June/July 1993 #30

Nonpoint Source News-Notes

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

News-Notes is produced by the Terrene Institute under a grant from the Assessment and Watershed Protection Division, Office of Wetlands, Oceans, and Watersheds, U.S. EPA.

Notes on Watershed '93

Video Conference Stresses Holistic Watershed Management Approach Says Utah Report on Watershed '93

EDITOR'S NOTE: The March/April 1993 issue of *Utah Watershed Review*, the eight-page newsletter of the Utah Nonpoint Source Water Quality Task Force carried this report on the Watershed '93 conference from a satellite-video participant's point-of-view. Thank-you Jack Wilbur, author of this article and editor of the *Review*.

Imagine attending a national environmental conference being held in another part of the country without leaving your own city.

That was exactly what happened for nonpoint source water quality officials in late March, when they were able to take part in a satellite conference called Watershed '93.

The water-quality conference originated in Alexandria, Virginia, but was watched live via satellite by local, state, and federal water quality administrators from across the country.

Speakers at the conference said the holistic watershed approach to water quality management makes good management sense, good environmental sense, and good community sense.

During a morning panel discussion, state, local, federal, and private-sector representatives discussed the holistic approach in terms of vision, barriers, and strategies to overcome barriers.

"In the Columbia River area, there is special-interest gridlock," said Billy Frank, a fisherman from Washington State and representative of the Northwest Indian Fisheries Commission. "It's not a scientific problem, it's a people problem. We in the West should learn from what's happened in the East. But we haven't learned a thing. We need to admit we've made mistakes and start the healing."

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Summary of Conference Work Sessions

Terrene Institute, which managed the conference, provided the following report: On the conference's last day, attendees participated in nine work sessions. Louise Wise of EPA's Office of Wetlands, Oceans, and Watersheds summarized the discussions that took place at the work sessions:

Groups agreed with the following points:

- Let the watershed breathe.
- Individual lifestyle changes are necessary.
- The young must be educated.
- Economic considerations must be taken into account.
- Both bottom-up and top-down approaches are necessary.
- National leadership is needed.

Groups noted that the following points should have been made during the panel discussion:

- The political will to act is needed.
- Information about systems, both economic and scientific, is needed.
- Private property rights must be considered.

Groups came up with the following "next steps":

- Establish a mechanism to coordinate state/federal/local efforts, using federal leadership.
- Deal with land use controls.
- Everyone — from the President on down — must be educated.
- Define problems with longer-term vision.
- Take into consideration the watershed's carrying capacity.
- Control growth and urban sprawl.
- Improve our science foundation and flow of information.
- Set national goals for the watershed approach.
- Quantify endpoints and measurable milestones.
- Establish an 900-number for information (and dollars).
- Use existing programs.
- Establish a national watershed forum to jump start the approach and solidify policy.
- Pass a constitutional amendment to guarantee every citizen's right to a clean environment.

Attendance at the Virginia conference site was about 1,100 people: 39 percent federal, 13 percent state/regional/provincial, 14 percent local, 3 percent tribal, 6 percent university, 12 percent private sector, 13 percent associations and nongovernmental organizations, and 1 percent non-affiliated. Julia Johnson of Terrene Institute reported, "There were participants from almost every state and even a few from out of the United States. The downlink sites were also very popular; there were approximately 47 set up to view the program."

Other panelists echoed the same kinds of concerns. Steve Tedder, a state-level water quality administrator from North Carolina, said basin-wide planning is necessary. He said a holistic approach is more consistent, equitable, and efficient.

Martha Prothro, acting assistant administrator of EPA's Office of Water, said personnel have specialized too much. "We forget these programs mesh together," she said.

Speakers also talked about community involvement. Billy Frank said it is not enough to get special interests together. Frank said the general public must also support water quality improvement efforts. "The people do not have any faith in their government anymore. We have to take the children of our land and educate them on an environmental curriculum," he pointed out.

Video Conference Stresses Holistic Watershed Management Approach, Says Utah Report on Watershed '93 (continued)

During the panel discussion, agency personnel from around the country called in with questions for the panelists. Most of the questions centered around the same barriers: government gridlock and lack of cooperation between agencies.

"The last thing I want to do is go to EPA for funding of our watershed management approach, because then you know who will try to direct everything," said Tedder.

But while state and local officials sometimes resist federal involvement and control of local-level projects, federal agencies have the "big money" to spend.

Utah's NPS program coordinators agreed, while watching the program, that the level of cooperation between local, state, and federal agencies seems to be as good or better in Utah as in the rest of the country.

One source of frustration for program managers may be the slowness of solving the problem. Nonpoint source pollution is a problem that originates from diffuse sources over long periods of time. The solution may be as slow in coming.

"It's a long job and it's going to take 100 years to solve it," said Frank. "We just have to do it."

Knowing all the resources available to state and local government agencies for water quality projects is one way to make the process go faster and smoother, said Prothro. She suggested state program coordinators should ask themselves if a proposed project is best suited for EPA Section 319 money or whether it would fit better into the USDA PL-566 program structure. "No one source of funding—EPA or whatever—can do it alone," she added.

The bottom line, Frank suggested, is taking ownership of the problem at a local level. "It's our land, our home, and our backyard; we have to make some decisions. We've got to change. The change has to come. Are we going to have agriculture? Are we going to have forestry? Are we going to have clean water?"

The Watershed '93 conference was held as a way to let local-level administrators from throughout the country talk about common issues and compare strategies. Those who watched and those who attended from Utah said it was worth the time.

Notes on Water Quality Management

Tribes in Harmony on Public Education Project With the Conservation Partnership

Since January, 1,000 television stations and 5,000 radio stations have been airing a conservation message from *Dances with Wolves* co-star Rodney A. Grant, who played "Wind in His Hair," urging all Americans to "share the heritage of living in harmony with our natural resources." The public service announcement is part of the Project Harmony campaign by the Conservation Partnership, made up of Soil Conservation Service (SCS), National Association of Conservation Districts (NACD), and the National Association of State Conservation Agencies (NASCA).

Filmed at the edge of the Blackfeet Reservation near Glacier National Park, Grant, in native dress, invites viewers to call 1-800-THE-SOIL to a receive free information packet. The packet includes suggestions on how urban dwellers can protect soil and water, a full-color poster of Grant on horseback, a coloring book, a bumper sticker, and news about the Earth Team volunteer program (see News-Notes #26, "SCS to the Rescue").

Three tribes offered outstanding assistance in the project: the Blackfeet, and the Salish and Kootenai from a neighboring reservation assisted in the production of the public information announcements; a Blackfeet tribal councilman served as a language coach for Grant; the Salish and Kootenai developed the packet's coloring book; and Salish and Kootenai tribal elders did translations that demonstrate the diversity of cultures among the many tribes in the United States. Salish Kootenai College is using the coloring book as a language revival tool.

SCS's Dan Himsworth called the effort "a true collaboration."

"The campaign has been successful beyond imagination," Himsworth continued. "We've received $3.5 million in donated airtime and more than 19,000 people have called the 800 number." In addition to local radio and TV stations across the country, over 2,000 magazines, newspapers, and cable TV systems have also received the message. Major media outlets — *New Yorker Magazine*, CNN, ABC, NBC, and CBS have inquired about the program.

Tribes in Harmony on Public Education Project With the Conservation Partnership (continued)

Grant has become the campaign's spokesperson, appearing at the NACD national conference in February and at the formal kickoff at the Capitol in Washington, D.C. on March 2, where he shared the podium with Chief Earl Old Person of the Blackfeet Nation and Representative Glenn English (D–Okla.), who sponsored the kickoff.

Project Harmony sprang from research done for SCS showing that many people were unaware of the services offered by SCS. In February 1993, SCS, NACD, and NASCA renewed their commitment to the Conservation Partnership by signing an agreement stating their shared vision and guiding principles. The vision of "a productive nation in harmony with a quality environment" will be guided in part by a commitment to "maintain and enhance our grassroots delivery system" and a pledge to work together to "empower people to make decisions." Project Harmony is a step toward those goals.

[For more information, contact: Dan Himsworth, USDA-SCS, 10 East Babcock St., Bozman MT 59715. Phone: (406) 587-6842. FAX: (406) 587-6761.]

Ambient Water Quality Monitoring in the U.S.: A Progress Report to the Office of Management & Budget

EDITOR'S NOTE: An earlier story on the Intergovernmental Task Force on Monitoring Water Quality (ITFM) outlining its overall mission and scope appeared in the *News-Notes* April 1992 issue (#20). ITFM's final report and recommendations are due early in 1995. Elizabeth Jester Fellows, chief of EPA's Monitoring Branch and chairman of ITFM, told *News-Notes* on the occasion of our earlier story:

> *We need a common language and framework for action that will allow each individual monitoring agency to take advantage of the other agencies, share its own products, and enable us all to answer the basic questions — how healthy are our waters and how well are our water management programs doing?*

The Intergovernmental Task Force on Monitoring Water Quality (ITFM) submitted its first-year review, evaluation, and a set of 11 conclusions and recommendations to the Office of Management and Budget (OMB) in December 1992.

Three particular problems were identified in the report:

- Many agencies spend billions annually monitoring water quality for a variety of purposes. Roles, objectives, and responsibilities are not always clearly defined, and no clear leadership or intergovernmental strategy links these efforts.
- Different agencies use different methods to measure the same parameter, often do not store information about the data that would enable others to use it with confidence, and keep the data in systems that others find hard to access.
- The resulting data are often not comparable and fall short of supporting management of water resources on a nationwide basis.

The report's principal conclusions and recommendations are:

- A nationwide, well-integrated monitoring strategy will enhance the implementation of defensible water quality programs and management decisions.
- Water management programs are changing to focus on multimedia, geographically based activities; biological and ecological information; and nonpoint source, wetlands, and sediment concerns. Water monitoring programs must be responsive to these changing needs.
- Better integration of water quality monitoring activities is now achievable because public and private organizations are more open to cooperation. Also, recent technological advances have created new opportunities to improve water quality monitoring.
- Monitoring investments will be made more effective through voluntary integration of existing programs to sharpen monitoring objectives, improve data consistency, and facilitate more effective interpretation and reporting.
- Representatives of all monitoring interests should be invited to participate in refining and implementing the process, to help define the recommendations, and to initiate the proposed changes needed to improve monitoring activities.
- A coordinated partnership that links organizations at national and regional levels should be established to oversee the adoption and implementation of a nationwide water quality monitoring strategy.

Ambient Water Quality Monitoring in the U.S.: A Progress Report to the Office of Management & Budget (continued)

- Physical, chemical, and biological indicators and associated monitoring designs should be developed to address specific questions for each monitoring objective and to measure progress toward achieving the objective.
- Participants in the nationwide strategy should use comparable field and laboratory methods to obtain comparable data over time and space that can be aggregated or synthesized in regional and national reports.
- A permanent information standards and comparability council should be established at the national level to provide technical support for participating agencies and other organizations collecting and using water quality information. Adherence to sound quality assurance and quality control principles is necessary to implement the nationwide strategy.
- Another task group of ITFM should be established to evaluate existing technology to interpret and assess water quality data, to recommend better ways to access such technology, and to recommend ways to provide technical assistance for applying the technology in the national strategy.
- A training program for personnel of participating agencies should be established to support the implementation of the strategic plan. The ITFM should proposed a nationwide training curriculum, including programs for public and volunteer organizations.

The ITFM is part of the implementation of a 1991 OMB directive to strengthen coordination for water information nationwide. The ITFM is chaired by the Environmental Protection Agency. The United States Geological Survey serves as vice chair and provides administrative and management support. Members of the ITFM currently include eight federal, one interstate, and seven state agency representatives. To date, over 80 additional federal and state agency representatives have been involved in the deliberations of the ITFM and its four task groups. The four groups involve framework, environmental indicators, data collection methods, and data management and sharing.

The ITFM expects to expand membership of the task force in its second and third years to include municipalities, industry, academia, and volunteer monitoring groups.

[To obtain copies of the report, contact U.S. Geological Survey, Office of Water Data Coordination, 417 National Center, Reston, VA 22092. Phone: (703) 648-5023.]

In Florida, Constructed Wetlands Solve Waste Management Needs During Four-Day Race Meet

EDITOR'S NOTE: This article appeared in the spring 1993 issue of *Aquaphyte*, the newsletter of the Center for Aquatic Plants and the Aquatic Plant Information Retrieval System (APRIS) of the University of Florida Institute of Food and Agricultural Sciences. It deals with how a potentially colossal nonpoint source problem was dealt with (1) by making it a point source and (2) through the carefully designed use of constructed wetlands and aquatic plants. The results meet state water quality standards, and the solution could very well pay for itself in the long run. Thank you to *Aquaphyte* editor Vic Ramey.

Problem:

You produce a large recreational event that draws 100,000 people from all over the world for only four days out of the year. This many people produce more than one million gallons of waste during four days. Furthermore, your event is isolated from the city — and there are no toilet facilities nearby, not even a Kwik-Stop store. There are environmental standards for disposing of this waste, and you cannot break the law.

What do you do?

One possible solution is to run wastewater trunk lines from your facility to a municipal treatment system. If you're lucky, you're close enough so that this would not be too expensive. If you're unlucky, and the nearest connection point is several miles away, the expense could be several million dollars.

In Florida, Constructed Wetlands Solve Waste Management Needs During Four-Day Race Meet (continued)

Another solution is to set up a line of portable chemical toilets, which are universally unappealing and incur significant trucking and other disposal expenses.

Yet another solution is to build a sewage treatment plant on site. However, conventional sewage treatment plants are expensive to build and operate, and they must be continuously supplied with waste in order to "feed the bugs" that break down waste; these systems do not work well with only the occasional "batch loads" of waste produced during infrequent events.

In real life, the National Hot Rod Association (NHRA) has experienced this dilemma: every year 100,000 thrill-seekers attend Gatornationals, a four-day national drag racing event held in Gainsville, Florida. Until recently, the isolated race track was fully equipped, except for toilet facilities. Now it even has flushing toilets.

NHRA's solution, in close cooperation with the Gainsville Regional Utilities (GRU), was to design and build an innovative "constructed wetlands" for primary, secondary, and tertiary sewage treatment. The system is unique because of its ability to accept sudden and heavy untreated waste loads after prolonged idle periods. And unlike the many acres of wetlands used in some places for tertiary wastewater treatment, this entire compact system occupies less than five acres.

The NHRA/GRU system takes advantage of a new combination of aeration ponds, a gravel denitrification bed, and flow-through ponds filled with aquatic plants for final "polishing."

The resulting treated water meets required environmental standards and is being used in two ways. Some is diverted for use in on-site fishponds; some is sent to an automatic sprinkler system that irrigates an on-site pine plantation.

During racing and other recreational events, the system acts as a wastewater treatment plant; during the rest of the year, it acts as an aquaculture farm, capable of supporting the commercial growth of fish, crayfish, shrimp, and other freshwater creatures. The aquaculture products and the pulp-timber can be sold to help pay for the system's overall construction and operating costs.

After two years of operation, the NHRA raceway wastewater treatment system has been declared a success.

The aquaculture part of the system was designed and built under the guidance of researchers Dr. Jerome Shireman and Douglas Colle, and visiting Polish fisheries experts, husband and wife Drs. Karol and Wanda Opuszynski, all of the Department of Fisheries and Aquatic Sciences of the University of Florida.

The Site

The compact five-acre treatment facility operates in four phases and releases treated water on site.

■ ***Phase 1 (Gatornationals phase)*** During this phase, a primary objective is to minimize odors by supplying oxygen. During racing events, untreated wastewater flows from restrooms into the one-half-acre lagoons, which are equipped with large, floating aeration pumps. The aerators are turned on and allowed to run continuously. During this phase, much of the organic matter in the wastewater is metabolized by bacteria, but little nitrification is accomplished.

■ ***Phase 2 (Nitrification phase)*** During this phase, ammonia in the wastewater is oxidized to nitrite and then to nitrate. Continuing aeration increases the population of and suspends waste-eating bacteria (*Nitrosomonas*), and helps remove total suspended solids (TSS) and reduce biological oxygen demand (BOD). (BOD is the amount of oxygen consumed by bacteria as they convert and use the organic waste materials.) During this phase, too, water alkalinity is reduced to levels safe enough for fish.

■ ***Phase 3 (Denitrification phase)*** Denitrification is carried out in the gravel denitrification bed (GDB). During this phase nitrite and nitrate in the water are converted to nitrogen gas, which disappears into the atmosphere. Sugar is injected into the wastewater to establish and maintain high bacterial populations for the denitrification reactions.

The GDB is a plastic-lined pit filled to a five-foot depth with one-inch diameter gravel. In the GDB, water is fed to the bottom of the bed and is distributed throughout the bottom by a

network of pipes. The water percolates *upward* through the rocks and drains at the top. The water is circulated between the GDB and the aeration lagoons until bacterial action has reduced the ammonia nitrogen to below 1.0 mg/L and the total nitrogen to less than 10 mg/L.

■ ***Phase 4 (Polishing phase)*** In this phase, treated wastewater is drained from the aeration lagoons into two long, narrow, flow-through aquatic vegetation ponds. One pond is filled with the submersed plant, hydrilla (*Hydrilla verticillata*); the other is covered over with the floating plant, duckweed (*Lemna* spp.). (See *News-Notes* Issue # 22, for a report on another treatment system using *Lemna*.)

In these ponds, the treated wastewater is "polished" for use as "make-up water" in the adjacent aquaculture ponds and for ultimate release into the raceway's spray irrigation system.

One purpose of the vegetation ponds is to reduce the total suspended solids (TSS) of the wastewater. This is accomplished mainly by the hydrilla, where the large leaf surface area of the submersed plants acts as a natural filter and provides much more substrate for the beneficial wastewater cleansing bacteria.

Another purpose of the vegetation ponds is to reduce the nitrogen and phosphorus in the wastewater. The constantly growing aquatic plants utilize nutrients and greatly reduce nutrient availability to algae. Reducing algal density makes the water much clearer.

Aquaculture Ponds

For thousands of years, Asian cultures have been using human and animal wastewater to culture fish and other food animals. Shireman and his researchers say their system is simply a more modern version of this age-old, completely safe and efficient way of growing food.

While finishing the wastewater to required standards, the aquatic plants are regularly harvested and fed to the plant-eating fish being grown in the aquaculture ponds. Harvesting the plants promotes their biomass production, thus further increasing their efficiency for cleansing wastewater, and making more plants available for aquaculture production.

In the present case, the fish being grown are grass carp (*Ctenopharyngodon idella*), which in Florida are used for aquatic weed control and elsewhere are used for food. Hydrilla is a favorite food of grass carp, and duckweed is a perfect size for growing fingerlings. In addition, blue tilapia and bighead carp have been raised in these ponds.

However, there is no reason to limit aquaculture to these kinds of fish—other fish may be grown for food or re-stocking programs, or other freshwater animals such as shrimp or crayfish may be cultured.

Results and Costs

The construction cost of the present facility, approximately $340,000, was less than one-third that of a conventional system of the same size. In addition, there are no high ongoing costs for continuous operational preparedness or for full-time personnel. Operating costs have been estimated at $12,000 per year.

Water Quality Standards

The final polished water that is disposed of on site to grow a pine plantation is of a higher quality than the standards required by the Florida Department of Environmental Regulation. These requirements are 20 ppm BOD, 20 ppm TSS, or 90 percent removal, whichever is greater; and 12 ppm ammonia nitrogen. Chlorine is applied before release to reduce the fecal coliform to less than 100/mL.

Aquaculture Value

The grass carp grown in the fish ponds may be sold in Florida for aquatic weed control. At the common sales price of six dollars for a 10-inch fish, the value of the fish grown in these ponds has been estimated at $24,000 per hectare.

The system has worked well during two Gatornational events, each of which produced "batch loads" of more than 1 million gallons of wastewater during the four days of races. By all measures, this unique and compact "natural" wastewater treatment system must be judged a success.

The University of Florida has produced a 15-minute video about this project. A copy of the video costs $15.00 (plus 90 cents tax for Florida residents). To order Videotape VT #455, send check payable to University of Florida, IFAS Publications, IFAS Building 644, Gainsville, FL 32611.

[For more information on this constructed wetlands system, contact Dr. Jerome Shireman, Department of Fisheries and Aquatic Sciences, University of Florida, 7922 NW 71st Street, Gainsville, Florida 32607. Phone: (904) 392-9617.]

Citizens Key to Successful Watershed Plans

EDITOR'S NOTE: The impressive words of wisdom that follow, first appeared in the March/April 1993 issue of *Sound Waves*, the bimonthly newsletter of the Puget Sound Water Quality Authority. Thank you Susanne Hindle, *Sound Waves* editor.

There is more citizen participation in watershed planning than in any other environmental planning process in Puget Sound—community residents are the backbone of the committees that develop watershed action plans.

But beyond those who serve on watershed committees, it is difficult to get people involved in what is designed to be a citizen-driven watershed planning process.

One problem, according to citizens and government officials at a recent watershed conference in Everett, Wash., is that people do not always understand their roles in the watershed planning process. Others stay away because they think watershed planning is probably bureaucratic and solutions are slow to evolve.

"We still have a number of shortcomings," Katherine Baril, director of Jefferson County's Washington State University Cooperative Extension office, told participants of "Managing Our Watersheds, the Nonpoint Experience in Puget Sound," sponsored by the Puget Sound Water Quality Authority, Washington State's Department of Ecology, and the Environmental Protection Agency. "We lack participatory decisionmaking, political constituency for the plans, and citizen willingness to lobby government officials for the plans."

Judy Likkel, a citizen volunteer who has organized 165 homeowners along Hood Canal to pay for their recreational shellfish to be tested, agreed. "Citizen stewardship is in our best interest," said Likkel. "But remember that, like our watersheds, stewards have needs, too. It's our challenge to figure out how to foster stewardship in an ownership-oriented society."

The key to fostering stewardship, noted Arnie Klaus, director of Whatcom County's Puget Sounders, is to meet people halfway and then some.

"Why is stewardship important? It depends on whom you talk to," said Klaus.

"There are many different reasons people want to get involved. Don't question them—use them. Get people out there for their reasons, not for yours," he said. "Once you get the people and they start doing something, then they start to recognize their roles in protecting water quality as watershed residents."

"You cannot possibly overestimate the amount of interest in the community to get involved," added Susan Handley with EPA Region 10. "There may be barriers to getting them involved; you have to figure out what those are."

Handley said it is best to first provide a nonthreatening way for people to get involved. "This will raise their comfort level," she said. "And remember that people want to feel competent. Make them successful in their first effort."

Baril suggested that it might help for planners and watershed planning committee members to take a step back every once in a while and look at the bigger picture. "It's not about writing plans," said Baril. "It's about changing behaviors and getting people involved.

Most importantly, Baril added, "We need to remember why we do watershed planning. We do planning because the forester needs to understand shellfish, we do it to re-evaluate behavior, and we do it for consensus building. If we don't deal with these issues, we will end up with cookie cutter plans throughout Puget Sound."

[For more information, contact Katherine Baril, director of Jefferson County W.S.U. Cooperative Extension, P.O. Box 572, Port Townsend, WA 98368. Phone: (206) 385-9158.]

EPA Issues Annual Report 1992 on the Watershed Protection Approach

EPA's Office of Wetlands, Oceans, and Watersheds has recently released its 1992 annual report on the watershed protection approach. The report summarizes

- EPA's strategy and the progress made in promoting a watershed protection approach over the last year, and
- The steps taken at EPA headquarters to implement the strategy.

It contains a summary of watershed activities in the field, beginning with the steps that EPA's regions have taken to support watershed protection and concluding with brief descriptions of individual watershed projects.

An appendix references pertinent EPA funding sources that could support watershed protection efforts.

The introduction clearly sums up the rationale behind the watershed protection approach and EPA's role as follows:

What is the watershed protection approach (WPA)?

The watershed protection approach is an integrated, holistic strategy for more effectively restoring and protecting aquatic ecosystems and protecting human health (e.g., drinking water supplies and fish consumption). This approach is a renewed effort by the U. S. Environmental Protection Agency to focus on hydrologically defined drainage basins — watersheds — rather than on areas arbitrarily defined by political boundaries. Thus, for a given watershed, the approach encompasses not only the water resource, such as a stream, river, lake, estuary, or aquifer, but all the land from which water drains to that resource. To protect water resources, it is increasingly important to address the condition of land areas within the watershed because as water drains off the land, it carries with it the effects of human activities throughout the watershed. By concentrating on natural resources and systems, it is possible to detect and take remedial action for such problems as declines in living resources and habitat loss.

The watershed protection approach has three major cornerstones:

1) *Problem Identification — Identify the primary threats to human and ecosystem health within the watershed.*

2) *Stakeholder Involvement — Involve the people most likely to be concerned or most able to take action.*

3) *Integrated Actions — Take corrective actions in a comprehensive, integrated manner once solutions are determined. Evaluate success and refine actions, as necessary.*

This approach places greater emphasis on all aspects of water quality, including chemical water quality (toxics and conventional pollutants, e.g., fecal coliform and total phosphorus), physical water quality (e.g., temperature, flow, and circulation), habitat quality (e.g., channel morphology, composition, and health of biotic communities), and biodiversity (e.g., species number and range). The approach encompasses all waters — surface and ground, inland and coastal. This approach is not a new centralized program that competes with or replaces existing programs; rather it provides a framework and new focus for effective integration of ongoing programs. In taking this expanded approach, EPA must work closely with other stakeholders who have responsibilities in this area.

Why is a watershed protection approach needed?

Although significant strides have been made in reducing the impacts of discrete pollutant sources and billions of dollars have been spent to build wastewater treatment plants, the nation's aquatic resources remain at risk. Today's challenges include resolving the significant pollution problems that come from literally millions of diffuse or nonpoint sources, maintaining safe drinking water supplies, and restoring and protecting aquatic habitats. These challenges require innovative solutions and, in a time of dwindling public resources, cooperation among many parties. The watershed protection approach provides the necessary framework for meeting these challenges. The approach emphasizes the involvement of all affected stakeholders and stresses the need for teamwork at the federal, state, and local levels to achieve the greatest improvements with the resources available.

EPA Issues Annual Report 1992 on the Watershed Protection Approach (continued)

A wide variety of sectors are expressing interest in watershed protection, including all levels of government, private businesses, academics, environmental groups, and individual citizens. The watershed protection approach provides comprehensive methods for identifying, tailoring, and implementing the solutions needed to protect and restore the nation's aquatic resources.

Who can benefit and why?

Everyone — individual citizens, the public sector, and the private sector — can benefit from a watershed protection approach. Individual citizens benefit because watershed protection improves the environment. The public sector benefits because agencies can accomplish more through cooperation with all stakeholders than they can on their own with limited resources. Participation by local entities ensures that those who are likely to be most familiar with a watershed, its problems, and possible solutions play a major part, often a leadership role. Users of the water resources (for example, industry, agriculture, and recreation) benefit because one of the intents of the approach is to distribute the burden of water resource protection more evenly among all stakeholders.

In communities across the United States, effective watershed management can lead to more environmentally sensitive and sustainable economic growth and development. Because watershed management brings all parties to the table, the potential exists for greater consideration to be given to protecting and restoring vital natural resources during planning for new development.

What is EPA's role?

EPA's overall goal for the watershed protection approach is *to maintain and improve the health and integrity of aquatic ecosystems using comprehensive approaches that focus resources on the major problems facing these systems within the watershed context.*

To meet this end, EPA has identified the following objectives:

- Align EPA programs to support risk-based watershed planning and management.
- Promote the use of the approach by its partners in other federal, state, and local agencies.
- Address the primary threats to ground and surface waters.
- Promote stewardship and a broad understanding of and participation in the approach by the public.
- Effectively measure progress toward restoring, maintaining, and protecting our nation's waterbodies and aquatic habitats.

In pursuing its overall goal and related objectives, EPA encourages and advances watershed protection at all levels of government and is actively involved in watershed partnerships when appropriate. EPA's Office of Water develops technical tools to assist communities in adopting watershed protection approaches, promotes the watershed protection approach concept through various outreach activities, and works inside and outside of EPA to align its programs to better complement the approach.

EPA's Strategy

The report indicates that EPA is pursuing a five-pronged strategy for adopting watershed management. The components of the strategy are:

- Try it out
- Develop tools
- Advertise it
- Measure success
- Align programs

An EPA headquarters support team has been convened with representatives from the four parts of the Office of Water (Office of Ground Water and Drinking Water; Office of Science and Technology; Office of Wastewater Enforcement and Compliance; and Office of Wetlands, Oceans, and Watersheds.) The support team is to serve the regions and states, as well as local and nongovernmental entities, in pursuing watershed protection approaches.

To Order The Report

The title of the publication is *The Watershed Protection Approach Annual Report 1992.* The publication number is *EPA840-S-93-001.* Copies may be ordered from NCEPI, 11029 Kenwood Road, Bldg. 5, Cincinnati, OH 45242. Or, you can order the report from Cincinnati by FAX: NCEPI, (513) 891-6685. There is no cost. (Be sure to include both the title and publication number in orders sent to NCEPI.)

[For general information on EPA's watershed protection approach contact Policy and Communications Staff, Office of Wetlands, Oceans, and Watersheds, U.S. EPA, 401 M Street SW, Washington, DC 20460. Phone: (202) 260-9108.]

EPA Issues Annual Report 1992 on The Watershed Protection Approach (continued)

EDITOR'S NOTE: For more information on EPA's involvement in watershed activities in your area, contact the appropriate regional contact listed below.

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(ME,NH,VT,MA,RI,CT)
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Bringing Back Coastal Wetlands: The Science of Restoration — A Review

EDITOR'S NOTE: This review was originally published in the February 1993 issue of *Marine Notes*, the newsletter of the Maryland Sea Grant College. The authors of the review are are Garry F. Mayer, chief of the NOAA National Marine Fisheries Service Habitat Research and Restoration Division, Restoration Center, and Peter Hill, a policy analyst and planner at the restoration center. Thank you, Sandy Harper, editor of *Marine Notes*.

The tale of wetlands in the United States is a tale of massive loss — from salt marshes, seagrass meadows, and mangrove stands to tidal flats, kelp forests, and coral reefs. Over the last 200 years, wetland acreage in the continental United States has steadily dwindled from some 200 million acres to an estimated 95 million; about one-third of those remaining are coastal in nature.

If human activity has been the cause of much of this wetland loss, a good deal of human activity, namely in far-reaching scientific efforts, is at work to find out how such diverse ecosystems can best be restored. At all levels of government, programs to help preserve and protect these habitats are now in place; moreover, they have been complemented by efforts to restore or recreate coastal systems that have been destroyed or impaired by human activities.

Restoring the Nation's Marine Environment, published recently by Maryland Sea Grant, covers a range of ongoing restoration efforts in the United States and abroad. The book discusses restoration of common coastal habitats — salt marshes, tidal flats, seagrass beds, kelp forests, and coral reefs — and of habitats impacted by special problems — urbanized estuaries, diverse habitats impacted by logging, and fisheries habitats destroyed by hydroelectric dam construction.

Questions remain, however: Just how well do these restored habitats function in comparison with the natural habitats? Can we expect them to flourish on their own for decades to come?

Tracking the Causes of Loss

A variety of factors account for the loss of coastal and estuarine habitats. Agriculture, transportation, construction and general urbanization, industry, logging, and aquaculture all physically disrupt the landscape and reduce environmental quality. Habitats are also affected by clearing, draining, diking, filling, dredging, and shoreline stabilization. Further effects result from water diversions and other hydrologic alterations, nutrient enrichment, changed water clarity, toxic substances from spills, and pollutants from chronic point and nonpoint sources. All such human-induced changes are often compounded by natural occurrences — storms, climate alteration, coastal subsidence, sea level rise, disease, and the appearance of new or exotic species.

Along the nation's coasts from Florida to Virginia to California, studies have identified and tallied wetland losses. In California, they range from 70 percent to 90 percent. In Washington State, eight out of 12 Puget Sound estuaries showed losses of 30 percent or more. Heavily urbanized and industrialized waterways, such as the Duwamish and Puyallup Rivers, exhibited historic reductions as great as 89.9 percent and 99.6 percent, respectively.

Mangrove and seagrass systems show similar declines. Along the East and Gulf Coasts, widespread die-offs of seagrass remain serious problems. The Chesapeake Bay and its tidal tributaries, which once supported between 100,000 and 300,000 acres of eel grass *(Zostera marina)* and 14 other species of submerged aquatic vegetation, today contain only about 50,000 acres. Further south, losses continue to mount: scientists estimate that approximately one-third of the seagrass meadows in coastal Florida have disappeared since the 1940s, while a loss of almost two-thirds has occurred along the Mississippi coast.

Is Restoration Enough?

Is the *science* of habitat restoration up to the challenge posed by coastal habitat losses that occurred in the past and that continue today? There is no unequivocal answer.

Research on the restoration of estuarine and coastal systems dates back only to the late 1950s in the United States. Large-scale, systematic programs did not begin until the late 1960s and early 1970s, with the advent of U.S. Army Corps of Engineers studies of the feasibility of creating habitat on dredged material. As a discipline of study, restoration science in coastal and estuarine systems grew progressively in the late 1970s and burgeoned in the mid-1980s.

Today, there are hundreds of created or restored tidal marshes and mangrove forests nationwide that support diverse fish and wildlife populations. Between 1989 and 1992, more than 800,000 acres of wetland fresh- and saltwater habitats were enhanced or restored by federal agencies nationwide. Whether these created habitats are functionally equivalent to natural habitats, and whether they will continue to function in this manner into the foreseeable future is still an open question.

As editor Gordon W. Thayer says in *Restoring Our Nation's Marine Environment*, "In the case of restored or created wetland habitats, the simple fact that they are green does not necessarily mean that they have developed into functional habitat providing services to living marine resources and to man. In fact, there is a growing body of literature to the contrary." When estuarine systems are lost or degraded, so are the important functions they provide — groundwater recharge and flood abatement, sediment retention and other mechanisms of shoreline erosion control, water quality improvement, trophic energy (food web) support, substrate and protective cover for fish and wildlife, recreational opportunities, and aesthetic values.

Progress Comes Slowly

The successful creation, enhancement, or restoration of habitats requires time and constant attention. While seagrass communities may need as little as three years to become fully functional, marsh systems may take 15 or more years; mangrove habitats may take 20 to 30 years. Under the most ideal circumstances, coral reefs can take decades to recover, and where pollution or other stresses are chronic, recovery may be postponed indefinitely. The more complex and highly developed the habitat, the greater the time and nurturing required to ensure a successful project.

Despite the complexities of habitat restoration, laboratory and field studies have yielded techniques that take less time, are less expensive, and are less fraught with uncertainty. For

example, research in Southern California's hypersaline estuaries evaluated factors to enhance both the rate of establishment and the degree to which functional equivalence is achieved by restored cordgrass habitat *(Spartina foliosa)*. The addition of supplemental organic material and nitrogen to areas planted with cordgrass accelerated *Spartina* growth and resulted in the production of taller plants. The addition of supplements is one of the factors needed to support the light-footed clapper rail, an endangered bird species that occurs in the area. On the other hand, parallel experiments conducted in East Coast *Spartina alterniflora* habitats were not successful.

Collective wisdom says that restoration success, regardless of habitat type, is marked by careful planning. This means selecting the most promising sites, determining the appropriate techniques to be used, and meticulous physical (and, if necessary, chemical) preparation of the sites, followed by timely planting. Follow-up biological activities, such as the removal of unwanted, competing, or destructive biological forms until the habitats become established, are also important. Central to any success is identification of restoration goals and the environmental factors that may limit its success. Equally critical is a well-designed monitoring plan that remains in place over the life of the restoration, not just the early stages, to track progress and suggest corrective actions, should they be necessary.

Current studies reinforce the need for these actions. To cite one instance, for selected species of seagrasses, experimentation has shown that site selection remains a complex problem: restoration is likely to be more effective in habitats that previously supported seagrasses; otherwise, substitution of one habitat type for another may result. Experience further underscores the critical nature of grading potential salt marsh restoration sites with high precision: slight deviations can cause improper inundation regimes, which, in turn, can jeopardize the success of a restoration project. Similar care must be taken in dealing with restoration sites contaminated with bioavailable toxic substances.

Advances in ecological science have enhanced our understanding of the environmental and ecological parameters needed to measure the progress and effectiveness of restoration efforts. While the growing sophistication of instrumentation has increased the accuracy and ease of taking data, monitoring still remains among the most poorly implemented aspects of habitat restoration. Many government agencies and industries have been unwilling to balance the cost of multi-year monitoring against savings derived from more successful and efficient restoration activities that are likely to result from improved scientific understanding.

Restoration Is Only Part of the Answer

According to Thayer, it is essential that a comprehensive evaluation of restoration, mitigation, and enhancement processes be initiated on a national scale. Research, he says, may demonstrate that the design criteria for projects need only be improved to approach functional levels of natural habitats. On the other hand, research may show that we cannot emulate nature as easily as has been assumed. If this is true, then policies must take this into account. But it is clear that restoration efforts must continue and even expand. "The goal of no net loss cannot be attained without active programs of habitat conservation and of restoration and creation that are based on sound scientific approaches," says Thayer. The alternative is continuing loss of ecological systems vital to environmental health. We must place a high priority on demonstrating that habitat restoration and enhancement can be done cost-effectively with present technology. Evidence of success will translate into support for expanding existing technologies and for developing new capabilities, such as the application of biotechnology and modern agricultural science to provide specially adapted plant stocks for large-scale undertakings. Even restoration failures are useful for identifying habitats that are difficult to duplicate — management can then focus on conservation and land use policy for these irreplaceable habitats.

As a final step, we must educate the public about the capabilities of coastal habitat restoration. Present expectations regarding the nature of successful restorations, the time required, and the costs associated often are unrealistic. Regardless of restoration capabilities, it is important for all of us to understand that the future existence of coastal and estuarine habitats can best be guaranteed by *avoiding* habitat loss and degradation.

[This book is the result of a collaborative effort between the University of Maryland Sea Grant College Program and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS). Restoring the Nation's Marine Environment, edited by Gordon W. Thayer, is 728 pages and costs $45.00. To order the book, call or write Maryland Sea Grant office, Maryland Sea Grant College, 0112 Skinner Hall, University of Maryland, College Park, MD. Phone: (301) 405-6376.]

North East Wisconsin Waters for Tomorrow, Inc. Organizes a Watershed for Cost-Effective Restoration

EDITOR'S NOTE: The following story was developed from a December 1992 newsletter and other material prepared by the citizens' nonprofit corporation, North East Wisconsin Waters for Tomorrow, Inc., and conversations with David White, team leader for the project. The organization was formed with the conviction that a management program to deal with the problems of *downstream* Lower Green Bay could not be developed as an entity by itself. The organization determined that a total watershed approach is necessary for the job.

The Genesis of N.E.W. Waters for Tomorrow, Inc.

N.E.W. (North East Wisconsin) Waters for Tomorrow, Inc., is a nonprofit citizens' organization formed with a belief that cost-effectiveness (i.e. getting the biggest bang for the buck) is an important criterion in choosing strategies for reducing pollution and meeting desired water resource management objectives in the Fox-Wolf watershed and lower Green Bay region of Wisconsin.

The Fox-Wolf watershed is a 6,600 square mile area of northeastern Wisconsin extending into 12 counties. It drains into Lake Michigan's lower Green Bay. Much of the watershed suffers from problems such as eutrophication and contaminated sediments. In many areas, desired conditions for recreation and habitat are not realized.

The U.S.-Canada International Joint Commission (IJC), oversees the Great Lakes Water Quality Agreement that the two countries signed in 1978. In 1985, the IJC designated lower Green Bay and a section of the Fox River from its mouth to the De Pere Dam, as an Area of Concern (AOC), one of 43 around the Great Lakes. AOCs are areas where the specific water quality objectives of the 1978 Great Lakes Water Quality Agreement have not been met. In the case of Lower Green Bay, human activities have impaired the beneficial uses of the area and reduced its ability to support aquatic life.

As a result of the 1985 recommendation of the IJC, the eight Great Lakes states and the province of Ontario committed to developing and implementing Remedial Action Plans (RAPs) to restore beneficial uses of Areas of Concern within their boundaries. The Remedial Action Plan process represents an innovative approach to water quality management, an ecosystem-based, "bottom-up" approach to bring together diverse local interests to tackle problems affecting the beneficial uses of the water resources of the area. The Wisconsin Department of Natural Resources (WDNR), with EPA support and intensive local involvement, produced a RAP for lower Green Bay in 1988.

David White, team leader for N.E.W. Waters for Tomorrow, Inc., has written:

> *The RAP process in lower Green Bay has continued to the implementation stage. There are many obstacles to achieving the "desired future state." Recommendations to attain desired objectives, such as the removal of nutrients causing eutrophication, cleanup of contaminated sediments, protection and reestablishment of habitat, and enhancement of recreation, require much effort from many entities, as well as substantial funds. The challenges to implementation are technical, social, and financial. Attaining the objectives of the RAP requires significant financial resources, social and political will, and answers to certain technical questions.*

Although many management activities are taking place throughout the watershed, it was concern for implementation of the Green Bay RAP that led a handful of Green Bay citizens to initiate North East Wisconsin Waters for Tomorrow, Inc. On the positive side, the founders felt that the goals and objectives of the Green Bay RAP were sound, as was its ecosystem emphasis.

However, the group felt that because of the potentially high cost of implementing the RAP, dollars spent for water resources management must be spent wisely and effectively.

North East Wisconsin Waters for Tomorrow, Inc. Organizes a Watershed For Cost-Effective Restoration (continued)

They also concluded that cost-effective decisions needed to be made in the context of the entire watershed. It was evident that activities throughout the watershed contributed to the problems in lower Green Bay.

Further, they felt that the many different management efforts in the watershed, planned or underway, needed to be pulled together and related to one another.

Because little was known about how to most cost-effectively meet the goals and objectives of water resource management in the region, the founders of N.E.W. Waters for Tomorrow hired an interdisciplinary analysis team to identify and evaluate cost-effective management strategies. In addition to several local and national consultants, the analysis team consists of three full-time members: a resource economist, a civil engineer, and an ecologist. The analysis team has three objectives:

- to identify the most cost-effective measures for desired water resources conditions in the watershed;
- to develop an analytical framework for use in the planning of water resources management in the watershed; and
- to identify the nature and extent of uncertainties relating to water resources management in the region.

The Analysis Team Approach

The approach has two key aspects:

- First, it had to be future oriented. This is because it makes sense to develop a management strategy that takes into account not only past actions and present conditions, but future problems likely to arise in a changing socio-economic-ecologic environment. Also, attaining desired objectives takes time because actions take time to implement and the ecosystem takes time to respond. The majority of the effort will therefore be directed toward identifying the most cost-effective measures to ensure that the objectives can be achieved and maintained.
- Second, the analysis must focus on the *watershed* in its entirety. The analytical framework is set up to determine the most cost-effective management strategy to meet desired objectives throughout the watershed.

The effort is directed at management objectives relating to:

1) ambient water and sediment quality (i.e., phosphorus, total suspended solids, and PCBs);
2) habitat; and
3) water-based recreation.

Ongoing Activities

Currently, the analysis team is busy compiling the needed background information, much of it from previous efforts. Ongoing work includes summarizing water resource management objectives, assessing the requirements needed to achieve those objectives, approximating the sources of water quality problems in the watershed (rural runoff, urban runoff, point sources), and projecting conditions in the watershed to 2010. The work plan called for completion of this compilation and preliminary analysis phase by February 1993, and then spending four months analyzing the cost-effectiveness of different management strategies. The analysis team will produce a report of the findings of the first year by July 1993. This document will present the framework, explain the uncertainties, and provide a discussion of cost-effective management strategies required to meet desired objectives in lower Green Bay.

[For further information, contact David White, Team Leader, N.E.W. Waters for Tomorrow, University of Wisconsin-Green Bay, Room ES-105E/2420 Nicolet Drive, Green Bay, WI 54311-7001. Phone: (414) 465-2170.]

Trout Unlimited Joins With Forest Service and Bureau of Land Management to Bring Back the Natives

EDITOR'S NOTE: David A.Nolte, a *News-Notes* reader from Redmond, Oregon, sent us two interesting and instructive articles the other day. What follows is his story outlining Trout Unlimited's participation in the Bring Back the Natives program. The program is a combined effort involving the primary managers of the public lands, the Forest Service, and the Bureau of Land Management, together with the National Fish and Wildlife Foundation and other national partners. Nolte is Trout Unlimited's coordinator for the program. (For an earlier story on Bring Back the Natives see *News-Notes* #22 June-July 1992). Thanks, David, for your contributions. David's other contribution to this issue of *News-Notes*, on the Crooked River Watershed, can be found under *Notes on Environmental Education.*

Bring Back the Natives

by David A. Nolte, Trout Unlimited

Funded by the National Fish and Wildlife Foundation, Washington, D.C., this key national fisheries program is the first national campaign combining Trout Unlimited with two major federal agencies, the U.S. Department of Agriculture (USDA) Forest Service and U.S. Department of the Interior (USDI) Bureau of Land Management, with partnerships including state agencies, local organizations, private businesses, citizens, and landowners. The program is aimed at restoring the health of riverine systems and the repopulation of native freshwater species. Currently, the program is funding 47 projects on 47 streams in 15 states. Twenty projects directly involve Trout Unlimited chapters, including those in California, Idaho, Nevada, Oregon, Wyoming, and Arizona.

The program operates through a cooperative effort that stresses improved watershed and ecosystem management and seeks to restore the health of entire riverine systems and their native species.

The BLM manages more than 270 million acres of public lands, including approximately 175,000 miles of streams and rivers and 4.2 million surface acres of ponds, lakes, and reservoirs. The BLM needs to expand its habitat enhancement and educational opportunities and work with a multitude of partners to accomplish management goals of fisheries that strategies such as Bring Back the Natives offers. Successful implementation of this program will substantially benefit coldwater fish, such as bull trout, inland redband rainbow trout, cutthroat trout, and various other salmonids.

Trout Unlimited, in partnership with the BLM, has established an overall program coordinator position to support the implementation and coordination of Bring Back the Natives projects. David A. Nolte, a Trout Unlimited member residing in Oregon, has been selected for this position. Nolte will promote and assist Bring Back the Natives projects that:

- Link instream restoration with sound federal land management.
- Emphasize sustainable management, with broad resource benefits.
- Implement large, watershed-level projects.
- Convey a history of Trout Unlimited interest and involvement.
- Include active local partners and cooperators.
- Included education of the community and general public about the project and watershed.
- Meet the need for challenge grant funds.

Trout Unlimited chapters are encouraged to seek partnerships with the Bureau of Land Management and USDA Forest Service for watershed-level projects that meet Bring Back the Natives program criteria.

[For more information, contact David A. Nolte, TU/Bring Back the Natives Program Coordinator, 6322 N.W. Atkinson Ave., Redmond, OR 97756; Voice and FAX: (503) 548-FISH; Phone: (503) 923-3344); FAX: (503) 447-8065.

News From the States and Localities, Where the Action Is

New Yorkers Lend State's Waters a Helping Hand

From the vast waters of Lake Erie to the beaches of Staten Island, from Adirondack Mountain streams to the busy Manhattan riverfront — all across the state, New Yorkers were cleaning creeks, stenciling storm drains, touring water treatment plants, monitoring rivers, exploring wetlands, taste-testing drinking water — you name it. If it was wet, New Yorkers were doing it. Why were they doing it? To celebrate the state's ninth annual Water Week, May 3-8.

The statewide celebration's theme was "Lend a Helping Hand to New York's Waters," and it invited state residents to become active stewards of the state's many and varied waters. Scores of towns and counties planned educational, stewardship, and celebratory activities, ranging from a shad festival in Kingston to a symposium in Melville, and a creek cleanup and tree planting in Eagle Mills. Sponsors of the events ranged from EPA Region 2 to local entities like the Wading River Civic Association.

A packet of educational materials emphasizing the watershed concept was sent to 25,000 educators, county extension offices, planning boards, civic and environmental groups, scouting organizations, legislators, municipal officials, concerned individuals, and county Water Quality Coordinating Committees across the state.

A brochure called "Clean Water...A Community Commitment to Protecting New York's Watersheds" brought watershed protection down to the local and individual levels, giving suggestions on preventing nonpoint source pollution.

The packet also contained the "Water Week Bulletin," which described the recently completed water quality strategies in most of New York's counties. Other brochures and booklets listed stewardship groups in the state, gave valuable ideas for participating in local government, and outlined classroom activities.

Accompanying the materials was a letter from Commissioner Thomas Jorling of New York's Department of Environmental Conservation. In it, he explained, "We all live in a watershed; our individual and group actions that affect air and land will inevitably affect the water." In the first week of May this year, New Yorkers all over the state learned how to make those actions positive ones.

[For more information, contact the Public Participation Section, Division of Water, Dept. of Environmental Conservation, 50 Wolf Rd., Albany, NY 12233-3501. Phone: (518) 457-0669.

In Montana, Local Water Quality Districts Make A Splash

EDITOR'S NOTE: This story originally appeared in the spring 1993 issue of *The Water Column*, the newsletter of the Montana Dept. of Health & Environmental Sciences, Water Quality Bureau.

Two of the most important issues of the 1990s are water quality and the recession. During 1992, the "Year of Clean Water," people have focused on the need to protect this most precious resource. At the same time, governments at all levels are faced with recession realities — a declining tax base and increased costs.

Is it possible to protect water quality and turn the economy around? Yes. Sound economic development in a vibrant, growing community depends on a clean supply of water. The dilemma is how to safeguard high-quality water when the coffer is empty.

In Montana, creating a local water quality district is one way to meet both challenges. In the 1991 Montana Legislature, Senate bill 136 was passed to allow counties to set up districts to protect, maintain, and improve water quality. Each district is authorized to set fees to achieve its objectives.

In Montana, Local Water Quality Districts Make A Splash (continued)

The Lewis and Clark county commissioners initiated the first local water quality district encompassing the Helena Valley watershed in February 1992. It was established after four months of public discussion. The city councils of Helena and East Helena passed resolutions to join the proposed district.

A 30-day protest period in March allowed the public to register objections to the district. Meetings were held with many local groups to explain the district and its fee structure. The *Independent Record* carried a lively discussion on the issues with arguments for and against the district. Each person to be assessed a fee received a postcard telling how to register a protest. If 20 percent of the affected public protests the district, the county commission must hold a referendum election to allow the voters to approve or disapprove the district. By April, fewer than that had registered a protest. The county commission held a public hearing. After hearing the views of the public, the commission voted to create the district.

The first order of business was to appoint a board of directors to oversee the district. The board consists of a county commissioner, and a member from Helena and one from East Helena. It also includes a member from the city/county board of health, another from the Lewis and Clark Conservation District, and interested citizens.

The board designs the program and activities of the district and submits them for approval to the Montana Board of Health and Environmental Sciences. This assures there will be no duplication of services between state and local programs. It also allows the district to request authorization to enforce certain aspects of the Montana Water Quality Act.

The Lewis and Clark County Water Quality Protection District has adopted a comprehensive program that it calls CAP — Clean Aquifer Program. This program includes water quality monitoring, toxic/hazardous material spill remediation, stormwater drainage inventory, and wellhead protection. It also will provide a used motor oil collection center and an education program for pesticide use reduction and household hazardous waste disposal.

[For more information on Montana's local water quality districts, contact Carole Mackin, Environmental Specialist, Water Quality Bureau, Cogswell Building, 1400 Broadway, Helena, MT 59620. Phone: (406) 444-2406.]

News on the Coastal Nonpoint Pollution Control Program

EPA and NOAA Begin Outreach Effort on Coastal Nonpoint Programs

EDITOR'S NOTE: *News-Notes* is continuing the series of articles on the Coastal Nonpoint Control Programs required by section 6217 of Coastal Zone Act Reauthorization Amendments of 1990 (see *News Notes* #28 April 1993 for a description of the program and the guidance documents available from EPA and NOAA).

EPA and NOAA kicked off their outreach effort on Coastal Nonpoint Pollution Control Program implementation in May with the first in a series of regional workshops for the 29 coastal states and territories developing coastal nonpoint programs. These workshops focus on the requirements of section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). They are designed to bring together state water quality and coastal zone management agencies as well as cooperating state agencies such as state agriculture and forestry departments. EPA and NOAA have scheduled eight regional meetings this summer throughout the United States.

The initial workshops, conducted in Virginia and Connecticut, provided states with their first opportunity since the release of the guidance documents in January (see *News-Notes* #27 March 1993) to give NOAA and EPA direct feedback on issues and concerns. Several common concerns were voiced by the states. First were concerns about the lack of funding provided by Congress to support development and implementation of state coastal nonpoint programs. Section 6217 authorizes NOAA to provide funds to states to develop coastal nonpoint programs. The authorizations in the law provide for $6 million in FY 92, increasing to $12 million for each fiscal year from 1993 through 1995. Actual appropriations for FY 92 and FY 93 have been only $2 million (to be distributed among all 29 states). Early budget projections for FY 94 suggest that level of funding will again be provided.

EPA and NOAA Begin Outreach Effort on Coastal Nonpoint Programs (continued)

States also raised concerns about how the new coastal nonpoint programs would relate to states' existing efforts to control nonpoint pollution and manage coastal resources. NOAA and EPA expect states to rely heavily on existing efforts to meet the requirements of 6217 and hope to identify and resolve potential conflicts with ongoing efforts throughout the program development process.

Another area of concern for states is the geographic scope of their coastal nonpoint program. The statute requires that NOAA, in consultation with EPA, review existing coastal zone boundaries and evaluate whether they extend inland to the extent necessary to control the land and water uses that have a significant impact on coastal waters. NOAA provided boundary recommendations to the coastal states on March 31, 1993 (see the April 7, 1993 *Federal Register* for notice of this action). These recommendations maintain a basic recommendation for coastal watersheds as outlined in the *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance* issued in January 1993. Where data indicated significant indicators on nonpoint source pollution above the coastal watershed boundary, NOAA recommended that states look beyond the coastal watershed boundary in determining the appropriate 6217 management area.

While a watershed boundary provides the most logical geographic unit for dealing with nonpoint source pollution, it does not always coincide with political jurisdictions or other areas that have been delineated for environmental programs. States with existing environmental laws that apply only to a portion of the state face the difficult task of determining how to network those laws into their coastal nonpoint programs or extend the coverage to adequately address the entire 6217 management area. Final determinations on the geographic scope of states' coastal nonpoint programs will be made as a part of the program development and approval process.

NOAA and EPA are continuing to work toward improving technical assistance to states in the development of their coastal programs. Prior to beginning the state workshops, NOAA and EPA conducted a briefing for other federal agencies such as the U.S. Department of Agriculture, U.S. Fish and Wildlife Service, and U.S. Geological Survey. The briefing outlined the CZARA outreach strategy and enlisted the support of these agencies in assisting states. This federal agency coordination will be an ongoing effort of NOAA and EPA. NOAA and EPA are planning additional workshops later this year for states and other interested parties. These workshops will focus on specific technical issues associated with implementing management measures to control coastal nonpoint pollution.

[For more information, contact Stuart Tuller at U.S. EPA, NPS Control Branch (WH-553), 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-7112. Or contact Marcella Jansen at NOAA, 1305 East-West Highway, 11th floor, Silver Spring, MD 20910. Phone: (202) 606-4181.]

Notes on the Agricultural Environment

Revised Soil Analysis Handbook an Aid in Nutrient Management

Both voluntary and regulatory programs for agricultural nonpoint source control are depending more and more on nutrient management. For example, Iowa has established a minimum level of nutrient and pesticide management for farms located in the critical treatment areas of projects cost-shared with 319 funds. And Pennsylvania recently passed a law that will require many farmers to fashion nutrient management plans (See article on page 20.).

As nutrient management programs are established, more farmers and growers are coming to rely on soil test results. Soil testing is a must to ensure that management plans are environmentally and economically effective. According to the Council on Soil Testing and Plant Analysis' new edition of its laboratory methods handbook, "Increased interest in soil testing is due in part to the cost of fertilizer materials and to the desire . . . to be environmentally correct in their use of agrichemicals."

To meet the need for reliable and consistent test results, the Council has completely revised its manual, *Reference Methods for Soil Analysis*. The new edition emphasizes quality assurance, having added an entire new section on that topic. In doing so, it anticipates laboratory accreditation, a national program being developed to improve analytical data quality for fine-tuning the management of nutrients in crop production and environmental quality.

Revised Soil Analysis Handbook an Aid in Nutrient Management (continued)

Last issued in 1980, the new 210-page manual describes 31 procedures in common use in the United States for determining soil fertility. Environmental concerns prompted the addition of new sections on soil field sampling, nitrate, heavy metals, and a method for estimating organic matter that does not use dichromate.

Reference Methods for Soil Analysis may be ordered from the Council on Soil Testing & Plant Analysis, Georgia University Station, P.O. Box 2007, Athens, GA 30612-0007. The cost is $25.00.

[For additional information, contact: J. Benton Jones, Jr., Secretary-Treasurer, Council on Soil Testing and Plant Analysis, Georgia University Station, P.O. Box 2007, Athens, GA 30612-0007. Phone: (706) 546-0425, FAX (706)548-4891.]

Landmark Pennsylvania Law Mandates Nutrient Management

Pennsylvania has passed a first-of-its-kind law to stem the flow of nutrients into state waters and the Chesapeake Bay. Signed by Governor Robert P. Casey on May 20, the Nutrient Management Act links livestock density to mandatory nutrient management. The law represents six years of debate, culminating in a hard-won consensus among environmental and agricultural interests.

"From the start, various interests were brought around the table," explained Paul Swartz of the Susquehanna River Basin Commission. "Bringing together representatives of government, agriculture, and environmental groups made the process more difficult, but the end result was the cooperation needed for passage and implementation."

The Act's primary purpose is to

> *establish criteria, nutrient management planning requirements, and an implementation schedule for the application of nutrient management measures on certain agricultural operations which generate or utilize animal manure.*

Under the Act, farms with more than 2,000 pounds of livestock or poultry per acre are required to develop and carry out approved nutrient management plans. About 8,000 to 10,000 existing beef, dairy, hog, poultry, and horse farms in Pennsylvania meet the animal density criteria.

"We need to be doing nutrient management bay-wide on any kind of acreage on which fertilizer is applied. This is an absolutely wonderful start in the right direction," noted Frances Flanigan, executive director of the Alliance for the Chesapeake Bay. "Nutrient management goes a tremendously long way toward addressing the bay's problems in a cost-effective way," she added.

Ninety percent of the fresh water streaming into the upper bay comes from Pennsylvania's Susquehanna River, and agricultural runoff is the largest source of nutrients in the river. Under the Chesapeake Bay Agreement with Maryland and Virginia, Pennsylvania has pledged to reduce nitrogen flow into the bay by nearly 20 million pounds per year.

The Pennsylvania State Conservation Commission, in conjunction with the state environmental and agriculture departments, has two years to promulgate regulations to implement the law and set minimum standards for nutrient management plans. During this period, the commission must identify best management practices and procedures for determining nutrient application rates. The aims are to balance nitrogen input from manure or chemical fertilizer with crop needs and minimize runoff of excess nutrients.

The law establishes an advisory group of 15 members to review the commission's regulations. The advisory group will consist of:

- five farmers,
- one feed industry representative,
- one commercial agricultural lender,
- one fertilizer industry representative,
- one local government representative,
- one academic agronomist or plant scientist,
- one veterinary nutritionist,

Landmark Pennsylvania Law Mandates Nutrient Management (continued)

- one representative of environmental groups,
- two citizens, and
- one hydrologist.

"As a first order of business, the State Conservation Commission is accepting nominations for the Nutrient Advisory Board," said Conservation Commission Executive Secretary Mike Krempasky.

Also established under the law is a program to certify nutrient management specialists to develop management plans. This program may shift how some technical services are provided to farmers. Government agencies that previously provided free services to farmers will now take on the role of reviewing and approving plans, although the development of plans will generally be in the hands of individual farmers or private sector professionals who have been tested under the state certification program. Local conservation districts or the State Conservation Commission will have the responsibility of plan review and approval.

Farmers must submit their nutrient management plans for existing farms within one year after regulations are promulgated and must fully implement them within three years of approval. Reviewers have 90 days to approve, modify, or deny plans.

Under the law the commission will offer various grants and loans to farmers for putting plans into action. The Act states, however, that

> *The three-year implementation schedule shall be extended . . . two years for substantial individual capital improvements required under an approved plan . . . if the owner or operator demonstrates that the cost . . . cannot be financed through available funding mechanisms; and . . . $2 million or more has not been appropriated for grants and loans. . . .*

The commission must also develop educational and technical assistance programs to accompany the regulations. Swartz pointed out that the law is a complement to the educational and voluntary path that the state has followed up to now. "The bill is significant in being a regulatory approach to agricultural nonpoint source pollution, but this law doesn't *replace* education with regulation; it *builds on* the voluntary framework of the Chesapeake Bay Program in the state," he said.

In addition to regulating farm practices, the Act also directs the Department of Environmental Resources to evaluate the water quality impacts of pollution from storm water, septic systems, wells, nonagricultural fertilizer use, and atmospheric deposition.

The nutrient management bill was sponsored by state Rep. Jeffrey Coy, who said, "[The law] is an important part of Pennsylvania's environmental future and the future of surrounding states and the Chesapeake Bay."

The U.S. Environmental Protection Agency applauded the law. William Matuszeski, director of EPA's Chesapeake Bay Program said, "I hope it's the first of...a new generation of legislation to deal with what is emerging as a more and more important problem." And Hank Zygmunt, EPA Region 3's nonpoint source coordinator commented, "The newly passed nutrient management law strongly complements Pennsylvania's Nonpoint Source Management Program. Pennsylvania's NPS program will surely benefit by including this law, which will set standards for nutrient management plans."

Appropriately, the formal signing ceremony on June 1 took place on the Kopp family farm in Dauphin County and included a tour of conservation practices used on the 100-cow dairy operation. The Kopps explained their nutrient management plan and showed visitors the farm's manure storage facility and terraced fields.

[For more information, contact Mike Krempasky, Executive Secretary, Pennsylvania State Conservation Commission, P.O. Box 8555, 400 Market St., Harrisburg, PA 17105-8555. Phone: (717) 787-5267.]

North Carolina Adopts Nondischarge Rule for Animal Waste Management Systems

The North Carolina Department of Environment, Health and Natural Resources, Division of Environmental Management (DEM) has usually invoked water quality regulations in response to citizen complaints about water quality problems after degradation has already occurred. DEM now believes a more proactive mechanism is needed to help farmers plan and operate animal waste management systems to protect surface and groundwater quality before problems occur.

North Carolina Adopts Nondischarge Rule for Animal Waste Management Systems (continued)

On December 10, 1992, North Carolina's Environmental Management Commission adopted a water quality rule that governs animal waste management in the state. The goal of the rule is for all animal management operations (regardless of size) not to discharge into the surface waters of the state. The rule allows animal waste management systems to be deemed permitted if certain minimum criteria are met. In addition, feedlots with more than 100 head of cattle, 75 horses, 250 swine, 1,000 sheep, or 30,000 birds must meet special conditions in order to be deemed permitted. This means that if the criteria or conditions are met and no waste is discharged to surface waters, then an individual permit is not required from DEM.

As of February 1, existing animal waste management systems and new or expanded animal waste management systems constructed between February 1 and December 31, 1993 must do the following:

1) register with DEM by December 31, 1993, and

2) submit a certification form signed by the owner and a state-designated technical specialist to DEM by December 31, 1997. The certification verifies that the animal waste management system has been approved as a nondischarging system and that the minimum operation and maintenance standards can be met.

New or expanded feedlots constructed after December 31, 1993, must submit a signed certification form to DEM before the animals are stocked. This certification indicates that the minimum design and construction standards for the waste management system have been met and that the operation and maintenance standards can be met for a nondischarging system. The standards and specifications are based on those used by the USDA Soil Conservation Service and the North Carolina Soil and Water Conservation Commission.

Facilities that fail to submit the registration and certification forms on time or fail to follow an approved plan must obtain an individual permit from DEM and are subject to appropriate civil or criminal penalties.

[For more information, contact David Harding, NC Division of Environmental Management, P.O. Box 29535, Raleigh, NC 27626-0535. Phone: (919) 733-5083. FAX: (919) 733-9919.]

EPA Region VII To Hold Animal Nutrient Workshops For Hog Producers

EDITOR'S NOTE: Buck Burch is the SCS Liaison to EPA Region VII and the editor of a new newsletter, *The Splash*, which offers information on water quality issues in Iowa, Kansas, Missouri, and Nebraska. Congratulations, Buck, on this article on hog producers and nutrient management of interest to *News-Notes* readers.

Animal nutrient workshops are being scheduled in each state throughout EPA's Region VII because of the increasing emphasis on the handling of animal nutrients and water quality concerns. Program content is directed to hog producers, but anyone interested in the swine industry is welcome to attend. Program topics include: how the federal Clean Water Act affects pork producers; how livestock waste management affects the producer; individual state water quality regulation; design regulations; economics of financing new and existing facilities; technical assistance; cost-share programs; implementing and operating a waste management system; public relations, and livestock nutrient management.

Those involved in formulating individual state programs include the National Pork Producers Council (NPPC), the State Pork Producers Associations, USDA Soil Conservation Service and USDA Agricultural Stabilization and Conservation Service, state departments of natural resources or environment, U.S. EPA, farm organizations, state departments of agriculture, and university extension services.

Earl Dotson, director of producer education for NPPC, Des Moines, Iowa ([515] 223-2600) and Buck Burch, SCS/EPA liaison, Kansas City, Kansas ([913] 551-7422), are coordinating the meetings on a regional basis. Meetings in Missouri began in March and will continue in all the states in the region throughout 1993.

[For more information, contact Buck Burch, SCS Liaison, U.S. EPA, Planning and Evaluation Section, 726 Minnesota Ave., Kansas City, KS 66101. Phone: (913) 551-7422.]

Reauthorizing the Clean Water Act

Clean Water Act May Target Agriculture, Reports Upper Midwest Conference

EDITOR'S NOTE: This article appeared in the April 1993 issue of *Keeping Current*, the water resources programs newsletter of the University of Wisconsin Cooperative Extension Service. See also the next story "Agricultural Policy and Water Quality: The National Perspective," which appeared in the same issue of *Keeping Current*.

Don't expect movement any time soon on reauthorization of the Federal Water Pollution Control Act (Clean Water Act), but when movement does occur agriculture will be a prominent topic of debate. That was the message of Susan Offutt, Executive Director of the Board on Agriculture, National Academy of Sciences. Offutt spoke March 17 at the LaCrosse, Wisconsin, conference, *Rural Nonpoint Source Pollution in the Upper Midwest.* Speaking before a crowd of about 300 conference attendees from Wisconsin, Minnesota, Iowa, and Illinois, Offutt predicted that it will be at least a year before Congress will engage in major debate on the act.

The CWA provides for control of point sources of pollution through a permit program based on treatment and controlled release of effluent, and a nonpoint source program based on a prevention through land management prescriptions or Best Management Practices.

Offutt said that when the debate heats up over nonpoint source pollution, agricuture will be scrutinized. Offutt said that EPA reports indicate 60 percent of the nation's threatened surface waters are affected by farming practices. She added, "Although urban development, marinas, dam building, and the like contribute to nonpoint source pollution, agriculture is seen by many people as the most significant source; so it's not a question of whether agriculture will be singled out — but how."

Offutt suggested three possible outcomes for the reauthorization of the Clean Water Act. The first would be an extension of the current legislation with some enhancement. If that happens, Offutt predicted it would mean the continuation of financial help for farmers in various cost-sharing programs like the Conservation Reserve Program. This option, according to Offutt, is not likely, due to the pressure to reduce the cost of agricultural programs. The second reauthorization possibility would be extending Coastal Zone Management (CZM) legislative provisions inland. Extending CZM would encompass not just lands near or adjacent to the Great Lakes, but inland to cover all lakes, rivers, or other bodies of water. Finally, Offutt's third option for CWA reauthorization would be to target certain groups or geographic areas. In this scenario, programs would be largely volunteer with some regulatory provisions.

The three-day conference in La Crosse also featured a number of speakers discussing local program successes. Topics included rural/farm management, riparian land management approaches, lake management, models for local involvement, and ways to build public/private partnerships. The Wisconsin Priority Watershed Program was discussed as part of a special panel featuring DNR nonpoint Section Chief Rebecca Wallace and Department of Agriculture, Trade and Consumer Protection unit leader Keith Foye. Wallace and Foye described the successes and concerns of the Wisconsin model for nonpoint source pollution abatement, which focussed on state support of local efforts, and the interaction between state government, local county offices, and the landowner.

Agricultural Policy and Water Quality: The National Perspective

At the meeting on March 15 - 16, the pending debate over reauthorization of the Clean Water Act and the 1995 Farm Bill set the stage for a national forum called "The Next Generation of U.S. Agricultural Conservation Policy." Over 500 individuals, agricultural leaders, and special interest group representatives attended. The Kansas City event featured discussions on water quality programs, trends in agricultural research, natural resources limits, and perspectives on farm policy and the environment.

Water quality protection via agriculture policy in the United States is not a minor expenditure. Currently, [a significant amount] of the $40 billion paid through incentive payments in various agricultural programs is targeted at protecting water resources. Robert Wayland, Director of the

Agricultural Policy and Water Quality: The National Perspective (continued)

EPA's Office of Wetlands, Oceans, and Watersheds expects water quality and resource protection to be the subject of numerous debates during the next year as Congress considers reauthorization of the CWA. Speaking at the Kansas City meeting, Wayland said, "Look for agriculture to be included in the debate." Wayland stated that past efforts have protected water quality, but more needs to be done to protect wetlands, estuaries, and biotic diversity in the natural community.

Not only will farmers see future changes in policy, but policy makers will feel the impact of reorganization. Tom Hebert, assistant to the Senate Committee on Agriculture, Nutrition, and Forestry said, "There's not a day that goes by that we don't discuss reorganization of USDA." A great deal of discussion has focused on creating a farm service agency where a number of USDA agencies would be brought together. Hebert pointed out, "There's a feeling on the Hill that there is a lack of coordination on issues that effect the farmer, especially at the national level."

Change won't come easily for USDA. Both Hebert and Wayland described how a new direction will require fundamental changes in laws that govern agriculture, many of which have evolved over the past 60 years.

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

In Wisconsin, Focus Groups Produce Straight Talk on Nonpoint Source Education

EDITOR'S NOTE: This article appeared in *Keeping Current*, published 10 times a year by the University of Wisconsin Extension. Thank you, Tom Lamm, editor.

Steve Bennett and Dotty Juengst recently joined the ranks of marketers, politicians, and public agencies who rely on focus groups as a source of information in planning their programs. In October 1992, Steve and Dotty, who staff the Northeast Wisconsin Water Quality Education Office, organized a set of four groups to get citizen perceptions about nonpoint source pollution and their attitudes toward current education efforts. Three of the focus groups included local residents in three different age groups, while the fourth involved professionals in communications, the media, and related fields. Steve and Dotty were assisted by a professional marketing agency in Green Bay. The following are some of the major recommendations offered by focus group participants:

- Avoid using the term "nonpoint source pollution" in a public education campaign. Focus group participants thought the term was too complicated and hard to understand. Most of them had never heard of the term in spite of its use in Wisconsin by water quality managers for the past 15 years. Media and professional communications participants didn't like the term and preferred not to use it. However, most participants could relate to the term "runoff."
- Find creative ways to engage youth and school children. To solve our nonpoint source pollution problems, long-term shifts will be necessary in citizens' ethics and ways of thinking. Some of these changes take a long time and can be initiated with children in their formative years. In addition, participants noted that they feel barraged by massive amounts of junk mail and information, most of which they ignore. However, when children come home from school with information that their parents can read, or when they can help with class assignments, the parents become involved too.

Nonpoint source pollution education needs a long-term strategy and a long-term campaign. Participants used examples such as smoking, drunk driving, and recycling to illustrate the long-term nature of public education campaigns. With regard to a nonpoint source pollution education campaign, participants had several suggestions.

- First of all, they suggested that a commitment of several years be made to a campaign.
- Second, they felt that the campaign should include work with school children and youth groups and the use of different media sources.
- They also felt that the broad topic of nonpoint source pollution needed to be broken into small, comprehensible messages. These messages should be repeated in different forms over an extended period of time.

- Finally, they felt that a successful campaign had to personally engage people in dealing with the problem of nonpoint source pollution. This could be accomplished by providing information on reducing runoff pollution through proper yard care practices; and by providing opportunities for involvement in stream clean-ups, water testing programs, and other activities.

[For more information, contact Steve Bennett, Northeast Water Quality Education Specialist, ES 317, UW, Green Bay, WI 54311-7001. Phone: (414) 465-2317.]

Stream Team Day Camp Guidebooks Produced

by Wendy Burt, City of Olympia, Wash.

Spice up your fun and games this spring and summer. See if your students can do the Puget Sound Scramble. Challenge your Scout group to the Water Cycle Relay. And don't forget to check out Backyard Bingo. That's right, *Forest, Stream, and Sound: a Guide to Conducting Water Quality Camps for Children and Families* is hot off the press. Whether you're looking for a new theme or format to liven up your own program, or are just searching for activities to fit a specific place or group size, the activities matrix can help you out.

This how-to guidebook offers a comprehensive view of the how, what, where, when, and why for the city of Olympia's innovative Stream Team day camps and family fun days. Held last summer at Priest Point and Watershed Parks, the city sponsored two three-day environmental education camps with a water quality focus for eight- to 12-year-olds. The camp was fully enrolled with 30 campers attending each session. The response was so enthusiastic that the city will be holding two camp sessions again this June. The camps were funded through the city of Olympia's Storm and Surface Water Utility and the Puget Sound Water Quality Authority's Public Involvement and Education Project Fund.

Written by the camp's instructors, Eva Shinagel and Jana Dean, *Forest, Stream, and Sound* provides activity descriptions, camp schedules, and many creative and fun ideas for how to run low cost, high enthusiasm camp activities.

Stream Team Workshops and Videos

The Stream Team program is also featuring six fun and informative workshops in 1993. Four two-hour workshops have been held so far: Stream Team Program orientation, lake ecology, common sense gardening, and a session entitled "Mayflies to Midges: Macroinvertebrates of Streams," which combined monitoring information with a fly-tying demonstration.

Still ahead this year are workshops on wetland ecology (August 19) and urban wildlife (October 14).

The Stream Team has produced a video about Stream Team efforts in the community called *The Future Belongs to Us*. They have also taped previous workshops: Floods and Flows; Landscaping for Healthy Streams; Wetlands, Wildlife and You; Bugs and Water Quality; and Fishwatching.

Stream Team efforts in Lacey and Thurston County are partially funded by grants from the Washington Department of Ecology Centennial Clean Water Fund. In the city of Olympia, the Stream Team is funded with revenue from the city's Storm and Surface Water Utility.

[For more information on the Stream Team, write Wendy Burt, Stream Team Coordinator, City of Olympia, Public Works Department, Water Resources Program, P.O. Box 1967, Olympia, WA 98507.]

Crooked River Watershed (Ore.) Cooperative Education Program

by David A.Nolte, Redmond, Ore.

A watershed education program currently in a startup phase located in Crook County, a rural county in central Oregon, proposes to educate students and citizens about the Crooked River watershed through development of public education partnerships between the Crook County School District and private businesses, landowners, city, county, state, and federal agencies; through changes in land use management, awareness of watershed issues and riparian/upland restoration projects designed to support the educational program which, in turn, will enhance the watershed at a basin level over a long-term period.

Mission Statement

The program will provide an educational curriculum for the Crook County School District that encompasses classroom and field studies, and work experience for all students and yearly,

Crooked River Watershed (Ore.) Cooperative Education Program (continued)

renewable, watershed rehabilitation projects designed to enhance the Crooked River basin and increase public awareness of the watershed's importance.

The Crooked River Watershed Cooperative Education Program (CRWCEP) is designed to become self-sustaining, initially to reach grades seven to 12 while slowly infusing curricula into elementary grade levels. It is expected to continue for a minimum of 10 years. A principal objective of the CRWCEP is to bring professionals from agency, business, and the local community into the classroom to expose students to "hands-on" real-world learning situations relating to watershed management, natural resources, and holistic resource management principles. This program has both technical and financial support of the Bureau of Land Management, USDA Forest Service, Oregon Department of Fish and Wildlife (ODFW), Crook County School District, Oregon State University Extension Service, Crook County Soil and Water Conservation District, local businesses, private citizens, and Trout Unlimited of Oregon. A matching grant from the National Fish and Wildlife Foundation (NF&WF) is providing startup funding of $24,100 to match 1:1 with any non-federal contribution. Additional matching grant monies for FY 93 include Phillips Environmental Partnership Grant (Phillips Petroleum Corporation) and an Embrace-A-Stream grant from Trout Unlimited.

FY 93 Major Subtasks

■ ***Williams Prairie Subtask*** — Twenty-two thousand dollars has been allocated by the Ochoco National Forest for this subtask (Challenge Cost Share). Currently in NEPA process with forest ID team established, looking at alternatives. We expect project work to begin in July. Objectives of this subtask focus on the restoration of a wet-meadow complex, North Fork, Crooked River.

■ ***Ochoco Creek Instream Classroom Subtask*** — The focus of this subtask is to utilize Ochoco Creek as it flows through the city of Prineville as a convenient living laboratory for students at Crook County Middle School (CCMS) and Crook County High School (CCHS). The students will be responsible for developing future management plans, implementation of rehabilitation projects and monitoring of projects and water quality. The effort required to prepare curricula and lesson plans will be documented and the processes will serve as a model for further curriculum revisions to support natural resource systems.

■ ***City of Prineville Soil Stabilization Subtask*** — FY 93 tasks include planning, soil testing, and landscaping plans.

This project involves Cook County High School (CCHS) students with the rehabilitation and enhancement of a steep-cut hillside. Besides working with the City of Prineville and Les Schwab Corporation, CRWCEP will be seeking other private businesses and agencies for monitoring support, financial support, or technical advice. Preliminary prepatory work and planning will be done by CCHS students.

■ ***Ochoco Creek Habitat Improvement*** (1992-93 in progress) CCHS and Future Farmers of America chapter, and vocational students are responsible for designing a naturescaping plan, bank stabilization plantings, tree plantings, interpretative signs, barrier free fishing platform and composter design & construction to support an ongoing project on Ochoco Creek.

■ ***Bureau of Reclamation/CCHS Vandalism Plan*** (FY 94 startup) — A Challenge Cost-Share grant to CCHS involving Advanced Placement English students to develop an education outreach plan for CCHS and for the community to address vandalism in and around the Prineville Reservoir area.

■ ***Watershed Education Curriculum Development*** (FY 93 through 2003). The Crook County School District (CCSD) staff with CRWCEP education committee guidance will be developing curricula for watershed education that follows Oregon 21st Century Education Act guidelines, which provide for Certificates of Advanced Mastery in at least six broad occupational categories of academic professional technical endorsements including Natural Resource Systems. CRWCEP plans to assist CCSD in becoming a "center of excellence" in Natural Resource Systems. The watershed education program will provide students with life skills and hands-on work related experiences.

1994 Potential Projects

■ *City of Prineville Wastewater Treatment Facility*— A partnership with the city of Prineville Wastewater Treatment Facility. This facility, still under construction, has received EPA money

for construction of secondary wastewater treatment facilities tied to the operation of a municipal golf course. The secondary wastewater is being used for water hazards and golf course irrigation. This facility would provide an excellent training laboratory for students in the CRWCEP program.

[For more information, contact David A. Nolte, 6322 N.W. Atkinson Ave., Redmond, OR 97756. Phone: (503) 923-3344. FAX (503) 447-8-065.]

NPS Electronic Bulletin Board (BBS) News

EDITOR'S NOTE: This portion of *News-Notes* is prepared by Elaine Bloom, Tetra Tech, for the benefit of the ever-increasing numbers of *News-Notes* readers who are regular users of U.S. EPA's *NPS BBS*. Tetra Tech is the contractor for the operation and content of the *NPS BBS*.

Nonpoint Source Electronic Bulletin Board System. The *NPS BBS*, through the user's personal computer, provides timely, relevant NPS information, a nationwide forum for open discussion, and the ability to exchange computer text and program files.

Special Interest Group Forums (SIGs or mini-bulletin boards) are dedicated to specific topics and have all of the features of the main *BBS*. Currently, the seven SIGs on the *NPS BBS* are: Watershed Restoration, Agriculture, Fish Consumption Risk Management, TMDLs, Waterbody System Support, NPS Research, and Volunteer Monitoring.

To access the *NPS BBS*, you will need • A PC or terminal • Telecommunications software (such as Crosstalk or ProComm) • A modem (1200, 2400 or 9600 baud) • A phone line.

The *NPS BBS* phone number is (301) 589-0205. Parameters are N-8-1.

An *NPS BBS* User's Manual is available: *U.S. EPA Nonpoint Source Information Exchange Computer Bulletin Board System – User's Manual* (Publication Number EPA 503/8-92/002.) Copies may be orderd by mail or FAX from NCEPI, 11029 Kenwood Road, Bldg 5, Cincinnati, OH 45242. FAX: (513) 891-6685. There is no cost. (Be sure to include both the title and the publication number in orders sent to NCEPI.)

Volunteer Monitoring Special Interest Group Forum Opens

EPA's Volunteer Monitoring Special Interest Group (VOLMON SIG) Forum is up and open for business. The VOLMON SIG provides the growing volunteer monitoring community with:

- up-to-date news items (including upcoming meetings, new publications, new programs, new discoveries . . . you name it),
- special articles on volunteer monitoring topics, and
- resource material such as a bibliography and a list of state volunteer monitoring contacts.

But perhaps most important, this SIG was developed to encourage the free flow of ideas among those engaged in volunteer monitoring nationwide. The target audience ranges from volunteer monitoring program managers to actual volunteers and folks who just want to know more about volunteer monitoring.

VOLMON SIG is managed by a program coordinator and a technical monitor.

The program coordinator is Alice Mayio, the Volunteer Monitoring Coordinator in EPA's Assessment and Watershed Protection Division, Office of Water. She will field questions and comments about EPA's volunteer monitoring program or suggestions for SIG features.

The SIG technical monitor is responsible for the technical operation of the SIG and for keeping bulletins, files, and databases updated. The technical monitor can address technical questions about the operation of the SIG (e.g., how to download a file). She or he will also be updating files, bulletins, and databases, and generally making sure things go smoothly on the SIG.

Please take advantage of the SIG's features; browse the messages, jump in when you have an answer to someone else's query, ask your own questions, and investigate our news bulletins, files, and database.

The SIG contains two online searchable databases:

- The Programs Database contains information about volunteer monitoring programs that are managed or sponsored by state agencies.

- The Documents Database contains references for documents of value to volunteer monitors.

Enjoy the VOLMON SIG, and tell others about the it. The more people use it, the better it will be. Think of this as an opportunity to exchange ideas and experiences with a nationwide audience of volunteer monitoring program coordinators, volunteers, academic folks, and government staff.

To access the VOLMON SIG from the *BBS's* Main Board, type JOIN at the "Main Board Command?" prompt. Then choose the VOLMON SIG from the list. It's SIG number 7.

Announcements

Investigations of Inappropriate Pollutant Entries Into Stormwater Systems: A Users' Guide

This users' guide is now available from U.S. EPA's Center for Environmental Research Information (CERI) in Cincinnati, Ohio. The guide assists municipalities in identifying illicit connections to municipal stormwater systems. The location and removal of these connections is a requirement of the NPDES Stormwater Permit program administered by EPA and states.

The document was developed by the Storm and Combined Sewer Program of EPA's Risk Reduction Engineering Laboratory in Edison, NJ. It is available from CERI at no cost while supplies last. To order, contact CERI's Document Distribution Section by phone:(513) 569-7562; or FAX: (513) 569-7566; or write: U.S. EPA-CERI, Document Distribution, 26 W. Martin Luther King Dr. (G-72), Cincinnati, OH. Be sure to reference document number EPA/600/R-92/238.

Guide to Construction of Stormwater Wetlands Released

The Metropolitan Washington Council of Governments has produced a manual that presents integrated and comprehensive design criteria for the construction of stormwater wetland systems in the mid-Atlantic region. The manual, authored by Tom Schueler of the Anacostia Restoration Team (see News-Notes #21), reviews four basic design variations for stormwater wetlands and reviews factors that improve pollutant removal capability.

Design of Stormwater Wetland Systems covers

- sizing stormwater wetlands
- creating deep-water cells
- developing pondscaping plans
- reducing maintenance
- avoiding secondary environmental impacts
- enhancing wildlife habitat
- creating community amenities

The manual also includes a review of wetland performance monitoring data and a revised native plant guide for pondscaping.

[Design of Stormwater Wetland Systems: Guidelines for Creating Diverse and Effective Stormwater Wetlands in the Mid-Atlantic Region is available from the Metropolitan Washington Council of Governments, 777 North Capitol St., NE, Suite 300, Washington, DC 2002-4201 for $25. Make checks payable to MWCOG.]

Datebook

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

Meetings and Events

1993

July

7-9 — *7th Annual Watershed Conference: Citizens and Clean Water*, Springfield, MO. Contact: Watershed Committee, The Ozarks, Inc., 300 West Brower, Springfield, MO 65802-3817. (417) 866-1127. FAX: 866-1918. Sponsored by the Watershed Committee of the Ozarks, Inc.

1993

July

16-18 *1st National Youth Environment Summit: Partners for the Planet Branching Out*, Cincinnati, OH. Contact: (800) 473-0263. Hosted by 14 organizations and agencies including EPA, FFA, USDA, and Kids for a Clean Environment.

August

2-13 *Environmental Management of Water Resources Projects Seminar*, Denver, CO. Contact: American Water Foundation, 1616 17th Street, Suite 376, Denver, CO 80202. Sponsored by the American Water Foundation. Lectures and discussions will be held 8/2-8/5 in Denver and will address EIS, regulations and laws (including NEPA), multi-objective environmental planning, recreation, industrial wastewater, hazardous wastes, and public opinion/advocacy. 8/6-13 will be a study tour beginning in Las Vegas where environmental issues relating to the development and management of the Colorado River will be discussed. The tour will continue through Arizona and will feature the recently constructed Central Arizona Project. The tour will end at the Coachella Valley Water District of Southern California.

8-11 *48th Annual Meeting of the Soil and Water Conservation Society*, Fort Worth, TX. Contact: Karen Howe. Phone 1-800-THE SOIL. Will include North American Summit on Soil and Water Conservation.

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

12-13 *Texas Synergistic Conference on Constructed Wetlands*, Nacogdockes, TX. Contact: American Water Foundation, 1616 17th Street, Denver, CO 80202. (303) 628-5516. FAX: (303) 628-5469. Sponsored by the American Water Foundation. Co-sponsors are Pineywoods RC&D and the College of Forestry, Stephen F. Austin University.

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

15-18 *Opportunities for Agroforestry in the Temperate Zone Worldwide*, Ames, IA. Contact: Carole Seifert, Iowa State University, Continuing Education, 102 Scheman Building, Ames, IA 50011-1112. (515) 294-1400.

29-9/2 *Innovations in Ground Water Management and Effluent Use Management*, Tucson, AZ. Contact: Herbert B. Osborn, General Chairperson, 2341 S. Lazy A. Place, Tucson, AZ 85713. (602) 883-4517. American Water Resources Association 29th Annual Conference and Symposium.

September

9-11 *Western Wetlands and Riparian Areas - Public/Private Efforts in Recovery, Management, and Education*, Salt Lake City, UT. Contact: Susan Foster, Thorne Ecological Institute, 5398 Manhattan Circle, Suite 120, Boulder, CO 80303. (303) 499-3647. FAX: (303) 499-8340. Sponsored by the Thorne Institute, USEPA Region 8, CO Department of Natural Resources, MT Department of Natural Resources and Conservation, ND Water Users Association, UT Department of Wildlife Resources, and WY Game & Fish Department. Topics include: research, delineation, and inventory efforts; outreach/education;management strategies; restoration, creation, and enhancement techniques; financial incentives; regulations and policies; and partnerships for protection.

10-12 *Building an Alliance for the Future: Linking Seniors to Environmental Action*, Washington, DC. Contact: EASI, 51 Main Street, P.O. Box 368, The Plains, VA 22171. (703) 253-5821. FAX: 253-5811. Sponsored by the Environmental Alliance for Senior Involvement. This leadership conference will highlight successful programs to build on volunteer opportunities for older persons who are concerned about protecting the nation's environment.

12-17 *ICUSD '93 - 6th International Conference on Urban Storm Drainage*, Niagra Falls, Ontario, Contact: Jiri Marsalek, 6th ICUSD, National Water Research Instit., P.O. Box 5050, Burlington, Ontario, Canada, L7R 4A6. (416) 336-4899. FAX: 336-4989.

14-15 *Texas Water Commission 8th Annual Groundwater Protection Seminar*, San Antonio, TX. Contact: Brad Cross, Community Support Section, TWC, P.O. Box 13087, Austin, TX 78711-3087. Phone: (512) 475-4594. Topics: protection of groundwater, wellheads, and aquifers; resource management; changing government agency roles; and interstate and international issues.

19-21 *A New Era for the Western Public Lands*, Boulder, CO. Contact: Katherine Taylor, Campus Box 401, Boulder, CO 80309-0401. Phone: (303) 492-1288. FAX: (303) 492-1297. Will explore the changing context of public lands policy, conflicts between public values and private rights, and emerging ideas about integrated management of resources within ecosystems and watersheds. Cost $250, with discounts available for government, academics, and nonprofit groups. Sponsored by University of Colorado Natural Resources Law Center and the Law Review.

19-24 *1st International IAWPRC Conference on Diffuse (NPS) Pollution: Sources, Prevention, Impact and Abatement*, Chicago, IL. Contact: Dr. Vladimir Novotny, IAWPRC Conference, Dept.Civil & Envir. Engineering, Marquette University, 1515 West Wisconsin Ave., Milwaukee, WI 53223. (414) 288-3524. FAX: (414) 288-7082.

23-24 *4th Annual Utah Nonpoint Source Water Quality Conference*, Logan, UT. Contact: Denise Stewardson, Conference & Institute Div., Utah State University, Logan, UT 84322-5005. (801) 750-1713.

23-24 *6th Annual Symposium of the Arizona Hydrological Society: Emerging Critical Issues in Water Resources of Arizona and the Southwest*, Casa Grande, AZ. Contact: Peter Livingston, CH2M Hill, Inc., 5210 E. Williams Circle, Suite 550, Tucson, AZ 85711-4486. (602) 748-9144. FAX: (602) 748-1316.

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September

28-29 — *Symposium on Agricultural Nonpoint Sources of Contaminants: Focus on Herbicides*, Lawrence, Kansas. Contact: Larry Fergusun, U.S. EPA, 726 Minnesota Ave., Kansas City, KS 66101. Phone (913) 551-7447. Sponsored by EPA and USGS.

October

2-7 — *1993 Water Environment Federation Annual Conference*, Anaheim, CA. Contact: Maureen Novotne, WEF, Technical & Educational Serv., 601 Wythe St., Alexandria, VA 22314-1994. (703) 684-2400.

2 — *Publicizing the Management and Permitting Issues for Urban Planning and Stormwater*, Anaheim, CA. Contact: Christine McKallip, WEF, 601 Wythe Street, Alexandria, VA 22314-1994. (703) 684-2400. FAX: (703) 684-2492. Sponsored by the Water Environment Federation.

3 — *Marine Water Quality Monitoring*, Anaheim, CA. Contact: Christine McKallip, WEF, 601 Wythe Street, Alexandria, VA 22314-1994. (703) 684-2400. FAX: (703) 684-2492. Sponsored by the Water Environment Federation.

4-8 — *International Symposium on the Ecological Effects of Arctic Airborne Contaminants*, Reykjavik, Iceland. Contact: Debra Steward, Technical Resources, Inc., 3202 Tower Oaks Blvd., Suite 200, Rockville, MD 20852.

27-29 — *1993 Rocky Mountain Ground Water Conference*, Albuquerque, MN. Contact: Michael E. Campana, Dept. of Earth & Planetary Science, University of New Mexico, Albuqurque, NM 87131-1116. (505) 277-3269. FAX: (505) 277-8843.

November

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

7-10 — *NACD Urban and Community Conservation Symposium: Partnerships for Livable Communities*, Minneapolis, MN. Contact: Debra A. Bogar, NADC Northeastern Region, P.O. Box 320, Leeds, MA 01053. (413) 585-8895. FAX: (413) 585-8897. Sponsored by National Association of Conservation Districts, National Association of State Conservation Agencies, USEPA, and USDA Soil Conservation Service, Forest Service, and Extension Service. Topics include: stormwater, forestry, water quality, land use , wetlands, waste management, alliance building, and education programs and issues.

December

11-15 — *55th Midwest Fish & Wildlife Conference - New Agendas in Fish and Wildlife Management: Approaching the Next Millennium*, St. Louis, MO. Contact: Wayne Porath, MO Dept. of Conservation, 1110 S. College Avenue, Columbia, MO 65201. (314) 882-9880.

13-14 — *Integrated Resource Management and Landscape Modification for Environmental Protection*, Chicago, IL. Contact: ASAE, 2950 Niles Road, St. Joseph, MI 49085-9659. (616) 429-0300.

Calls For Papers — Deadlines

August

5 — *The International Land Reclamation and Mine Drainage Conference and the 3rd International Conference on Abatement of Acidic Drainage*, April 25-29, 1994, Pittsburgh, PA. Contact: Debbie Lowanse/Bob Kleinmann, U.S. Bureau of Mines, P.O. Box 18070, Pittsburgh, PA 15236. (412) 892-6708. FAX: 892-4067. Co-hosted by U.S. Bureau of Mines, Office of Surface Mining, U.S. EPA, and Tennessee Valley Authority. Topics: acid mine drainage prediction, chemical and biological treatment of AMD, geotechnical engineering in mined areas, mine closure/bond release, mine chemistry, mine hydrology and groundwater protection, mine soil productivity, mine subsidence, mine waste management and characterization, regulations and policy issues, reclamation of derelict/abandoned mined lands, revegetation case studies, slope stability/erosion control, wetlands on mined lands, and wildlife/habitat restoration.

September

9 — *Tenth Thematic Conference on Geologic Remote Sensing*, San Antonio, TX, May 9-12, 1994. Contact: Nancy Wallman, ERIM Conferences, P.O. Box 134001, Ann Arbor, MI 48113-4001. (313) 994-1200) ext. 3234. FAX: (313) 994-5123. Sponsored by the Environmental Research Institute of Michigan. Focuses on geologic remote sensing and GIS with special emphasis on mineral and hydrocarbon exploration, and environmental and engineering applications.

November

1 — *Responses to Changing Multiple-Use Demands: New Directions for Resources Planning and Management*, Nashville, TN, April 17, 1994. Contact: Ralph H. Brooks, General Chairperson, Tennessee Valley Authority, Water Management, Evans Bldg., Rm. 1W 141, Knoxville, TN 37902. (615) 632-6770. American Water Resources Association Annual Spring Symposium. Topics will include water use trends, water-resources forecasting, hydrologic modeling, GIS tools, water pricing policies, water allocation, water law, BMPs, environmental impact mitigation, reservoirs, and hydropower licensing.

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Nonpoint Source NEWS-NOTES is produced by the Terrene Institute under an EPA Cooperative Agreement (# 820957-01) from the Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Water, U.S. Environmental Protection Agency. Views expressed do not necessarily reflect those of EPA or the Terrene Institute. Mention of commercial products or publications does not constitute endorsement, or recommendation for use by EPA or the Terrene Institute.

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