Farm*A*Syst's Benefits (continued)*

*Secretary of Agriculture Honors Farm*A*Syst*

Farm*A*Syst also took home one of Agriculture Secretary Dan Glickman's 1997 Honor Awards. These awards acknowledge programs that make outstanding contributions to agriculture, consumers of agricultural products, and to the USDA's ability to serve America.

"Today, we celebrate our own," Glickman said. " We honor them for their leadership in making USDA a powerful force for good and for change." The Farm*A*Syst was one of only nine environmental programs to be so honored.

In accepting the award, Jackson credited the collective efforts of all the staff — local, state, and national — and pledged that the program would continue to help individuals take voluntary action. Joe Wysocki, the Cooperative State Research Education and Extension representative to Farm*A*Syst, also noted the interagency cooperation between CSREES and NRCS and the U.S. Environmental Protection Agency as significant factors in the program's success.

Clearly, Farm*A*Syst's commonsensical approach has great appeal. Since the pilot program — a state program to educate farmers about how their actions affect drinking water — it has evolved into a nationwide program that has also developed a nonfarmer Home*A*Syst program and a Field*A*Syst assessment (dealing with cropland, pastureland, woodland and wetlands, among other land uses), and these programs also work with farm commodity associations to develop commodity-specific assessments.

These awards and the translation of the Farm*A*Syst assessment into Spanish (see pp. 22-23) are an indication that this program is not only being tailored to meet specific needs, but also that specific states, countries, and individual users are able to adapt the program and make it work for them.

*[For more information, or to order a Farm*A*Syst/Home*A*Syst packet, contact Farm*A*Syst/Home*A*Syst, B142 Steenbock Library, 550 Babcock Dr., Madison, WI 53706-1293. Phone: (608) 262-0024; fax: (608) 265-2775; email: <homeasyst@macc.wisc.edu>; web site: <www.wisc.edu/homeasyst>.]*

Pfiesteria Problems Persist

The microbe Pfiesteria, *Pfiesteria piscicida* (Latin for "fish killer"), has been known to haunt North Carolina rivers, appearing intermittently between July and October, killing billions of fish, and driving tourists away. Pfiesteria blooms were discovered in North Carolina eight years ago, and although the microbe is a suspect for fish kills in the Gulf of Mexico, confirmed Pfiesteria-related fish kills had, until recently, been isolated to North Carolina. But in August and September 1997, the phantom killer struck once again this time in tributaries of the Chesapeake Bay.

Pfiesteria is dubbed a phantom because of the way it suddenly appears, kills, and vanishes. Because its behavior is so unusual and so deadly to fish, it has been the subject of many misconceptions, a fair amount of controversy, and few conclusions.

According to reports by North Carolina's Department of Health, Environment, and Natural Resources and the Maryland Department of Health and Mental Hygiene, Pfiesteria has been identified in salt and fresh waters from Delaware to Florida, but seems to thrive primarily in estuarine waters. Pfiesteria cells (see accompanying box) usually remain dormant in the sediment but, under some circumstances, some of them will become active and release neurotoxins that paralyze fish. During the active stage, the organism secretes a blistering agent that causes lesions. Often, within a few hours of their appearance, the cells again transform, leaving only dead and ravaged fish as evidence of their visit.

According to North Carolina's Stan Music, fish kills occur when a sufficient number of Pfiesteria cells enter the active life stage. The population size need not be extremely high; Pfiesteria populations ranging from 200 to 250,000 cells per milliliter of water have caused fill kills. The most important factor — the change from dormant to active life stage — appears to be triggered by the chemical secretions of nearby fish, Music reported.

Human Health Connection Debated

Scientists have been studying the possibility that Pfiesteria also causes human health problems such as those experienced by researchers at North Carolina State University: numbness, dizziness, memory loss, and skin rashes. Others, however, doubt such a connection. During two

Pfiesteria Problems Persist (continued)

recent epidemiological studies, one by North Carolina's Department of Health, Environment, and Natural Resources and one by East Carolina University, individuals exposed to Pfiesteria failed to develop a particular set of symptoms or a high illness rate. According to Music, this indicates that "if there are human health effects, they are not frequent, severe, or fatal."

Despite such studies, however, reports of illness continue to come in from individuals having contact with the water during or after a fish kill. According to Music, physicians who evaluate these individuals "cannot rule out an association to Pfiesteria, but could also attribute the problems to other causes." Music emphasized that "to date, no case of illness outside the laboratory can be definitely linked to the organism."

Nevertheless, research continues into the possibility of a link between Pfiesteria toxins and human illness. In August, the Maryland Department of Health and Mental Hygiene announced that a medical team has identified a series of symptoms, including burning sensation, respiratory irritation, and loss of concentration, that may be caused by the toxin produced by Pfiesteria. The medical team performed clinical tests on a number of individuals who reported illness after intensive exposure to water from Maryland's Pocomoke River. Once again, officials were unable to link Pfiesteria and human health problems definitively.

In earlier investigations, 13 researchers at the North Carolina State University Aquatic Botany Laboratory (the first to discover the organism) displayed symptoms ranging from a "drugged" feeling to sores, nausea/vomiting, short-term memory loss, and difficulty breathing. These workers generally worked with Pfiesteria for only one or two hours a day over a six-week period, but some of the symptoms have recurred in the affected researchers up to six years after exposure. These symptoms led to state and federal mandates that all further work with the toxic dinoflagellate be conducted in isolated, quarantined, limited-access facilities.

Understanding Pfiesteria

Pfiesteria is a one-celled dinoflagellate that sometimes behaves like a plant with chloroplasts and other times appears to be an animal. Researchers at North Carolina State University's Aquatic Botany Laboratory first began studying the dinoflagellate in 1988.

Some dinoflagellates reproduce in extraordinary numbers, causing a discoloration of the water, often referred to as a "red tide." Less than two percent of the known species of dinoflagellates are toxic.

Pfiesteria can assume more than 20 different forms during their life cycle, including a difficult-to-detect cyst stage, a toxic amoeboid stage, and a toxic flagellated stage. Fish excretions trigger encysted cells to emerge and become toxic.

According to Dr. Kenneth Olden, Director of the National Institute of Environmental Health Sciences in Research Triangle Park, North Carolina, Pfiesteria produces at least two distinct toxins — a nogatoxin that causes lesions and a neurotoxin that affects the central nervous system.

Recent Fish Kills Widen the Investigation

Since August, four fish kills have been reported in Maryland, prompting Governor Parris N. Glendening to close portions of the Pocomoke and the Chicamacomico Rivers and King's Creek while possible human health effects were studied. Recently, the Governor reopened the Pocomoke.

Pfiesteria has not been confirmed in any of Virginia's waters that empty into the Bay, however, the Virginia Department of Health, Virginia Department of Environmental Quality, the Virginia Institute of Marine Science, the Old Dominion University phytoplankton laboratory and other agencies (all members of Virginia's Pfiesteria Task Force) are continuing to sample Virginia's waters. Virginia Governor George Allen recently authorized plans for a mobil Pfiesteria laboratory that will include up to 14 aquariums, high-efficiency particulate air filters, a fume hood, and an autoclave.

As research continues, North Carolina officials recommend that people avoid contact with water during and for at least 24 hours after a fish kill episode. Maryland officials advise that water recreation is safe where there have been no fish kills and fewer than 20 percent of the fish have lesions. Fish lesions are, according to scientists, caused by a variety of stressors, and studies have shown that during a fish kill significantly more than 20 percent of the fish exhibit lesions.

Outbreaks May Be Related to Runoff

Reasons for Pfiesteria-related fish kills are unclear, although some suspect that elevated levels of nitrogen and phosphorus in rivers are supporting increased populations of the organisms. North Carolina reports that Pfiesteria "appears to thrive in nutrient pollution" and attributes North Carolina's outbreaks to increases in nutrients from wastewater treatment plants and runoff from agricultural land, golf courses, and developed areas.

Pfiesteria Problems Persist (continued)

The Chesapeake Bay Foundation's Mike Hirshfield also thinks that the recent problems in the Chesapeake Bay tributaries resulted from nutrients in the water. "Evidence suggests that elevated nutrients are the key to Pfiesteria problems," he said. Hirshfield is convinced that nonpoint source pollution, especially poultry manure, is a large contributor of nutrients to both the Pocomoke and Manokin Rivers. "Both watersheds support a large number of poultry operations, the waste from which is widely spread on fields," he said. As with other linkages involving Pfiesteria, however, no definite relationships have yet been established between pollutant sources and Pfiesteria populations. Until a cause can be pinpointed, Pfiesteria's presence remains a threat, which leaves beleaguered officials hoping that nutrient reduction efforts already underway in North Carolina rivers and Chesapeake Bay tributaries will have a positive effect.

[For more information, contact Stan Music, North Carolina Department of Environment, Health, and Natural Resources; Occupational and Environmental Epidemiology Section, 512 N. Salisbury St., Archdale Building, Raleigh, NC. Phone: (919) 715-6425. The Maryland Department of Natural Resources has set up a 24-hour Pfiesteria hotline: 1-888-584-3110.]

News from the States

Point-Nonpoint Source Trading May Be the Future for Wastewater Permits

What does a big malting company have to do with small farmers miles away? A lot, if it is part of the burgeoning movement toward integrating point source and nonpoint source pollution control.

Under a National Pollution Discharge Elimination System (NPDES) permit issued for a new wastewater treatment plant, the Rahr Malting Company is now responsible for reducing the amount of nonpoint source pollution from upstream agriculture. The five-year permit is Rahr's license to build a new wastewater treatment plant in exchange for its commitment to reduce nonpoint source pollution in the upper reaches of the Minnesota River. The new permit makes Rahr's expansion possible and helps protect the river.

In the past, Rahr sent its wastewater discharge to the Metropolitan Council's Blue Lake Treatment plant on the Minnesota River, but the company, which produces 24 million bushels of barley malt per year, must expand its operation to remain competitive. It proposed, therefore, building its own treatment facility in Shakopee, Minnesota, necessitating an NPDES discharge permit by the Minnesota Pollution Control Agency (MPCA). Rahr hoped that building its own treatment facility would lower operating costs and increase production. Rahr also plans to provide a beneficial reuse of the malt sludge.

EPA and the MPCA established a Total Maximum Daily Load for biochemical oxygen demand for the lower reaches of the Minnesota River in 1988 because of the increasing abundance of oxygen-demanding bacteria. Two factors contribute to BOD in the Minnesota River — wastewater treatment plants and NPS pollution.

Under the permit, Rahr is allowed to discharge eight pounds of phosphorus from their treatment plant for every one pound of phosphorus removed from the runoff entering the river upstream of the facility. A small reduction in phosphorus upstream will result in a large reduction in biochemical oxygen demand downstream where, during low flows, the river is overloaded with organic material that settles and builds up in one location. Rahr is allowed to discharge more phosphorus at its downstream location than it reduces upstream because it will be introducing it in a part of the river that does not experience biochemical oxygen demand overload. Trading parameters have also been set for nitrogen, biochemical oxygen demand, and sediment.

For the permit, the Minnesota Pollution Control Agency chose BMPs that would be easy to evaluate. Trading-eligible BMPs identified thus far include soil erosion BMPs, rotational grazing, livestock exclusion, critical area set-asides, and wetland treatment systems. Reductions in loadings as a result of the BMPs will be calculated using mathematical equations accepted by the USDA NRCS, such as the Universal Soil Loss Equation.

According to the Agency, the trading permit provides a flexible means of compliance for the Rahr Malting Company, while also ensuring a degree of water quality that is equal to or better

Point-Nonpoint Source Trading May Be the Future (continued)

than that which would have resulted from a more traditional permit. MPCA's Norman Senjem believes that the agency may be able to use a similar trading strategy to achieve antidegradation and waste load allocation requirements with future permits.

The new permit reflects the growing trend toward the protection of environmentally sensitive areas by protecting the watershed as a whole, rather than focusing on isolated areas. "Impacts on the river are being estimated in an integrated way," says Senjem, a key player in the permit's development. He points out that water quality managers are no longer looking at point and nonpoint sources as separate environmental stressors. In Williamsburg, Virginia, for example, local regulations require property developers to control nutrient runoff from any impervious surfaces they create. Developers are allowed to meet their removal requirements by installing on-site BMPs — or they can buy excess phosphorus credits from a regional stormwater management facility.

Rahr is already living up to its end of the bargain. The company has purchased or leased upstream parcels of land from farmers, or in some cases, from towns along the river. Rahr has installed vegetated filter strips, riparian buffers, and other BMPs near the banks of the Minnesota River or waterways that empty into the river. The company has allocated $250,000 over the next five years to reduce upstream nonpoint source pollution and further BMP installations. The funds will be supervised by a board of citizens concerned with water quality conservation. The board members, who represent grass roots organizations and state offices in addition to Rahr, will oversee the selection of BMP sites. Construction of the wastewater treatment plant will begin in spring 1998.

To protect the entire watershed, regulators must look all the sources of pollution in the watershed, even the sources that cannot be traced back to one responsible party. A pollutant trading strategy like the Rahr permit is certainly one tool regulators will be considering in the future.

[For more information, contact Norm Senjem, Minnesota Pollution Control Agency, Watershed Assistance, 520 Lafayette Road North, St. Paul, MN 55155-3898. Phone: (612)282-6243. Or contact Bob Peplin, HDR Engineering, Inc., 300 Parkdale 1 Building, 5401 Gamble Drive, Minneapolis, MN 55416-1518. Phone: (612) 591-5420; fax: (612) 591-5413.]

Pacific Northwest Farmers Get Seal of Approval — "Salmon-Safe" Labeling on Ag Products

EDITOR'S NOTE: Reprinted from *Labels: Linking Consumers and Producers* (1[2]: July 22, 1997), a publication of the Institute for Agriculture and Trade Policy. To subscribe to the newsletter electronically, send email to <majordomo@igc.apc.org>. In the body of the message type: subscribe label news.

This spring, the Pacific Rivers Council (PRC), a Portland, Oregon, conservation group, launched its "Salmon-Safe" marketing campaign, which offers a seal of approval on agricultural goods produced using farming practices that keep rivers clean enough for wild salmon to spawn and thrive. So far, the initiative has enrolled a dozen regional agricultural producers including wineries, juice processors, and rice growers.

Salmon-safe certification is based on an operation's impact on water quality and riparian habitat. PRC salmon-safe production guidelines include using cover crops to minimize erosion and ecologically sound methods to control weeds and pests. Certified producers are allowed to attach a "salmon-safe" label to their products.

Related Book

"Eco-labeling: Actual Effects of Selected Programs." Available from OECD Publications and Information Center, 2001 L St. N.W., Suite 650, Washington, D.C. 20036-4922. Phone: (202) 785-6323; fax: (202) 785-0350.

At present, PRC salmon-safe products are carried in about 30 retail outlets—mostly natural and specialty foods stores—throughout Oregon and Washington. "We're asking consumers to vote with their dollars," said Daniel Kent, PRC marketing director.

Another label that may soon be seen on agricultural products — this time on the East Coast — is the "Virginia Green" label, indicating that the product is grown by a sustainable producer. That initiative is part of the Virginia Association for Sustainable Biological Farming's consumer education and market development program.

[For more information, contact IATP at email: <kclements@iatp.org> or its website: <http://www.sustain.org.bulletins.>]

Wisconsin Farmer Setting the Pace for Pesticide Management

Wallendal Supply, a family-run farm in Grand Marsh, Wisconsin, has won the north central region's Environmental Stewardship Award for protecting water quality through innovative pesticide management. The award, established by the National Potato Council through the Pesticide Environmental Stewardship Program (PESP), rewards farmers for protecting human health and preserving the environment by reducing the use of pesticides and the risks associated with their use.

And Wallendal Supply has done just that. The Wallendal family has raised potatoes, soybeans, corn, and other vegetables on their 3,100-acre plot of land for 25 years. Water quality is a major concern on the farm, which sits directly over an aquifer. The farm's sandy and loamy soil has high potential for leaching agricultural chemicals.

The Wallendal farm monitors the groundwater twice a year for nitrate and pesticide levels. The farm has two monitoring sites with three wells — each at different depths — at each site. The farm also features a hi-tech pesticide and fertilizer storage complex that exceeds all state and federal regulations. The storage complex is the size of a small barn and is underlain with concrete to protect groundwater from potential spills. According to John Wallendal, the building paid for itself recently when a tank holding ammonium nitrate was damaged, leaking 12,000 gallons of the fertilizer. The building's leak-proof design completely contained the spill.

In addition to guarding against accidental spills, the Wallendals also conduct daily scouting trips to see what kinds of pests are plaguing their crops and whether the problem warrants a pesticide application. Often, they find that pesticides are not needed.

Other Conservation Practices

The Wallendal farm is also protecting its precious topsoil by using conservation tillage and a low-pressure irrigation system. The low-pressure, center-pivot irrigation system reduces the velocity at which irrigation water hits the soil, thereby reducing the splash that hits the soil and the amount the sediment that gets carried away in runoff. The system uses approximately 25 pounds of pressure per square inch (psi) as opposed to traditional systems that use 80 psi. This type of irrigation also reduces the amount of fertilizer that is washed away from the soil before it has had a chance to infiltrate the ground. The low-pressure irrigation system has reduced the family's use of fertilizer by about 20 percent, though they are still experiencing increases in potato yields and quality.

The Pesticide Environmental Stewardship Program is sponsored by EPA, USDA, and FDA. Its partners agree to develop and implement environmental stewardship pesticide plans. As a cooperating partner, the National Potato Council developed its Pesticide Environmental Stewardship Award, which is given annually to potato growers who have reduced the risks brought on by pesticide use without compromising potato yield or quality.

[For more information on the Environmental Stewardship Awards, contact the National Potato Council, 5690 DTC Boulevard, Suite 230E, Englewood, CO 80111-3200. Phone: (303) 339-3654. To learn more about the pollution prevention strategies at Wallendal Supply, contact John Wallendal. Phone: (608) 339-3654.]

Padilla Bay Farmers and Estuarine Research Reserve Take to the Field — Testing Conservation Practices on a Demonstration Farm

At first glance, 100 acres of low-lying cropland crisscrossed with drainage sloughs and adjacent to Puget Sound's Padilla Bay seems a rather unlikely place to find a farm run by an environmental agency. After all, the high-intensity row crop agriculture typical of the area is not commonly considered "water-quality friendly." But the Padilla Bay National Estuarine Research Reserve is seeking to change that perception with a demonstration project designed to test conservation practices in a real-life laboratory.

The agricultural demonstration farm, purchased by the Reserve in 1994, enjoys wide support of farmers and environmentalists in the Padilla Bay community. Researchers in the bay have long been interested in the effects of agricultural practices on water quality and ecosystem health, and now hope to find long-term solutions to these problems using the Reserve and adjacent farmland as a research site.

Pedilla Bay Farmers and Estuarine Research Reserve (continued)

Farmers involved in the project voice similar concerns. "As our population and our knowledge increases, we realize that, as a natural resource-based industry, we cannot do things as we did in the past. This project is an attempt to evaluate the impacts [of our actions on the bay] and find solutions that are positive, not negative," says Paul LaCroix, a member of the project's advisory committee and manager of the Western Washington Farm Crops Association.

The Reserve approached the demonstration farm project from the standpoint of water quality and estuarine resource management, but the agenda quickly grew to assimilate the concerns and interests of people living on the bay. The final list of issues comprises a wide range of topics including those related to water quality: septic systems, sedimentation, animal waste, residential use of hazardous products, nutrient loading, pesticide use, specific drainage practices, and nonpoint source pollution from row crop agriculture. Other issues are related to water quantity and on-site impacts: flooding, erosion, low summer flow and drainage costs, forestry practices, and farmland protection. After juvenile salmon unexpectedly appeared in sloughs adjacent to the demonstration farm, fisheries were also added to the agenda.

Highly visible to the public — especially those who hike the public trail that meanders along the top of the historic sea dike that protects the farm from the shallow estuary — the demonstration farm is ideally located for research and education. The Padilla Bay National Estuarine Research Reserve, part of a cooperative program between the state of Washington and the National Oceanic and Atmospheric Administration managed by the Washington State Department of Ecology, is located on the northeastern side of Puget Sound. The bay contains one of the largest intertidal beds of eelgrass on the west coast and receives much of its fresh water from a relatively small watershed of residential, industrial, timber, and agricultural lands. Over half of the 23,000-acre watershed is in high-intensity row crops like peas, grains, seed crops (beets, cabbage, spinach), flower bulbs, potatoes, and other vegetables. Surface water enters the bay through a series of sloughs and ditches that drain the flat, low-elevation farmland.

With funding from NOAA's Office of Ocean and Coastal Resource Management, the Reserve developed an operational plan for the farm guided by a steering committee that included representatives from federal agencies, Washington State Department of Ecology, the local conservation district, Washington State University Cooperative Extension and Research Division, the Diking and Drainage District, a local environmental group, farmers, and grower cooperatives. Involvement of the farming community has been important for the project. In addition to farmer participation on the steering committee, the project solicited input on the plan from individual producers in the watershed.

Plans for the demonstration farm include establishing sites for annual water quality and quantity measurement both on and off-site; developing a hydrologic model and design solutions to address drainage impacts, establishing cover crops and buffer zones; and developing educational materials about the demonstration farm.

[For more information, contact Terry Stevens, Padilla Bay National Estuarine Research Reserve, 1043 Bayview-Edison Road, Mount Vernon, WA 98273. Phone: (360) 428-1558; fax: (360) 428-1491; e-mail: <tstevens@padillabay.gov>.]

Predicting Crop Disease — A New Tool for Integrated Pest Management

EDITOR'S NOTE: This article is the fifth in the series of USDA Water Quality Demonstrations Projects featured in *Nonpoint Source New-Notes*.

The Wallkill-Rondout Watershed Demonstration Project in southeastern New York State is taking integrated pest management to new technical heights. Thanks to a unique weather forecasting system, participating producers can cut back on their use of a fungicide that controls leaf blight in onions and reduce the risk of water contamination.

The project installed automated remote weather stations in the onion fields on 11 farms and uses them in combination with integrated pest management scouting to predict outbreaks of the fungus that causes blight. The fungus multiplies only under specific humid weather conditions. The system, called BLIGHT-ALERT, was developed by James Lorbeer and his former graduate students Paul Vincelli and Paul Shoemaker at Cornell University. BLIGHT-ALERT is activated whenever daily visual inspections by IPM scouts determine that the average infestation in a

Predicting Crop Disease — A New Tool (continued)

field has reached the level of one lesion per leaf. Based on planting date, relative humidity, temperature, and the probability of rain in the next 36 to 48 hours, the system predicts the chances of an economically damaging outbreak. Farmers, who access the information via modem, fax, or an automated telephone hotline, can then make informed decisions about whether to apply fungicide. The demonstration so far has shown that it is possible to reduce fungicide applications in most years and still produce a quality onion crop.

USDA's Cooperative State Research, Education and Extension Service, Cornell Cooperative Extension, Natural Resources Conservation Service, and Farm Service Agency along with local Soil and Water Conservation districts are cooperating with the Wallkill-Rondout Water Quality Demonstration Project.

Staff from Cornell University's Plant Pathology Department, the Natural Resource Conservation Service, the Northeast Regional Climate Center, New York State Integrated Pest Management Program, and Cornell Cooperative Extension established the communication link from the remote weather stations and operate the BLIGHT-ALERT predictive system. The Northeast New York Weather Association provided two additional weather stations and a computer to download the BLIGHT-ALERT information and managed the weather data and BLIGHT-ALERT predictions for 1997.

Selected by the USDA in 1991 for a Water Quality Demonstration Project, the Wallkill-Rondout Watershed is located in portions of New York's Orange, Ulster, and Sullivan counties. The watershed's rich organic soil, known locally as "black dirt" produces half the state's onion crop.

The Wallkill Rondout project is anticipated to continue until 1999. In addition to the BLIGHT-ALERT demonstration, it demonstrates techniques in irrigation management, well testing, composting, erosion control, and calibration of manure spreading equipment. The project is also working to expand Integrated Pest Management into Integrated Crop Management (ICM), by considering both nutrients and pesticides in its efforts to reduce surface and groundwater contamination and maximize the value of the crop. Both IPM and ICM use a combination of best management practices, resource planning, and chemical applications to protect environmental quality and crop yields.

[For more information, contact Debra M. Armstrong, Area Extension Specialist, Cornell Cooperative Extension, Dillon Drive, Community Campus, Middletown, NY 10940. Phone: (914) 344-1234; fax: (914) 343-7471.]

Nutrient Planning and Animal Waste Management — State Laws and Regulations

Since the mid-1990s, several states, while recognizing the voluntary actions of farmers in reducing NPS, have found that these efforts alone are not enough to protect surface and ground water quality. The 1996 National Water Quality Inventory Report to Congress still ranks agricultural operations as the primary source of impairment to rivers, lakes, and wetlands. Recent headlines highlighting associated human health concerns provide further impetus for improving animal waste and nutrient management. Pennsylvania, North Carolina, Vermont, Kentucky, Minnesota and Iowa, among others, have responded to this call to action with tighter controls on the nutrients and animal waste in runoff from farming activities not covered by NPDES permitting.

Pennsylvania

Pennsylvania addressed livestock operations by passing the Nutrient Management Act in 1993 (see *Nonpoint Source News-Notes* #30), and the subsequent March 1997 Nutrient Management Regulations. An effort to improve farm efficiency and prevent nonpoint source pollution from agricultural nutrients, the Pennsylvania regulations establish minimum criteria for farm nutrient management plans. Operations with more than two animal units (2,000 pounds) per acre of grazing are required to submit nutrient management plans as outlined by the regulations.

The Act requires minimum standards for the construction, location, storage capacity and operation of animal manure on affected agricultural operations. Plans must include:

- the total amount of manure generated, used, and exported from the operation annually,
- nutrient application rates by field or crop group,
- procedures and provisions for the use or proper disposal of excess manure,
- manure management and storage practices,
- stormwater runoff control practices, and
- other appropriate BMPs necessary to protect the quality of surface and groundwater.

The Act establishes cost-share mechanisms for agricultural producers, creates a fund to help producers pay certified specialists to develop the farm plans, and provides guidance on manure storage and application. Pennsylvania is developing another financial assistance program to help implement the plans.

According to Doug Goodlander of the Pennsylvania Department of Agriculture, the four-year cooperative process used to develop these regulations was time well spent. All stakeholders, including the State Conservation Commission, the Department of Environmental Protection, Department of Agriculture, farmers, and environmental groups, were engaged in the discussion to ensure that the regulations would be both "doable" by the agricultural community and sufficient to protect water quality. The State Conservation Commission, in cooperation with the departments of Environmental Protection and Agriculture will oversee the Act during its implementation, which started October 1, 1997. Local conservation districts will provide immediate assistance to the regulated operations.

Vermont

In Vermont, a similar process of discussion, negotiation, and sometimes heated debate yielded the state's Agriculture Nonpoint Source Pollution Reduction Program Law and Regulations, supported by the Accepted Agricultural Practices Regulations (effective June 1995) and Best Management Practices Regulations (effective January 1996). (See *Nonpoint Source News-Notes* #44 for more information.) These regulations apply to any size animal operation — even one horse or cow. Permits are not issued and enforcement is complaint-driven. The state's Department of Agriculture which administers these regulations, provides technical assistance to farmers, and financial assistance is also available from the state and federal cost-share programs.

North Carolina

North Carolina's attack on animal waste pollution includes a 1993 amendment to its nondischarge rules that require animal operations to register with the state's Division of Water Quality. Under rules effective January 1997, farm owners must designate an "Operator in Charge" who has passed an examination on animal waste operations and management systems; laws and regulations applicable to these systems; the equipment, calibrations, and calculations used in these systems; and record-keeping procedures. Land application procedures for animal waste are a key part of the training. Initially, at least 10 hours of training must be completed by these operators, with six triennial continuing education hours.

The North Carolina rules, more stringent than NPDES permits, also require a Certified Animal Waste Management Plan, including best management practices to ensure no discharge from confined livestock facilities that have more than 100 cows, 75 horses, 250 swine, 1,000 sheep, or 30,000 birds with a liquid waste system.

Facilities covered by North Carolina's rules undergo an operational review six months before a compliance inspection, thus providing time for the operation to come into compliance should any problems be discovered. Determination of compliance is on a case-by-case basis.

North Carolina also increased its set-back distances (i.e., the distance that must be maintained between any waters of the state and new farm sites) — first in 1996, and again in 1997 with the passage of the Clean Water Responsibility Act. This Act also establishes a two-year moratorium on the construction of new swine farms, swine farm expansions, and new swine farm lagoons and animal waste management systems. The moratorium creates a lag time during which research can be conducted, results compiled, and recommendations made. In the same period, counties may develop zoning ordinances. The overall impact on water quality improvement from the passage of these rules and laws is expected to be positive although the data to show it may be years away. (See *Nonpoint Source News-Notes* #46 for additional information on North Carolina's animal waste strategy.)

Iowa

In 1995, Iowa passed House Rule 519 that requires animal operations to have very detailed manure management plans and prohibits land applications in excess of the nitrogen needs of crops. The manure management plans are required for permitted facilities: that is, (1) for all confinement facilities greater than 625,000 pounds of animal weight capacity using a liquid waste management system and an aerobic, anaerobic, or earthen storage basin or lagoon; and

Nutrient Planning and Animal Waste Management (continued)

(2) for all facilities having an animal weight capacity of 625,000 pounds or greater using a manure management system that stores manure in a dry form. Further, any new facility (with between 200,000 and 625,000 pounds of animal waste capacity) that doesn't fall under the permitting requirements is still required to submit a manure management plan.

In addition to the land application limits, the animal waste management plans include

- separation and setback distances,
- recordkeeping,
- operating procedures for dry and liquid waste management facilities, and
- agreements establishing the conditions for transferring or decommissioning the facility.

Recent laws in Iowa and some other states, do permit the manure application laws to be relaxed if the growers' manure management plan can show that the excess has been sold and is being responsibly used in some other form — for example, as compost or as a supplemental feed ingredient.

Minnesota

Although no new state laws or regulations have been passed in Minnesota, the state is strengthening pollution prevention efforts with regard to animal waste. As livestock and poultry operations in the state are changing to fewer but larger operations, the Minnesota Pollution Control Agency is recognizing the need to revise its feedlot program, first adopted in 1971, to reduce potential nutrient runoff from these facilities. Increased funding from the state legislature has enabled the agency to conduct more on-site inspections and to better track manure management plans and practices. Thus it can also apply stronger enforcement for negligent producers, conduct more research and monitoring of the effects of animal waste on water quality and adopt more stringent permit requirements to protect water quality. Minnesota attributes the successful administration of the program to delegating implementation authority to 44 counties where "County Feedlot Officers" are familiar with issues facing their particular areas.

For the past year and a half, a task force made up of agricultural producers, producer groups, environmental organizations, county, state and university officials and private consultants has been considering possible rule revisions regarding manure management in Minnesota. Various proposals under consideration for facilities with more than 50 animal units include adoption of manure management plans for each facility; special protection measures for land within 300 feet of public waters, including land application procedures for manure; and 50-foot setbacks from wells and other potential groundwater seepage areas for manure application. Other issues up for possible revision include manure storage facility specifications and feedlot odor concerns.

Other States

Although more general in nature, Virginia and Kentucky have passed laws to protect water quality from agricultural runoff. Both of these laws include "bad actor" clauses to crack down on noncomplying farm operators.

Still other states are realizing that NPDES permitting requirements alone do not solve all their water quality problems associated with animal waste and are beginning to explore alternatives. For example, some states are exploring how to handle situations in which an operation doesn't have enough cattle to fall under the NPDES Concentrated Animal Feeding Operations (CAFOs) guidelines, but the 500 head they do have are all standing a stream.

Kentucky Software Ties BMPs to Watersheds

A new software package developed by the Kentucky Division of Conservation and the Natural Resources Conservation Service offers agricultural producers a user-friendly "point and click" method for identifying recommended BMPs for farm operations located in specific areas of the Commonwealth's watersheds. The software is tailored to address producer requirements under Kentucky's new Agricultural Water Quality Act, which links individual farm water protection plans to a statewide plan. A "bad actor" provision in the legislation provides a powerful incentive to producers to comply with both the individual farm plans and the state plan.

By using the software program, farmers will be able to develop individualized water quality plans for their operations. A selection of menus addressing various aspects of the watershed will be displayed with options for accessing further information on water quality, problem pollutants and suspected sources, unique resources within the watershed, census data on population and farm operations, and other issues. Recommended BMPs for particular operations will be listed, with references to agencies or other entities offering technical, financial or other assistance.

The Kentucky Division of Conservation will use information from the program to track BMP implementation, state cost-share projects, and to monitor and prioritize water quality projects within the state's watersheds. The software will be available on the department's homepage, which is also scheduled for availability in early 1998.

[For more information, contact Charles (Chalky) Vaughn at the Kentucky Division of Conservation. Phone: (502) 564-3080.]

Nutrient Planning and Animal Waste Management (continued)

Innovative, assertive steps, like those taken cooperatively by the agricultural and environmental communities in North Carolina, Pennsylvania, and other forward-thinking states can help lead the way to improved water quality across the country.

[For more detailed information on state nutrient laws, see Enforceable State Mechanisms for the Control of Nonpoint Source Water Pollution, published by the Environmental Law Institute, 1616 P Street Northwest, Suite 200, Washington, DC 20036. Phone: (202) 939-3800; fax: (202) 939-3868; email: <law@eli.org>; website: <www.eli.org>.]

Agricultural Chemical Retailers' Report — Farmers Want High-Tech, Nutrient, and Pest Management Information

Agriculture in Minnesota is changing, and agricultural chemical dealers are eager to keep up with the times, according to results of a recent survey of ag dealers. Among the changes that dealers are responding to is an increasing demand for higher technology services and more customized nutrient and pest management alternatives.

The Minnesota Crop Production Retailers, a professional association, and the Minnesota Department of Agriculture teamed up to mail the 700 surveys asking agricultural chemical dealers in Minnesota about their training needs and business practices (and those of their farmer clients) related to nutrient management and environmental protection. More than 45 percent responded to the survey.

The respondents were classified by dealership type: 115 were individually owned or private partnerships, 210 were member-owned cooperatives, and 25 were public corporations. To target training and information needs, most of the retailers were also identified by geographic regions of the state.

Ag Dealer and Client Profiles

The average retailer surveyed has been in business for 44 years, and more than 70 percent of the businesses were under the same ownership the entire time. Each company employed an average of 11 people. The dealers reported that their customers are primarily cash grain farmers (58 percent), followed by dairy (18 percent), other livestock (18 percent), and vegetable and specialty crop farms (4 percent). Five percent of the customers do not operate commercial farms.

Demand for Services

The five most frequently offered services were:

- custom fertilizer application,
- whole field soil testing,
- farm nutrient management planning,
- fertilizer and pesticide record keeping, and
- soil testing for field variation.

Based on a consistent increase of retailers offering these services, the survey found that yield monitoring and variable pesticide application rates have the greatest projected growth statewide. A moderate decrease in whole field soil testing services may be offset by a corresponding increase in soil testing for field variation and variable fertilizer application services. On-farm manure spreader calibration, farm financial record keeping, and computerized farm management were the least frequently offered services. Although regional variations exist, the survey indicated that the statewide industry is moving toward higher technology services such as variable rate pesticide and fertilizer application.

Retailers reported that the most popular method of offering crop consulting services to their clients was through an in-house consultant selling both services and products. A number of dealers noted that this arrangement could be perceived as a conflict of interest.

The most frequently cited problem encountered by the retailers was the farmers' unwillingness to pay for services (73 percent of responses). Other impediments retailers found were staffing and time limitations, high time and labor investment, lack of farmer interest, and competition with agencies or consultants. Again, some regional variation affected the types of difficulties faced by the retailers.

Agricultural Chemical Retailers' Report Highlights (continued)

Retailers were asked how frequently they contact government agencies that have information available on nutrient and pest management. Although the three most frequently contacted agencies were the Minnesota Department of Agriculture, the University of Minnesota Experimental Stations, and the Minnesota Extension Service, no agency was contacted "often." There were no significant regional differences in the agencies contacted.

Ag dealers statewide indicated that they are most interested in learning more about farm nutrient management, application timing, soil testing, and pesticide use. Of least interest were computerized manure applications plans, local manure exchange programs, and feedlot permits and management. The survey revealed that retailers in different regions had different interests.

In an effort to target dealer education and training opportunities, the survey asked them to pick topics that would be most useful to their business, as well as those they would find least useful. Responses to these questions again varied by region, but, overall, indicated that farm nutrient management planning, variable rate technology, and farm nutrient economics were most favored. When reporting on their least useful topic choices, it was quite clear that manure-related topics were of least concern to the retailers statewide.

The survey also questioned dealers about which information delivery methods they prefer. Nutrient management information, published articles, information for display in dealerships, and Cooperative Extension courses ranked above all other listed methods.

Uses of the Survey

Minnesota's Department of Agriculture used the survey results to focus the agenda in series of workshops conducted throughout the state in September of 1996 and in the fall of 1997. John Wagner, an agricultural chemical advisor in the department, sees the survey results as an indication that retailers, in general, are leaning toward offering higher-technology services to their customers. On the downside, the survey also illuminated for Wagner the challenge of interesting more retailers, and consequently farmers, in manure management.

The survey was part of an overall joint effort by the Minnesota Department of Agriculture, the University of Minnesota Extension Service, the Minnesota Association of Soil and Water Conservation Districts, and the USDA. The entire effort was made possible by an extension to a nutrient management program approved by the Minnesota Pollution Control Agency.

[For more information, contact John Wagner, Agronomy and Plant Protection Division, Minnesota Department of Agriculture, 90 West Plano Boulevard, Saint Paul, MN 55107-2094. Phone: (612) 297-7122; fax: (612) 296-7386; email: <John.Wagner@state.mn.us>.]

Technical and Research Notes

Native Warm Season Grasses Returning to the Landscape in Virginia

by Charles Lunsford, Virginia Department of Conservation and Recreation

On a warm July evening, a dozen or so folks stand in a pasture listening to Jim Hepner as the thunder rolls across the mountains in Shenandoah County, Virginia. Hepner, a farmer and conservation specialist with the Lord Fairfax Soil and Water Conservation District, is talking about native warm season grasses. He describes how these grasses once covered the landscape in Virginia and the eastern United States prior to cultivation of the land, overgrazing, and fire protection. Cool season grasses introduced by the Europeans eventually replaced the warm season grasses. But today, these native grasses are making a comeback in Virginia.

Rod Bankston, watershed coordinator for the North Fork Shenandoah River/Holmans Creek watershed project is working to develop conservation plans incorporating rotational grazing and forage management for cattle producers. He is optimistic that the landowners visiting Hepner's farm will catch the native grass bug by seeing how the warm season grasses (big and little bluestem, indiangrass, switchgrass, and gamagrass) are thriving during a summer drought while the cool season grasses in neighboring pastures and hayland are suffering. Bankston knows that warm season grasses not only provide needed summer forage; they will also reduce the runoff of soil and nutrients once the rain returns.

The watershed project, initiated in 1996 with EPA 319 funds, encourages landowners to start planting warm season grasses on a small scale (three to five acres) since it may take two years to

Native Warm Season Grasses Returning to Virginia (continued)

get a good stand. Management of the grasses is different from cool season grasses. Haying is recommended for the first production, rather than grazing, and the warm season grasses should never be grazed short. A height of 12 inches is preferred.

And Along the Rappahannock

On a July day in another field on Virginia's Coastal Plain, several individuals stand in a 12.5-acre field that was planted a year before with a mixture of warm season grasses (big bluestem, indian grass, and switchgrass). Now the grasses are already chest high. Here in Richmond County along the banks of Cat Point Creek, a tidal tributary to the Rappahannock River which empties into the Chesapeake Bay, warm season grasses provide a buffer between cropland and the riparian forest along the creek's banks. The grasses were planted as part of the Cat Point Creek watershed project that was initiated in April 1996 with EPA 319 funds. This field, too, along with three 2-acre plots of pure stands planted on the farm, is serving to familiarize local farmers with the native grasses.

The group in this Richmond County field includes watershed coordinator Theresa Tabulenas, Lloyd Mundie, a local farmer, and William Reay of the Virginia Institute of Marine Science. They are surprised by how much the grasses have grown in just over a year and by the potential for working with landowners in the watershed to use these native grasses for forage, wildlife cover (especially for small game such as rabbits, quail, and songbirds), and riparian borders. A riparian buffer, combining switchgrass and hardwood seedlings, was planted along a perennial stream on the farm by watershed citizens in 1996. The grasses are creating a dense and deep root system (nine feet or greater) that will intersect the shallow water table and reduce nitrogen loadings to surface waters. Thus, the buffer is an important management practice in the Cat Point Creek watershed, which — like much of the mid-Atlantic coastal plain — has a vulnerable shallow water table.

Reay has recently completed a two-year project on Virginia's Eastern Shore, also funded with EPA 319 funds. That project evaluated the potential of native warm season grasses to reduce shallow ground water nitrogen levels prior to the water's discharge into adjacent surface waters. Reay established a 0.624-acre plot of switchgrass as a buffer between cropland and a tidal inlet in Northampton County.

The site last year hosted a field demonstration conducted by Reay and the Virginia Department of Game and Inland Fisheries' Patricia Moore. Enthusiastic support and the obvious benefits of warm season grasses may just bring these natives home to the coastal plain once again.

[For more information, contact Charles Lunsford, Virginia Department of Conservation and Recreation, 203 Governor Street, Richmond, VA 23219. Phone: (804) 371-8984; email: <cal@dcr.state.va.us>.]

Filter Strips That Pay for Themselves — Multiuse Border Plantings

Purdue University researchers exploring the use of income-producing plants in filter strips have found a way to offset the monetary losses that a farmer incurs when removing land from production.

In 1990, horticulturalist Bruno Moser, wildlife specialist Brian Miller, and agronomist Keith Johnson began an alternative-income filter strip planting demonstration project on a university research farm. They planted a filter strip with a ground cover of orchard grass and three rows of horticultural shrubs, spaced six feet apart in rows 12 feet apart.

Ornamental Branches in Demand by Florists

The researchers chose to plant pussy willow, red-twigged dogwood, and corkscrew willow because the ornamental branches of each can be sold to florists. An added benefit is that the shrubs can be harvested in the late fall or winter, a farmer's "down time." The pussy willow, a native North American plant, normally flowers in the early spring but can be harvested as early as January and forced to bloom indoors. The branches of the red-twigged dogwood turn an attractive bright red during the fall. The corkscrew willow has appealing bent and curved branches that can be harvested at any time but most easily during winter dormancy. The unique qualities of the plants add interest to flower arrangements.

The money that the shrubs provide is substantial. Based on their third year harvest, the researchers estimate that a farmer can make $5,000 per acre, assuming a planting of 660 shrubs per acre. Moser expresses concern that supply could exceed demand if this technique were widely applied. "But most likely," he says, "this will not be a problem because a relatively small amount of land will actually be used to produce ornamental branches at each location. We currently have three farmers, located 30 to 40 miles apart, who will be planting ornamental branches for demonstration projects. They are planning to communicate and work together to sell the branches."

Visible Benefits

Although the ongoing 1990 demonstration project has not monitored water quality, Moser has observed signs that the strip is successfully absorbing nutrients. "The shrubs closest to the field are visibly larger and are obviously influenced by the increased fertility." Moser expects the grass/bush filter strip to be at least as effective as a standard grass filter strip. The orchard grass may be even more effective as ground cover, given the added nutrient uptake by the bushes. Moser also notes that the ground-level, horizontal branches will capture some plant material, such as corn stubble, that can wash right over a grass-only filter strip.

In addition, the filter strip provides habitat for wildlife. The orchard grass is designed to be mowed once a year to encourage wildlife to move in. Harvesting the branches encourages horizontal growth that then sends off new branches, forming a dense mat of growth that provides protection for wildlife.

Farmers Interested in Multiple Benefits of Filter Strips

Recently, Moser and his colleagues have expanded the project to include more multiuse borderland plantings, and are encouraging farmers to create areas of mixed plantings, including income-producing plants, to serve as wind breaks, shelter belts, filter strips, or simply to improve the aesthetics of the land around the borders of fields, property lines, driveways, and other places. David Swain, a local independent farm advisor, says that farmers are interested in exploring the possibilities that multiuse plantings provide. Most farmers are not only interested in the income, but also in the opportunity for erosion control, game- and songbird habitat, and aesthetic improvements. The farmers' objective is to replace sensitive cropland or unused farmland with plantings that will meet these needs.

As part of a recent multiuse borderland plantings grant, the researchers have fielded 10 border planting demonstration projects — one of which is an alternative-income filter strip demonstration project on a working farm. These projects allow the researchers to demonstrate other types of plantings such as bush cherries, bittersweet bushes, papaw trees, persimmon trees, Chinese chestnuts, and hollies. Each of these plants produce either edible fruit or branches and berries that are desirable for decoration.

One concern about using horticultural-variety plants is their susceptibility to herbicides. Says Moser, "If the wind is blowing a certain direction when a neighboring farmer sprays herbicide, it could wipe out all the bushes. Farmers using these alternative-income plantings need to inform their neighbors and ask for their cooperation."

The researchers are presently working on a guide to help farmers remove land from production and replace it with mixed borderland plantings. It will include a section on how to incorporate alternative-income plants that will help pay for the change. The decision guide, expected in September 1998, will be geared toward eastern cornbelt farmers but will contain information of use to farmers and landowners nationwide.

People living off the land are concerned about protecting their vital resources for themselves and for their descendants. The incorporation of alternative-income plantings into filter strips is a another way to help farmers afford the cost of setting aside productive land for the sake of soil conservation and water quality protection.

[For more information, contact Bruno Moser at (765) 494-1352 or Brian Miller at (765) 494-3586. Or write to them at Purdue University, West Lafayette, IN 47907.]

Managing Ground Water Data—Use It or Lose It

by Andrea Bennett, U.S. EPA, Region 3

A pilot program in Albemarle County, Virginia, is using groundwater data from local health departments and state and university studies to build a digital hydrogeologic database management system.

The Need for Data

Although ambient surface water monitoring is becoming commonplace, the ambient monitoring of aquifers is still quite infrequent. Yet groundwater is an important resource that is susceptible to pollution from nonpoint sources, such as on-site wastewater disposal systems, and monitoring is essential to its protection. The Albemarle project, a project conducted by the Virginia Department of Mines, Minerals and Energy, Division of Mineral Resources, compensates for this gap. It interfaces existing water well data with digital geologic and topographic map data and validates the data locationally with a global positioning system (GPS) unit.

To increase the accuracy of the monitoring data, the Division of Mineral Resources is working closely with the Thomas Jefferson Health District, which is in charge of permitting water wells and drain fields. The collaboration will result in a new GPS and management framework that will allow more accurate collection of data from wellheads.

A Practical Outcome

Neighboring counties have expressed interest in the project and the Division of Mineral Resources has received additional funding to construct a similar database in nearby Louisa County. In this case, the project will define a "footprint." It will determine how much land a single-family dwelling requires to protect a septic field and water well. With funding from EPA, the projects represent a low-budget way of increasing the data available to local agencies for decisions concerning the permitting and installation of water wells and on-site wastewater disposal systems, and whether current land-use zoning and ordinances are really protecting the groundwater resource.

[For more information, contact Nick Evans, Senior Geologist, Virginia Department of Mines, Minerals and Energy, Division of Mineral Resources, P.O. Box 3667, Charlottesville, VA 22903. Phone: (804) 963-2317; fax: (804) 293-5121.]

Citizen Action Notes

Rio Bravo River Watchers Uncover Health Risks

EDITOR'S NOTE: Adapted from *The Volunteer Monitor* (Fall 1996).

What began as a volunteer river monitoring project evolved into a health survey in the colonias along the Rio Grande, and finally into the Colonia Education and Empowerment Project with the goals of helping impoverished communities improve the quality of their environment and building stewardship.

Colonias are unregulated human settlements along both sides of the Texas-Mexico border. Typically they lack services like sewage treatment, potable water, paved roads, and electricity. Colonia residents are at risk for health problems because they use water from the river and from shallow wells for bathing and cooking. Many residents fish the river for food or to supplement their incomes, or use the river for recreation, especially during the summer when temperatures often rise above 100° F. All of this occurs despite the over 55 million gallons of untreated sewage and industrial waste that are dumped into the Rio Grande at El Paso/Juarez daily. Not surprisingly, the colonia disease rates are staggering. For example, the rate of hepatitis A is five times greater in the colonias than in the United States.

Cynthia Lopez, a doctoral student in public health, joined forces with the Rio Bravo River Watchers, who are trained and certified by Texas Watch of the Texas Natural Resource Conservation Commission, to survey the health of the residents, as well as the waterway. The

Rio Bravo River Watchers Uncover Health Risks (continued)

combined fecal coliform counts from the River Watchers' routine water quality testing along with Lopez' health survey identified human health risks from contact with contaminated water.

By partnering with Lopez, the River Watchers were able to expand the original health survey into a long-term study with funds from the EPA Environmental Justice Fund and the Switzer Family Fund. Results of the health survey documented disproportionately high rates of health problems such as gastrointestinal disturbance, skin rash, and respiratory disease.

After presenting the data to the Commission for Environmental Cooperation, the River Watchers received more than $45,000 to establish the Colonia Education and Empowerment Project. With these funds, residents will be trained as water monitors and educated about local problems and needs.

[For more information, contact Gary Bryant, Communications Coordinator for Texas Watch, Texas Natural Resources Conservation Commission, P.O. Box 13087, Austin, TX 78711-3087. Phone: (512) 239-6941. Or Cynthia Lopez, 11024 Montgomery NE #127, Albuquerque, NM 87111. Phone: (505) 296-7547.

The Mountains to Sound Regreening Program

The Mountains to Sound Greenway Trust, a Seattle conservation group, put youthful energy together with a biosolids recycling program to revegetate eroding mountain slopes in Washington's Cascades mountains. The slopes had been scarred by abandoned logging roads.

Camping Out for a Purpose

During the summer of 1996, local volunteers and international visitors camped out above the Interstate 90 corridor and worked to erase two abandoned logging roads along which debris-plugged culvert pipes had created serious erosion problems. The erosion compromised the stability of the mountain slopes and threatened the fish habitat in the stream below. In many areas, the road was beginning to crack and slide into the creek.

The Weyerhaeuser Company donated equipment and labor to improve access to the sites and to deliver more than 1.6 million pounds of biosolids compost, 20,000 pounds of seed, and 2,000 hay bales. Heavy equipment pulled up the outside edges of the roads and folded them into the hill, recreating the natural slope. Volunteers removed four culverts and restored the streambeds to their natural widths.

A biosolids compost was spread on the roads and then planted with grass seed and mulched with hay. Volunteers were amazed at the speed with which the rich medium sprouted vegetation. In the streambed, volunteers placed rocks and woody debris to slow flows and create pools. They stabilized the steeper slopes with terraces, compost, and seed.

In 1997, the Greenway volunteers completed the work by planting thousands of trees. Within a few years, the scars of the old logging roads will be forever removed from the mountainsides and the streams will be protected from erosion.

The Mountains to Sound Greenway Trust, a nonprofit partnership of citizens, private landowners, businesses, public agencies, environmental organizations, and local governments, works to protect and enhance the environment in the scenic Interstate 90 corridor from Puget Sound to the east side of the Cascades. The Regreening Program was developed by the Trust to involve hundreds of volunteers in restoring and revegetating inactive logging roads along the scenic interstate. This program has generated significant interest because it not only entails repairing mountain slopes and educating young people; it also involves innovative recycling of biosolids.

Compost used in the regreening program originates in King County, where residential, commercial, and industrial wastewater is collected and extensively treated, resulting in a nutrient-rich organic by-product called biosolids. Biosolids are recycled as a fertilizer in several ways. As a compost product, biosolids are mixed with sawdust and allowed to decompose for a year. The resulting product or compost is a mulch material called GroCo that can be used by landscapers and home gardeners throughout the Puget Sound region.

GroCo provides the nutrients and water retention capability that plants (and trees) need to grow and stabilize the mountainside. As the vegetation grows, its root systems help hold soil in place and protect water quality downstream.

The Mountains to Sound Regreening Program (continued)

Involving volunteers, especially young people, in beneficial environmental projects and educating them about the region's natural heritage and sustainable recycling is one of the goals of the Mountains to Sound Greenway Trust. Over 600 volunteers participated in the projects, donating more than 5,000 hours of labor.

[For more information or to obtain a video showing the Compost Regreening project, contact the Mountains to Sound Greenway Trust. Phone: (206) 382-5565.]

Jersey Governor Proclaims Watershed Awareness Month

New Jersey Governor Christine Todd Whitman proclaimed May 1997 Watershed Awareness Month. Her proclamation notes that while New Jersey is proud of the steps it has already taken to improve and safeguard the environment, the watershed approach requires more emphasis on cooperation, innovation, pollution prevention, and planning. It depends, Whitman said, on all citizens taking positive steps to control waste and runoff. She emphasized the importance of providing citizens with information on how their actions impact the watershed and how they can have a positive effect.

Notes on Education

*Farm*A*Syst Available in Spanish Translation*

In response to suggestions from many people, Doug Knox, Natural Resources Conservation Service representative to the Farm*A*Syst/Home*A*Syst national office, organized a national team to translate the popular Farm*A*Syst assessment document into Spanish. Farm*A*Syst is a nationwide, voluntary, confidential, self-assessment program for pollution prevention on the farm.

The team created a basic version of the original assessment document using simplified wording and an uncomplicated format, then translated that basic version into Spanish. Because many versions of Spanish are spoken in the United States, team members had to be familiar with many different dialects. They spent many hours choosing words that would be readily understood in most dialects. Where differences still remain, each state can change the wording in the Spanish version to the dialect spoken in its geographic area. The assessment is also used in Mexico (with similar adaptations to accommodate the dialects spoken there) and requests are coming in from countries in South America.

One of the translators, Mario Morales, of Jornada Resource Conservation and Development (RC&D), New Mexico, has experienced different versions of Spanish in various places throughout the United States and its territories. He said,

> *I knew from being the RC&D coordinator in the Virgin Islands that their Spanish is slightly different from the dialects spoken in Costa Rica or California and Arizona, from the "Spanglish," spoken in New Mexico and Puerto Rico, and from the "Tex-Mex" spoken in Texas. The Spanish spoken in the interior of Mexico is also different from that spoken near the border.*
>
> *I knew that a lot needed to be communicated [during the translation], that we had to try to agree on which wording to use, and that it would take an effort to hash it out.*
>
> *I give Doug a lot of credit for bringing a good group together, who have different backgrounds and different experiences. This is the most enjoyable work I've ever done. It is something that will benefit a lot of people. I'm looking forward to promoting it. The positive impact it will have just can't be imagined.*

Basic Version

The basic version has proved very popular because it is shorter and easier to understand than the original document. It was also expanded to include assessment materials for woodlands, pasturelands, meadowlands, croplands, and wetlands. That material was developed by the Natural Resources Conservation Service Materials Development Team.

*Farm*A*Syst Available in Spanish Translation (continued)*

The Spanish version of Farm*A*Syst, now in its first printing — and the basic English and the expanded basic English versions — are available on the worldwide web: <http://www.wisc.edu/farmasyst>. Note, too, that the Farm*A*Syst assessment packet is also available from any local Cooperative Extension office.

[For more information, please contact Doug Knox, NRCS Coordinator, B142 Steenbock Library, 550 Babcock Drive, Madison, WI 53706-1293. Phone: (608) 262-0024; fax: (608) 265-2775; email: <farmasyst@macc.wisc.edu>.]

Toyota Funds Environmental Education Program

With part of a $2 million dollar grant from Toyota Motor Corporation, the Chesapeake Bay Foundation (CBF) and three other nonprofit advocacy organizations selected by the Foundation, have launched a national environmental education network — Children Linking with the Environment across the Nation.

After a nationwide search that involved 160 groups from 24 states, CBF selected three different organizations in the United States to participate in the network. They are the Save San Francisco Bay Association, Oakland, California; the Cahaba River Society of Birmingham, Alabama; and the North Carolina Coastal Federation of Newport, North Carolina. CBF, the largest regional nonprofit conservation organization in the United States, awarded a one-time start-up grant of up to $120,000 over two years to each of these CLEAN-National partners in November 1996. CLEAN-National will provide the grant money, staff, support, and guidance to enable the recipient organizations to launch educational initiatives as a tool to achieve their missions.

The remainder of the Toyota grant will be used in two other programs at the Chesapeake Bay Foundation: expansion of CBF's curriculum "Chesapeake Choices and Challenges" into Pennsylvania (CLEAN Curriculum); and an initiative to improve environmental education in the urban communities of Baltimore, Maryland; Washington, D.C.; and Hampton Roads, Norfolk, and Richmond, Virginia (CLEAN Urban).

[For more information, contact Alison Kolwaite, CLEAN-National Coordinator, Chesapeake Bay Foundation, 162 Prince George Street, Annapolis, MD 21401. Phone: (410) 268-8816; fax: (410) 268-6687; email: <akolwaite@savethebay.cbf.org>.]

Reviews and Announcements

Books

■ **Funding and Monitoring Resources.** *The Catalog of Federal Funding Sources for Watershed Protection*, published in September 1997 by the U.S. Environmental Protection Agency's Office of Wetlands, Oceans and Watersheds, this catalog highlights federal grants and loans that may be used at the local level to support watershed projects. One of 11 documents in the Watershed Academy Information Transfer Series, it lists 52 federal programs with information on where and how to obtain funding.

This useful catalog is organized into categories including coastal waters, conservation, economic development, education, environmental justice, fisheries, forestry, Indian Tribes, mining, pollution prevention and control, and wetlands; and it describes other publications and websites on funding and technical assistance, in addition to the federal programs. Resources are indexed by department or agency, by statute, and by title. The book's appendixes contain contact information from regional and state agencies and feedback forms to submit additional sources of funding or to correct listed information.

[To order copies of the document free of charge, contact the National Center for Environmental Publications. Phone: (513) 489-8190 or (800) 490-9198; fax: (513) 489-8695. The document can also be found on the Watershed Academy homepage at <http://www.epa.gov/owow/watershed/wacademy/fund.html>.]

■ **Monitoring Documents.** Three new monitoring documents just released from EPA's Office of Water will help state, regional, and local environmental professionals determine the effectiveness of nonpoint source best management practices. The first document is a comprehensive guide to NPS monitoring; the other two focus on forestry. The documents are available free of charge from the National Center for Environmental Publications and Information at (513) 489-8190.

Books (continued)

- *Monitoring Guidance for Determining the Effectiveness of Nonpoint Source Controls* (EPA 841-B-96-004) is a comprehensive document for use by those who monitor, evaluate, and fund monitoring proposals. It provides detailed information needed to design monitoring programs tailored to a variety of different situations. Chapters are devoted to developing a monitoring plan, biological monitoring, data analysis, and quality control. Appendices to the document provide information on available monitoring guidelines, data sources, example monitoring programs, and statistical tables.
- *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures: Forestry* (EPA-841-B-97-009)
- *Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures: Agriculture* (EPA-841-B-97-010).

Other Watershed Academy Transfer Series Titles

- *Watershed Protection: A Project Focus* (EPA-841-R-95-003)
- *Watershed Protection: A Statewide Approach* (EPA-841-R-95-004)
- *Monitoring Consortiums: A Cost-effective Means to Enhancing Watershed Data Collection and Analysis* (EPA-841-R-97-006)
- *Land and Cover Digital Data Directory for the United States* (EPA-841-B-97-005)
- *Designing an Information Management System for Watersheds* (EPA-841-R-97-005)
- *Information Management for the Watershed Approach in the Pacific Northwest* (EPA-841-R-97-004).
- *Watershed Academy Catalog of Watershed Training Opportunities* (EPA-841-D-97-001)
- *Statewide Watershed Management Facilitation* (EPA-841-R-97-011)
- *Watershed Approach Framework* (EPA-840-S-96-001)
- *Top 10 Watershed Lessons Learned* (EPA-840-F-97-001)

Most of these documents may be browsed of downloaded from the Internet at <http://www.epa.gov/owow/watershed/wacademy/its.htm>.

[To obtain free copies, contact National Center for Environmental Publications and Information (NCEPI), Phone: (513) 489-8190 or (800) 490-9198; fax: (513) 891-6685.]

■ **Composting.** *The Soil and Water Connection: A Watershed Manager's Guide to Organics.* The Composting Council has prepared a slender, concise, 32-page booklet on recycling and waste management designed with the watershed manager in mind. The *Soil and Water Connection* explores how compost can preserve, purify, restore and remediate soil and water resources but the booklet also moves beyond the issues of recycling and waste management to a larger view of environmental stewardship. Using organics to protect soil and water is the first step toward a sustainable society. Copious footnotes, references, and a glossary and chart are included to help users adapt various composting applications to their specific needs.

[To obtain a copy of The Soil and Water Connection ($5 for members, $10 for nonmembers), contact the Composting Council at (703) 739-2401, or email: <comcouncil@aol.com>.]

■ **Caring for Coastal Wetlands.** *Texas Coastal Wetlands: A Handbook for Local Governments.* Funded by EPA and published by the Texas General Land Office in January 1997, this coastal wetlands handbook is a practical "how to" guide for anyone interested in voluntary initiatives to conserve, restore, or create coastal wetlands. It addresses the role of local governments in coastal wetlands management and identifies tools that municipalities, counties, conservation and reclamation districts, ports and navigation districts, river authorities, and regional councils of governments can use to keep wetland systems intact.

[To request a copy of Texas Coastal Wetlands: A Handbook for Local Governments, contact Claire Randle at (513) 475-2330; email: <claire.randle@glo.state.tx.us>.]

■ **Low Gradient Stream Monitoring.** *Field and Laboratory Methods for Macroinvertebrate and Habitat Assessment of Low Gradient, Nontidal Streams.* This document establishes standard procedures for collecting biological and physical habitat data in low-gradient nontidal streams of the Middle Atlantic Coastal Plain ecoregion. It includes standard methods for collecting and processing macroinvertebrate samples and for quantifying habitat quality.

The methods developed by EPA for high-gradient streams were modified for use in low gradient streams. Low gradient streams typically have velocities less than 0.5 feet per second and lack riffle habitats. Therefore, the kick-net developed for high gradient streams has been replaced by the dip-net, and a variety of habitats are sampled rather than a single habitat.

The methods presented in this document were developed by the Mid-Atlantic Coastal Streams (MACS) Workgroup for Coastal Plain streams from New Jersey to South Carolina. The methods may also be applicable to other regions that have low gradient streams. Testing is encouraged in the application of these methods to areas outside this region.

[To obtain copies of this document (or information about the Mid-Atlantic Coastal Streams Workgroup), contact John Maxted, Delaware Department of Natural Resources and Environmental Control, Division of Water Resources, 29 S. State Street, Dover, DE 19901. Phone: (302) 739-4590; fax: (3301) 739-6140; email: <jmaxted@dnrec.state.de.us>.]

■ **Community Action.** *WaterWorks, a Guidebook for Community Action Groups.* Published by the Tennessee Valley Authority, the 58-page second edition of this excellent guide helps citizens build and sustain effective community groups to clean up and protect water resources. It provides step-by-step instructions for working in partnership to develop a strategy, keep up the momentum, and become sustainable.

[For a free copy, contact TVA Water Management, Clean Water Initiative, WT 10D, 400 West Summit Hill Drive, Knoxville, TN 37902-1499. Phone: (423) 632-3034.]

■ **Urban Runoff Management.** *Institutional Aspects of Urban Runoff Management: A Guide for Program Development and Implementation.* A comprehensive review of the institutional frameworks of successful urban runoff management programs, this manual was prepared to help individuals responsible for developing and implementing urban erosion, sediment control, and stormwater management programs. The book includes summaries of 32 successful state, regional, county, and municipal urban runoff programs. These include information about the program's legal and institutional framework, goals, performance standards, design criteria, staffing, budget, inspection and compliance processes, and public education efforts — and how these efforts contribute to the program's success. Recommendations for implementing successful programs are presented based on the authors' experiences and input from the 32 programs. Principal authors are Eric Livingston and Earl Shaver with contributions from Dr. Richard Horner and Joseph Skupien. The manual was done in cooperation with EPA Office of Water and EPA Region 5.

[To order send a check, money order, or purchase order for $37 (includes shipping and first class postage) to Watershed Management Institute, Inc., 410 White Oak Drive, Crawfordville, FL 32327. For more information, contact Eric Livingston at (850) 926 5310, or Earl Shaver at (410) 758-2731.]

■ **Agricultural Resources.** *Agricultural Resources and Environmental Indicators, 1996-1997,* a publication of the USDA Economic Research Service, Natural Resources and Environment Division and a useful compendium of information, contains both hard facts and trend analyses relative to the condition of natural resources in the farming sector. The report identifies how land and water (i.e., natural resources) and commercial inputs (e.g., energy, nutrients, pesticides, machinery) contribute to production and environmental quality. It also links resource conditions to technological changes, production practices, and farm programs.

The complex connections between farming practices, conservation, and the environment are, as the preface reminds us, "increasingly important components in U.S. agriculture and farm policy"; and while few people will read this book cover to cover, it should become a staple for legislators, regional planners, watershed associations, and environmental organizations as much as for farmers, farm policy advisors, agricultural cooperatives, institutes, and industries.

Section 4, on production management — with sections on crops, crop residues, pests, nutrients, and irrigation water — contains much that is new (relative to the earlier edition of Agricutural Resources and Environmental Indicators [AREI]). Such analyses can help balance the public's perception of agricultural communities as both cultivators and stewards of the nation's land and water resources.

The book does not discuss per se the increasingly urgent need to develop new management techniques and markets for the volume of animal wastes associated with potential agricultural nonpoint source pollution. What it does say about this topic is included in the sections on

Books (continued)

nutrients (3.1) and nutrient management (4.5). The next comprehensive edition of the handbook, however, is expected to include more extensive coverage of this important issue.

AREI supplemental reports and updates on specific topics are available from time to time on the worldwide web or by subscription. As these updates bridge the information gap between publication of the comprehensive reports, they are another reason to keep this publication among one's favorite environmental references.

[For more information, contact Richard Magleby, Economic Research Service, 1800 M Street, Northwest, Room 4095, Washington, DC 20036-5831. Phone: (202) 694-5615. To order, call (800) 999-6779. Ask for Agricultural Resources and Environmental Indicators, 1996-1997, Publication number 719. Information is also available on the ERS homepage: <http://www.econ.ag.gov>, and the publication can be downloaded (using Acrobat.3) from <http://www.econ.ag.gov /epubs/pdf/ah712.>]

Videos

■ **On Farms and Urban Development.** "The Urbanization of Agriculture," the Maryland Farm Bureau's award-winning video, is now available for use by community groups across the state. Produced in cooperation with the American Farm Bureau Federation and filmed primarily in Maryland, the video features farmers who have adapted to, and, in some cases, are flourishing in the face of, development pressures. Most of the strategies farmers used could be adapted to other parts of the country.

In December 1996, the video won first place in its division at the National Agricultural Marketing Association awards presentation in Chicago. In February, it was honored by the Communicator Awards, a national awards organization that recognizes outstanding work in the communications field.

[For more information, contact Amy Miller, Maryland Farm Bureau, Phone: (410) 922-3426.]

■ **For the Public.** "Maine's Polluted Water: We Can All Help," is an informative 30-minute video. It defines pollution and pollution's impact on water, the various ways that pollution is generated, and what people can do to avoid it. The point is made that everyone contributes to the problem, even those living inland at a distance. While the focus is on the Maine coast, the lesson applies to every watershed. The video was produced by TV station WCSH-TV with technical assistance from the Maine Department of Environmental Protection and the State Planning Office.

[To borrow a copy, contact Kathy Hoppe, Maine Department of Environmental Protection, 1235 Central Drive, Presque Isle, ME 04769. Phone: (207) 764-0477; email: <kathy.m.hoppe@state.me.us>.]

CD-ROMs

■ **TVA Offers Guidelines for Selecting Native Plants.** TVA's just-published *Banks and Buffers — A Guide to Selecting Native Plants for Stream Banks and Shorelines* is a guide to help shoreline property owners and others improve water quality by stabilizing streambanks and restoring shoreline buffer systems using native plants. It is accompanied by a riparian plant selector software application on CD-ROM. The CD provides color photographs of 117 species of native plants and information about their characteristics and environmental tolerances to help property owners identify plants best suited for particular sites. The database also includes a listing of more than 400 wholesale and state forestry nurseries.

[For a copy, call TVA at 423-751-7338 or write to TVA Water Management, 110 Market Street, CST 17B, Chattanooga, TN 37492-2801. The cost is $25, plus $5 for shipping and handling.]

■ **Understanding and Visualizing Ordinances.** *Pennsylvania Bluprints: Best Land Use Principles and Results* is an educational multimedia CD-ROM that presents innovative, yet practical, land use ordinances and other regulatory techniques. It contains a collection of dynamic image simulations and actual examples to clarify and illustrate regulatory concepts that are difficult to understand in text-only renditions.

[To order Bluprints, send a check for $14, payable to Penn State University to Penn State University, Department of Landscape Architecture, 210 Unit D, University Park, PA 16802-1429.]

Internet

■ **Index of Watershed Indicators.** EPA has released the Index of Watershed Indicators (IWI), the agency's first comprehensive assessment of the 2,111 watersheds in the continental United States. The index organizes and presents aquatic resource information on a watershed basis, comprising 15 indicators, or data layers, which describe both a watershed's condition and vulnerability.

Internet (continued)

Available in full on the Internet, the report displays each indicator on a detailed map, with an explanation of the importance of the indicator, the data sufficiency thresholds, notes on interpreting the information, plans to improve the data layer, and contacts for more information. While the paper copy of the report contains substantial information about the IWI, detailed watershed information (e.g., the name and location of water supplies, performance of NPDES permit holders, fish and wildlife consumption advisories issued, and basic demographic and physical data about the watershed) is available only on the Web.

Anyone with access to the Web can locate a watershed of interest using searches starting with common geographic data such as schools or zip codes. Users can also download data and maps.

The IWI on the Web represents a significant change in the way EPA displays technical information and provides local access to watershed level data. EPA Administrator Carol Browner and Assistant Administrator for Water Bob Perciasepe hope that by providing the public with detailed information on water quality in each watershed, the Agency will be encouraging local stewardship in the care of the country's rivers and streams.

As more information becomes available, the Index will be updated. Alaska and Hawaii will be included in the index's next phase.

[The index can be found on the Web at <http://www.epa.gov/surf/iwi>. To obtain a printed copy, contact NCEPI, 11029 Kenwood Road, Building 5, Cincinnati, Ohio 4524. fax: (513) 891-6685.]

■ **A Restoration Website.** EPA's Office of Wetlands, Oceans, and Watersheds now has a website for public and private, large and small organizations interested in river corridors and wetlands restoration. Users can visit river corridors and wetlands restorations, and receive and contribute information concerning projects, programs, or organizations. EPA's goals in establishing this resource are to provide a depository of information to help federal and state agencies understand local needs and to help local groups understand what federal and state agencies have to offer.

Local restoration practitioners will find the website a valuable network. Many grassroots organizations have worked hard over the years and made tremendous contributions to the restoration of river corridors and wetlands; they will now have an opportunity to put their community, organization, or projects on the map and be recognized by a national audience.

The project's data structure accommodates the type of restoration project undertaken, partners involved, funding, restoration goals, accomplishments to date, and photographs. Project information can be added to the database by using an online form under the heading "Put Your Project on the Map." The site also includes information about proposals for future restorations that should foster the development of partnerships. The URL for the restoration website is <http://www.epa.gov/owow/wetlands/restore>.

[For more information concerning this site or River Corridors and Wetlands Restoration Partners, contact John Pai, U.S. EPA (4501F), 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-8076; email: <pai.john@epamail.epa.gov>.]

■ **Other EPA Websites.**

- Surf Your Watershed <http://www.epa.gov/surf>
- Envirofacts <http://www.epa.gov/envir/index.html> Envirofacts is a relational database that integrates data extracted monthly from five facility or site-based EPA program systems:
  - Superfund Data — Comprehensive Environmental Response, Compensation and Liability Information System(CERCLIS)
  - Hazardous Waste Data — Resource Conservation and Recovery Information System (RCRIS)
  - Toxic Release Inventory (TRI)
  - Water Discharge Permits — Permit Compliance System (PCS)
  - AIRS Facility Subsystem — Envirofacts Aerometric Information (EF AIRS/AFS)
  - Grants Information — Grants Information and Control System (GICS) which is updated biweekly

Internet (continued)

- Facility Index System (FINDS) — Integrates EPA facility information in five facility-based EF data systems
- Latitude/Longitude Info (LRT) — integrates latitude and longitude coordinates for EPA Regulated facilities
- Master Chemical Integrator (EMCI) — integrates chemical information in EF data systems
- Mapping Tools — Maps on Demand (MOD) contains SiteInfo, BasinInfo and Facility Density Mapper

■ Models <http://earth1.epa.gov/OST/Tools>

- BASINS: Better Assessment Science Integrating Point and Nonpoint Sources (a powerful tool for managing watersheds), Windows
- SWMM: Stormwater Management Model, Windows
- SWRRB: Simulation for Water Resources in Rural Basins, Windows
- P-ROUTE: Pollutant Routing Model, Windows
- QUAL2E: Enhanced Stream Water Quality Model, Windows

■ Office of Water <http://www.epa.gov/OW>

- Watershed Protection Program <http://www.epa.gov/owow/watershed>
- Nonpoint Source Program <http://www.epa.gov/owow/nps>
- American Heritage Rivers Program <http://www.epa.gov/owow/heritage/rivers.html>

NPS Electronic Information Exchange News

The NPS Information Exchange has evolved from a modem-based electronic bulletin board to a system of Internet resources. Documents, including News-Notes issues 1–49, are now located on the NPS Information Exchange World Wide Web site: <http://www.epa.gov/owow/info/newsnotes/index.html>

NPSINFO is the Information Exchange's e-mail discussion group.

To subscribe to this group, send an e-mail message to listserver@unixmail.rtpnc.epa.gov.

Include the following information in your message: subscribe NPSINFO yourfirstname yourlastname.

After you subscribe, you will receive a welcome message explaining the discussion list and how to post messages to it.

Reflections

Agriculture Encouraged to Set Priorities in Community-Based Assistance through Planning

EDITOR'S NOTE: Excerpt from speech by Bob Wayland III, Director of U.S. EPA's Office of Wetlands, Oceans, and Watersheds

"Would you tell me please, which way I ought to go from here?" asked Alice in Lewis Carroll's classic. "That," replied the Cheshire Cat, "depends a good deal on where you want to get to." As we discuss resource planning, I hope very much that we can agree that we should work together to help our customers and constituencies formulate their farm or enterprise level plans with a necessary, if challenging, destination in mind. These plans should be guided by the business owner's need to realize a good return on investment, by the farm family's need to live on a farmstead that provides a healthy environment, by society's need for wholesome and affordable food, and by the need to assure that the farm is operated in harmony with nature. This latter need, to be a good neighbor within the larger community in which the farm exists

Agriculture Encouraged to Set Priorities (continued)

and to be a caring steward for both the assets of the farm and the natural resources of our nation, is what I'm here to talk about. And, I want to note that there are new information management technologies becoming available to lend a hand in meeting these important needs.

Meeting the Challenge

. . . Many programs, funding sources, and new initiatives [are] available to assist the agricultural community to voluntarily solve the significant water pollution problems associated with their production activities. The question we must answer now is [this]: Are we, and is the agricultural production community, up to the task of tackling and solving water quality problems in an expeditious manner? I believe that it is absolutely imperative that agriculture meet this challenge and demonstrate progress in doing so in the very near term. We all know that point sources have made tremendous investments, under the compulsion of permit and enforcement programs, to sharply reduce pollution from their operations. They, and the public, are rightfully looking to other sources to do the same, and they are becoming increasingly vocal in this regard.

It is my sincere hope and belief that we can successfully address remaining water quality problems with the available technical and financial tools, provided that we have the commitment and resolve to do so. When this conference ends and we each return to our desks and fields, let us do so with renewed resolve to use our tremendous energy, enthusiasm, and expertise to achieve our water quality goals, to see healthy fish return to our streams, to drink clean and safe water from our reservoirs and groundwater supplies, and to swim and play safely in all of our waterbodies. We and our agricultural partners in conservation have a bright future, where profitability and a clean and healthy environment make all of us winners.

— Robert H. Wayland III
National Agricultural Resource Management Planning Conference, New Orleans, LA

Datebook

DATEBOOK is prepared with the cooperation of our readers. If you would like a meeting or event placed in the DATEBOOK, contact the NPS NEWS-NOTES editors. Notices should be in our hands at least two months in advance to ensure timely publication. This listing is available online at www.epa.gov/OWOW/NPS/events.html. A more complete listing is available on the NPS Information Exchange World Wide Web Site (see the NPS Information Exchange box in this issue for directions on how to get on).

Meetings and Events 1998

January

9-10 — *Establishing Direction and Embracing Change: Environmental Education in New Jersey*, Trenton, NJ. Contact Tanya Oznowich, New Jersey Department of Environmental Protection, Environmental Education Unit, P.O. Box 402, Trenton, NJ 08625-0402. Phone: (609) 984-9802.

26-27 — *Conservation Buffers Initiative Conference*, San Antonio, TX. For more information or to receive a copy of the agenda, contact CTIC at (765) 494-9555; website: <www.ctic.purdue.edu>.

February

9-12 — *Retrofit Opportunities for Water Resource Protection in Urban Environments: A National Conference*, Chicago, IL. For more information or to request a copy of the conference program and registration form, contact, Bob Kirschner at the Northeastern Illinois Planning Commission's Natural Resources Department, 222 South Riverside Plaza, Suite 1800, Chicago, IL 60606. Phone: (312) 454-0400; fax: (312) 454-0411.

10-12 — *Managing Manure in Harmony with the Environment and Society*, Ames, IA. Contact Bob Ball, Natural Resources Conservation Service, Parkade Center, Suite 250, 601 Business Loop 70 West, Columbia, MO 65203. Phone: (573) 284-4370; email: <bobb@mo.nrcs.usda.go>.

March

22-27 — *Wetland Engineering and River Restoration Conference,* Adams Mark Hotel, Denver, CO. The first American Society of Civil Engineers conference to bring together the engineering and ecological community to address issues facing wetlands and rivers around the world. Contact: American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20109. Phone: (703) 295 6000 or (800) 548-2723; fax: (703) 295-6144.

April

6-7 — *First National Mitigation Banking Conference,* Washington, D.C. Bringing leading bankers and restorationists together to discuss how and where to use mitigation banking, how it fits in with watershed planning, what "in lieu of fee" means to mitigation banking, and the future of mitigation banking — among other topics. Contact Terrene Institute, 4 Herbert Street, Alexandria, VA 22305. Phone: (800) 726-4853 or (703)548-5473; fax: (703) 548-6299; email: <terrinst@aol.com>.

6-9 — *EPA Region 6 Nonpoint Source Watershed Conference,* Baton Rouge, LA. The conference hopes to gain greater participation from those working the land, from farmer to city stormwater managers. Contact Jan Boydstun (504) 765-0546.

15-17 — *Team Wetlands: 101 Ways to Win for Wetlands,* Arlington, VA. Learn more about conserving your community's wetlands. Contact Terrene Institute, 4 Herbert Street, Alexandria, VA 22305. Phone: (800) 726-4853 or (703) 548-5473; fax: (703) 548-6299; email: <terrinst@aol.com>.

16-18 — *Challenge '98: A Working Symposium for Reducing the Impacts of Urbanization on Southwestern Wetland and Riparian Resources,* Albuquerque, NM. Presentations will span from early geologic history and water use to present social, economic, environmental and political realities. Contact the New Mexico Riparian Council, P.O. Box 40166, Albuquerque, NM 87196; or call Doug Shaw: (505) 842-3256; or email: <jharden@nmia.com>.

29-May 3 — *The Future Frontier,* Anchorage, AK. Contact the River Management Society at (406) 549-0514; email: <rms@igc.apc.org>.

May

3-6 — *Watershed '98 — Watershed Management: Moving from Theory to Implementation,* Denver, CO. Sponsored by the Water Environment Federation. Contact WEF at (703) 684-2400; e-mail: <confinfo@wef.org>.

3-6 — *National Conference on Environmental Decision Making,* Knoxville, TN. Contact University of Tennessee Conferences at (423) 974-0280; e-mail: <conferences@gateway.ce.utk.edu>. Additional information can be found on the National Center for Environmental Decision-making Research web- site at <http://www.ncedr.org>.

17-22 — *Flood Mitigation Technology: Times Are Changing,* Milwaukee, WI. Sponsored by the Association of State Floodplain Managers. Contact Leslie A. Bond, Program Chair, 1998 Association of State Floodplain Managers Conference, P.O. Box 427, High Rolls, NM 88325. Phone: (505) 682-1359; fax: (505) 682-1369; email: <bond@wazoo.com>.

26-30 — *Specialty Conference on Rangeland Management and Water Resources,* Reno, NV. An interdisciplinary forum to exchange ideas about how to better understand and respond to conditions and trends related to water in grassland ecosystems. Sponsored by the American Water Resources Association and the Society for Range Management. Contact AWRA, 950 Herndon parkway, Suite 300, Herndon, VA 20170-5531. Phone: (703) 904-1225; fax: (703) 904-1228.

June

5-9 — *Balancing Resource Issues: Land, Water, People,* San Diego, CA. Annual Conference of the Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, IA 50021-9764. Phone: (515) 289-2331; fax: (515) 289-1227; website: <http://www.swcs.org> or email: <swcs@swcs.org>.

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

Editorial contributions from our readers sharing knowledge, experiences, and/or opinions are invited and welcomed. (Use the COUPON on page 31.) However, NEWS-NOTES cannot assume any responsibility for publication or nonpublication of unsolicited material or for statements and opinions expressed by contributors. All material in NEWS-NOTES has been prepared by the staff unless otherwise attributed. For inquiries on editorial matters, call (202) 260-3665 or (703) 548-5473 or FAX (202) 260-1517.

For additions or changes to the mailing list, please use the COUPON on page 31 and mail or fax it in. We are not equipped to accept mailing list additions or changes over the telephone.

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