July 1999
#58

Nonpoint Source News-Notes

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Commentary

The Making of a National Town Meeting on Sustainable Development

by James E. Murray, Director, and Josephine A. Powell, Deputy Director, Wayne County Department of Environment (Michigan)

The CWAP logo denotes articles related to action items called for in the President's Clean Water Action Plan. See News-Notes #51 and #52 for more information on the plan.

More than a year ago, the President's Council on Sustainable Development (PCSD) approached the Wayne County/City of Detroit Roundtable to discuss Detroit as the host site for the National Town Meeting for a Sustainable America. The PCSD believed that a National Town Meeting would help to launch the proposals and ideas of the President's Council throughout the country. As a forum created in 1994 to promote and enhance sustainable development initiatives in Wayne County, our Roundtable was an ideal partner for the effort. In addition, Detroit would be a great host city since it is poised at the edge of change—the city is actively redeveloping its brown field sites, attracting new businesses and residents, and reiterating its commitment to sustainability through a community sustainable development indicator project. The city had also just finished a community reinvestment visioning project that involved prioritizing sustainable development needs at the neighborhood level. Regionally, Wayne County was conducting the Rouge River National Wet Weather Demonstration Project (Rouge River Project), a working example of a locally driven watershed approach to pollution management resulting in cost effective and more rapid restoration of this severly impacted urban river.

Representatives of the PCSD toured several areas that are part of new environmental initiatives throughout the metropolitan area and met representative stakeholders from regional government, local communities, business, and community and environmental groups before they decided on Detroit as the meeting site. We were committed to serving as local hosts for the meeting, along

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National Town Meeting on Sustainable Development (continued)

with the City of Detroit and General Motors. We were later joined by the faith-based community organization MOSES (Metropolitan Organizing Strategy Enabling Strength). MOSES was created as a vehicle for local residents to advocate community-based solutions to local problems such as crime, environmental issues, urban sprawl, and the lack of recreational opportunity.

The primary objective of the National Town Meeting was to showcase examples of best management practices and sustainable programs and activities under way throughout the country. The program emphasized building individual and institutional capacity so that the best practices can be replicated elsewhere. It focused on sustainable solutions that are available today and ways that communities can take advantage of them.

We were all eager to display our sustainable development success stories at the meeting. Wayne County submitted proposals to the PCSD for several sustainable projects, including our Rouge River Project. Through the project, we are restoring the Rouge River with model sustainable policies, tools, programs and practices; initiatives to control nonpoint source pollution and combined sewer overflows; community education and involvement; habitat preservation and restoration; and the improvement of recreational spaces and opportunity in and along the Rouge River. Forty-eight communities and 1.5 million people have partnered to manage pollution and restore the Rouge River through the project. Our proposals, including the Rough River Project, were among the 150 that were accepted from the nearly 500 proposals submitted for consideration.

Sustainable development is a concept in which communities seek economic development approaches that also benefit the local environment and quality of life. Sustainable development provides a framework under which communities can use resources efficiently, create efficient infrastructures, protect and enhance the environment and quality of life, and create new businesses to strengthen their economies. Where traditional approaches can lead to congestion, sprawl, pollution, and resource overconsumption, sustainable development offers real, lasting solutions that will strengthen our future.

After a ceremonial ribbon cutting Sunday, May 2, the National Town Meeting was under way! More than 300 exhibitors demonstrated sustainability and showcased sustainable development projects. Exhibitors ranged from large corporations like General Motors, Dow Chemical, and BP Amoco to agencies like EPA, DOT, the Michigan Department of Environmental Quality, and the Local Government Commission. Projects showcasing sustainability ranged from our Rouge River Project to projects from nonprofit organizations like the National Tree Trust, the Michigan Land Use Institute, the Izaak Walton League, Focus HOPE, and the Sierra Club. Our "Lessons Learned" presentation featured participants from the diverse stakeholder groups in the Rouge River watershed that have partnered to create a comprehensive approach to addressing the challenges facing the river. With more than 140 learning sessions scheduled throughout the National Town Meeting, there were vast opportunities to discuss and promote ideas on sustainable development.

One of the most highly vaulted events at the meeting was our Rouge 2000 learning session. The session was held at the Henry Ford Museum located near the Rouge River. Ford Motor Company Chairperson William Clay Ford, Jr. spoke on some of the early environmental efforts of his grandfather Henry Ford. He then went on to describe current plans of the company to incorporate significant measures to improve the environment and, specifically, to restore downstream uses of the Rouge River. To bring about their plans, he indicated they intend to have the renowned Dean of the University of Virginia School of Architecture, William McDonough, consult with them on the billion dollar renovation and refurbishment of the historic Dearborn, Michigan, Rouge Assembly complex (built in 1919 on the Rouge River). Ford's efforts will ensure its sustainability well into the next millennium and will have a positive effect on the Rouge River, one of the most severely impacted urban rivers in Michigan.

A great deal of enthusiasm and energy for the work required to move our nation toward sustainability was exhibited at the meeting. The faith in our capacity and our commitment to do so, however, was most evidenced by 21 high school students from around the country. In a student roundtable they spoke of their own efforts in social, environmental, and economic settings to make a difference in their communities, their schools, and their work. Members of the student roundtable came from urban, suburban, and rural communities and attended public, private, and

National Town Meeting on Sustainable Development (continued)

home schools. Representative of the diversity of our ethnic and racial heritages and beneficiaries of our past (both the good and the bad), the students will be stewards and innovators of our future. They spoke of the challenges they see in their daily lives that move them to advocate for sustainability. These children had cleaned rivers, mentored their peers, built solar cars, and marched for environmental justice and equal access to green space. The students challenged us to do the work that needs to be done, to be good stewards, to make commitments to sustainability, and to make sure that we have ensured a more sustainable America by having more sustainable families.

Now that the National Town Meeting is over, we need to fashion a mechanism to nurture the partnerships that have been forged between the local, state, and federal governments through the meeting. Our challenge is to be able to capture the energy and build a network that supports the work that so many diverse and committed stakeholders are undertaking.

[For a copy of the proceedings of the National Town Meeting, contact the Global Environment and Technology Foundation at (703) 750-6401.]

Notes on the National Scene

New Legislation Seeks Solutions to Control Harmful Algal Blooms and Hypoxia

Pfiesteria, red and brown tides, and hypoxia in the Chesapeake Bay, the Gulf of Mexico, and other coastal waters are just a few of the reasons the President signed into law the Harmful Algal Blooms (HAB) and Hypoxia Research and Control Act of 1998 (HAB/Hypoxia Act or HABHRCA). Congress has authorized the Department of Commerce to develop several reports and to conduct other research, education, and monitoring related to the prevention, reduction, and control of harmful algal blooms.

The HAB/Hypoxia Act is part of the Coast Guard Authorization Act of 1998 and 1999. Also known as Title VI, the new law required the President, through the Committee on Environment and Natural Resources (CENR) of the National Science and Technology Council, to establish a Task Force to assess the ecological and economic consequences of harmful algal blooms and hypoxia. The Task Force is chaired by the National Oceanic and Atmospheric Administration's National Ocean Service, and it includes representatives from EPA, National Aeronautics and Space Administration, the National Science Foundation, the Food and Drug Administration, the National Institutes of Health, the Navy, and the Departments of Agriculture, Interior, and Justice.

Hypoxia in the Gulf of Mexico is the result of excessive nutrients transported to the Gulf by the Mississippi River, the loss of natural wetlands and vegetation along the river's banks, and the interaction of freshwater and salt water. NOAA estimates that 90 percent of the nutrient load causing the problem comes from nonpoint sources such as storm water runoff from city streets, farm runoff, and automobile exhaust fumes. Excessive nutrients nourish algae blooms that eventually die, settle to the bottom, and decompose, using up the oxygen in the deeper waters. This lack of oxygen kills shellfish and other bottom dwelling orgranisms.

The Task Force is charged with providing several reports to the President and Congress — a HAB assessment report, a national hypoxia assessment report, and an integrated assessment of hypoxia in the northern Gulf of Mexico. Completion of the national assessment reports is expected in November 1999. The hypoxia assessment for the Gulf of Mexico will build on six scientific reports produced for the CENR in conjunction with the Mississippi River/Gulf of Mexico (MR/GM) Watershed Nutrient Task Force. The MR/GM Task Force was established in December 1997 in response to the growing zone of hypoxia threatening the economic vitality of the Gulf's fisheries. (EPA, together with senior representatives from other federal, state, and tribal agencies and organizations, formed the MR/GM Task Force to study the excessive nutrient runoff to the Mississippi River Basin and to develop a strategy to combat it.) Those six scientific reports are now available for public comment. (See *News-Notes* #51 for more information on the activities of the MR/GM Task Force.)

New Legislation Seeks Solutions to Control Harmful Algal Blooms and Hypoxia (continued)

In addition, the new legislation calls for the development of an action plan that is based on the hypoxia assessment for the Gulf of Mexico and details alternatives for reducing, mitigating, and controlling hypoxia in the Gulf. The new law codifies many of the activities previously begun by the MR/GM Task Force and the CENR. The MR/GM Task Force is expected to take the lead in developing the required action plan, which must be submitted to Congress by March 2000.

[For more information on the CENR Task Force, contact Don Pryor, Office of Science and Technology Policy, Executive Office of the President, Washington, DC 20402. For more information on the MR/GM Task Force, contact Mary Belefski, U.S. EPA, Mail Code 4503F, 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-7061; fax: (202) 260-1977; e-mail belefski.mary@epa.gov. A copy of the six science reports can be downloaded from the Internet at www.nos.noaa.gov/Products/pubs_hypoxia.html or www.epa.gov/msbasin, or contact John Field, NOAA, National Center for Coastal Ocean Science, WS, 13446 SSMC4, 1305 East-West Highway, Silver Spring, MD 20910. Phone: (301) 713-3060, ext. 135; e-mail: John.Field@noaa.gov.]

Center Develops $1.1 Billion Plan to Reduce Polluted Runoff Entering Mississippi River

According to a newly proposed plan, Congress needs to create a 10-year, $1.1 billion federal program to help farmers and homeowners reduce the amount of pollution being washed into the Upper Mississippi River. The plan was developed by the Resource Studies Center at Saint Mary's University in Minnesota, which has worked with farmers, agency officials, and conservation groups to develop the Mississippi River Stewardship Initiative, a new federal program to reduce polluted runoff.

The proposed program was developed in consultation with the U.S Department of Agriculture, U.S. Army Corps of Engineers, EPA, the U.S. Geological Survey, and the University of Minnesota. The Stewardship Initiative would identify major sources of polluted runoff, increase federal incentives to adopt better land management practices, create a water quality monitoring network, improve coordination, and expand outreach efforts to farmers and homeowners.

According to the Center, 25 percent of the fertilizer applied in Minnesota, Wisconsin, Iowa, Illinois, and Missouri is washed off farm fields, costing farmers more than $300 million annually and increasing water treatment costs. The Stewardship Initiative developed by the Center would increase annual funding for voluntary programs designed to reduce fertilizer loss.

[For more information, contact Barry Drazkowski at (507) 457-6925; e-mail: bdrazkow@smumn.edu, or Scott Faber at (202) 347-7550; e-mail: sfaber@amrivers.org; web site: www.amrivers.org/umrsnews.html.]

EPA Urges States to Upgrade NPS Programs To Receive FY 2000 Section 319 Funds

Although state nonpoint source management programs (called for by section 319 of the Clean Water Act) have matured considerably since the passage of the Clean Water Act, EPA and the states have agreed to a process whereby states will upgrade their programs even further to focus on more effective solutions to water quality problems caused by nonpoint source pollution. Once approved by EPA, such upgraded programs will qualify states, as provided in the President's Clean Water Action Plan, to receive additional section 319 funding beginning in fiscal year 2000.

In May 1996, EPA and the states reached agreement on a new, streamlined framework for the implementation of state nonpoint source programs under section 319. The resulting guidance, *Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Future Years*, significantly reduces federally imposed administrative requirements. The *Guidance's* long-term vision is to implement dynamic, effective nonpoint source programs designed to achieve and maintain beneficial uses of water. The agreement calls for the states and EPA to work together to review, revise, and implement enhanced nonpoint source management programs that incorporate the following nine key elements:

- Explicit short- and long-term goals, objectives, and strategies to protect surface and ground water.

EPA Urges States to Upgrade NPS Programs (continued)

- Strong working partnerships and collaboration with appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizen groups, and federal agencies.
- A balanced approach that emphasizes both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired or threatened.
- A strategy to both abate known water quality impairments resulting from nonpoint source pollution and prevent significant threats to water quality from present and future activities.
- An identification of waters and watersheds impaired or threatened by nonpoint source pollution and a process to progressively address these waters.
- A process to review, upgrade, and implement all program components required by section 319 of the Clean Water Act, and establish flexible, targeted, iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable.
- An identification of federal lands and objectives that are not managed consistently with state program objectives.
- Efficient and effective management and implementation of the state's nonpoint source program, including necessary financial management.
- A feedback loop whereby the state reviews, evaluates, and revises its nonpoint source assessment and its management program at least every five years.

As specified in the Clean Water Action Plan, beginning in FY 2000, additional section 319 monies will be awarded to those states with EPA-approved nonpoint source management program upgrades:

"**KEY ACTION:** EPA and other federal agencies will provide technical and other assistance to states to help upgrade polluted runoff programs to address all nine key program elements. Beginning in FY 1999, EPA and all states, territories, and tribes will expedite incorporation of the nine key elements established in national guidance into section 319 state nonpoint source management programs. Also in FY 1999, EPA will advise states, territories, and tribes that beginning in FY 2000, EPA will award any section 319 monies appropriated above the $100 million authorized level only to those states, territories, and tribes that have incorporated all nine key elements into an EPA-approved section 319 nonpoint source management program."

Under the agreement, states can implement their programs in a manner that maximizes their ability to achieve the nine key elements. Together, the elements can significantly accelerate and strengthen state efforts to reduce NPS pollution. In exchange, the new approach drops the former practice of competitive grants. Instead, EPA awards grants to the state based on a formula reflecting the number and extent of NPS-related water quality problems in each state. States also have greater flexibility directing section 319 grant funds. Most importantly, states with approved upgraded programs will be eligible for section 319 money above the $100 million that is currently authorized.

Although EPA has greatly streamlined the program for all states under the new approach, which focuses on technical assistance and support rather than grants oversight. States with track records of high performance over several years may request and be granted Enhanced Benefits Status. Such status reduces oversight and gives these states greater flexibility in implementing their programs. Specifically, nonpoint source enhanced benefits states will have top priority for developing multiyear plans; be subject to less detailed EPA review of grant work plans; be able to reduce the amount and frequency of reports; and be given top priority for advanced technical expertise and assistance.

In a recent memo to all state and interstate water quality program directors and EPA regional water division directors, Assistant Administrator for the Office of Water Charles Fox said, "I wish to emphasize that upgrading state nonpoint source programs is of critical importance if we are to succeed in our efforts to solve the remaining water quality problems in the United States.....Those nine key elements are critical to developing specific goals and objectives that will guide each state's program in both the short and long term; fostering broad and productive partnerships with all parties that have a stake in solving nonpoint source pollution problems; and implementing necessary measures and practices expeditiously and effectively."

[For more information, contact Stu Tuller, U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-7112; fax: (202) 260-1977; e-mail: tuller.stu@epamail.epa.gov.]

New Rule Regulates Discharges from Military Ships

Ballast water, gray water, steam condensate, submarine bilge water, hull coating leachate, firefighting foam, deck runoff— most people have probably never heard these terms unless they've been in the Navy or have worked on a ship. These are some of the discharges associated with the normal operation of a military vessel, which are the focus of a new Clean Water Act rule. On May 10, 1999, EPA and the Department of Defense (DOD) published the final Phase I rule for Uniform National Discharge Standards (UNDS) for Armed Forces vessels in the *Federal Register*.

This rule regulates incidental discharges — discharges that occur during normal day-to-day operations — from Army, Navy, Air Force, Coast Guard, and Marine Corps vessels within inland waters and 12 nautical miles from the U.S. coastline. Currently, discharge standards vary from port to port and from state to state. Armed Forces vessels must now comply with the new national standards rather than individual state standards. DOD and EPA are gathering input from interested states.

Section 325 of the 1996 National Defense Authorization Act, entitled *Discharges from Vessels of the Armed Forces*, amended section 312 of the Clean Water Act to provide the Department of Defense and EPA authority to jointly establish Uniform National Discharge Standards for incidental liquid discharges from vessels of the Armed Forces. Previously, section 312 had addressed only the regulation of sewage.

Even though many discharges from large vessels like Navy ships are already regulated through various policies, the new standards will set a precedent for regulating hard-to-define sources of water pollution. Implementation of the new standards will encourage the development of environmentally sound ships while at the same time not interfering with the ships' critical roles as defenders and protectors of the nation.

The new standards will be established in three phases. Phase I activities focused on identifying the discharges that occur during day-to-day operations on Armed Forces vessels and assigning them into two groups — those that require a marine pollution control device (MPCD) and those that do not. An MPCD is any equipment or management practice designed to treat, retain, or control discharges incidental to the normal operation of a vessel. Publication of the final Phase I rule in the Federal Register by EPA and DOD marked the completion of Phase I.

In this Phase I rule, DOD and EPA identified 39 incidental vessel discharges. They determined that 25 of those discharges require some type of MPCD. The other 14 vessel discharges for which it was determined that the use of an MPCD is not required will be exempt from other federal, state, or local regulations. For a listing of all the discharges, visit the UNDS web site at http://206.5.146.100/n45/doc/unds/unds.html.

Phase II involves setting performance standards for MPCDs for the discharges identified in Phase I as requiring controls. During Phase III, DOD will establish guidelines for designing, constructing, installing, and using MPCDs.

[For more information, contact Gregory Stapleton, U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-0141; e-mail: stapleton.gregory@epamail.epa.gov. Visit the UNDS web site at http://206.5.146.100/n45/doc/unds/unds.html.]

Beach Action Plan Released in April

In April, EPA released its much-anticipated multiyear Action Plan for Beaches and Recreational Waters to help states and localities protect public health in these areas. It is a strategy for reducing the risks of infection to recreational water users by improving water quality programs, risk communication, and scientific information. The Beach Action Plan is a response to the Beaches Environmental Assessment, Closure and Health (BEACH) Program announced by EPA Administrator Carol Browner in May 1997, as well as the President's 1998 Clean Water Action Plan (see "EPA Beach Program Makes Waves" in News-Notes #55 for more information on the BEACH Program).

In integrating all associated program, policy, and research needs and directions, the Beach Action Plan describes activities that EPA's Office of Water and Office of Research and Development will undertake to accomplish two goals:

- enable consistent management of recreational water quality programs and
- improve the science that supports those programs.

Beach Action Plan Released in April (continued)

To meet the first objective, consistent program management, EPA will sponsor conferences and meetings with federal, state, tribal, and local representatives to identify the needs and deficiencies of recreational water quality monitoring programs. Based on information gathered from these meetings, EPA will strengthen water quality standards and implementation programs by developing policies and assisting local managers working to meet recommended criteria. In addition, EPA plans to conduct training activities, increase risk communication, encourage technology transfer, and publish guidance documents on risk management and monitoring criteria.

EPA conducts the National Health Protection Survey of Beaches annually to collect data on state and local monitoring efforts, applicable standards, communication methods, contamination problems, and more. So far, surveys have been conducted in 1998 and 1999 for the 1997 and 1998 swimming seasons. Data received this spring are available at www.epa.gov/ost/beaches/local.html.

Also under the BEACH Program, the Vice President announced in June 1998 a public right-to-know initiative to give the general public access to state and local information on recreational water quality through an Internet web site at www.epa.gov/ost/beaches. This BEACH Watch web site will soon house a real-time (up-to-date) electronic database for all beach health-related information and will provide recreational water users with national and local details on advisories and closings.

To improve the science that supports recreational water monitoring programs, the Beach Action Plan's second objective, the plan commits to the development of better indicators of the potential presence of pathogens in recreational waters. Current indicators will be researched and reevaluated. The plan also calls for increased use of computer modeling to assess beach water quality. Finally, it calls for more research to determine pathogen occurrence and indicator relationships associated with combined sewer overflows, or CSOs.

[The Beach Action Plan is available through the BEACH Watch web site (www.epa.gov/ost/beaches) or by calling the National Center for Environmental Publications and Information at 1-800-490-9198. For further information, contact Barbara Klieforth at (202) 564-6787 or send e-mail to klieforth.barbara@epamail.epa.gov.]

EPA Puts 1999 Beach Survey Results on the Web

The results are in from the second annual National Health Protection Survey of Beaches conducted by EPA in the Spring of 1999. EPA distributed 322 questionnaires to beach health protection agencies in 33 states. Survey participants were asked the following: Which beaches are being monitored? How often are they monitored? Who conducts the monitoring? Where and how often have advisories or closings been issued? What methods are used to determine beach advisories and closings? How often are water quality standards exceeded at the beaches?

The survey gathered information on 1,403 beaches nationwide, an increase of approximately 400 beaches since last year. EPA's review of coastal beaches (including the Great Lakes) showed that, of the 1,062 coastal beaches, more than 350 had an advisory and/or closing in 1998. Agencies reported that 935 beaches (88 percent) had water quality monitoring programs. Of these, 67 percent monitor at least once a week, if not more frequently; 31 percent monitor less than once a week; and 2 percent monitor only after rain or special events. The survey also confirmed that a wide variety of standards are used in monitoring water quality at beaches.

EPA intends to conduct the survey each year, and as new information becomes available, it will be added to the BEACH Watch web site. EPA also plans to add more inland (freshwater) beaches to the survey next year. The results of the 1999 survey are available on EPA's BEACH Watch web site at www.epa.gov/OST/beaches/.

States From Which Survey Responses Were Received

California	Maryland	Ohio
Connecticut	Massachusetts	Oregon
Delaware	Michigan	Pennsylvania
Florida	Minnesota	Rhode Island
Hawaii	Mississippi	South Carolina
Illinois	New Hampshire	Texas
Indiana	New Jersey	Virginia
Louisiana	New York	Wisconsin
Maine	North Carolina	

Lakeside Residents Pay for Activities that Pollute

If you live near West Boggs Lake in Southern Indiana, you might not be able to build that new pier for your boat or reseed your lawn — not without first applying for a special-use permit. Residents of Daviess and Martin counties living around the 622-acre lake must adhere to stringent regulations to help reduce nutrient runoff into the lake. Under the Daviess and Martin County Parks and Recreation Department's Buffer Zone Management Program, 280 residents whose property borders a 100-foot buffer zone owned by the Parks and Recreation Department must pay annual fees for day-to-day uses that degrade the quality of the water in the lake. They must also apply for special permits for any special uses that could further degrade water quality, such as mowing, seeding, fertilizing, planting or removing trees, or stabilizing shorelines.

Daviess and Martin counties jointly manage the program because the property line dividing them runs through the middle of the lake, making the two counties co-owners. User fees fund the buffer zone program, which controls residential runoff problems, regulates the design and placement of residential septic tanks, and prevent livestock grazing within the buffer. User fees range from $25 for basic land use to $40 for a boat. Total revenue from all West Boggs users in 1998 was $493,757, of which $14,580 came from special-use permit holders. According to Mike Axsom, the Department's supervisor, this program is the only one of its kind in the state of Indiana.

To obtain a special-use permit, residents must supply park officials with a description of their property and a septic system certificate of compliance obtained within the last five years from the county health department. The certificate of compliance indicates that the septic system has been inspected by the health department, passed a dye test, and meets all county requirements. Once issued, the special permit is renewed every five years following inspection by department officials. The permit stipulates that residents are not allowed to cut bushes or trees or conduct any excavation in the buffer zone.

In addition to obtaining a special permit for certain activities, residents also have to obtain a separate permit to apply lawn chemicals. According to Axsom, the only herbicide approved for use is Glyphosate, more commonly known as Round-Up, which controls most nuisance plants and, if applied correctly, affects only the plant with which it has direct contact. It also breaks down very quickly, leaving no toxic residue in the soil. Fertilizers are allowed only if they are very low in phosphorus. All insecticides not labeled for restricted use are allowed, provided the label directions are followed and users comply with permit requirements.

When any chemical application permit is issued, the chemical is not allowed within 20 feet of the shoreline, regardless of the chemical used. Violation of these regulations can result in termination of permits and all use of the buffer-zone lands. Should this occur, the buffer zone lands in question would be allowed to revert back to a riparian state to act as a filter strip. Continued use of buffer-zone lands without a valid permit can result in charges of trespassing.

The buffer lands were purchased from private landowners when the lake was built in the late 1960s. Before the establishment of the Buffer Zone Management Program in 1994, residential use of lakeside property was not regulated by an established management plan. As a result, several NPS-related problems plagued the lake, including high turbidity, persistent algae blooms, high bacteria counts, and extremely high nutrient loading. In 1990 and 1991, the Indiana Department of Natural Resources Division of Soil Conservation conducted a feasibility study to assess eutrophication of the lake using a rating scale to identify water quality problems and their causes. The rating for eutrophication includes measurements of total phosphorus, soluble phosphorus, organic nitrogen, nitrate, ammonia, dissolved oxygen, light penetration, light transmission, and plankton. Lakes with an index between 1 and 25 are considered to be high quality, those between 26 and 50 are intermediate quality, and indexes between 51 and 75 are low quality. The 1991 study found the West Boggs Lake index to be 33, placing it in the intermediate quality class.

Lakeside Residents Pay for Activities that Pollute (continued)

Lakeside residents initially resisted the strict buffer zone regulations around West Boggs Lake. In fact, when the program first began, residents continued to use parts of the buffer zone as their personal property. Several even filed a lawsuit claiming adverse possession when the Parks and Recreation Department asserted its authority over the buffer zone. In Indiana, the adverse possession law asserted that public property used by a person for a long period of time could become his or her property. The residents' law suit prompted the Parks and Recreation Department to prepare language for the Indiana legislature to enact a law preventing adverse possession of any public land in Indiana. The law was passed in the spring of 1998.

Since the lawsuit, most of the lakeside residents have changed their opinion of the buffer zone program. According to Axsom, the same people who once strongly opposed the counties' authority over the land now strongly support the program because personal property at West Boggs Lake has become more marketable since the program began. Residents report that when their homes or lots are placed on the market, sales take place more quickly with less negotiation on price. In a relatively new subdivision called West Boggs Shore III, lot sales have risen dramatically over the past two years. Where previously only three to four lots per year were sold, developers say that the subdivision will probably sell all 10 of its new lots within a year.

[For more information, contact Mike Axsom, Parks Department Supervisor, Daviess-Martin Joint County Parks and Recreation Department, P.O. Box 245, Loogootee, IN 47553. Phone: (812) 295-3421; fax: (812) 295-4356; e-mail: boggs@dmrtc.net.]

Burley Lagoon — The Saga Continues

EDITOR'S NOTE: Adapted from an article by Kathy Minsch in *Sound Waves*, Spring 1999, Volume 14, No. 1

Burley Lagoon, located in Washington State on Puget Sound's Key Peninsula, is in trouble again. This picturesque bay, home to a growing number of residents and a long-time commercial shellfish operation, has the dubious distinction of being downgraded twice. What happened?

In a rural watershed, Burley Lagoon faces increasing pressures from growth as more people decide to live in the area. The slowly circulating, shallow lagoon waters are particularly susceptible to runoff from houses, farms, and roads.

A 1984 study by the Washington State Department of Ecology showed a direct link between nonpoint pollution and shellfish bed downgrades. Based on that study, and after the first Burley downgrade in 1985, the Department of Ecology issued an action plan to address failing on-site sewage systems, runoff from farms, and stormwater drainage. Ten years of work and millions of dollars later the lagoon was upgraded for harvest — a tribute to many partners responsible for the success, including local and state agencies, residents, and the shellfish industry.

Shellfish Bed Classifications

Approved: Shellfish can be harvested directly to market at any time or season.

Conditionally Approved: An area will be closed to shellfish harvesting for a length of time based on some condition which correlates to decreased water quality, such as rainfall.

Restricted: Shellfish must be relayed from the area to an "approved" area, left for a length of time to purify, and then can be harvested.

Prohibited: No shellfish harvesting is allowed at any time under any circumstances.

After monitoring data from Burley Lagoon showed a sharp increase in fecal coliform, an indicator of bacteria that can contaminate shellfish, making them unsafe to eat, the Washington State Department of Health again downgraded the commercial shellfish-growing area on March 1, 1999.

"It is unfortunate that we're again dealing with a downgrade in an area where so much work was done — underscoring the need to keep a constant vigil to maintain the health of the lagoon," said Bill Dewey, a Puget Sound shellfish industry representative on the Puget Sound Council.

The Puget Sound Water Quality Management Plan directs key state and local agencies to quickly complete a shellfish closure response strategy following a downgrade. State law also calls for local governments to form a shellfish protection district within 180 days of a downgrade. Since Burley Lagoon crosses county lines — the upper watershed and its tributaries originate in Kitsap County, and the lower watershed and commercial shellfish area in Pierce County — both are involved in the response. A shellfish closure response committee (which includes local watermen) hopes to finalize a long-term strategy by August of 1999.

Burley Lagoon—The Saga Continues (continued)

Pierce and Kitsap counties have a long history of partnering in this watershed. Each has enacted shellfish protection districts before — Rocky Bay and Port Gamble. To address the downgrade at Burley Lagoon, Kitsap County is continuing a survey that began last fall to track any on-site sewage and small farm problems; the Tacoma-Pierce County Health Department is also identifying problems in its area of the watershed.

Commercial shellfish beds in Burley Lagoon were first downgraded from "approved" to "restricted" in October 1981 due to failing on-site septic systems and poor animal waste management practices. After many restoration efforts, the area was upgraded to "conditionally" approved in October 1993, meaning the beds were to be closed for five days after a period of heavy rain (and thus stormwater runoff). In March 1999, deteriorating water quality forced another downgrade to "restricted" for the same reasons as before. Under the restricted classification, shellfish grown in the lagoon will have to be transferred to an approved shellfish area for cleansing before they can be harvested for sale.

Dewey noted the need for counties to have strong operation and maintenance programs in place to prevent on-site systems from failing — a key priority in the Puget Sound Water Quality Work Plan. "It appears that Pierce and Kitsap are stepping up to that challenge," said Dewey.

Meanwhile, the Western Oyster Company in Burley Lagoon is being closed for the second time, and owner Jerry Yamashita's option to transfer his oysters to Henderson Inlet is at risk because water quality in that area is also declining.

Yamashita is concerned about the future, "Our world is getting smaller as it gets more populated," he said, "We cannot exist at the expense of the other person. We all need to survive together." It's going to take hard work and a personal commitment from everyone who lives, works, and plays at Burley Lagoon to restore and ensure the future health of this sensitive ecosystem.

[For more information, contact the Puget Sound Water Quality Action Team, P.O. Box 40900, Olympia, WA 98504-0900. Phone: (800) 54-SOUND; web site: www.wa.gov/puget_sound/pswqateam/pswqat1.html.]

Notes on Watershed Management

Funding Increased for Acid Mine Restoration Program

The Department of the Interior's Office of Surface Mining (OSM) is supporting the watershed restoration agenda of the President's Clean Water Action Plan through the Appalachian Clean Streams Initiative (ACSI). This initiative supports community efforts to accelerate the cleanup of rivers and streams polluted by runoff from abandoned coal mines throughout the Southeast and in other parts of the Nation.

Eleven states, working with numerous partners, have used ACSI grants to complete or begin 25 projects, resulting in dramatic improvements in water quality and the recovery of fisheries destroyed by mining early in this century.

Appalachian Clean Streams Initiative Projects and Funding

STATE	NO. OF PROJECTS IN FY 1997–1998*	CLEAN STREAMS FUNDING FOR FY 1997–1999
Alabama	1	$ 666,014
Illinois	1	$ 925.271
Indiana	3	$ 710,540
Iowa	1	$ 188,253
Kentucky	3	$ 1,459,310
Maryland	2	$ 275,823
Missouri	1	$ 186,915
Ohio	3	$ 1,265,574
Pennsylvania	4	$ 3,361,850
Virginia	1	$ 690,730
West Virginia	5	$ 2,586,720

* Note: Since February 8, 1999, states have generally not obligated FY 1999 funds to specific projects. Based on discussions with the states, OSM expects FY 1999 funding to generate approximately 10 to 15 projects, including both new projects and major expansions of existing projects.

Funding Increased for Acid Mine Restoration Program (continued)

In FY 1999, a total of $5.9 million was appropriated for ACSI state grants, a significant increase over the FY 1998 $2.5 million. Also in FY 1999, OSM is providing $750,000 for grants to nonprofit groups such as local watershed organizations to construct mine drainage treatment projects.

Applications for watershed cooperative agreement grants in the range of $5,000 to $80,000 were accepted until June 1. To continue these programs in FY 2000, OSM has proposed a total of $10 million. Additional information on eligibility criteria and application materials are available through OSM's web site at www.osmre.gov/acsihome.htm.

Although the cleanup of mine drainage problems will be a lengthy process, technological improvements and funding increases are setting positive trends for the restoration of watersheds in the Nation's coal fields.

[For more information, contact Fred Fox, Office of Surface Mining, South Interior Building, 1951 Constitution Avenue, NW, Washington, DC 20240. Phone: (202) 208-2527; e-mail: ffox@hdqgw.osmre.gov.]

Study Shows Water Flow Management in Michigan Aids in Salmonid Recovery

For 80 years, "peak flow management" of hydropower dams caused water flow in western Michigan's Manistee River to fluctuate dramatically each day, ranging from 10-year floods to droughts. Studies have shown that this periodic release of large amounts of water can either strand aquatic organisms or sweep them downstream, negatively affecting the fish that rely on them for food.

Relief came to the Manistee, a major Lake Michigan tributary, 10 years ago when peak flow management was abandoned in favor of a less disruptive practice known as "run-of-river flow management." Run-of-river plants produce power around the clock, unlike peak flow plants whose dams are typically used only when the power is most needed. Water was allowed to flow naturally through the Tippy and Hodenpyl dams as a result of terms specified in new hydropower licenses. Today, the change is beginning to pay off. Researchers at the University of Michigan and Michigan State University, funded in part by NOAA's Michigan Sea Grant Program, have found that survival of young chinook salmon in the Manistee has increased since the late 1980s in response to a stable water flow.

"Natural reproduction is incredible now," says Sea Grant and University of Michigan fisheries biologist Ed Rutherford refering to the numbers of chinook and steelhead wild smolts in the Manistee. "It's gone from about 100,000 to approximately 700,000 smolts annually."

Still, the switch to run-of-river flows hasn't solved everything. The researchers found that although steelhead reproduction has also increased, the fish have a lower survival rate than young chinook. Rutherford suspects warm water temperatures might be the reason. Steelhead spawn and rear in the tailwater of dams, he explains, where summer water temperatures might be too warm. Top-draw dams pull the warmer surface water from above the dam, which then flows downstream. Because steelheads remain in the stream longer than salmon, Rutherford suspects they might be affected to a greater degree by warm water temperatures.

Using electroshocking sampling techniques, Rutherford and his colleagues measured the abundance and diversity of fish in the Manistee over a two-year period. They also used smolt traps to monitor the smolt run and examined the scales and vertebrae of adult fish to distinguish wild salmon from those reared in hatcheries. (Most salmon caught in Lake Michigan are hatchery-produced.) The researchers estimate that the greater numbers of chinook and steelhead wild smolts surviving in the Manistee represent an 8.6 and 6.4 percent increase, respectively, in potential harvest available to recreational anglers. During peak flow regimes in the late 1980s, the harvest was much lower.

The Bottom Line

The increase in chinook and steelhead is crucial information that will feed into the next phase of the project to be completed this year. University of Michigan economist Michael Moore, along with Michigan State University agricultural economists Frank Lupi and John Hoehn, will use a state-of-the-art economic model of recreational fishing in Michigan to translate the improved ecological changes into the dollars and cents of economic benefits.

They already know one thing: sportfishing is big business. Spending associated with recreational fishing for salmonids (of which chinook and steelhead are two species) in the Great Lakes is estimated to contribute $1 billion per year to the economy, according to a Great Lakes Fisheries Commission special economic report. However, estimating the economic benefit of improvements to the sportfishery can be tricky.

For example, in the process of relicensing hydropower dams, the Federal Energy Regulatory Commission (FERC) was required in 1986 to consider the benefits of fish and wildlife protection, recreational opportunities, and preservation of environmental quality. The problem, explains Moore, is that FERC's method of analysis has historically characterized costs and benefits only in terms of profits and losses to the companies that own the dams. "One of the things we found," says Moore, "is that FERC collects very little information on benefits of improved ecosystem function and recreational opportunities. They do an unbalanced analysis."

Incorporating comprehensive data on costs and benefits can have tangible effects. For example, explained Moore, each hydropower license contains a series of operating conditions. Specific operational changes such as adding fish ladders or changing to run-of-river flows, can be required or recommended if potential benefits are first recognized and quantified. On the Manistee, new data on steelhead raise the question of altering top-draw dam operations to bottom-draw to provide steelhead with cooler water. The economic model will balance these benefits against the costs of run-of-river flows, which are measured in terms of lost hydropower revenues from the change in flow management. In the coming years, the economic approach might be relevant to more than just the Manistee River as numerous dams in the Great Lakes basin come up for relicensing.

Over the next two years, the researchers will continue their work on the Au Sable and Muskegon rivers to create a scientific evaluation framework that is generally applicable to Great Lakes tributaries. From that work may come a model case study for other regions struggling with the conflicting goals behind sustainable ecosystem management.

[For more information, contact Edward S. Rutherford, Assistant Research Scientist, Michigan Sea Grant, University of Michigan School of Natural Resources and Environment, The Dana Building, 430 E. University Street, Ann Arbor, MI 48109-1115. Phone: (734) 663-3554, ext. 104; e-mail: edwardr@umich.edu.]

Agricultural Notes

Perdue Joint Venture Offers Poultry Litter Option for Delmarva Producers

Cleaner waters along Delmarva's eastern shore (Delaware, Maryland, and Virginia) is the goal of a new effort announced by Perdue Farms. Founded in 1920, Perdue is the largest integrated poultry producer in the Northeast and the third-largest in the United States. Perdue plans to help area chicken producers dispose of their excess chicken manure, which has become a major threat to water quality in the Chesapeake Bay. Under the plan, Perdue will partner with AgriRecycle of Springfield, Missouri, to create a joint-venture company that will process poultry litter into a USDA-approved organic starter fertilizer product that can be transported to other areas of the country.

In announcing the initiative, Jim Perdue, chairman of Perdue, said, "Both poultry and crop producers are faced with increasing environmental mandates on farming. Our goal is to help keep farming viable on the Delmarva Peninsula." Perdue said the company has been seeking a solution for the litter and that "many options were considered." One of the reasons Perdue selected

Perdue Joint Venture Offers Poultry Litter Option for Delmarva Producers (continued)

AgriRecycle was that they offer the technology Perdue believes will be the most effective and efficient in helping resolve the nutrient management issue.

"There are still a lot of details to be worked out, but our intention is to compensate our producers for their litter," said Perdue. AgriRecycle's technology creates a product that can be used in conjunction with chemical fertilizers. The pelletizing process to be implemented results in a starter fertilizer product that has a consistent nutrient value and is pasteurized. The fertilizer can be easily and safely transported to locations outside Delmarva that are deficient in nitrogen and phosphorus for use by row-crop farmers. Under current practices, poultry producers usually apply the litter directly to land as a crop fertilizer.

"Our pelletized litter is an ideal complement for chemical fertilizers since it helps the plant absorb the nutrients in a more effective manner," explained Mike Ferguson of AgriRecycle. "Chicken litter is rich in humus and organic matter, which have been depleted in certain row crop farming areas. By replacing these vital elements to the land, plants are able to absorb more nutrients and the soil is better able to retain moisture, which prevents runoff and resultant nutrient losses."

The new facility will be located on the Delmarva peninsula to ensure easy access to a steady supply of raw material and to the shipping and rail lines necessary to transport the finished product to customers. AgriRecycle and Perdue anticipate the new facility will process as much as 120,000 tons of raw poultry litter each year (waste from 1,200 broiler houses), producing 95,000 tons of pelletized product. The 120,000 tons is more than a third of the manure generated by the 240 million birds the company processes on the Delmarva peninsula annually. The facility is expected to cost between $5 million and $6 million. "We hope to have this innovative facility up and running by the end of the year," Perdue said.

[For more information, contact Mike Ferguson, AgriRecycle, 1525 West Sunshine Street, Suite C, Springfield, MO 65807. Phone: (417) 831-3001; web site: www.agrirecycle.com, or Tita Cherrier, Perdue Farms Incorporated, P.O. Box 1537 Salisbury, MD 21802-1537. Phone: (410) 860-4407.]

Neuse Rules Aim at Reducing Nitrogen in Pamlico Sound

by Deanna Osmond, Assistant Professor and Extension Specialist, Department of Soil Science, North Carolina State University

On August 1, 1998, a new set of rules known as the "Neuse Rules" became effective for the Neuse River Basin in eastern North Carolina. The rules require a 30 percent reduction in nitrogen loading to the Pamlico Sound by the year 2003. Large fish kills and the discovery of *Pfiesteria* in the past decade spurred the development and adoption of the rules by the North Carolina Environmental Management Commission.

Specifically, the rules mandate nutrient management training for anyone applying fertilizer to 50 acres or more of cropland, turfgrass, or other land, or the preparation of a nutrient management plan. The rules encourage farmer education so that they will understand nutrient management and be able to write their own plans. In addition, the rules mandate that farmers use riparian buffers, controlled drainage, and nutrient management plans as BMPs.

North Carolina's Environmental Management Commission sets environmental rules that are first heard at public hearings. After adjustments, the rules are then passed by the Commission and become legally effective. The Neuse Rules are part of the Neuse Crop Management Project, a three-year cooperative effort to expand integrated pest management and nutrient management practices in North Carolina. This grower-led project focuses on educating farmers in the Neuse River Basin about nitrogen and herbicide management to help them reduce costs and decrease nitrogen runoff into the river. The project's organizers are working closely with the growers to help develop practices that demonstrate the rules but also help them meet their bottom lines. The goal of the project is to develop a sound scientific and economic basis for herbicide and fertilizer treatments on corn, cotton, wheat, and soybeans, which account for 84 percent of planted acres in the Neuse River Basin.

Neuse Rules Aim at Reducing Nitrogen in Pamlico Sound (continued)

As part of the project, four farms scattered throughout the basin have been selected to serve as demonstration projects and in-field training sites to showcase the BMPs farmers must implement as part of the Neuse Rules. The BMPs currently being installed will be demonstrated from installation through use. In addition, producers will receive information on the economics of the practices, which practices can be cost-shared, and sources for cost-share funds. The farms will also be used for in-field nutrient management training of commodity suppliers and crop consultants.

Partners in the Neuse Crop Management Project

Cotton, Inc.
Dixie
Royster-Clark
Southern States Cooperative
Corn Growers Association of North Carolina
National Cotton Council
North Carolina Farm Bureau
North Carolina Plant Food Association
North Carolina Small Grain Growers Association
North Carolina Soybean Producers Association
North Carolina Department of Agriculture and Consumer Services
North Carolina Department of Environment and Natural Resources

Although not required by the Neuse Rules, herbicide-reducing techniques will also be used at three of the four sites and by other area farmers. HADSS, an herbicide application decision support system developed at North Carolina State University, will help farmers make decisions about what herbicides should be used and where they should be sprayed. Agronomic business representatives will also be trained to use HADSS.

A team approach, the Neuse Crop Management Project, is a partnership of private industry, commodity organizations, state agencies, and agricultural producers. For example, the National Cotton Council has developed an environmental stewardship self-assessment program called Cotton Cares, an evaluation system similar to Farm*A*Syst that is available to cotton producers in the Neuse River Basin (see *News-Notes* issues #44, #50, and #51 for more information on the Farm*A*Syst Program.) Cotton Cares helps cotton producers evaluate their own farm production systems. Partnership programs like Cotton Cares will be critical as the agricultural community works toward reducing its nitrogen contributions to the Neuse River.

The North Carolina Cooperative Extension Service, part of North Carolina State University, will carry out the demonstration projects. Funding has been provided by the Clean Water Management Trust Fund, a North Carolina state government fund that restores degraded waters. Additional funds will be supplied by EPA and the Pew Charitable Trust Foundation through the Program for Strategic Pest Management.

The agricultural community isn't the only sector being affected by the rules. Urban areas in the Neuse River watershed will also be required to reduce nitrogen by 30 percent, including point source and nonpoint source discharges. The rules will apply to cities with populations greater than 10,000 and counties with populations greater than 50,000. These urban areas face four requirements. They must: (1) use BMPs, both structural and design, to limit stormwater runoff, (2) eliminate illegal discharges into storm sewers, (3) identify stormwater retrofit opportunities, and (4) develop and implement a series of education programs (such as storm drain stenciling, adopt-a-stream, etc.).

[For more information, contact Deanna L. Osmond, Assistant Professor and Extension Specialist, Department of Soil Science North Carolina State University, Box 7619, Raleigh, NC 27695-7619. Phone: (919) 515-7303; fax: (919) 515-7494; e-mail: deanna_osmond@ncsu.edu; web site: ces.soil.ncsu.edu/soilscience/staff/deanna.htm.]

New BMP Insurance Protects Farmers from Crop Damage

BMP insurance will soon ensure stable incomes for farmers, who will be able to use BMPs without worrying about whether they will lose money by doing so. Together, the Agricultural Conservation Innovation Center, Agren, the Iowa Agriculture Insurance Innovations Consortium (IAIIC), and the Iowa Department of Economic Development are developing several innovative policies for specific BMPs or integrated pest management (IPM) practices for farmers in the Midwest. For less than half the cost of conventional farming methods, farmers can protect themselves against the risks of trying a new conservation practice.

Root Rating	Estimated Payable % Decrease in Crop Yield Potential
3.50 – 4.00	5%
4.01 – 4.50	12%
4.51 – 5.00	19%
5.01 – 5.50	26%
5.51 – 6.00	—

Farming–A Risky Business

Everyone knows that you can't predict the weather, but for farmers this carries a deeper meaning. Crop yields are subject to many natural hazards, and farmers try to minimize these risks by applying more fertilizers and pesticides than needed or recommended. Tom Buman, president of Agren, an agricultural and environmental consulting firm in Carroll, Iowa, believes that farmers are hesitant to use BMPs because they perceive an economic risk. "If you feel a situation is risky, you are less likely to try it," says Buman. Buman believes that the new BMP insurance policies will reduce the amount of inputs to the crop and "substitute financial insurance for product insurance." He continued, "I am in the business of helping people adopt management practices that save money and help the environment."

Insurance for Conservative Pesticide Application

Although corn farmers traditionally apply a soil-based insecticide every year to ward off corn rootworm beetles, many farmers don't even need it. For $4 to $5 per acre or one-third the cost of the insecticide application, a farmer can purchase an insurance policy that guards against monetary losses resulting from rootworm larval feeding.

Here's how it works. A farmer hires an approved private crop scout to inspect a corn or soybean field in July or August, using the university-recommended scouting procedure for that state. If the scout determines that there is a significant chance of an infestation, the farmer applies an appropriate insecticide. On the other hand, if the scout determines that there is little chance of a corn rootworm larval infestation, the farmer has the option of purchasing an insurance policy. If the insurance company approves the scout's credentials and recommendation, it issues the policy before May 15 for coverage that growing season. In early July, the approved scout conducts another inspection to check for corn rootworm damage, looking for feeding scars on the corn's roots. If the damage is greater than a root rating of 3.5 (on the Iowa State University 1 to 6 root damage rating scale), a third-party adjuster must determine the level of damage. The amount payable is determined by the cash value of the reduction of the potential yield, based on the adjustment of root ratings and the yield history of the field. If the root damage rating is above 3.5 and the harvest is slowed by severely damaged corn, the farmer is eligible for additional compensation, based on the average custom rates for that region. Severely damaged corn must be reported by November 1, and the farmer must leave a minimum field sample of one combined-width strip, the length of the field, for every 40 acres.

Other BMP Insurance Policies

■ ***Nitrogen Management Policy.*** IAIIC is also developing a policy that promotes the judicious use of nitrogen fertilizers. The difficulty in managing nitrogen is compounded by the fact that most nitrogen is applied well in advance of when the crop really needs it. Therefore, farmers have to apply nitrogen at higher than recommended rates to reduce the risk of not having enough nitrogen available especially in those years when significant leaching or denitrification occurs.

IAIIC is funding research on using remote sensing technologies as a adjustment tool. A farmer would apply only the recommended amount of nitrogen and could then purchase an insurance policy if he or she were uncomfortable with the risk of yield reduction resulting from an inadequate supply of nitrogen. Remote sensing would be used later in the season to detect

nitrogen deficiency. If a deficiency is found, an indemnity payment would be made to the insured producer.

■ ***Split Application of Nitrogen Policy.*** To reduce the amount of nitrogen used, a farmer may choose to split one large application into two smaller applications. Nitrogen will first be applied before planting, with the second application following a nitrogen test taken after crop emergence. Farmers are reluctant to use split application of nitrogen because unfavorable weather might hamper the second application, which could make the crop nitrogen-deficient.

To reduce the risk of nitrogen-deficient crops and promote the split application of smaller amounts of nitrogen, ACIC will work with groups of farmers and local agencies to tailor policies to address this issue. These policies are based on the amount of rainfall accumulated during the window of the second nitrogen application. For approximately $10 to $100 per acre, depending on the level of coverage, a farmer can insure the fields to cover 125 percent to 175 percent of the normal rainfall. The farmer can also choose to insure the fields for 2 weeks to 30 days. Farmers will apply a post-emergent herbicide rather than atrazine also face a rainfall-related risk. This policy will be available to farmers interested in adopting post-emergent herbicide applications, as well.

■ ***Cold-Soils Policy That Promotes No-Till.*** ACIC has worked with the USDA National Soil Tilth Laboratory and the Conservation Technology Information Center (CTIC) to develop a cold-soils no-till insurance policy. The policy offers financial risk protection to no-till farmers against cold weather during the three key weeks of planting. For example, $25 of coverage per acre protects a farmer against receiving less than 85 percent of normal heat units for the given three-week period. Depending on the field location, level of coverage, and percent of heat units insured (75 percent to 85 percent of normal), the cost of the policy ranges from $2 to $10 per acre. The farmer calls for an adjustment if he or she believes that the insured level of heat units was not met.

ACIC is now looking for insurance companies interested in offering these innovative BMP policies. "We're trying to remove the low points caused by the occasional failure of BMPs. Farmers are the same as everyone else: they want a stable income. These insurance policies will stabilize income and be more profitable than product insurance," promises Buman.

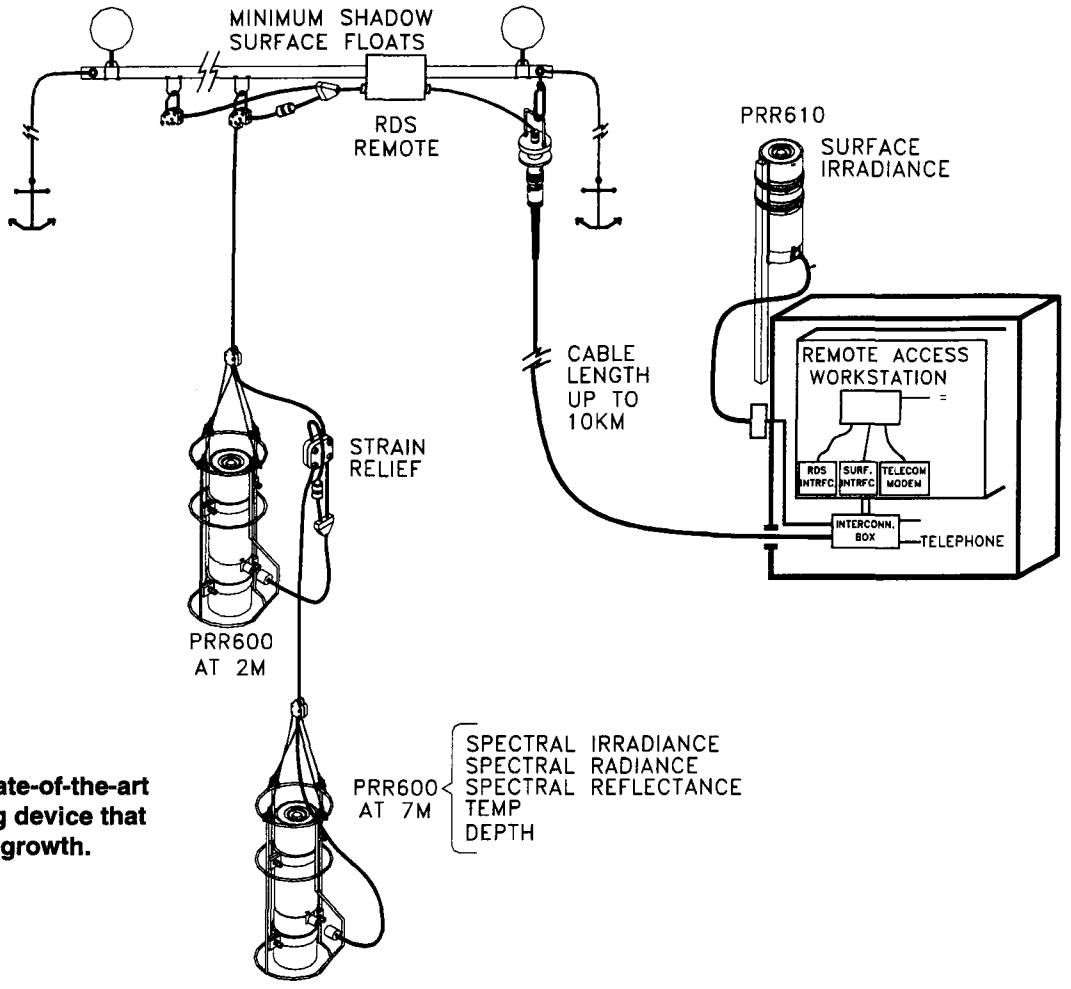
[For more information, contact Jim Cubie, Agricultural Conservation Innovation Center, 2234 South Hobson, Charleston, SC 29405-2413. Phone: (843) 740-1329; e-mail: jim.cubie@agconserv.com. For additional information, contact Tom Buman, Agren, 312 West 3rd Street, Carroll, IA 51401. Phone: (712) 792-6248; e-mail: tbagren@netins.net. For more information on CTIC's role in this project, contact Dan Towery at (765) 494-6952.]

Technical Notes

California Scientists Develop State-of-the Art Water Monitoring System

Scientists at the Los Angeles Department of Water and Power (LADWP) and Biospherical Instruments, Inc., (BSI) have developed a state-of-the-art remote sensing device to monitor algal growth in Los Angeles area reservoirs. A third generation of the patented device, called a remote electro-optical sensor (REOS-3), has been operating in five LADWP reservoirs since 1997. Eight systems will be installed in LADWP reservoirs by the end of 1999.

Although an overabundance of planktonic algae in municipal water systems is not a public health concern, it affects the taste of drinking water, produces an undesirable odor, and causes aesthetic problems that undermine the public's confidence in LADWP's ability to provide high quality water. In addition, an overgrowth of algae can cause the oxygen level in reservoir waters to become so low that fish and other aquatic species either migrate to other waters or suffocate. According to Brian White, a biologist at LADWP and codeveloper of REOS-3 with BSI senior scientist John Morrow, Los Angeles Reservoir was chosen as the test site for a REOS-3 algal control strategy because it produces algae at an extremely rapid rate, serves most of the people in Los Angeles, is a headwater for several downstream reservoirs, and has the staffing and facilities to support immediate action in response to an impending algal bloom.



REOS-3 is a state-of-the-art remote sensing device that monitors algal growth.

The REOS-3 system works by monitoring algal biomass with a pair of reflectance radiometers that are permanently submerged in the reservoir. The radiometers, which were developed by BSI to provide ground truth for NASA ocean color satellites, measure both the natural fluorescence of planktonic algae and the attenuation of ambient light passing through the water column. These independent measurements support estimates of the algal standing crop.

The radiometers transmit data every 2 seconds to an onsite controller that is polled once a day by a master domain controller located at LADWP headquarters. The master domain controller distributes daily REOS-3 reports to a team of treatment operators, biologists, and engineers at three different locations. The team then determines if the reservoir should be treated to alleviate the algae. This daily decision making process allows algal growth to be controlled with fewer chemicals before water quality is compromised. The result is higher water quality at less cost.

The one-year demonstration at Los Angeles Reservoir showed that the REOS-3 system allowed for 42 percent fewer chlorine treatment days and a 40 percent decline in tons of chlorine used, compared with three previous years. The reduced chlorine treatments have saved the LADWP about $140,000 in yearly chlorine costs at Los Angeles Reservoir, which exceeds the REOS-3 purchase price by $40,000.

White and Morrow plan to simplify the approach so it can be used for smaller, less high-tech applications. They also plan to test additional sensors, including a probe that measures copper concentration since copper is another means of treating algae in reservoirs.

[For more information, contact Brian White, Biologist, Los Angeles Department of Water and Power, Water Quality Section, 111 North Hope Street, Room A-18, Los Angeles, CA 90012. Phone: (213) 367-3419, fax: (213) 367-3297; e-mail: brian.white@water.ladwp.com.]

Research Shows Satellite-based Data Will Help Farmers Spot-treat Problem Areas

EDITOR'S NOTE: Adapted from an article printed in *Agricultural Research*, March 1999.

Farmers will soon be able to get a bird's-eye view of their farms with a single click of their computer mouse. That's the goal of Agricultural Research Service (ARS) scientists and private industry representatives working together under one of the largest cooperative research and development agreements (CRADAs) in the history of the USDA research agency. The project aims to provide farmers with satellite-based information on the health of their crops so they can apply spot-specific remedies for insect or weed invasions and improve long-term management practices.

RESOURCE21 of Englewood, Colorado — ARS's CRADA partner — plans to launch up to four satellites devoted to remote sensing for farmers. James S. Schepers, the ARS CRADA coordinator for the project, leads the research team at the ARS Soil and Water Conservation-Research Unit in Lincoln, Nebraska.

Schepers explains that six ARS laboratories and four private companies are participating, including The Boeing Company, an aircraft manufacturer in Seattle, Washington; Farmland Industries, the nation's biggest agriculture cooperative, based in Kansas City, Missouri; Marconi Integrated Systems, a remote sensing firm in San Diego, California; and the Institute for Technology Development, a nonprofit company in Ridgeland, Mississippi. ARS allocated more than $900,000 for research at laboratories in Lincoln, Nebraska; Shafter, California; Phoenix, Arizona; Ames, Iowa; Beltsville, Maryland; and Lubbock, Texas.

Once the technology is in place, Farmland Industries plans to deliver it to 600,000 farmer-members. This farmer-owned cooperative has 1,500 local co-op associations in 25 states, and each association has at least one farm supply store. Trained experts at these outlets would use the satellite-based system to further help farmers.

Checking Data Accuracy

To get the project under way, a small plane carrying sensors similar to those which will be mounted on satellites flew over ARS research plots in Arizona, California, Iowa, Nebraska, and Texas during the past two growing seasons. The sensors are digital cameras that view crops or soil in several bands of reflected light — both visible and near-infrared. The cameras record energy as digital numbers representing the amount of light hitting the sensor. ARS provided data to help RESOURCE21 convert the digital numbers to numbers that represent surface properties like reflectance. These reflectance numbers are then used to create maps for farmers that represent crop and soil conditions.

To represent field conditions, ARS researchers took detailed, systematic measurements of crop growth and development. These measurements — captured by more than a dozen different kinds of scientific instruments — determine how well the imagery in digital format correlates with the scientists' on-foot field measurements.

Sounding an Early Warning

The information is critical, says ARS plant physiologist Stephan J. Maas, because the imagery could alert farmers to problems in time for them to take action. Maas and his colleagues conducted the tests at ARS's Western Integrated Cropping Systems Research Unit in Shafter, California.

"Our results," says Maas, "indicate that the imagery is sufficiently accurate to perceive whether the crop is coming up well enough for the grower to let it continue for the rest of the season — or whether it is coming up so poorly the grower needs to replant while there's still time. "Later in the season," Maas adds, "the imagery can tell you if gaps are appearing in the plant canopy. Because the imagery is keyed to global positioning satellites, you can get the exact coordinates of the

trouble spot in the field. You can find out if there is something wrong with your irrigation system or if insects are attacking the crop or if there's some other type of problem."

Scientists led by ARS plant physiologist Jerry L. Hatfield at the National Soil Tilth Laboratory in Ames, Iowa, are designing statistical techniques to interpret what's known as temporal variation — the patterns of change seen in aircraft and satellite images over time. By viewing the same fields as those scanned by the remote sensors, scientists are able to determine the patterns of the soil color and topography and crop growth. The researchers then analyze the patterns for clues about soil conditions and crop growth over the growing season. This will allow farmers to pinpoint specific problem sites in a field and apply nutrients and pesticides only where needed.

Detecting Yield-Limiting Factors

ARS scientists in Lubbock and Lincoln are testing remote sensing's ability to detect conditions that can reduce crop yields, such as water stress and nitrogen deficiency. In 1998, the second year of trials in Lubbock, a sensor-equipped plane flew over cotton and cornfields every day to view the effects of the worst April-through-July drought in Texas High Plains history. The project's scientists were able to test remote sensing of nitrogen deficiencies in crops under extremely dry, as well as fully irrigated, conditions.

"The drought and high air temperatures were so bad," says Dan R. Upchurch, "that when we cut back on irrigation by only a third, we grew 80 percent less corn." Upchurch leads research at the ARS Cropping Systems Research Laboratory in Lubbock. Upchurch and agricultural engineer Donald F. Wanjura compared two levels of watering in both corn and cotton to see how reduced watering affected crops during a severe drought. For each water level, they tested five levels of nitrogen fertilizer application.

To verify the aerial readings, the scientists took ground measurements such as leaf water potential, a measure of how tightly water is held in leaf tissue. They also collected data from a field weather station and a set of infrared thermometers that measure leaf temperature. A boom-mounted camera perched above the canopy measured light reflectance of the fields.

The purpose of the experiment was to see whether cameras can detect plant nitrogen deficiency before visible signs appear, under both dry and wet conditions. Lincoln researchers are working to develop signatures — "fingerprints" of the different light wavelengths — to indicate nitrogen deficiency or water stress. "For each area, a different stress may predominate," says Schepers. "In Texas, that's water. In Nebraska, nitrogen is of more concern."

[The research is a part of Integrated Farming Systems, an ARS National Program described on the Internet at www.nps.usda.ars.gov/pro-grams/ 207s2.htm. For more information, contact James S. Schepers, USDA-ARS Soil and Water Conservation Research Unit, 119 Keim Hall, University of Nebraska, Lincoln, NE 68583-0915. Phone: (402) 472-1513; fax: (402) 472-0516; e-mail: jscheper@unlinfo.unl.edu.]

Less Fertilizer, High Yields of Wheat — A Win-Win Situation

Pamela Matson and her colleagues used funds from the National Research Initiative's Forest/Range/Crop/Aquatic Ecosystems Program to help combat the consequences of the "Green Revolution," as reported in the April 3, 1998, issue of *Science*. Although the increased use of chemical fertilizers and pesticides, irrigation, and mechanization has increased crop yields, it has also resulted in deposition of nitrates from soils into freshwater and marine ecosystems, often causing blooms of microorganisms like algae; unwanted accumulations of nitrous oxide, a greenhouse gas; and increased levels of tropospheric ozone and acid rain because of increases in nitric oxide. But high yields and environmental degradation need not be a trade-off. Matson's research confirms that high yields are possible using less fertilizer, saving farmers money and reducing environmental costs.

Matson's research was designed to assess management alternatives that reduced the amount of nitrogen released into the air and water, but were still economically and agronomically feasible. The researchers used irrigated spring wheat systems in the Yaqui Valley of Sonora, Mexico, for

their study. The Yaqui Valley is a major wheat-producing region that has helped to foster the Green Revolution. (The Green Revolution is the name given to an effort begun in the 1960s to transfer agricultural technologies to agriculturally less-advanced regions of the world.)

The experiment took place during the 1994-95 and 1995-96 wheat cycles. It included a control where no fertilizer was added, a conventional farming treatment currently in use in the region, and three alternative farming methods — 28 percent less fertilizer, fertilizer later in the crop cycle, and both. All three alternative methods differed in the amount of fertilizer applied before irrigation, and one of the methods used 28 percent less total fertilizer as compared to conventional amounts.

Amount and Time of Nitrogen Applications

Practice	Total Nitrogen Applied (kg N/ha)	Percent Applied Before Planting	Percent Applied At Planting	Percent Applied After Planting	Total Nitrogen Lost (kg N/ha)
Traditional Practice	250	75	0	25	6.61
Alternative 1	250	33	0	67	6.93
Alternative 2	250	0	33	67	3.31
Alternative 3	180	0	33	67	0.74
Control	0	0	0	0	0

None of the alternative methods significantly affected the wheat yield (the control yielded 2 tons per acre and the alternative methods had a yield of about 2.4 tons/acre), but there were significant differences in the amount of nitrogen released into the soil and air. The best alternative method, the one that applied 28 percent less nitrogen than the conventional method, resulted in a 69 percent reduction in total nitrogen loss and an approximate savings of $22 to $30 per acre to the farmer. Therefore, this alternative method is not only environmentally friendly and agronomically feasible, but it is also economically more desirable — a win-win situation.

Tim Strickland, program director of the Forest/Range/Crop Aquatic Ecosystems Program, points out that "Dr. Matson's work is a stellar example of how an improved understanding of the mechanisms controlling natural processes can enhance environmental protection and profitability of agriculture."

[For more information, contact Pamela A. Matson, Stanford University, Green Earth Sciences Building 355, Stanford, CA 94305-6055. Phone: (650) 725-6812; fax: (650) 725-0979; e-mail: matson@pangea.stanford.edu.]

Notes on Education

Girls Scouts Work for Clean Water While Earning New Patch

Girl Scouts all over the Washington, DC, metro area are working hard to gain a new patch to sew to their jackets. The new Water Drop Patch Program is an innovative clean water partnership between the Girl Scout Council of the Nation's Capital and EPA's Office of Wetlands, Oceans, and Watersheds. The program encourages girls to make a difference in their communities by becoming watershed and wetlands stewards. It also teaches them to use their skills to educate others in their community about the need to protect the nation's valuable water resources.

The Water Drop Patch Program provides 20 different watershed activities in which Girl Scouts can get involved, including (depending on age level) the following:

- Identifying ways to reduce water pollution at home and in the yard.
- Visiting local wetlands or wetland exhibits (e.g., National Zoo wetlands exhibit) and learning about wetlands' importance and their basic characteristics.
- Learning about their local watershed, including the source of their drinking water.

- Stenciling storm drains with a reminder that storm drains dump directly to a local waterbody.
- Conducting "streamwalks" to monitor and survey local stream health.
- Hosting watershed and ground water festivals to raise community awareness.
- Monitoring water quality.
- Participating in stream, wetland, and beach cleanups.

After completing a prerequisite number of these activities, Girl Scouts earn a beautiful patch with an embroidered white egret on a lily pond.

Although the program has been in existence only since March 1999, many girls are already working toward earning their patches. Tina Fierros, a Brownie leader in the DC area, is very excited about getting her girls involved in the Water Drop Patch Program. In May Fierros took her Brownie troop on a camping trip to Prince William Park in Virginia. There the girls examined the water and wildlife for signs of pollution. They were accompanied by an EPA mentor, who taught them about toxic substances and how they get into the ground water. Eleven girls earned their Water Drop patches on the trip.

To help the Girl Scouts get started, EPA published a Water Drop Patch Program booklet that provides background information on watersheds, NPS pollution, wetlands, and ground water/drinking water; a list of resources and helpful web sites; and a glossary. The booklet has been distributed to 6,500 troops (approximately 45,000 girls) in the D.C. metro area. It will be made available to other councils at regional workshops throughout the year, and it is also available on the Internet at www.epa.gov/surf2/adopt/patch/. Girl Scouts all over the country will soon be able to earn a Water Drop patch from the Girl Scout Council of the Nation's Capital.

The Water Drop Patch Program is just one of the many innovative watershed partnerships encouraged in the President's Clean Water Action Plan. One of the plan's key actions calls for EPA to support local organizations and citizens in locally based watershed protection efforts, and to encourage the organization of groups nationwide by increasing the availability of information and technical assistance.

[If you want more information or have ideas for other innovative watershed partnerships, contact Patty Scott, U.S. EPA, 4501F, 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-1956; fax: (202) 260-2529; e-mail: scott.patricia@epamail.epa.gov.]

Educational Resources Column

VIDEOS

■ The Chesapeake Bay Program has developed, ***Beyond Sprawl,*** a video on six techniques to curtail urban sprawl. It discusses urban boundaries, infill development, transit-oriented development, transfer of development rights, rural clustering, and traditional neighborhood development. To order a copy, contact the Chesapeake Bay Local Advisory Committee, 416 Goldsborough Street, Easton, MD 21601. Phone: (410) 822-9630; fax: (410) 820-5039.

■ ***The Groundwater Adventures of Walter Wet*** is a 12-minute video that discusses the hydrologic cycle, aquifers, point and nonpoint source pollution, and wellhead protection. It is intended for a wide variety of audiences from schoolchildren to elected officials. The video has won an Award of Distinction from The Communicators Awards, a national awards organization that recognizes outstanding work in the communications field. The Award of Distinction is awarded for projects that exceed industry standards in production or communication skills. The video costs $19 and can be obtained by calling Maria DuBois, Passaic River Coalition, at (908) 766-7550.

■ ***Use of Constructed Wetlands for Stormwater Runoff*** is a 20-minute video on how wetlands reduce pollution, design elements of wetlands, success stories, and sources of assistance. The video cost $19.95 and is available from the Cornell University Resource Center, 7 BTP, Ithaca, NY 14850 or visit the Cornell Cooperative Extension web site at www.cce.cornell.edu/publications/catalog.html.

REPORTS AND PUBLICATIONS

■ ***Life on the Edge . . . Owning Waterfront Property*** was published by the University of Wisconsin Extension especially for shoreland property owners or would-be owners. The increasing demand for waterfront property is just one example of how private living styles can infringe upon public rights. If you are interested in waterfront living and a lifestyle that has a low impact on the environment, this book is for you. To order, send $3.00 per copy plus $1.50 for shipping/handling for a total of $4.50 (make checks payable to UW-Extension) to UWEX-Lakes Program, College of Natural Resources, University of Wisconsin, 1900 Franklin Street, Stevens Point, WI 54481.

■ ***Stories in the Land: A Place-Based Environmental Education Anthology,*** produced by the Orion Society, continues the Nature Literacy series with a handbook for teachers and citizens who wish to cultivate place-based learning. Classroom teachers show how they use art, science, and storytelling to open new possibilities for curriculum. Specific, doable activity descriptions accompany each essay. For a copy, contact the Orion Society, 195 Main Street, Great Barrington, MA 01230. Phone: (413) 528-4422; web site: www.orionsociety.org.

Reviews and Announcements

Stormwater Strategies: Community Responses to Runoff Pollution

The report, *Stormwater Strategies: Community Responses to Runoff Pollution*, was produced by the Natural Resources Defense Council (NRDC) in May of 1999 and provides more than 150 examples of successful programs across the country. "Reducing runoff pollution does not have to be an overwhelming problem for communities," says George Aponte Clarke, an NRDC policy analyst and one of the report's authors. "Our report shows that when motivated, local governments are able to develop strong programs to fight this problem."

The report presents key strategies used by local governments that are currently being used to control stormwater runoff. Detailed case studies, organized by region, highlight everything from urban retrofitting to volunteer monitoring and stormdrain stenciling.

[For a copy of the report, send $14.00 plus $3.00 shipping and handling to NRDC Publications Department, 40 West 20th Street, New York, NY 10011.]

Community Resources Guide

Solutions to common problems geared to the unique needs of smaller communities can be found in *Helpful Resources for Small Communities*. The publication is a free listing of guidebooks and other materials from the National Center for Small Communities. The materials contain valuable tips for saving time and money, helpful worksheets and checklists, useful ways to turn ideas into action, and references to additional resources and assistance. The guide offers publications and services on local government management, community and economic development, raising funds and cutting costs, funding strategies, underground storage tanks, drinking water and wastewater treatment, and more.

[To order, contact NCSC, 444 North Capitol Street, NW, Suite 294, Washington, DC 20001. Phone: (202) 624-3550; fax: (202) 624-3554; e-mail: kjackson@sso.org.]

Riparian Forest Wildlife Guidelines for Landowners and Loggers

This 30-page publication was developed in cooperation with the nonprofit organization Forest Stewardship Foundation and is being distributed by Montana State University Extension Service. With chapters describing the importance of streamside management zones; dead wood habitat; and forest birds, fish, and other wildlife, the publication provides principles and guidelines useful to anyone interested in riparian forests.

[To order this publication (#EB146), send $5.00 to MSU Extension Publications, P.O. Box 172040, Bozeman, MT 59717. Phone: (406) 994-3273.]

Nutrient Loading from Conventional and Innovative Site Development

A number of new site planning techniques may be able to reduce post-development nutrient export by conserving forest cover, reducing or disconnecting impervious cover, reducing high-input lawn areas, protecting riparian areas, using pervious areas for stormwater treatment, and installing alternative on-site disposal system technologies. When implemented together, these better site designs can reduce nutrient export and infrastructure costs to the developer and the community.

In *Nutrient Loading from Conventional and Innovative Site Development,* the Center for Watershed Protection analyzed four conventional site plans that represent typical development scenarios across the Chesapeake Bay — a large-lot, single-family residential subdivision; a medium-density residential subdivision; a commercial strip mall; and an office park. Basic development variables such as total drainage areas, total impervious cover, effective impervious cover, lawn cover, forest cover, soil type(s), utilities (length and type), size, type and length of stormwater conveyance, size and type of stormwater BMPs, riparian forest cover, linear feet of roads, and method of wastewater treatment were measured at each site.

Surface nutrient export from each site was computed using the Simple Urban Nutrient Output Model (SUNOM). A spreadsheet model was used to calculate the costs of infrastructure development. Each site was then redesigned as an innovative development using national model land development principles developed by the Center.

The study found that better site designs can reduce impervious cover by 25 to 40 percent for a range of development scenarios, and produce from 40 to 65 percent less phosphorus and nitrogen than conventional site designs, roughly the same amount that can be removed by a well-designed stormwater pond. The study also found that innovative site designs cost 5 to 20 percent less to build than conventional site designs.

[The study costs $20 and is available from the Center for Watershed Protection, 8391 Main Street, Ellicott City, MD 21043. Phone: (410) 461-8323; fax: (410) 461-8324; or download an order form at www.pipeline.com/~mrrunoff.]

Protecting and Restoring Watersheds: A Tribal Approach to Salmon Recovery

The Columbia River Inter-Tribal Fish Commission has developed this handbook to explain the Columbia River treaty tribes' strategic approach to watershed restoration. It includes sections on watershed assessment, watershed protection, active and passive restoration, and monitoring. The book also includes an extensive resources section with links to web sites, bibliographies, and contacts at organizations that can help you get started on the ground. The handbook draws on up-to-date science, is presented in easy-to-understand language, and is intended to help watershed councils, landowners, and other natural resource practitioners undertake restoration in ways consistent with the tribal restoration philosophy. It is organized around the concept that good science, good sense, and good partnerships produce good results.

[For a copy of this free handbook, contact Jill Ory, Watershed Department, Columbia River-Inter-Tribal Fish Commission, 729 Northeast Oregon, Suite 200, Portland, OR 97232. Phone: (503) 238-0667; e-mail: oryj@critfc.org; web site: oryj@critfc.org.]

Reflections

In Good Hands

by Carol Forshee, U.S. EPA Office of Water

Eager young student teams from 23 universities competed at the campus of New Mexico State University in Las Cruces in April in the annual International Environmental Design Contest. The contest was held by the Waste-Management Education and Research Consortium (WERC). I was privileged to act as a judge. Schools throughout the world, including the United Arab Emirates and Mexico, presented solutions for current environmental problems in the United States.

WERC was established in 1989 by the U.S. Department of Energy (DOE) to expand the Nation's capability to address waste management issues through education, and technology development and transfer. WERC members include New Mexico State University, University of New Mexico, New Mexico Institute of Mining and Technology, and Diné College, in collaboration with Sandia National Laboratories and Los Alamos National Laboratory.

The contest began that year when DOE in Albuquerque, New Mexico, requested innovative designs to remediate hazardous and nuclear waste that was polluting the soil and water at the site. It has since grown to include universities and many government and corporate sponsors. The sponsors submit problems for solution and the advisory committee of universities and sponsors chooses which problems will be used in the contest.

This year schools were judged on their solutions to up to six of the following tasks:

1. Mine tailing stabilization
2. Suppression and immobilization of radioactive airborne particulates
3. Innovative landfill closure cap
4. Transuranic waste reduction
5. Pipeline waste removal
6. In situ soil decontamination

The problems were all real situations, but WERC disguised the locations. Some schools entered solutions for only one problem, while others entered as many as five.

Presentations were reviewed by 80 judges representing government, industry, academia, and private consulting firms. Most of the judges were scientists and engineers from such prestigious organizations as Sandia Labs, Los Alamos National Lab, Oak Ridge National Lab, Hanford Nuclear Site, U.S. Army Corps of Engineers, Battelle-Pantex, Lockheed Martin, and others. Judges also came from universities in China, Ireland, Germany, Mexico, Portugal, and Slovakia.

Working for the Watershed Branch of EPA's Office of Water, I chose to judge Task 1: Mine Tailings Stabilization, along with 13 other judges. I received 12 papers to read and score before arriving at the contest. To my surprise, no two solutions were alike. Some contained similar elements, but were implemented in different ways or used in combination with different elements. Solutions ranged from draining runoff from the tailing pile into a wetland, to draining through permeable walls of material to stabilize heavy metals, to complete encapsulation of the pile. Two teams placed layers of material in the pile to effect bioremediation. One team even proposed a barrier of ice below the pile. Another team chose to place electrodes in wells dug in the pile. With a current powering the electrodes, and the pile saturated with sulfuric acid, the metals would migrate to the cathodes, where they would be stabilized by phosphoric acid.

Each team wrote a paper describing its project, made an oral presentation, conducted a bench-scale demonstration using samples from the tailings pile, and displayed a poster. Prizes were awarded for first and second places for each task. Other awards, such as best paper, best oral presentation, and

In Good Hands (continued)

most innovative were also handed out at the judges' discretion. Purdue University won the overall prize of $2,500 for presenting the best solutions for more than one task. First place winners for Tasks 1-6 were Clarkson University, University of Idaho, University of Missouri, Purdue University and Oregon State, Montana Tech, and Case Western and Purdue University, respectively. High schools in Tatum and Las Cruces, New Mexico also took home first place awards.

On the last day of the contest, the students attended a job fair; some were more excited about the opportunities available at the job fair than about winning the contest.

The contest is a win-win situation. Sponsors get free research for their money, and the students get to try their hands at real-life problems and have their projects evaluated. According to the contest's director, Dr. Abbas Ghassemi, "This is the best educational and practical experience the students receive. They get an opportunity to address real-world problems during the school year, prepare a working model, and present it to leading experts from all over the U.S. serving as judges." The innovative solutions proposed during the contest proved that the future is in good hands. The next contest will be held April 3-7, 2000.

[For more information, contact Carol Forshee, U.S. EPA, 401 M Street, SW, Washington, DC 20460. Phone: (202) 260-7111; fax: (202) 260-1977; e-mail: forshee.carol@epamail.epa.gov. Or contact Dr. Abbas Ghassemi, New Mexico State University, P.O. Box 30001, Las Cruces, New Mexico 88003-8001. Phone: (505) 646-2038; fax: (505) 646-1719; e-mail: aghassem@nmsu.edu.]

Datebook

DATEBOOK is prepared with the cooperation of our readers. If you would like a meeting or event placed in the DATEBOOK, contact the NPS News-Notes editors. Notices should be in our hands at least two months in advance to ensure timely publication.

Meetings and Events

July 1999

14-17	*Sixth Biennial Stormwater Research and Watershed Management Conference*, Tampa, FL. Contact Diane Caban, Mail Code: MAN, SWFWMD, 2379 Broad Street, Brooksville, FL 34609-6899. Phone: (352) 796-7211.
24-30	*Coastal Zone '99*, San Diego, CA. Contact: Madeleine Walsh, Urban Harbors Institute, University of Massachusetts, Boston 100 Morrissey Blvd., Boston, MA 02125-3393. Phone: (617) 287-5570; fax: (617) 287-5575.

August 1999

5-8	*1999 Midwest Environmental Education Conference "At the Crossroads,"* Stillwater, MN. Web site: www.seek.state.mn.us/cal/calendar./cfm.
8-11	*Water Resources into the New Millenium: Past Accomplishments, New Challenges,* Seattle, WA. The 1999 International Water Resources Engineering Conference. (800) 548-2723; web site: www.asce.org/conferences/we99/index.html; e-mail: conf@asce.org.
8-11	*Walk on the Wild Side, Soil and Water Conservation Society Annual Conference*, Biloxi, Mississippi. Contact Pat Mulligan (515) 289-2331, ext. 17; email: patm@swcs.org.
9-12	*1999 Stockholm Water Symposium: Urban Stability Through Integrated Water-Related Management*, Stockholm, Sweden. Contact the Stockholm International Water Institute at +46 -8-736-20-08; e-mail: sympos@siwi.org; web site: www.siwi.org.
14-17	*Sixth Biennial Stormwater Research and Watershed Management Conference,* Tampa, FL. Contact Diane Caban, SWFWMD, Mail Code: MAN, 2379 Broad Street, Brooksville, FL 34609-6899. Phone: (352) 796-7211, ext. 4297.
16-20	*Working at a Watershed Level,* Durham, NH. Course addresses watershed ecology, system dynamics, assessment and analysis, planning/management approaches, remediation strategies, public involvement, and outreach/education. Contact Barry Tonning at (606) 244-8228; e-mail: btonning@csg.org; web site: www.statesnews.org/ecos/working.htm.
August 31-September 1	*West Coast Regional BEACH Conference*, San Diego, CA. Contact Mary Crowe at (703) 385-6000, ext. 144 or crowema@tetratech-ffx.com or visit www.epa.gov/OST/beaches.

September 1999

12-17 — *7th Annual National Nonpoint Source Monitoring Conference,* Morro Bay, CA. Contact Katie Kropp, Central Coast Regional Water Quality Control Board, (805) 549-3336.

14-16 — *The Seventh Symposium on the Chemistry and Fate of Modern Pesticides,* Lawrence, KS. Contact the University of Kansas, Division of Continuing Education, 1515 St. Andrews Drive, Lawrence, KS 66047-1625. Phone: (785) 864-4790; fax: (785) 864-5074; e-mail: bproctor@ukans.edu.

14-16 — *6th Biennial Stormwater Research and Watershed Management Conference,* Tampa, FL. Contact Diane Caban, Southwest Florida Water Management District, Mail Code: MAN, SWFWMD, 2379 Broad Street, Brooksville, FL 34609-6899. Phone: (352) 796-7211, ext. 4297; web site: www.swfwmd.state.fl.us.

21-22 — *Successful River Corridor Management Planning and Policy Considerations,* Fargo, ND. Contact Linda Kingery at (701) 352-3550; e-mail: lkingery@polarcomm.com.

21-23 — *9th Southern States Annual Environmental Conference and Exhibition,* Biloxi, MS. Contact MISSTAP. Phone: (601) 325-8067; fax: (601) 325-8616; e-mail: lindig@che.msstate.edu; web site: www.che.msstate.edu/misstap.

22-24 — *Working at a Watershed Level,* Jekyll Island, GA. Training course in basic aquatic ecology, watershed assessment, management, outreach, and stakeholder involvement. Contact Barry Tonning at (606) 244-8228; e-mail: btonning@csg.org; web site: www.statesnews.org/ecos/working.htm.

25-30 — *15th International Estuarine Research Federation Conference,* New Orleans, LA. Contact Denise Reed, (504) 280-7395, djreed@uno.edu or Robert Twilley, (318) 482-6146, rtwilley@usl.edu.

October 1999

9-13 — *WEFTEC '99.* Contact Water Environment Federation, Attn: WEFTEC '99 Program Coordinator, 601 Wythe Street, Alexandria, VA 22314-1994 or visit WEF's web site at www.wer.org/docs/conference.html.

18-19 — *East Coast Regional BEACH Conference,* Tampa, FL. Contact Mary Crowe at (703) 385-6000, ext. 144; e-mail: crowema@tetratech-ffx.com; website: www.epa.gov/OST/beaches.

November 1999

15-17 — *Understanding and Addressing Risks to Groundwater, The 15th Annual Groundwater Foundation Fall Symposium,* Atlanta, GA. Contact Cindy Kreifels or Zoe McManaman at (800) 858-4844.

16-17 — *Wetlands and Remediation: An International Conference,* Salt Lake City, UT. This conference will include both the treatment and remediation of contaminated wetlands and the use of wetlands for the treatment and remediation of contaminated water and wastewater. Contact Karl Nehring at (614) 424-6510; e-mail: nehringk@battelle.org.

18 — *Rivers, Dams, and the Future of the West,* Salt Lake City, UT. Topics will include assessing the impacts of dams, riparian restoration, planning and modeling mitigation, riverine ecosystems, and more. Contact the Jack Hamilton, Executive Director, Utah Wetlands and Riparian Center, University of Utah, 1515 Mineral Square, Rm. 138, Salt Lake City, UT 84112. Phone: (801) 581-6384; e-mail: jack.hamilton@m.cc.utah.edu.

December 1999

15-17 — *Conservation 2000: Conference to Highlight Local, State, and Federal Programs,* New Orleans, LA. Contact the Conservation Technology Information Center at (765) 494-9555 or e-mail: ctic@ctic.purdue.edu.

January 2000

16-20 — *4th International Conference on Diffuse Pollution,* Bangkok, Thailand. Contact Ms. Nitayaporn Tonmanee, Department of Land Development (DLD) Phaholyothin Road, Chatuchak, Bangkok 10900, Thailand. Phone: (662) 579-0111, ext. 1386; fax: (662) 562-0732; e-mail: ldd@mozart.inet.co.th.

February 2000

7-10 — *Tools for Urban Water Resource Management and Protection: A National Conference,* Chicago, IL. Contact Bob Kirschner, Natural Resources Department, Northeastern Illinois Planning Commission, 222 S. Riverside Plaza, Suite 1800, Chicago, Illinois, 60606. Phone: 312/454-0401, ext. 303; fax: 312/454-0411; e-mail: bobkirs@nipc.org; web site: www.epa.gov/owow/urban.html.

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

Editorial contributions from our readers sharing knowledge, experiences, and/or opinions are invited and welcomed. (Use the COUPON on page 27.) However, *News-Notes* cannot assume any responsibility for publication or nonpublication of unsolicited material or for statements and opinions expressed by contributors. All material in *NEWS-NOTES* has been prepared by the staff unless otherwise attributed. For inquiries on editorial matters, call (202) 260-3665 or (703) 548-5473 or FAX (202) 260-1977.

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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. It is distributed free of cost. 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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News-Notes
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