



Nonpoint Source News-Notes

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

Notes on the National Scene

Transportation Equity Act Provides New Funds to Protect Water Quality



The CWAP logo seen throughout this issue 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.

The Transportation Equity Act for the 21st Century (TEA-21), signed by the President on June 9, 1998, promises to strengthen proven strategies to safeguard public health and the environment, including point and nonpoint source control measures. TEA-21 creates new opportunities to improve air and water quality, restore wetlands and natural habitats, and rejuvenate urban areas through transportation redevelopment, increased transit, and sustainable alternatives to urban sprawl. Among other things, TEA-21 includes provisions that target the nation's leading cause of water pollution — nonpoint source runoff.

The law emphasizes the coordination of federal agencies and authorizes highway safety, transit, and other surface transportation programs for the next six years. While some of the programs are new, the law continues most of the programs initiated by the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the first transportation legislation which addressed environmental protection in a significant way. ISTEA gave state and local officials substantial flexibility to shift funding among surface transportation modes and provided substantial funding for high technology, such as intelligent transportation systems, to make travel safer, cleaner, and more efficient. A total of \$217,573 billion was earmarked for various programs under TEA-21, \$8.1 billion of which will be used to protect the environment.

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According to Ed Drabkowski of EPA's NPS Control Branch, "The Federal Highway Administration recognizes the need for controlling nonpoint pollution and is addressing storm water runoff along highways, and the erosion and sedimentation problems associated with construction, operation, and maintenance of our nation's highways. EPA and FHWA are already working with state departments of transportation and local transportation agencies to address NPS pollution, and the new TEA-21 strengthens federal support for state NPS control measures."

Several provisions of TEA-21 aim to protect water quality, including:

- **Transportation Enhancement.** Funded through a 10 percent set-aside (\$3.3 billion over 6 years) of the Surface Transportation Program (STP), transportation enhancements are projects that improve communities' cultural, aesthetic, and environmental qualities. Some of the eligible activities include, for example, bicycle and pedestrian pathways, historic preservation, acquisition of conservation or scenic easements, rails-to-trails projects, and the mitigation of water pollution due to highway runoff. Because most transportation projects are classified under stormwater rules as "industrial" (construction) discharge sources which require stormwater NPDES permits, pollution from such activities as bridge scraping or gravel road grading can be mitigated with funds from the transportation enhancement program.
- **Environmental Restoration and Pollution Abatement.** Also under STP, state transportation departments can spend up to 20 percent of the cost of reconstructing, rehabilitating, resurfacing, or restoring a transportation facility to address water pollution or environmental degradation associated with current or past projects. This could include retrofits or construction of stormwater treatment systems, BMPs, and riparian or wetland restoration projects.
- **Wetlands Restoration and Mitigation Banking.** STP and National Highway System (NHS) funds can be used to help address wetlands losses caused by past, current, or future federally aided transportation projects. TEA-21 also establishes a preference for mitigation banks in STP or NHS projects that involve natural habitat or wetlands mitigation.
- **Environmental Streamlining.** TEA-21 requires that federal agencies work together to streamline environmental review of transportation projects. Streamlining will speed up reviews under the National Environmental Policy Act and other environmental assessments, including review of wetlands and stormwater permits.
- **Transportation and Community System Preservation Pilot.** Over the next six years, a total of \$120 million is earmarked for a pilot project to encourage states and local agencies to plan, develop, and implement strategies that integrate transportation and community planning. This pilot project is modeled after successful planning initiatives in several states such as Oregon, Florida, and Maryland. Funding for the project is \$20 million in FY 1999 and \$25 million per year for FYs 2000 through 2003.
- **Transportation-Environment Cooperative Research Program.** The act will fund a program to research the relationship between highway density and ecosystem health. The program will also establish an advisory board that will make recommendations about environmental research, conservation, and technology transfer.
- **Clean Vessel Act.** TEA-21 continues funding for the construction of pumpout and dump facilities in marinas. As more and more states seek to designate both coastal and inland waters as no-discharge areas, this provision is becoming increasingly significant.
- **Metropolitan and Statewide Planning.** TEA-21 consolidates the metropolitan and statewide planning criteria established in 1991. "Protect and enhance the environment" is one of the seven broad categories state transportation departments and metropolitan planning organizations must consider in preparing long-term transportation plans. The provision presents an opportunity to look at urban sprawl and to integrate consideration of watershed plans, wetlands, habitat, and open space.

Drabkowski points out that although state transportation departments ultimately decide how to use the funds given them under TEA-21, EPA, citizens groups, municipalities, and others can influence their decisions. Such groups can encourage environmental awareness at project sites, the development and enforcement of erosion and sediment control programs, and good environmental management practices in general. He adds that, "as more people become aware of runoff pollution, a reduction in NPS pollution will be noted." TEA-21 provides resources to fund both the National Pollutant Discharge Elimination System and NPS environmental controls. Funds might be used to

**Wetlands and Highways:
A Natural Approach**

Wetlands and Highways: A Natural Approach is a quick read from the Federal Highway Administration on mitigating wetland loss, including 10 success stories on mitigation banking across the nation. Contact the Federal Highway Administration, (202) 366-2069, Publication No. FHWA-PD-94-004.

restore watersheds, improve stormwater treatment systems that address runoff from highways, and enhance municipal storm sewer systems that service highways and surrounding areas.

According to a statement by U.S. Department of Transportation Secretary Rodney E. Slater, "This legislation strengthens proven strategies to safeguard public health and the environment, such as the Congestion Mitigation and Air Quality Improvement Program to help communities clean their air, transportation enhancements to help them improve their quality of life, and new technologies, such as less polluting vehicles and intelligent transportation systems."

[For more information, visit www.fhwa.dot.gov/tea21/index.htm or contact Fred Bank, Natural and Cultural Resources Team Leader, Federal Highway Administration, Mail Route HEP-40, Washington, DC 20590. Phone: (202) 366-5004.]

Fourteen Rivers Designated American Heritage Rivers

Some flow through pristine forests. Others carry traffic to large commercial ports. Some have already undergone restoration; still others remain heavily polluted. But together, the 14 American Heritage Rivers selected last summer reflect the extraordinary diversity that characterizes America's rivers. The American Heritage Rivers Initiative recognizes and rewards voluntary community-based efforts to restore and protect the environmental, economic, cultural, and historic values of the country's rivers. Unlike programs where federal agencies act as the lead decision makers, leadership in applying for the designation and carrying out American Heritage Rivers plans is locally driven.

The selection, announced by the President and Vice President in July, means that, over the next five years, communities along the rivers will carry out their own plans for revitalizing their rivers, aided by a "river navigator." Each river navigator, supported by the federal government and selected with local input, will help communities identify existing federal programs and resources that can help them implement their action plans.

Although some designations cover the entire length of a single river, others include more than one river or cover only stretches of a river.

Blackstone and Woonasquatucket Rivers (MA, RI). Historic sites along the rivers illustrate the region's transition from pristine forest to agriculture to industry. Passing through Worcester and Providence, two of the largest cities in New England, both rivers suffered from heavy industrial use. Recent efforts, however, have improved water quality and reclaimed historical sites. The American Heritage River designation will help the 26 river communities to integrate ongoing and future restoration activities.

Connecticut River (CT, MA, NH, VT). Flowing for more than 400 miles from the Canadian border to the Connecticut coast, the river passes through New England's great northern forest, 99 cities and towns, and some of the nation's best preserved wetlands. The Connecticut River is an economic lifeline for the region, and its watershed provides key habitat for a variety of wildlife. The Connecticut River action plan will continue efforts already begun to clean up the river. The river's communities envision a river with clean water, salmon runs, improved and diverse recreational opportunities, protected open lands with river access, and riverfront development in downtown areas.

Cuyahoga River (OH). Once so polluted that it caught on fire, the 100-mile-long Cuyahoga was a symbol of the plight of America's rivers and a rallying point for passage of the Clean Water Act. Through new laws and partnerships, the water quality of the river has improved dramatically, and the river's communities are experiencing a rebirth. The action plan focuses on balanced planning of economic and environmental uses of the river and the surrounding landscape. Designation as an American Heritage River will bring four existing partnerships together in a coordinated effort to revitalize the watershed.

Detroit River (MI). The 32-mile-long Detroit River, once a "roadway" for early settlers, American Indians, and slaves fleeing the South, today serves more than five million people with drinking water, recreation, and cultural opportunities. The river paid a heavy price during the region's industrial growth, but cleanup efforts have improved water quality, and wildlife again flourishes. Goals of the action plan include reducing toxic pollution, encouraging environmentally sound riverfront industry, and improving access to riverside parks and wildlife areas.

Hanalei River (HI). From headwaters high on the slopes of Mt. Waialeale on the island of Kauai, one of the wettest spots on earth, the Hanalei River flows 16 miles through a lush, scenic valley before it empties into Hanalei Bay. The valley is populated by unique Hawaiian plants and animals (many of them endangered) and contains a number of archeological sites. The Hanalei community is working to preserve traditional lifestyles and protect unique natural resources in the face of increasing population and economic pressures for development. Designation as an American Heritage River provides an opportunity for local government and stakeholders to establish a forum for resolving potential conflicts over use of the river.

Hudson River (NY). Flowing 315 miles from the Adirondack Mountains to the New York Harbor, the Hudson is one of the nation's most important commercial and recreational rivers. More than eight million people in 19 counties live in the Hudson River Valley. More than 400 environmental groups, sportsmen's organizations, historic societies, and nonprofit organizations are working on a variety of projects in the valley. Designation as an American Heritage River will help improve coordination among federal, state, local, and private efforts to improve and protect the river and its wetlands, restore waterfront communities, and stimulate cultural activity.

Upper Mississippi River (IA, IL, MN, MO, WI). The longest river in America, the Mississippi is perhaps the most renowned as well. For generations, the river known as the "Father of Waters" and the "Big Muddy" has inspired artists and writers. This key economic link through America's heartland helps sustain one of the most diverse wildlife populations in the world. Among the plans of the 58 river communities along the upper Mississippi are redevelopment of St. Louis' aging port with housing, museums, and greenways; creation of a Mississippi River Discovery Center in Dubuque; and establishment of the Tom Sawyer University in the Quad Cities to educate the public about the river.

Lower Mississippi River (LA, TN). This designation covers the stretches from Memphis and Baton Rouge to New Orleans. The lower Mississippi supports rich farmland, extensive wetlands, and the largest port complex in the world. Memphis is working to revitalize its downtown riverfront area by improving public access, preserving open spaces and historic sites, and developing new recreational opportunities. Plans from Baton Rouge to New Orleans include creation of a riverside community center, cleanup and redevelopment of riverfront property, preservation of cultural and historic sites, and development of a comprehensive plan to protect coastal resources.

New River (NC, VA, WV). Despite its name, the New River is the oldest river in North America — probably about 320 million years old. It originates in the Blue Ridge Mountains and flows north for 250 miles through hills and farmland to West Virginia's coal country. Communities along the New River are committed to maintaining traditional land uses like agriculture, fishing, forestry, and recreation while generating new economic activity to compensate for the decline in coal mining. Development of the action plan has helped strengthen community ties between at least two localities. After working together on the action plan, residents of West Jefferson pitched in to help their neighbors in Bakersville during floods last January.

Potomac River (DC, MD, PA, VA, WV). The Potomac River and its watershed lie at the heart of the American experience, from the river's agricultural highlands to the nation's capitol in Washington, DC. A major environmental restoration effort has been under way since the 1960s, when President Lyndon Johnson declared the river "a national disgrace." The action plan for the Potomac involves dozens of communities and aims at continued water quality improvement and environmental restoration, development of effective flood control plans, promotion of the region's rich historical heritage and recreational opportunities, and local citizen involvement.

Rio Grande (TX). Flowing from Colorado to the Gulf of Mexico, through one of the country's fastest-growing regions, the Rio Grande forms the border between Mexico and the United States. The North American Free Trade Agreement has fueled a manufacturing boom on the Mexican side of the river, and trade between Mexico and Texas is key to the regional economy. Livestock ranching and other agricultural uses predominate outside the metropolitan areas. Although water quality has suffered in recent years, the lower Rio Grande valley remains one of the most biologically diverse regions in the United States. The action plan will focus on creating partnerships to assess water needs; support voluntary environmental, economic, and cultural initiatives; address bilateral issues; and protect individual property rights. The designation covers the cities of El Paso, Laredo, and Brownsville, and Big Bend National Park, Amistad National Recreation Area, Falcon Reservoir, and Atatosa Wildlife Preserve.

St. Johns River (FL). Beginning as a broad marsh south of Cape Canaveral, the St. Johns flows 310 miles to Jacksonville. It drops only 30 feet along the way, making it one of the laziest rivers in the world. The St. Johns provides a major route for commercial shipping, as well as opportunities for boating and other recreation. It supports a diverse array of wildlife, from bald eagles to the endangered manatee. Dolphins often make their way 20 miles upriver and can be spotted by office workers in Jacksonville high-rises. Major plans are being developed for water quality, flood protection, and watershed restoration projects along the entire length of the river.

Upper Susquehanna and Lackawanna Rivers (PA). These rivers flow through scenic valleys in northeastern Pennsylvania, where coal mines helped fuel America's industrial growth but left a legacy of pollution that communities are now working to reverse. Since the early 1980s, citizens and organizations in the watershed have completed several projects to restore the rivers, protect important natural resources, and foster economic revitalization. The action plan includes a comprehensive ecosystem study, flood protection, restoration of mine-scarred land, economic growth, and new recreational and educational resources.

Willamette River (OR). Flowing 187 miles from the Cascade Mountains to the Pacific Ocean, the Willamette was the final destination of pioneers on the Oregon Trail. They called it the "Garden of Eden," but it later became known as one of the nation's most polluted waterways. A major cleanup effort is beginning to restore the river. Priorities for new and continued efforts include protecting and restoring wetlands and floodplains, finding cost-effective solutions to flooding and sewage problems, improving the health of aquatic species and habitat, and minimizing the impacts of population growth and changing land use.

The action plans developed for the rivers seek to, in Vice President Gore's words, "clean up America's rivers, create new jobs, and strengthen the communities that surround them for generations to come." But the 14 designated rivers are not the only waterways that will benefit from the initiative. Through the American Heritage Rivers website, all river communities can get information on flood events, population change, road networks, the condition of water resources, and partnerships already at work in their area. Customized maps and environmental and educational assessment models will also be made available.

[For more information, visit www.epa.gov/rivers or contact the American Heritage Rivers Hotline, (888) 407-4837.]



Editor's Note: An article on the EPA-USDA Joint Strategy for Animal Feeding Operations that appeared in *Nonpoint Source News-Notes* #53 (July-August 1998) erroneously implied that the strategy had been released at that time. We apologize for the error. Please note that some of the proposed deadlines reported in that article have changed.

As part of the Clinton Administration's Clean Water Action Plan, Agriculture Secretary Dan Glickman and EPA Administrator Carol M. Browner announced on September 16 a draft plan to improve America's water quality and reduce public health risks associated with animal feeding operations. Glickman and Browner invited public comment on the proposed USDA-EPA Unified National Strategy for Animal Feeding Operations.

"Earlier this year, President Clinton announced his Clean Water Action Plan to finish the job of cleaning up America's waterways. Today, this Administration is taking a major step toward that goal by working together to curb a significant source of water pollution — animal wastes that run off into our waterways," says Browner. "This draft plan is the most aggressive strategy ever proposed to address this problem and protect our nation's rivers, lakes, and streams."

"This is a customer-driven strategy," says Glickman. "Comments from the public are essential to shaping it. This comment period provides the public with an excellent opportunity to let us know how we can work with livestock producers to improve the quality of our nation's water while keeping the livestock industry strong and protecting the quality of life in rural communities. We want to hear from owners and operators of animal feeding operations and the livestock industry on the draft strategy."

The proposed USDA-EPA Unified National Strategy for Animal Feeding Operations is one of more than 100 actions President Clinton directed as part of the Clean Water Action Plan. The plan identifies nonpoint sources as the most important remaining sources of water pollution and provides a coordinated effort to reduce polluted runoff. The release of the USDA-EPA draft strategy to control animal waste runoff is a key action item under the President's plan.

The draft strategy proposes a variety of voluntary and regulatory approaches. It is designed to help AFO owners and operators remain financially healthy while reducing threats to public health and water quality. The draft strategy also relies on industry leadership to provide educational, financial, and technical support for pollution control plans.

The strategy establishes a national expectation that all animal feeding operations develop and implement comprehensive nutrient management plans by the year 2008. These plans include manure handling and storage, application of manure to the land, record keeping, feed management, integration with other conservation measures, and other manure utilization options. USDA's Natural Resources Conservation Service estimates 300,000 feeding operations will need to develop or revise comprehensive nutrient management plans to meet expectations of the strategy.

As part of the strategy, USDA and EPA estimate that 95 percent of the 450,000 animal feeding operations will be encouraged to implement voluntary comprehensive nutrient management plans. An estimated 15,000 to 20,000 livestock operations will be required to develop comprehensive nutrient management plans as part of permits under the Clean Water Act (currently about 2,000 permits have been issued). The regulatory program intends to focus permitting and enforcement activities on concentrated animal feeding operations, or CAFOs, which include the largest AFOs (those with 1,000 or more animal units), AFOs with unacceptable conditions such as direct discharge into waterways, and AFOs that are significant contributors to water quality impairment within a watershed.

EPA and state agencies will expand efforts to ensure that all permits include comprehensive management requirements, including land application conditions, and will revise regulations to support this effort by December 2001. In addition, EPA will revise national environmental

guidelines to limit discharge from poultry and swine facilities by December 2001 and national guidelines for cattle and dairy facilities by 2002.

Over the next several months, EPA and USDA will accept comments on the draft strategy. The deadline for comments is January 19, 1999. After the public has had a chance to review the document, EPA and USDA will hold listening sessions in several cities to get comments firsthand. The sessions will occur in late November and the date and locations will be publicly announced.

[Copies of the draft strategy are available from EPA's Water Resource Center at (202) 260-7786. Comments on the draft strategy should be addressed to Denise C. Coleman, Program Analyst, USDA, Natural Resources Conservation Service, P.O. Box 2890, Attention: AFO, Washington, DC 20013-2890. For information on the schedules for the listening session or to access the strategy, visit www.nhq.nrcs.usda.gov/cleanwater/afo or www.epa.gov/owm/afostrat.htm.]

News from the States, Tribes, and Localities

Maryland Law Brings Lawn Care into Nutrient Management Arena

Farmers have long been a target of concern about nutrient runoff, but a new law in Maryland fingers another group — the folks that make your lawn green and lush. Both agricultural producers and lawn care professionals in Maryland must now abide by a new law provision that requires some commercial fertilizer applicators to apply nutrients in accordance with the recommendations of the University of Maryland Cooperative Extension Service or face a fine of up to \$10,000.

The requirement is a part of the Water Quality Improvement Act of 1998 — passed into law on May 13 upon signature by Maryland Governor Parris N. Glendening — which establishes a system of nutrient management planning and financial and technical assistance for farmers in Maryland to reduce nutrients in the Chesapeake Bay. By December 31, 2002, every farm operator in Maryland who uses chemical fertilizers must implement a certified nutrient management plan for nitrogen and phosphorus.

The new law also requires commercial applicators like professional lawn care companies that service nonagricultural or state-owned sites larger than three acres to apply nutrients in accordance with the recommendations of the University of Maryland Cooperative Extension Service. The provision covers areas like golf courses, public school athletic fields, and homes with large lots.

The University of Maryland Cooperative Extension Service recommends that homeowners apply fertilizer no more than three times a year, depending on conditions, and to try to avoid pesticides altogether. However, many homeowners and professional lawn care businesses apply four to five treatments of fertilizer each year and at least one round of pesticides. One franchise even suggests two doses of fertilizer in the spring, one in the summer, one in the fall, and one in the winter — nearly double what the University of Maryland Cooperative Extension Service suggests.

Critics say the new law barely scratches the surface when it comes to pollution from lawn fertilizers. According to a new Gallup poll, 22 million U.S. homeowners spent more than \$14.6 billion on professional landscape/lawn care/tree care services in 1997. The number of households using these services increased by one million in 1997 while spending rose \$600 million over the previous year. One study found that as much as 60 percent of nitrogen applied to turf grass leached to groundwater; however, other studies have found that only 5 percent leaches to groundwater. Such inconsistencies demonstrate the need for further testing.

Unlike farmers, lawn care professionals will not be required to develop nutrient management plans. However, according to Louise Lawrence, chief of the state Office of Resource Conservation, "The Maryland Department of Agriculture is planning to conduct spot checks of these businesses to ensure compliance with the Cooperative Extension Service's recommendations." Regulations to implement the law are now being drafted and are expected to be finalized in the next few months.

Tom Delaney, executive vice president of the Professional Lawn Care Association of America (PLCAA), says the new law in Maryland (or similar laws elsewhere) will have little effect on the lawn care industry since most of their customers have lawns less than three acres in size. Delaney believes improper use of fertilizer by homeowners themselves far outweighs any problems resulting from improper use by professional lawn care providers. "Homeowner education seems to be the weakest link in the chain when it comes to addressing nutrient runoff," says Delaney. "We must keep in mind that only 15 percent of all of the lawns that receive treatment are treated by professional lawn care providers. That means the rest — 85 percent — are treated by folks like you and me who are by no means experts when it comes to lawn health and fertilizer requirements."

Even before the legislation was enacted, some environmentally conscious lawn care services were addressing nutrient runoff. Christopher Forth, a certified professional agronomist and region technical manager for the mid-Atlantic region with TruGreen-ChemLawn, suggests only three applications of fertilizer — one in the early fall, one approximately 6-8 weeks later, and a light application in the spring — keeping in line with most extension service recommendations. TruGreen-ChemLawn agronomists also refer their Virginia customers to Virginia Tech's Cooperative Extension website at www.vt.edu/vt98/research/coopextension.html.

Recently, the PLCAA worked in partnership with EPA's Pesticide Environmental Stewardship Program, the National Association of County Agricultural Agents, USDA, the National Foundation for Integrated Pest Management, and the Better Lawn Institute to develop *Water Quality and Your Lawn*, an educational brochure on proper turf management practices. The brochure provides tips that help protect water quality and explains how lawns can act as a water purification system to keep lakes and streams clean.

There is no doubt that nutrients can "green up" turfgrass. But judicious fertilization can keep lawns healthy and even reduce the chance of fertilizers reaching groundwater. Research has shown that a properly fertilized lawn has an extensive root system that uses nutrients more efficiently and allows

less to leach through the soil. In addition, a strong root system can make a lawn more resistant to summer drought. Phosphorus, nitrogen and potassium are all important nutrients in lawn care, but if erosion occurs, phosphorus and potassium can move with soil particles and contribute to pollution. Mobile forms of nitrogen can leach through the soil to contaminate the water supply if not properly applied.

Agricultural Provisions of the Act

The Water Quality Improvement Act of 1998 requires all agricultural operations with annual gross incomes in excess of \$2,500, or more than eight animal units (one animal unit equals 1,000 pounds), to implement a nutrient management plan. Maryland farmers using commercial fertilizers must develop nitrogen and phosphorus-based plans by December 31, 2001, and have them in place one year later. Farmers applying animal manure or sludge must develop nitrogen-based plans by December 31, 2001, and implement them by December 31, 2002. These farmers will also be required to develop a nitrogen and phosphorus-based plan by July 1, 2004, with implementation required one year later.

Although the Water Quality Improvement Act includes specific time frames with administrative penalties for non-compliance, the law builds in many incentives aimed at helping farmers meet deadlines and requirements. Additional Cooperative Extension consultants will be available to write nutrient management plans, and 15 new field personnel will be hired by soil conservation

Fertilizer Application Tips from the University of Maryland Cooperative Extension

- Have soil tested before applying fertilizer, and retest every three to five years. (In Maryland, call the Home and Garden Information Center to obtain testing materials at 1-800-342-2507. For other states, contact your local county extension agency for testing information.)
- Apply no more than 1 lb./1,000 ft² of fertilizer at a time.
- Cool season grasses, such as tall fescues and Kentucky bluegrass, should be fertilized in the fall. Warm season grasses, such as zoysiagrass and Bermudagrass, should be fertilized in the late spring or early summer.
- Keep fertilizer off of sidewalks, driveways, and streets. If fertilizer lands on these surfaces, sweep it onto the lawn or scoop it up for later use.
- Reassess the need for high maintenance lawn care. Consider using ground cover, shrubs, and trees, especially in shady areas and near streams or drainage areas in your lawn.
- Never apply fertilizer to swales or other drainage areas in lawns.
- Never apply fertilizer to dormant lawns or to frozen ground.
- Don't use fertilizer to melt ice. It doesn't do a good job, and much of it gets washed into waterways.

districts statewide. Tax incentives of up to \$4,500 to help farmers make the transition to phosphorus-based nutrient management planning and additional deductions for equipment purchases for poultry or livestock manure spreading will also be offered.

In addition, farmers who want their nutrient management plans developed by a non-governmental consultant may be eligible for cost-share assistance of up to \$3 an acre under the Maryland Agricultural Water Quality Cost-Share Program. Nutrient management plans developed with cost-share assistance are required to be implemented as they are developed. Other incentives include the establishment of an animal waste technology fund and a pilot poultry litter transportation program for the lower Eastern Shore counties.

[For more information on the Water Quality Improvement Act or a summary of the Act's provisions, call the Maryland Department of Agriculture at (410) 841-5863.]

Land Development Provisions to Protect Georgia Water Quality



An Atlanta developer has created a new residential development that incorporates the best of the old and the new in a water-quality-friendly neighborhood called Burnt Hickory Registry. The developer, Steve Macauley of Macauley Homes and Neighborhoods, worked closely with Cobb County to obtain exceptions from existing local regulations that actually contribute to nonpoint source runoff.

Traditional housing developments in the county have uniform lot sizes (usually a half acre) that ignore the natural topography of the land. (See *News-Notes* #53 for more on better site development.) At Burnt Hickory, lots are platted with attention to the slope and other natural features. This has, in some cases, resulted in smaller lot sizes than traditional planned development zoning dictates. However, by following the natural contours and features, a minimal amount of land is cleared and more open green space is available in the community.

Award-Winning Development Manual

The practices Macauley implemented in planning and building Burnt Hickory Registry are included in an award-winning document from the Georgia Department of Natural Resources and the University of Georgia's School of Environmental Design. *Land Development Provisions to Protect Georgia Water Quality* outlines actions that developers can take to minimize harmful impacts to streams. The manual received a National Merit Award in the Planning and Urban Design Category at the 1998 American Society of Landscape Architects (ASLA) convention, and received a similar award from the Georgia ASLA.

The fifteen provisions serve as a partial "menu" from which municipalities can make selections and adapt them to local needs and conditions. The provisions can help to control construction of impervious surfaces, define alternative transportation options, and specify dimensions and materials for streets, parking lots, and residential lots.

For more information, contact Ted Mikalsen, Georgia Environmental Protection Division, Nonpoint Source Management Program, Floyd Towers East, Suite 1070, 205 Butler St, SE, Atlanta, GA, 30334. Phone: (404) 656-4887.

Macauley reduced impervious surfaces by 10 to 20 percent by making the streets narrower. Where cul-de-sacs could not be eliminated, the runoff impact was lessened by landscaping the center of these areas. Another aesthetically pleasing protective feature is an eight-foot setback for all sidewalks with trees and landscaping buffering the sidewalk from the road.

Even during construction, contractors took precautions to keep runoff to a minimum. Felled trees were ground up and used on site to create check dams to filter runoff. Hydroseed or mulch covered disturbed soil, and temporary small detention ponds with stand pipes were installed to control flow. As the ponds filled, drainage through the stand pipes is routed through the check dams to filter sediments from stormwater runoff. Visual inspections during rain indicated water clarity similar to pre-disturbance.

By combining features of both traditional neighborhood development (still favored by zoning requirements in Georgia) and open space planning, which maximizes green spaces, common areas, nature trails and preserves, Macauley is promoting "Town Park" planning. He uses the environmentally friendly features of Burnt Hickory Registry as a marketing tool. He also incorporated historic features found during an archeological survey of the site into the development, including the remains of a 1848 chimney, a Civil War trench/rifle pit, and an old mill on several "premium lots." As demand by environmentally conscious home buyers increases, Macauley hopes that local governments will continue to make concessions to development practices that promote better land stewardship while decreasing environmental impacts.

[For more information, contact Steve Macauley, Macauley Homes and Neighborhoods, 2700 Delk Rd, Suite 150, Marietta, GA 30067. Phone: (770) 419-2397.]

Restoring Minnesota Habitat



Minnesota is investing proceeds from state bond sales in protecting natural resources. Since 1986, when the Minnesota legislature passed the Reinvest in Minnesota (RIM) Act, \$60 million has purchased 2,650 conservation easements totaling 81,800 acres. An additional \$15 million has been appropriated for 1999-2000. The RIM Reserve Program has been embraced by both local governments and landowners as a way to save valuable resources without losing revenue generated from farming privately owned land.

This win-win tactic targets land parcels that currently are a factor in degrading the state's water, soil, and wildlife resources including sensitive groundwater recharge areas, riparian corridors, and drained wetlands. Once the state purchases the easement from the landowner, the landowner agrees to establish and maintain conservation practices on the parcel and is reimbursed for the cost up to a specified limit. The perpetual easements essentially buy the state land use rights and prohibit activities such as cropping, grazing, wildlife habitat alteration, and construction on the easement.

Once an easement is established, compliance monitoring once a year for the first five years, and then once every three years helps ensure landowner compliance with the terms of the easement. The first years, as vegetative buffers and other new measures become established, are most critical.

Popular and Successful

The program is popular. Landowner applications exceed available program dollars three to one. Three keys to the longevity and success of this program are partnerships, local administration, and continued monitoring. Forming partnerships with other entities, including federal agencies, other state and local agencies, and conservation and farming organizations, to share costs has enabled the RIM program to purchase more conservation acres. These partners also lend technical support to the program. Although the Minnesota Board of Water and Soil Resources is responsible for overall administration of the program, local soil and water conservation districts work directly with landowners to complete the acquisition process and conservation measures.

Incentives Pay

To more efficiently use its financial resources, the RIM Reserve Program recently joined forces with the Conservation Reserve Enhancement Program (CREP). CREP, administered by USDA's Farm Service Agency, pays farmers and ranchers to take their most environmentally sensitive lands out of production for a minimum of 10 years. These landowners are also required to plant native vegetation, reduce erosion, and provide habitat for threatened wildlife on these lands. On the same parcel of land, CREP pays for the conservation easement for the first 15 years, and then RIM begins payment of the perpetual easement. Basically, this saves the RIM program 15 years of payments and enables more acres to enter the RIM program. The landowner receives an incentive payment for agreeing to this arrangement.

A similar agreement exists with the Natural Resource Conservation Service's Wetland Reserve Program (WRP). The RIM program overlays their perpetual easement payment with the WRP's 30-year easement on the same parcel of land to reduce RIM's financial burden. After the first 30 years of the WRP easement, RIM begins to pay for the perpetual protection of sensitive environmental resources. So far, under this agreement, 4,400 acres have been reserved under WRP, essentially saving the RIM program \$2.9 million.

According to Tim Fredbo, program manager for RIM, the program is meeting its objectives, and the landowners are satisfied with the conservation easement agreements.

[For more information, contact Tim Fredbo, Minnesota Board of Water and Soil Resources, 1 West Water Street, Suite 200, St. Paul, MN 55107. Phone: (612) 296-0880.]

Urban Notes

Parking Lot at Florida Aquarium Becomes Laboratory

One of the most interesting exhibits at the Florida Aquarium isn't the shark tank or the alligator pen, but the parking lot. The lot is the site of a new study that will document the performance of several different stormwater treatment methods on parking lot runoff.

The Southwest Florida Water Management District and the Florida Department of Environmental Protection are working together on the project, which will take three years to complete. When the project is over, the two agencies will have invested more than \$250,000 in grants for the research, which will address Florida's, and one of the nation's most pressing water quality problems.

Betty Rushton, of the Southwest Florida Water Management District is leading the research on stormwater treatment technologies and their performance, which involves using a treatment train approach to clean up stormwater runoff from the parking lot. According to Rushton, not only does the design treat stormwater, but the grassed swales and forested wetlands also "make for a prettier and cooler parking lot," an important consideration for urban dwellers feeling trapped by concrete and asphalt.

In a treatment train, several different methods are used in succession to reduce the amount of pollutants at each stage of the treatment. The treatment train at the aquarium parking lot channels water from pavement through swales into planted forested wetlands called strands and, finally, into a wet detention pond before it is discharged into the bay.

Step One: The Parking Lot

Impervious surfaces are one of the largest sources of polluted runoff, yielding oil, grease, litter, heavy metals, organic carbons, and other car-related pollution. During the study, Rushton will measure pollutant concentrations from three types of pavement — permeable, cement, and asphalt. Most parking lots today are paved with asphalt, a suspected component of pollution itself.

Step Two: The Swales

After runoff leaves the parking lot, it collects in four-foot swales placed between the rows of cars. The gently sloping depressions, planted with native grasses, slow the runoff and allow it to infiltrate. A clever design made the swales possible without the sacrifice of parking spaces by taking two feet off the end of each parking space. Now the front end of each car hangs over a permeable swale instead of impermeable pavement.

Step Three: The Strands

Runoff that is not absorbed in the swales drains into the forested wetlands, or strands. These strands consist of several kinds of native plants, including wax myrtle, cabbage palms, black rush, and other native grasses that withstand periodic flooding. Several trees species, including cypress, red maple, and bay, were planted specifically for their ability to reduce stormwater flow and absorb pollutants. The strands work similarly to the swales except they are larger and often contain standing water.

Step Four: The Wet Detention Pond

The last component of the treatment train is a wet detention pond. The permanent pond allows pollutants to gradually settle to the bottom or be absorbed by plants and sediments. Treated runoff leaves the pond and empties into the bay. The pond is planted with native aquatic pickerelweed, which adds surface area for filtration and absorption of pollutants in stormwater runoff. Besides collecting samples as water leaves the swales in the parking lot, Rushton will collect samples before

the runoff enters the pond and after it leaves. Rushton will also collect runoff that does not drain through a swale as a control condition.

Rushton started collecting samples in August and will continue to collect them after storms for the next two years. She will then analyze the results and release them in the winter of 2001. The data collected will be compared to baseline measurements taken before the project began. Preliminary data collected thus far have been promising, indicating a drastic reduction in polluted runoff when the treatment train is used.

The parking lot project serves two other functions: public education and project demonstration for commercial developers. The Management District encourages applicants to look at the site and to consider its design as an alternative in their development design. So far, the Dibbs Commercial Center in Hillsborough County has used a similar design in their permit application. The Management District's Brooksville Office in Hernando County, Florida also uses a similar design.

Aquarium Visitors Learn About More Than Jellyfish

Visitors at the Florida Aquarium start learning as soon as they enter the parking lot. The Aquarium hosts nearly 600,000 visitors each year, most of whom use the parking lot. Located throughout the lot are signs explaining the exhibit and the experiment. Each driver who enters the lot receives an illustrated brochure explaining the exhibit, including drawings to help visitors identify the swales, strands, and pond, and the vegetation found in each. Becky Clayton, curator of education at the Aquarium, also works with the Hillsborough County School System (the 13th largest school system in the nation) to develop a curriculum to teach ninth graders about stormwater and water quality issues. "The curriculum, called 'Florida Science,' will replace traditional biology with Florida-specific science education that focuses on the environment," says Clayton. The program will include field trips to the parking lot exhibit. The Aquarium also plans to add an interpretative program to the exhibit within the next year that will offer a special behind-the-scenes tour into the workings of the stormwater experiment.

[For more information, contact Betty Rushton, Resource Projects, SWFWMD, 2379 Broad Street, Brooksville, FL 34609. Phone: (352) 796-7211, ext. 4276; fax: (352) 754-6885. Or contact Becky Clayton, The Florida Aquarium, 701 Channelside Drive, Tampa, FL 33602. Phone: (813) 273-4085; fax: (813) 209-2067.]

Publications on Open Space Zoning

Open Space as a Resource in the Land Preservation District

The Montgomery County (Pennsylvania) Planning Commission produced the *Open Space as a Resource in the Land Preservation District* brochure to help communities address open space issues. This brochure looks at the role of open space planning in municipal comprehensive planning, options for physical use and management, types of landscapes that can be preserved or created, the function of a landscape management plan, and how long-term management can tie into community-wide visions for open space. For a copy, contact Brian O'Leary at (610) 278-3728.

Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks

In his book *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks*, Randall Arendt, landscape architect and one of the nation's leading advocates of open space conservation, focuses on how municipalities can improve their zoning and subdivision regulations to better maintain open space for the enjoyment and benefit of the entire community. The handbook is available for \$35.00 from Island Press. Call (800) 828-1302.

Growing Greener

This book, also by Randall Arendt, summarizes how municipalities can use the development process to their advantage to protect interconnected networks of open space. It presents four basic actions key to the conservation design process and two case studies of subdivision designs at work in Pennsylvania. For a copy, send a check for \$56 (which includes \$6 postage and handling) to Randall Arendt, 226 Monument Avenue, Malvern, PA 19355.

Conservation Subdivision Design for Stormwater Runoff

This manual provides guidance for site design that incorporates conservation. The intent is to provide an incentive for land developers to retain and incorporate natural site features into site development, thereby reducing or eliminating the need for structural stormwater management controls. The manual discusses conservation design as it relates to wetlands, floodplains, forested areas, meadows, riparian buffers, soils, and other natural features. Copies are available for \$25 plus \$4 postage by contacting the Sediment and Stormwater Program, Division of Soil and Water Conservation, DNREC, 89 Kings, Dover, DE 19901. Phone: (302) 739-4411; website: www.dnrec.state.de.us.

Model Urban Natural Resources Conservation Plan Tackles NPS Head On

Six urban demonstration sites are helping the city of Madison, Mississippi, find a balance between economic growth and conservation of natural resources. By the year 2000, the city will have completed a new Model Urban Natural Resources Conservation Plan to guide new zoning ordinances and other development requirements. The city is working in partnership with the Mississippi Soil and Water Conservation Commission.

The six demonstration sites will test buffer zones, detention basins, and parking lots designed to hold water, and check dams (rocks put in streams to slow down the current so that sediment can settle to the bottom). The BMPs will be monitored over the next two years and judged on how well they prevent erosion, filter runoff, and protect water quality.

During the past two years, data on land use activities, stream quality, and the amount and location of impervious surfaces have been collected from four watersheds in the area. The Brashear Creek, Culley Creek, Culley Lake, and Hearn Creek watersheds are experiencing rapid population growth. Background information collected about the watersheds will also be analyzed in the plan to help educate city residents and officials of the importance of controlling NPS pollution.

Guide for Urban Planning

Urbanization and Water Quality: A Guide to Protecting the Urban Environment is a step-by-step guide for planning, organizing, financing, and publicizing a nonpoint source management program.

The cost for the 67-page manual is \$37. Orders placed before Dec. 15 will receive 20% off. To order, contact Terrene Institute, 4 Herbert St., Alexandria, VA 22305. Phone: (703) 548-5473.

According to Phylis Vandevere, project coordinator for the Mississippi Soil and Water Conservation Commission, "Streams in Madison have suffered immensely from the effects of urban growth." Many are the victims of sedimentation, polluted runoff, and streambank erosion. The plan will identify areas that need the most help and suggest actions to protect water quality. Vandevere hopes that other municipalities experiencing rapid growth will be able to use the plan as a model to develop their own plans and data banks to prevent some of the problems that Madison has encountered.

Administered by the Mississippi Soil and Water Conservation Commission and on the local level by the Madison County Soil and Water Conservation District, the project is funded by a \$272,000 section 319 grant to the state of Mississippi and matching state and local funds.

[For more information, contact Phylis Vandevere, Mississippi Soil and Water Conservation Commission, P.O. Box 23005, Jackson, MS 39225-3005. Phone: (601) 354-7654.]

Agricultural Notes

Surface Water Improves in Central Columbia Plateau, Ground Water Problems More Persistent

A five-year study by the U. S. Geological Survey suggests that less sediment is washing into Central Columbia Plateau streams, probably as a result of increased use of best management practices by area farmers. Other findings, notably pesticide contamination of ground and surface water of eastern Washington and western Idaho area, were less heartening.

The Central Columbia Plateau is a 13,100-square mile area between the Columbia and Snake rivers that includes the cities of Moses Lake and Pullman, Washington, and the entire Palouse River Basin. The Plateau is one of more than 50 areas across the nation being investigated by the USGS as part of its National Water Quality Assessment (NAWQA) program.

The USGS study showed that the use of sprinkler or drip rather than furrow irrigation has decreased soil erosion in the Columbia Basin Irrigation Project area, which is intensively fertilized and irrigated. In the Palouse River Basin, erosion has also decreased, perhaps due to BMPs such as no-till seeding. Decreased sediment loading, pesticides and their breakdown products means degraded aquatic habitat can begin to improve. However, the study found that a breakdown product of the environmentally persistent banned insecticide DDT in both streambed sediment and in bottom fish at concentrations exceeding guidelines for the protection of aquatic life.

"Another problem for fish habitat is excessive plant growth caused by high levels of nutrients in streams," says Mark Munn, a biologist for the USGS study. But lower rates of fertilizer application may account for nitrate concentrations leveling off in some areas.

Ground Water Impacted

Shallow wells, generally those less than 150 feet deep, are the most susceptible to contamination. However, many public water supplies draw from wells at greater depths and are less susceptible to contamination from agricultural practices.

"From the standpoint of human health, we were most concerned about checking for nitrate and pesticides in drinking water," says Sandy Williamson, USGS hydrologist and chief of the study. "We found nitrate levels exceeding the maximum contaminant level in about 20 percent of all wells." (A maximum contaminant level, or MCL, is a drinking water regulatory standard set by EPA for treated drinking water.)

"The story on pesticides is a mixed bag," Williamson says. "We found at least one pesticide in nearly half of the drinking water wells sampled, but pesticide levels were only a very small fraction of their MCLs." As a cautionary note, however, Williamson says that about half of the pesticides detected in Central Columbia Plateau wells do not have MCLs established.

Difficulty in Accessing Pesticide Significance

Lack of information makes it difficult to assess the significance of pesticides in drinking water. "As scientists, we don't know enough yet about what happens when these pesticides are combined," he says. "In some of the very shallow wells that the USGS installed for monitoring purposes, we found up to seven different pesticides."

Encouraging news is that none of the newer pesticides, which break down more rapidly in the environment, were found at concentrations exceeding MCLs. All compounds exceeding drinking water standards (found in only one percent of the wells sampled) are older compounds that have not been sold as pesticides since the mid-1980s.

However, agricultural impacts on water quality go beyond the concerns for drinking water; the aquatic ecosystem of the plateau also has been significantly affected. Munn notes that stream sampling by the USGS showed seven currently used pesticides at concentrations above the limits recommended for protecting aquatic life.

[For more information, contact Sandy Williamson, 1201 Pacific Avenue, Suite 600, Tacoma, WA 98402. Phone: (253) 593-6530, ext. 235; fax: (253) 593-6514; e-mail: akwill@usgs.gov]

A 35-page color report, *Water Quality in the Central Columbia Plateau, Washington and Idaho, 1992-95* summarizes the results of the study. The report is available free of charge from the USGS Branch of Information Services, Box 25286, Denver Federal Center, Denver, CO 80225. Phone: (303) 202-4700; fax: (303) 202-4693; e-mail: nawqa_ccpt_wa@usgs.gov. The report (USGS Circular 1144) may also be viewed at water.usgs.gov/lookup/get?circ1144/.

Insurance Rewards Farm*A*Syst

Editor's Note: See *NPS News-Notes* #50 for another recent article on Farm*A*Syst activities.

Northwestern Michigan is the scene of an important breakthrough in insurance coverage for local farmers. The Northwest Michigan Groundwater Stewardship Program worked with the North Pointe Insurance Company of Michigan in the spring of 1997 to develop an insurance program that rewards farmers for clean water practices. "We called insurance companies and asked, 'Can we make it financially beneficial to participate in the Farm*A*Syst program?'" says Janet Person of Michigan's Antrim Conservation District. "After several question-and-answer sessions, North Pointe Insurance agreed to give it a try."

North Pointe Insurance investigated Farm*A*Syst and the goals of the Michigan Groundwater Stewardship Program and concluded that Farm*A*Syst could be at the forefront of "preventive insurance." Farm*A*Syst enables farmers and ranchers to identify pollution risks from nitrates, microorganisms, and toxic chemicals by using a worksheet. Acknowledging that correcting the problems identified by Farm*A*Syst would potentially lower the risk of costly insurance claims, North Pointe Insurance decided to offer lower insurance premiums to farmers who participate in the local groundwater stewardship program.

To receive the lower insurance premium, a farmer completes the requirements in three successive stages (see accompanying box). After each stage, the farmer receives the premium credit: five percent individual reductions for Stages 1 and 2, and an additional 10 percent reduction for the completion of Stage 3. A farmer already doing a good job of preventing pollution can receive the lifetime insurance premium credit through a positive high-risk assessment and a letter from the Conservation District. Program participation is open to any farmer insured through North Pointe.

As part of the program, a groundwater technician works with the farmer to identify practices to reduce the risk of contamination and develop the Emergency Preparedness Plan. Confidentiality and privacy are respected, allowing a close working relationship.

Is the program successful? "My first farmer could hardly wait," says Person. "After a few minor changes, all he needed to get credit was a lock on a storage shed — and he couldn't get to the store fast enough!"

So far, only North Pointe Insurance is participating in the program, but others may soon buy in. According to Person, "We would love to work with Farm Bureau since they are one of the largest insurers in the agricultural community. In my opinion, their support would give the program a real boost."

State dollars fund Farm*A*Syst, but grant money from corporations may become available. "Public funds cannot fund these programs forever," says Person. "It makes sense for the corporations to become involved. They are funding their own clients."

The Farm*A*Syst program encourages partnerships among federal and state governments, farm organizations, and private business to support the voluntary efforts of farmers and ranchers in protecting the environment. Farm*A*Syst is funded nationally by USDA's Cooperative State Research Education and Extension Service, Natural Resources Conservation Service, and EPA.

*[For more information, contact Janet Person, Antrim Conservation District, 106 Depot, Complex 2, Bellaire, MI 49615. Phone: (616) 533-8363. For information on Farm*A*Syst, contact Farm*A*Syst/Home*A*Syst, B142 Steenbock Library, 550 Babcock Drive, Madison, WI 53706-1293. Phone: (608) 262-0024; website: www.wisc.edu/farmasyst.]*

Requirements for Earning Premium Credits

Stage 1

- Complete all Farm*A*Syst worksheets pertaining to the farm with a groundwater technician.
- Update Emergency Preparedness Plan that is easily accessible to emergency crews.
- Design a stewardship plan to correct all high risks identified in Farm*A*Syst worksheets 5 and 6.

Stage 2

- Properly seal (not cap) all dug, drilled, or driven wells not in use.
- Provide chemical/fertilizer storage facilities that:
 - ✓ are downslope and at least 150 feet from any private well
 - ✓ are 200 feet from any surface water
 - ✓ have impermeable floors (not dirt, gravel, or wooden plank floors)
 - ✓ are locked and marked as chemical and fertilizer storage facilities
- Stay at least 150 feet from the wellhead when filling sprayers with fertilizers or chemicals, or filling the sprayer at a field site.

Stage 3

Complete all Farm*A*Syst worksheets pertaining to the farm and have no high risks except for household wastewater and hazardous waste.

Notes on Riparian and Watershed Management

Working Buffer Strips Provide Both Profit and Protection for Oregon Farm

By Miles Merwin



Adapted from an article that appeared originally in the *Temperate Agroforester*, July 1997.

Oregon farmer Rob Miller planted his first buffer strip of native cottonwood 25 years ago along the riverbanks adjacent to his cropland. Since then, "working" buffer strips have not only protected his valuable farmland from erosion, but have also provided a profitable wood crop. They are now an integral part of a diversified farming operation that includes row crops, a research and production nursery, and specialty crops.

Mt. Jefferson Farms, owned by second-generation farmer Rob Miller, produces a variety of row crops on about 200 acres of fertile alluvial soil along the North Santiam River in the Willamette Valley south of Salem. According to Miller, the farm originally had 600 acres of irrigated cropland along the river, but lost 400 acres to erosion and siltation from periodic flooding. The remaining acreage has been saved by the planting of riparian buffer strips.

In the mid-1960s, Miller procured cuttings of 100 hybrid clones for testing on the family farm. He planted the first buffer strips of native black cottonwood (*Populus trichocarpa*) and hybrid poplars in 1970. The original plantings have withstood several major floods along the river, and portions of it have since been harvested several times for high-value wood products. "My aim is to show landowners that buffer strips can be profitable," Miller says, "or at least a break-even proposition."

The original planting of native black cottonwood was commercially thinned in 1980 and 1994. The 1994 harvest yielded 10,000 board feet per acre, almost all of which was sold for veneer peeler logs at a value of \$350 per thousand board feet. The harvest produced a total gross return of \$70,000. Miller says that other sites on his farm planted with black cottonwood in the mid-1970's have yielded 20,000-25,000 board feet per acre of veneer grade logs.

Miller has also planted poplars and cottonwoods in upland areas of his farm where the soils are too poor to grow economic yields of row crops or grass seed. In a 10-year-old test planting that includes native black cottonwood and several clones of hybrid poplar, the native cottonwood has grown about half as fast as the hybrid poplar. However, where Miller has planted native cottonwoods on better soils adjacent to the riverbank, they have attained merchantable size for veneer in as little as 12-15 years.

Streambank Protection

Miller sees the use of riparian buffer strips to protect water quality as a proactive step to meet expected future regulation which may mandate controls on farming operations near riparian areas. He has about 200 acres of multipurpose riparian buffer at Mt. Jefferson Farms, managing it as a profitable wood crop, protecting his farmland from erosion and flooding, and preventing excess nutrients and agricultural chemicals from reaching the river. The plantings range from 200 to 1,000 feet wide along two miles of river frontage. Miller's aim is to harvest and replant portions of the buffer strips every year to achieve an annual sustained yield of timber while maintaining their protective capacity.

In addition to the riparian buffer strips of cottonwood and poplar, Miller has effectively used several bioengineering practices to prevent streambank erosion. Both poplars and willows are densely planted as "live stakes," and cuttings are used to construct fascines and brush mattresses to help protect the river banks. Buffer strips, combined with bioengineering measures, reduced erosion and siltation of Miller's farmland during recent floods while large barriers of rock rip-rap installed to protect the neighboring farm on the opposite side of the river were not successful.

Miller uses a zonal design to establish riparian buffer strips at Mt. Jefferson Farms. In the zone closest to the river, native cottonwood and native understory plants are established. In some areas with suitable soils, hybrid poplars are densely planted (one per square foot) near the riverbank, both to control erosion and as a stool bed for cuttings. In the next zone away from the river, a variety of trees are more widely spaced for timber production. In addition to hybrid poplar, Miller is also planting Knobcone-Monterey hybrid pine and leyland cypress for wood production on a sustainable cycle of harvest and coppicing or replanting.

Nursery Operations

Mt. Jefferson Farms is Oregon's first and largest hybrid poplar nursery. The company has growing grounds and greenhouse facilities near Salem. Every year, the nursery produces millions of dormant cuttings for landscaping, farmland plantings, and industrial fiber plantations.

"Buffers" Misunderstood by Public

Earlier this year, focus groups organized by the Maine Department of Environmental Protection's Nonpoint Source Program examined marketing NPS controls to the general public. Several findings concerned buffer strips. They found that the term "buffer" carries a different meaning for the public than the one intended by water quality agencies. One member of the focus group said that a buffer was a product used to wax a car.

In addition, the public is more interested in advantages like privacy, noise reduction, and attracting birds and wildlife. They are less interested in "intangibles" like protecting water quality.

The groups recommended avoiding "techno-ese," and saying, for example, "plant trees and shrubs, instead of "plant a buffer." They also advocated picking selling points with the public's concerns in mind, rather than the agency's.

Asking people to plant a buffer for water quality does not appeal to individual needs and societal values. Future campaigns should include slogans like "plant trees and shrubs, screen out noise, increase privacy, attract wildlife, and protect water quality," the groups recommended.

The nursery also does selection, breeding and genetic improvement of hybrid poplars for private industry and public agencies. Many new poplar clones, obtained from Washington State University, University of Washington and other sources, have been screened in greenhouse and field trials. Clones are tested not only for growth, but also for their capacity to take up nutrients such as nitrogen and phosphorus. Clones that are highly efficient at absorbing excess nutrients will be used for "phytoremediation" treatment of wastewater.

In 1992, Miller began selecting and custom-propagating a variety of other native tree and shrub species for ornamental and environmental purposes, e.g., wastewater treatment, filter strips, bioengineering, and watershed revegetation. Customers for contract propagation include both public agencies (e.g., USFS, BLM) and private companies. The aim is to propagate plant material for replanting in the same watershed or zone where it originated. Miller says that the practice of using locally-collected native plants, rather than introducing off-site genetic material, improves the survival rate for revegetation projects. The nursery has propagated spirea, alder, cottonwood, rose, berries, conifers, willow, cypress, and grasses.

[For more information, contact Rob Miller, Mt. Jefferson Farms, P.O. Box 12708, Salem, OR 97309. To subscribe to Temperate Agroforestry, contact Temperate Agroforestry, 203 ABNR, University of Missouri, Columbia, MO 65211. Website: www.missouri.edu/~afta/afta_home.html.]

Report Lists Communities Suffering Flood Losses

A new National Wildlife Federation (NWF) report, *Higher Ground: Voluntary Property Buyouts in the Nation's Floodplains, A Common Ground Solution Serving People at Risk, Taxpayers and the Environment*, identifies 300 communities in 35 states that could benefit from voluntary property buyouts to avoid repeated flood losses. According to the report, voluntary buyouts can help people by providing them with the means to acquire new homes outside of high risk areas, serve taxpayers by eliminating future disaster recovery costs, and improve the environment by permanently converting purchased land to recreational or natural floodplain and wetlands uses.

The top "repetitive loss" communities listed in the report each have clusters of properties with a history of two or more flood losses of at least \$1,000 each in any 10-year period.

The 20,000 voluntary property buyouts that have been completed or are in progress nationwide represent a new approach to dealing with floods and floodplains, according to the report. For the past 60 years, floodplain management has been dominated by structural projects, such as levee and river channelization construction, which often encourage development in floodplains. *Higher Ground* discusses the financial status of the National Flood Insurance Program; federal, state, and

local responsibilities; environmental benefits; pertinent federal laws and programs; and the implications of global climate change. The document also includes NWF's recommendations to improve the voluntary buyout option and reform floodplain policy.

[For a copy of the report, contact NWF, Customer Services, 8925 Leesburgh Pike, Vienna, VA 22184-0001. Phone: (703) 790-4100; website: www.nwf.org/pubs/higherground.]

Watershed Management Helps Lake Le-Aqua-Na Regain Quality



Summarized from a report by Thomas E. Davenport and Susan Ratcliffe Kaynor

Spanning nearly two decades, a watershed management project has helped Illinois' Lake Le-Aqua-Na turn the corner on water quality. Twenty years ago, the lake was suffering from excessive nutrients, nuisance blue-green algae blooms, excessive aquatic weeds, large zones depleted of dissolved oxygen, winter fish kills, high turbidity, and sedimentation.

Lake Le-Aqua-Na, a publicly owned lake in Stephenson County, Illinois, was created in 1956 by impounding Waddams Creek. Covering almost 45 acres, the lake has a watershed of 37 square miles dominated by cropland, with some forest and grasslands. Surrounded by a state park, Lake Le-Aqua-Na is valued by area residents for year-round recreation.

In 1980, local, state, and federal entities formed a partnership to look at in-lake water quality problems. The federal EPA Clean Lakes Program funded an assessment from 1981 to 1983, and Illinois EPA, with public involvement, identified the goals of the assessment:

- Improved year-round dissolved oxygen concentrations
- Increased Secchi transparencies
- Reduced total phosphorus during spring turnover
- Reduced soil erosion in the watershed
- Reduced nutrient loading (internally and externally)
- Reduced algae blooms
- Reduced aquatic macrophytes

The community rallied around the project and implemented recommended watershed management measures. Farmers, whose farms averaged about 250 acres each, were already rotating their corn, soybean, oat, and meadow crops. Producers conducted a special conservation tillage project on most of the cropland. In the upper portion of the watershed, they implemented contour strip cropping and contour planting, and enrolled land in the Conservation Reserve Program. In areas of high sediment delivery, mechanical practices such as terraces, grassed waterways, water and sediment control basins, and streambank stabilization were implemented.

Recommendations for in-lake management included:

- Aeration to improve dissolved oxygen concentrations and reduce internal nutrient loading
- Weed harvesting twice yearly to control aquatic macrophytes and reduce internal nitrogen loading
- Periodic applications of algicides
- Shoreline stabilization to reduce nutrient and sediment loading directly to the lake

Credit for the success of the project goes not only to landowners, but also to several agencies that worked together to support local leadership. Project sponsors and local staff worked hard to provide services and funding. For example, USDA — represented by the Cooperative State Research, Education, and Extension Service, Natural Resources Conservation Service, and Farm Service Agency — contributed educational, technical, and financial assistance. EPA provided technical and financial assistance through the Clean Water Act section 314 Clean Lakes program. The Illinois Department of Natural Resources, Illinois EPA, and the Stephenson County Soil and Water Conservation District provided monitoring, educational, technical, and financial assistance as well. Individual landowners provided cooperation and financial match contributions.

By 1986, sediment, in the form of total suspended solids, had been reduced 88.8 percent from pre-project levels. The project reduced erosion and sediment yield from crop land by 57 percent, streambank erosion by 600 to 1,000 tons annually, and total phosphorus loads by 86.4 percent. Total nitrogen loading did not decrease initially, but during 1992-1994, it decreased by up to 60 percent. Between 1981 and 1986, the form of nitrogen also shifted from Kjeldahl nitrogen to nitrate, possibly due to the reduction of surface runoff and an increase in subsurface outlet drainage associated with terraces, sediment control structures, and conservation tillage.

One measure of improvement in the lake was the shift in algae species. During the summer of 1991, blue-green algae, which has a noxious odor, was dominant. However, diatoms and green algae, more conducive to a healthy aquatic community, dominated from 1992-1994.

In 1993, District Conservationist Jim Ritterbusch found most practices were still in place and functioning as intended. Although the advances have been notable, remaining problems illustrate the challenges of nonpoint source lake pollution. For example, while sediment and phosphorus inputs decreased, achieving the dissolved oxygen goal required aeration to mix the layers within the lake.

"This lake project illustrates the importance of implementing both watershed management practices and in-lake practices, such as aeration, to achieve water quality goals," observes Anne Weinberg, the EPA contact for the Clean Lakes Program.

[For more information, contact Thomas E. Davenport, U.S. EPA Region 5, 77 West Jackson, Chicago, IL 60604. Phone: (312) 886-0209; fax: (312) 886-7804.]

Dam Removal Becoming Widespread

When it comes out within a year, the privately owned Edwards Dam on the Kennebec River in Maine — which has blocked 17 miles of prime fish-spawning habitat for 160 years — will be one of the first hydroelectric dams removed in the United States. And other dams are coming down all across the country, opening many miles of fish-spawning habitat.

The U.S. Fish and Wildlife Service, with a coalition of conservation groups, advocated the removal of Edwards Dam, which is regulated by the Federal Energy Regulatory Commission (FERC). Since its construction, the dam has prevented free passage of Atlantic salmon, American shad, river herring, striped bass, shortnose sturgeon (listed as endangered under the federal Endangered Species Act), Atlantic sturgeon, rainbow smelt, and American eel. The Fish and Wildlife Service administers the Endangered Species Act and has responsibility for anadromous fish.

"As many as 4 million river herring, 500,000 shad, and 3,000 salmon may someday soon find suitable habitat on the Kennebec River above Augusta," Interior Secretary Bruce Babbitt predicts. "The environmental benefits of dismantling this dam far outweigh any future usefulness. Its removal is a conservation milestone and was achieved through a remarkable partnership that can become a model for the nation."

Under the Lower Kennebec River Comprehensive Hydropower Settlement Accord, Edwards Manufacturing and the city of Augusta will relinquish their hydropower license and ownership of Edwards Dam to the state of Maine by January 1, 1999. The state, in turn, will dismantle the dam in 1999 and return the property to the city.

The accord embodies a unique partnership among the city of Augusta, state of Maine, Department of the Interior and other federal agencies, private conservation organizations, upstream dam owners, and Bath Iron Works. The diverse group will work together to ensure funding for dam removal and associated restoration work. Trust funds established under the agreement will be used to help restore and manage migratory fish in the Kennebec River during the next 15 years.

Snake River to Lose Dams?

Large federally owned dams in the Columbia River basin are not regulated by FERC (although most hydroelectric dams are). But, next year, the U.S. Army Corps of Engineers is expected to make recommendations to Congress on whether to remove or modify four dams on the Snake River. Currently, juvenile salmon are collected at Snake River dams and moved downriver by barge and trucks to the Columbia River.

Commercial fishermen, Indian tribes, and environmentalists want stronger salmon protection measures. Electric utilities, such as the Bonneville Power Administration, are concerned that changes will boost electricity costs, hurting their competitive ability when utility deregulation begins.

Neuse River's Quaker Neck Comes Out

On December 17, 1997, barges swinging industrial balls demolished Quaker Neck Dam on North Carolina's Neuse River near Goldsboro. Secretary of the Interior Babbitt was present and called the demolition "an act of restoration and renewal."

The Quaker Neck Dam was built by the Carolina Power Company in 1952 to supply cooling water for a steam generating plant. The seven-foot dam kept anadromous fish, including the endangered shortnose sturgeon, from spawning grounds. Mike Wicker of the U.S. Fish and Wildlife Service says that catches of American shad in the Neuse fell from 700,000 pounds in 1953 to 25,000 pounds in 1995.

Fish will now have access to 75 miles of the main stem of the Neuse and 925 miles of tributary streams. Anglers are expected to generate tens of millions of dollars in rural markets along the tributaries, creating sustainable and mature economies, and potentially increasing property values.

According to Wicker, in addition to boosting the local economy, anadromous fish also play a role in nutrient management. He calls them a "natural nutrient pump." They are early-growing species that spend their first weeks in the river consuming benthic insects, which use the nutrients in the water. The fish then swim downstream, carrying the nutrients with them, Wicker explains

FERC is an independent regulatory agency within the Department of Energy that, among other duties, licenses and inspects private, municipal and state hydroelectric projects. Some 550 dams will come up for re-licensing by the FERC in the next 15 years, and since 1986, the agency has been required to weigh a dam's impact on wildlife and recreation against its economic benefits.

Other Dams Already Removed or Soon to be Removed

- After a partial collapse in 1996, the Newport No.11 dam on the Clyde River in Vermont was removed for safety reasons, allowing salmon to return upstream for the first time in 40 years.
- In 1997, a local irrigation district on Oregon's Rogue River voted to support the removal of the Savage Rapids Dam, saving \$4 million in renovation costs and easing migration of salmon and steelhead.
- In November 1997, the Western Canal Dam on a tributary of California's Sacramento River was demolished to let threatened Chinook salmon spawn upstream for the first time since the 1920s.
- Removal of the Elwah Dam in Washington state was approved in July 1998, clearing the way to reopen what used to be one of the richest salmon runs in the nation.

[For more information, contact Mike Wicker, U.S. DOI, Fish and Wildlife Service, P.O. Box 33726, Raleigh, NC 27636-3726. Phone: (919) 856-4520, ext. 22; fax: (919) 856-4556.]

Tech Notes

"Seeing-Eye" Sprayer Fights Weeds Using Less Herbicide

A new sprayer uses a light reflectance sensor to scan the ground for weeds, then kills them with less herbicide than conventional sprayers use. The eight-row hooded sprayer uses its sensor to

*"Seeing-Eye"
Sprayer
(continued)*

distinguish differences in the light reflected from bare soil and from weeds between crop rows. If it "sees" a weed, it sprays it.

The sprayer was developed for row crops through a cooperative research and development agreement between Patchen, Inc., of Los Gatos, California, and Agricultural Research Service (ARS) scientists in Mississippi. Researchers tested the sprayer as part of the Mississippi Delta Management Systems Evaluation Area project.

The project studied how farm production practices affect the water quality of three Mississippi lakes. In 1996 and 1997, the savings on herbicide spraying averaged 78 percent on 105 acres of cotton and 51 percent on 115 acres of soybeans over the two growing seasons for farms using the new sprayer. Both crops were grown with conservation tillage systems that held plowing to a minimum and relied on crop residue to control erosion.

ARS scientists say this technology will help farmers by minimizing herbicide use and cutting costs while reducing the environmental impact of agrichemicals on water supplies.

[For more information, contact James E. Hanks, USDA-ARS Application and Production Technology Research Unit, P.O. Box 225, Stoneville, MS 38776. Phone (601) 686-5382.]

Grass Tailored for Putting Greens Improves Game and Water Quality

TifEagle, a new Bermuda grass for putting greens, debuted this summer on golf courses in Florida, Georgia, and other southern states.

It is the latest product of Agricultural Research Service (ARS) geneticist Wayne W. Hanna's research to develop new forage and turfgrass varieties with improved performance, quality, pest resistance, and other desired traits. One of the most environmentally friendly grasses developed thus far, TifEagle crowds out weeds, even at low cutting heights. It reduces the need for herbicides that can wash off the grass during downpours and endanger groundwater.

TifEagle is being licensed to certified seed producers under a collaborative agreement between ARS and the Georgia Seed Development Commission and University of Georgia Research Foundation, both located in Athens, Georgia. ARS has applied for a patent. Through licensing, Hanna hopes to preserve the genetic purity and longevity of TifEagle in commercial production.

Software Predicts Pesticide and Nitrogen Leaching

Kansas State University graduate student Steven Starrett has engineered an advanced computer program called KTURF that is designed to predict pesticide and nitrogen leaching in the upper 20 inches of turfgrass given the soil conditions and watering schedule of a golf course. The model was developed in response to growing public concern about the quality of drinking water supplies near golf courses. In 1982 alone, golf course managers used more than 5.4 million kilograms of pesticides and nitrogen for turf grass management. Starrett's work is supported by the United States Golf Association. For more information, contact Steve Starrett. Phone: (785) 532-1538; e-mail: steveks@ksu.edu.

Groundskeeper Ralph A. Hinz of The Landings golf club in Savannah, Georgia, is impressed with TifEagle's ability to tolerate the close, daily mowing that gives the North's cool-season bentgrass varieties their putting speed. Unlike many of the South's existing Bermuda varieties, including the industry standard Tifdwarf, TifEagle withstands routine cutting to a height of 3 millimeters (one-eighth of an inch). Most important to golf course managers, its leafy canopy stays lush and carpetlike, ensuring a golfer's ball rolls quickly in the direction it's putted.

"You can get Tifdwarf to where it's really fast for special golfing events like the Masters," says Hinz. "But you can't keep it at the same height as a bentgrass for too long before it starts to thin out from stress." Such stress can open the door to weeds, necessitating the use of herbicides. TifEagle's key advantage is its fast growth and tightly knit root system that results in a thick canopy that discourages weeds.

"It's very aggressive, which I feel is a plus," says William F. Smith, a golf superintendent who began testing TifEagle last year at the Country Club of Columbus in Columbus, Georgia. "I look at it as far superior to our existing greens."

More than three dozen university scientists and golf superintendents from California to North Carolina participated in tests proving TifEagle's superiority.

Hinz, who helped evaluate TifEagle, plans to establish the new grass this summer on all the putting greens at one of The Landings' six courses. He has already

received positive feedback from the club's golfing clientele. "They'll ask, 'How come this green putts better than the others on the course?'" says Hinz.

For his part, Smith says, "We'll plant our practice putting green in TifEagle, just to see how it responds to wear and tear." Meanwhile, Hanna is continuing his search for hardy new grasses, especially those with resistance to fungi and insects like the tawny mole cricket.

"We have a philosophy here," he says. "We're going to have to grow grass in the future with less water and less pesticide. So we make sure we don't baby our grasses in the test plots."

[For more information, contact Wayne W. Hanna, USDA-ARS Forage and Turf Grass Research Unit, P.O. Box 748, Tifton, GA 31793. Phone: (912) 386-3177; fax: (912) 391-3701.]

Notes on Outreach and Education

Oh No! Not Another Fact Sheet!

How many times have you walked into an outreach meeting and heard someone chirp, "Let's do a fact sheet!"? How do you know if a fact sheet is indeed the right vehicle to reach your target audience with your message? And what is your message anyway? Unfortunately, outreach activities are often conducted in a haphazard, uncoordinated fashion, resulting in a great deal of time and money spent without achieving any clear success. Just as you would never drive through unfamiliar territory without a map, you should not conduct an outreach program without a plan.

Environmental outreach and education can be powerful tools to prevent and reduce nonpoint source pollution throughout the watershed. Because many nonpoint source controls involve voluntary actions by individuals, effective outreach and education are needed to create awareness, provide information, and encourage community involvement. By taking the time up front to plan and design your outreach program, you can maximize your available resources, producing effective outreach products directed to your target audience.

What Are the Steps to Developing an Effective Outreach Plan?

Developing an effective outreach plan requires six major steps. Because each step builds on the previous one, rushing through a step or avoiding one altogether will make your entire plan unstable. For example, if you have not thoroughly researched the needs of your target audience, how can you craft a message that benefits them?

Step 1: Define Your Goals and Objectives

Before you start designing that fact sheet, you need to sit down with your planning team and identify goals and objectives for your project. This will help set your road map for the development of materials and activities down the line. Goals are general statements that express the broad focus of the entire planning and management effort. Objectives are specific actions that help achieve the goals. Keep the desired outcome in mind when forming your objectives. For example, do you want to create awareness, provide information, or encourage action? Making your objectives as specific as possible, including a time element and an intended result, will make it easier to identify specific tasks for achieving the objective and will enable you to evaluate whether you've achieved the objective.

Step 2: Identify Your Target Audience

Your target audience is the group of people you want to reach with your message. Target audiences can be grouped several different ways depending on the objective pursued. Some common groupings include geographic location, demographic characteristics, occupation, and behavior patterns. Your target audience will likely incorporate more than one of these groupings. In all cases, break down your target audience into the smallest segments possible that still retain the

characteristics of the audience. If your audience is too broad, chances are you won't be able to develop a message that engages and resonates with everyone.

Once you've identified your target audience, you'll need to gather information on them before proceeding to the next step. To develop an effective message that reaches your audience, you need to find out what they think about the issues and what messages might engage and motivate them. You must also identify what communication channels the target audience uses to get information. This will help you to develop, format, and distribute your message.

You can use several different tools to collect information on your target audience, depending on their makeup and your available time and money. Each approach has advantages and disadvantages, so pick the one that works for you. These tools include surveys by mail or phone, focus groups, and resources from public agencies or trade associations.

Step 3: Create Your Message

After gathering information on the target audience, you are ready to craft a message that will engage them and help achieve your objectives. The message should be specific and tied directly to something your target audience values.

Effective messages should also state specific actions required to achieve the desired results. Instructions should be clear, nontechnical, and familiar to the audience. Providing a means for the audience to become more involved or receive additional information through a toll-free telephone number, Internet website, or other means always helps. Make everything — the behavior change requested, the involvement needed, or the support required — user-friendly.

Here are some benefits you might want to include in your message:

- Saves money
- Saves time
- Is convenient
- Is free
- Will improve your health
- Is more efficient

Step 4: Package Your Message

Now it's time to determine the best package or format for eventual delivery of the message to the target audience. This is when you decide whether a fact sheet is the best vehicle for your message.

By far, the most popular format is print, including fact sheets, brochures, flyers, magazine and newspaper articles, booklets, posters, bus placards, billboards, and door hangers. Printed materials can be created easily and referred to again and again by the target audience.

Everyone likes to get free "stuff" like promotional items or "give-aways." These items include Frisbees, magnets, key chains, tote bags, coffee mugs, and bumper stickers. Give-aways are good ways to promote watershed organizations, simple actions, and general awareness.

Using the professional media — newspapers, television, magazines, and radio — is not difficult, but requires some orientation and basic training on how to involve them in your outreach effort. Opportunities to place your message in the media include informational news stories, people features, issue analyses, public service announcements, interview programs, call-in shows, editorial columns, and feature items related to sports, recreation, or outdoor living.

Step 5: Distribute Your Message

Once the message has been packaged in the desired format, proceed with distribution. Common distribution mechanisms include direct mailing, door-to-door visits, phone calls, visits to targeted businesses, presentations, hand-outs at events, media outlets, and postings in public places.

Remember that you don't always have to distribute the message yourself. If your target audience subscribes to an existing periodical, it might be more effective to include your message in that publication. Most publications seek submittals that will interest their audiences, so don't hesitate to piggyback! It will certainly save you the hassle of dealing with mailing lists, postage costs, or news media releases. It will also increase the likelihood that your message will actually be read by members of the target audience, since they are already familiar with the publication.

Step 6: Evaluate Your Outreach Plan

Evaluation provides a feedback mechanism for continuous improvement of your outreach effort. Build an evaluation component into the plan from the beginning to ensure that the outreach program generates some accurate feedback.

The degree to which you evaluate your outreach program will be determined by your time and available resources. At a minimum, you should review the outreach plan with the staff or watershed team to determine whether the outreach activities attained or supported the objectives and reached the target audience. If your target audience or objectives change over time, evaluation will help you make sure your outreach program as well.

Using the step-by-step approach to develop an outreach plan saves time and resources by collecting information and answering questions as you develop your plan, not after you implement it.

[Adapted from Getting In Step — A Guide to Effective Outreach in Your Watershed. To receive a copy, contact Barry Topping, The Council of State Governments, 3560 Iron Works Pike, P.O. Box 11910, Lexington, KY 40578-1910. Phone: (606) 244-8228; e-mail: btonning@csg.org.]

Rouge River Team Offers Tips for Successful Outreach

Several recommendations to consider when developing local public outreach materials or programs have emerged from the experiences of the Public Involvement Team of the Rouge River (Michigan) National Wet Weather Demonstration Project. Early in the Rouge River project, staff recognized the need for a comprehensive public involvement and education program to support the restoration activities. A 1994 survey of watershed residents suggested that a grassroots approach coupled with a top-down strategy was the best approach.

The following recommendations support maintenance of long-term interest and participation by the watershed residents in resource protection activities.

- **Initiate a two-way flow of information with key stakeholder groups.** To encourage dialogue between residents and city officials in the Rouge River project, a business association organized by the residents holds monthly meetings to discuss environmental issues. These meetings are attended by representatives from local businesses, the police department, the department of public works, city hall, and the county environmental department.
- **Aim education toward children.** One example is provided by a grassroots organization, Friends of the Rouge, which sponsors a project that teaches water quality testing in 100 public schools.
- **Build partnerships and use the communication networks/resources of existing organizations.** For example, the Rouge River project convened an automotive services roundtable that included representatives from watershed automotive businesses and the local chamber of commerce to educate small and mid-sized businesses on how to change business practices that affect the river's quality.
- **Use available media to the best advantage.** Movie goers at local theaters in the Rouge River watershed viewed three public service announcements designed to promote public awareness of the Rouge.
- **Avoid duplication of efforts.** Use information from third parties such as environmental organizations, state environmental and natural resource agencies, and the academic and scientific communities.
- **Rely on peer-to-peer communication to pass on important information.** For example, a local member of the League of Women Voters is working to educate League members about Rouge environmental issues. The organization also helped distribute Rouge River educational materials.

- **Provide “hands-on” activities in addition to printed information.** In one Rouge River neighborhood, the residents adopted an adjoining wetlands and participated in storm drain stenciling.
- **Understand that before personal behavior changes occur, a target audience will go through a process of awareness, understanding, and then involvement.** For example, promoting “Rouge Friendly” lawn and garden tips (such as using native grasses, not over-fertilizing, and allowing grass to grow longer) is part of an effort to change the aesthetic expectations and hence the behavior of landowners.
- **Apply the “Think Globally, Act Locally” concept to an outreach program.** Focusing locally on a common resource to bring all stakeholders together will enhance any outreach efforts.
- **Avoid barriers to public participation by allowing flexibility in involvement options.** Provide a menu of activities that can be undertaken by residents to contribute to the overall watershed goals.
- **Educate local governments or agencies to recognize the impacts that their own activities have on the local resource.** For example, convincing the local department of public works and municipalities that more frequent street sweeping can reduce water quality impacts is one measure that the Rouge project highly recommends. Educating municipalities on how to use environmentally friendly lawn and garden care practices in parks and public spaces and encouraging them to share this information with the public is another way to reduce nonpoint source impacts.
- **Celebrate successes and have fun.** Acknowledge the contributions of citizens and businesses to let them know that they are an important and appreciated part of the watershed project. The Rouge project has awards breakfasts and encourages local elected officials to present certificates to participants.

In addition to practicing what they preach, the Rouge River Project Public Involvement Team is currently working to find additional “non-traditional” stakeholder groups (such as the League of Women Voters) who are interested in addressing watershed environmental issues, and is focusing on their River Steward program and volunteer monitoring. The team is always on the lookout for outreach opportunities, small or large.

[For more information, contact Josephine Powell, Wayne County Department of Environment, 415 Clifford, Detroit, MI 48226. Phone: (313) 224-7652.]

Sea World/Busch Gardens Recognize Environmental Excellence

Since 1992, the SeaWorld/Busch Gardens Environmental Excellence Awards have recognized the outstanding efforts of students who are working to protect and preserve the environment. The award, which has a \$20,000 grand prize, focuses on student-driven projects that offer creative solutions to environmental projects and that demonstrate significant environmental and educational impacts.

K-12 students in the United States, Canada, the United Kingdom, and Puerto Rico are eligible to apply. Judges include representatives from the Center for Marine Conservation, National Fish and Wildlife Foundation, American Oceans Campaign, National Wildlife Federation, The Nature Conservancy, National Geographic Society, The Izaak Walton League of America, Conservation International, and the SeaWorld/Busch Gardens education departments.

For more information, visit the SeaWorld/Busch Gardens Animal Information Database at www.seaworld.org or www.buschgardens.org, or phone: (407) 363-2389.

Editor's Note: The web address for Adopt-A-Watershed was incorrect in issue #53. The address is www.adopt-a-watershed.org.

Curricula

"Wetland Riches," is an environmental education activities manual published by a consortium headed by the Minnesota Association of Soil and Water Conservation Districts. The manual targets 5th and 6th grade students. Contact Minnesota Association of Soil and Water Conservation Districts, 790 Cleveland Ave. South, Suite 216, St. Paul, MN 55116. Phone: (612) 690-9028.

"Totally Wetlands" is a cross-curricular guide for teachers of K-12. The new resource from the Adopt-A-Pond Programme is free to Ontario teachers. For more information, contact Kimberly Baily at the Metro Toronto Zoo, 361A Old Finch Ave., Scarborough, ON M1B 5K7. Fax: (416) 392-4979.

Videos

Terrene Institute has a series of short (10- to 12-minute) videos about wetlands. "Wake Up to Wetlands!" explains the value of wetlands — ecologically and economically. "Communities Working for Wetlands" depicts kids and adults from Maryland to Minnesota working to conserve their wetlands. "A Prelude to the Future" gives a brief history and introduction to mitigation banking. Each video is \$11.50 plus \$3.50 for shipping and handling. Contact Terrene Institute, 4 Herbert St., Alexandria, VA 22305. Phone: (703) 661-1582; website: www.terrene.org

CD-ROM

"The Living Landscape," a new interactive computer game, takes learners of all ages through various best management and conservation practices to turn a rundown farm and landscape into an environmental showplace. Cost is \$8 for the first CD and \$5 for each additional CD with same order. Contact CTIC, 1220 Potter Drive., Suite 170, West Lafayette, IN 47906. Phone: (765) 494-9555; e-mail kyw@ctic.purdue.edu; website: www.ctic.purdue.edu.

Reviews and Announcements

Texas Nonpoint SourceBOOK

The Texas Nonpoint SourceBOOK is not a book at all, but a website developed under the direction of the Statewide Stormwater Quality Task Force, sponsored by the Texas Chapter of the American Public Works Association. The web-based document assists public works officials in Texas. A wealth of information is available, including the history of nonpoint source management, an urban nonpoint source primer (for beginners), information on how to develop and implement a nonpoint source plan, a description of urban runoff management programs, methods to characterize urban waters, a compilation of water quality and watershed characteristics in Texas, and details about practices to manage runoff water quality.

For more information, contact Keith Kennedy of the North Central Texas Council of Governments at (817) 695-9221. The site can be found at www.txnpsbook.org.

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control

A "how-to" book that provides information on combining cultural, physical, and chemical methods of pest control with biological controls, the *Natural Enemies Handbook* draws on the experience of 60 experts. The handbook explains how to release natural enemies and enhance their activity;

identify and use natural enemies to control pests in crops, gardens, and yards; and minimize pesticide impacts. Over 300 color photographs and drawings help readers identify insects, mites, and spiders that can be used as natural enemies.

The handbook, published in July 1998, is available in hardback (\$50) or paperback (\$30). To order, use the online order form at www.ipm.ucdavis.edu/GENERAL/naturalenemiesflyer.html or contact the University of California, Division of Agriculture and Natural Resources, Communication Services-Publications, 6701 San Pablo Avenue, Oakland, CA 94608-1239. Phone: (800) 994-8849 or (510) 642-2431; e-mail: danrcs@ucdavis.edu.

"Antidotes to Sprawl" Website

Looking for assistance in developing or implementing more sustainable urban development? Thanks to EPA Region 5, help is just a click away! The agency's website lists valuable resources pertaining to grant funds, data and information, and technical assistance. The contacts are organized by environmental and metropolitan issues so that municipal officials can refer quickly to their own specific concerns. Each issue page contains a list of related federal programs and regional agency contacts within Region 5, but people from other parts of the country will also find it useful. Visit the site at www.epa.gov/region5/sprawl/.

Workshops and Handbook for Wetlands Conservation and Sustainability

During the past year, the Izaak Walton League gathered students, government employees, teachers and landowners to field test the monitoring methods and wetland information presented in the *Handbook for Wetlands Conservation and Sustainability*. The goal of the League's Save Our Streams wetlands initiative is to help citizens, educators, and community and business leaders become involved in wetlands education and conservation by teaching them about wetland ecology, functions, values, and monitoring methods. The handbook contains over 200 pages of wetland information including wetland types, functions and values, project ideas, resources and contacts.

The League customizes a workshop to fit the needs and schedule of each client. The workshop is geared towards citizens with a non-science background who are interested in learning more about protecting our nation's diminishing wetland resources.

During the field tests, the League partnered with local wetland experts at each site and engaged citizens in actual wetland monitoring techniques during half-day field exercises. A favorite activity was the wetland role play, an interactive component of the workshop, enabling participants to gain insight to the diverse views of stakeholders interested in wetlands.

For more information on the handbook or on setting up a workshop, contact Julie Middleton, Izaak Walton League, 707 Conservation Lane, Gaithersburg, MD 20878-2983. Phone: (800) 548-0150; e-mail: sos@iwla.org; website: www.iwla.org.

Managing Cover Crops Profitably

To help farmers boost their bottom line while enhancing the environment, a new book from USDA's Sustainable Agriculture Network greatly expands field-ready information on cover crop species and practices proven to build soil and provide a host of agronomic benefits. The 212-page *Managing Cover Crops Profitably, 2nd Edition*, features information gleaned from the latest cover crop field trials, lab tests, and on-farm experiences from every region of the United States. It includes management details such as seeding rates, as well as broader considerations of how to design rotations to maximize benefits.

Comprehensive chapters on the most promising cover crop species, fact-filled charts and lists of seed suppliers, expert contacts, and other relevant publications make the indexed guide invaluable

for both newcomers and cover crop veterans. Chapters focus on easy ways to get started with cover crops, economics, nitrogen crediting, soil building and developing cover crop-based rotations.

To order, send \$19 to Sustainable Agriculture Publications, Hills Building, University of Vermont, Burlington, VT 05405-0082. Visit the SAN/SARE website at www.sare.org or contact Andy Clark for more information about SAN.

Grants Reporting and Tracking System Database

The section 319(h) nonpoint source Grant Reporting and Tracking System (GRTS) is now available through a link on EPA's "Surf Your Watershed" homepage (www.epa.gov/surf). GRTS is used by states to report to EPA on activities and projects funded under section 319(h) of the Clean Water Act. Information can be browsed on a state basis or, in a limited fashion, by hydrologic unit code. For more information, contact Don Kunkowsk, NPS Control Branch (4503 F), U.S. EPA, 401 M St., SW, Washington, DC 20460. Phone: (202) 260-7103.

STORET Water Quality Database

On September 3, EPA released its modernized version of the STORET water quality database system (Phase 1). STORET has been and will continue to serve as EPA's principal repository for marine, freshwater, and biological monitoring data. The modernized STORET is free to users, easy to use, flexible enough to go anywhere you can take a laptop, and requires quality assurance information for data credibility. The original STORET was developed in the 1960s and operated for 33 years. Modernization of the system took seven years and involved a wide range of stakeholders. The new STORET is available on CD ROM. Copies of the CD ROM are available free of charge from EPA. Data stored in STORET will be accessible to the public on the Internet early in 1999 as part of the Phase 2 release. To obtain a CD ROM copy of STORET, call (800) 424-9067 or e-mail STORET@epa.gov.

Watershed Academy 2000 Distance Learning

As part of its Watershed Academy, EPA is developing Academy 2000 Distance Learning, using the Internet as a classroom. Academy 2000 consists of training modules on watershed science, effective communications, and organizational management and development. Modules include:

- Principles of Watershed Management
- Watershed Restoration
- Economics of Sustainability
- Monitoring Consortia
- Watershed Modeling
- Executive Overview of the Watershed Approach

The website contains 13 modules, with at least seven more planned. Running time for each module is about two hours. The website is www.epa.gov/owow/watershed/wacademy/acad2000/index.html.

Inventory of Watershed Training Courses



EPA is looking for assistance in producing an Inventory of Watershed Training Courses. The inventory is listed as a key action item in the Clean Water Action Plan, which calls for federal agencies "to complete an inventory of watershed training programs" in 1998.

The purpose of this inventory is to provide information on available watershed-related training courses sponsored by governmental and nongovernmental organizations. The target audience for the inventory includes federal, state, and local agency staff; tribes; and watershed groups. EPA's Watershed Academy developed an earlier document titled "Watershed Academy Catalogue of

Watershed Training Opportunities," published in May 1997, and is taking the lead to update this inventory. The Watershed Academy is working with the Interagency Watershed Training Cooperative, Natural Resources Training Council, EPA's Office of Water Watershed Training Work Group, and others to complete the inventory.

Courses should focus on protecting or restoring watersheds (or aquifers), cover important tools used in watershed protection, or address one aspect of the watershed management cycle (e.g., planning, implementation, evaluation). To submit course information, contact Liz Hiatt, Tetra Tech, 10306 Eaton Place, Suite 340, Fairfax, VA 22030. Phone: (703) 385-6000; fax (703) 385-6007; e-mail: hiettli@tetrattech-ffx.com.

Reflections

Cycle of Harmony

by Sarah Helen Sentz - grade 5
Teachers: Dale Durr and Dave Denny

Snow, rain, then water
Flowing, gently flowing,
Passes rocks, passes plants and animals,
Passes people.
What is it saying?
Listen.
cold, so cold, at first, and fast,
chattering.
Then warmer and slower,
humming
Through the mountain valley,
Down the Missouri and the "mighty Miss"
To the gulf of Mexico.
When will it stop?
Never.
Snow, rain, then water...

Sarah Helen Sentz, a fifth grader from Choteau Elementary School, Choteau, Montana, was a 1998 finalist in the River of Words poetry contest. For more information about the contest, contact River of Words Project, 1847 Berkeley Way, Berkeley, CA 94703. Phone: (510) 848-1155; fax: (510) 848-1008; e-mail: row@irn.org;

Datebook

Datebook is prepared with the cooperation of our readers. To list a meeting or event in the Datebook, fax your information to (703) 385-6007, Attn: NPS News-Notes, at least two months in advance to ensure timely publication. Datebook is available online at www.epa.gov/owow/nps/events.html and at www.epa.gov/owow/info/NewsNotes/index.html.

Meetings and Events

November 1998

9-11

The Science of Managing Forests to Sustain Water Resources, Worcester, MA. For more information, contact Jim Taylor, Metropolitan District Commission - Division of Watershed Management, 20 Somerset Street, Boston, MA 02108. Phone: (617) 727-5274; fax: (617) 727-8301; e-mail: jim.taylor@state.ma.us.

11-13

18th Annual International Symposium of the North American Lake Management Society, Alberta, Canada. Contact Symposium Program Co-chair Al Sosiak, (403) 678-9856; e-mail: asosiak@env.gov.ab.ca, or Everett Fee, (403) 678-9856; e-mail: (403) 678-9856.

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Groundwater Protection: Tools for individuals and Municipalities Rowan University, Glassboro, NJ. Contact Greg Westfall, USDA NRCS. Phone: (732) 246-1171; e-mail: westfall@nj.nrcs.usda.gov.

- 12-15 *1998 Priming the Pump and Groundwater National Designation Conference*, Alicante, CA. Contact The Groundwater Foundation, P.O. Box 2258, Lincoln, NE 68542. Phone: (800) 858-4844; fax: (402) 434-2742; e-mail: info@groundwater.org.
- 15-19 *1998 Annual Conference on Water Resources & Symposia on Management of Human Impacts on the Coastal Environment and Applications of Water Use Information*, Point Clear, AL. Contact AWWRA, Attn: 1998 Annual Conference & Symposia, 950 Herndon Pkwy, Ste. 300, Herndon, VA 20170-5531. Phone: (703) 904-1225.

December 1998

- 6-10 *Hydrophobic Organic Compounds in Rivers*, San Francisco, CA. Contact Valerie Kelly (vjkelly@usgs.gov) or Kathy McCarthy (mccarthy@usgs.gov), USGS, 10615 SE Cherry Blossom Drive, Portland, OR 97216. Phone: (503) 251-3244; fax: (503) 251-3470.
- 14-16 *Nutrient Management in the 21st Century*, Denver, CO. Contact America's Clean Water Foundation, P.O. Box 75115, Washington, DC 20013-5115. Phone: (202) 898-0908; e-mail: acwf@clark.net; website: www.acwf.org.
- 15-17 *Second Annual Partners for Smart Growth Conference*, Austin, TX. Contact the Urban Land Institute, (800) 321-5011; website: www.uli.org.

January 1999

- 11-15 *Working at a Watershed Level*, Chico, CA. Contact Dr. Donald Holtgrieve, (530) 898-5780; fax: (530) 898-6781; e-mail: holtgrieve@facultypo.csuchico.edu.
- 24-27 *Tailings and Mine Waste 99*, Ft. Collins, CO. Contact Linda L. Hinshaw, (970) 491-6081; fax: (970) 491-3584; e-mail: lhinshaw@engr.colostate.edu.

February 1999

- 10-12 *The 1999 North Carolina Environmental Education Conference*, Research Triangle Park, NC. Contact Judy Pope, Office of Environmental Education, P.O. Box 27687, Raleigh, NC 27611-7687. Phone: (919) 733-0711.
- 18-19 *Conference on Stormwater and Urban Water Systems Modeling*, Toronto, Ontario. Contact Lyn James, Computational Hydraulics, Int., 36 Stuart Street, Guelph, ON, Canada N1E 4S5. Phone: (519) 767-0197; fax: (519) 767-2770; e-mail: info@chi.on.ca; website: www.chi.on.ca.
- 18-20 *Third Annual American Wetlands Month Conference: Communities Working for Wetlands*, New Orleans, LA. The conferences will feature hands-on, interactive workshops where participants will learn how to solve their own wetland problems. Contact Terrene Institute, 4 Herbert St., Alexandria, VA 22305. Phone: (703) 548-5473; fax: (703) 548-6299, e-mail: terrconf@erols.com.

Call for Papers Deadlines

November 1998

- 30 *Third Annual American Wetlands Month Conferences: Communities Working for Wetlands*, San Francisco, CA, April 15-17, 1999, and Boston, MA, May 6-8, 1999. Contact Terrene Institute, 4 Herbert St., Alexandria, VA 22305. Phone: (703) 548-5473; fax: (703) 548-6299, e-mail: terrconf@erols.com.

January 1999

- 30 *Conference on Stormwater and Urban Water Systems Modeling*, February 18-19, 1999, Toronto, Ontario. Abstracts for papers are solicited on the use of state-of-the-art computer models for resolving real water pollution problems. Contact Lyn James, Computational Hydraulics, Int., 86 Stuart Street, Guelph, ON, Canada N1E 4S5. Phone: (519) 767-0197; fax: (519) 767-2770; e-mail: info@chi.on.ca; web: www.chi.on.ca.

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