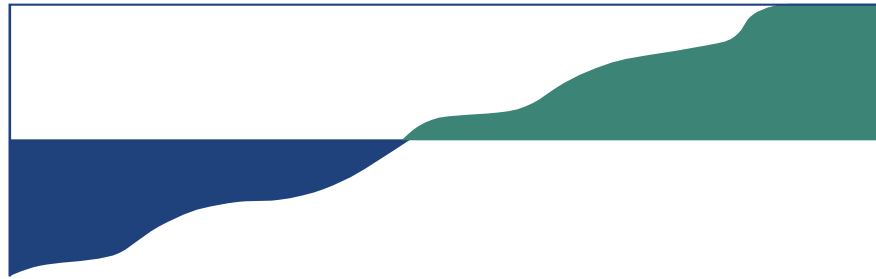




Watershed Events



A Bulletin on Sustaining Water Resources and Ecosystems

In This Issue...

This issue of *Watershed Events* focuses on the relationship between ecological protection activities and public health and safety. Recent events have shown that protecting drinking water sources, preserving wetlands and floodplains, and limiting activities in environmentally sensitive areas will protect not only ecological integrity, but human health and safety as well.

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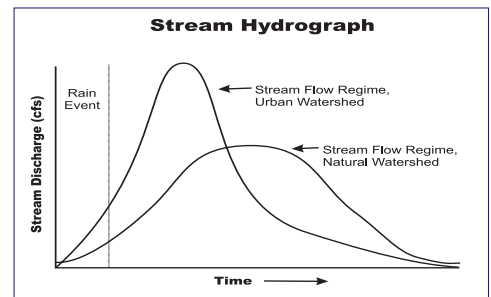
Droughts, Floods, and Sprawl— They're All Connected

Almost a year ago, it seemed ironic to be writing about solutions to a drought while sitting at a battery-powered laptop computer in the middle of a flood. But the fact is that floods happen even during droughts. Unfortunately, most of this much-needed water runs off roofs, parking lots and roads and is collected and discharged to the nearest creek or river by storm sewer systems. Most municipalities treat storm water as a nuisance instead of as a resource and usher it as quickly as possible downstream. Granted, engineered solutions are necessary to control unusually high flows that are a threat to public safety, but the value of storm water as a resource and as a partial solution to droughts is traditionally ignored. A drought is defined as a natural phenomenon caused by changes in weather patterns that result in less-than normal rainfall. Although we cannot manufacture more rain, we can better manage the water that does fall in our region.

Last year, the simultaneous occurrence of a severe drought and flooding from Hurricane Floyd hit hard in eastern Pennsylvania. The region's groundwater had substantially declined over the past two years. Flows had dropped to record low levels on many streams. When Floyd struck, small waterways such as Valley Creek at Valley Forge National Park—a small watershed with

two major highways and expanding development—rose rapidly within hours from low drought flows to damaging flood flows.

What causes such sudden and extreme flows? Slope, soils, geology and climate contribute to the rate of watershed runoff. But the rapid expansion of impervious cover,



especially in the watershed's urban and suburban areas, increases velocity and makes it especially difficult for rainwater to recharge the ground water.

What can we do differently so more water recharges this critical ground water supply? How can we better plan and design new developments so that adequate water supply is ensured and storm damage is lessened?

The underlying problem is that current laws treat water management in a disconnected and piecemeal fashion; groundwater and surface water are

See Droughts, page 2

Watershed Events

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Watershed Events provides updated and timely information to professionals and others interested in the development and implementation of the watershed approach and in achieving watershed goals. The watershed approach focuses on mitigating the primary threats to ecosystem and human health and involving stakeholders to take action in an integrated, holistic manner. Please direct any questions or comments to:

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treated as separate, independent resources. In addition, primarily because of the way the federal water laws are written, most states' environmental protection departments have separate bureaus or sections for each water issue—water supply, wastewater, storm water, wetlands, floodplains, erosion and sediment control, and flood prevention design.

Land and water management is like a giant jigsaw puzzle. Staring at an individual piece can be frustrating and unfruitful, but when the pieces are successfully connected, a clear picture emerges. At all levels, we must manage land and water as interdependent resources. Critical needs include the elimination of "roadblocks" and the creation of incentives or regulations to:

- Increase rainwater infiltration on a "lot-by-lot" basis.
- Design new detention/retention basins to retain and filter flows from small storms to increase ground water levels and protect surface water quality.
- Retrofit existing detention basins to infiltrate flows from small storms.
- Increase water reuse and gray water systems.
- Increase land application of treated wastewater.
- Protect ground water from over withdrawal.

Development of water conservation initiatives and programs that discourage development in floodplains and

encourage the restoration and naturalization of these riparian corridors are critical. Project and subdivision reviews that include analysis of

Experts tell us that water management is best done on a **watershed or basinwide basis**. This requires all who have a stake, whether in or outside government, to join in developing approaches tailored to regional needs."

—Madeline Albright
Earth Day speech on Global Water Security in the 21st Century

potential watershed impacts are also needed. If we treat the flows from small storms and treated wastewater as resources instead of wastes, we can reduce damage from storm water runoff and drought impacts and, most importantly, store this critical water for stream base flow and water supply.

Some question whether strong economic progress can be realized if stricter environmental standards are in place. In reality, economic progress is dependent on a healthy environment. By improving the integrity of our water resources while reducing the potential damages from storms and droughts, the economy will be strengthened. Agriculture, tourism, and industry will continue to thrive, and communities can attract the high tech, clean industries they desire. If we respect the natural value of our ground water, streams, and riparian corridors and realize the development potential of working *with* the natural system, our communities will be more livable and desirable.

For more information, contact Carol R. Collier, Executive Director, Delaware River Basin Commission, and Jan Bowers, Executive Director, Chester County, Pennsylvania, Water Resources Authority, (609) 883-9500.

Model Ordinances on the Web is a valuable resource for communities in search of suggestions on how to strengthen the language of their regulations and ordinances to better protect environmental resources. Check out exemplary ordinances dealing with erosion and sediment control, stream buffers, open space, operation and maintenance, illicit discharges, postconstruction runoff, and other areas.

Visit www.epa.gov/owow/NPS/ordinance/ or the Center for Watershed Protection's web site at www.cwp.org. Also, be sure to visit the Smart Growth Network web site at www.smartgrowth.org/index2.html.

Protecting Our Water Supplies

For water suppliers responsible for providing consumers with safe drinking water, treatment processes that remove potentially harmful substances are most often viewed as the most manageable solution. Yet, as pressures grow that limit the quality and quantity of drinking water supplies and increase the burdens of water suppliers to comply with drinking water quality standards, water suppliers and regulators are increasingly recognizing the importance of combining treatment with watershed partnerships to prevent contamination of water supplies in the first place. Below are some examples of how some water suppliers are broadening public water system management to include the principles of watershed management to ensure the protection and conservation of source water quality.

City of Brotherly Love Makes Clean Water a Priority

Philadelphia has a long-standing interest in watershed protection, although that interest has sometimes been compelled by circumstance. Even in Colonial times, city residents noted the poor quality of their water and with good reason. The soiled water from privies and wastes from industry seeped into the ground water, fouling the wells that all Philadelphians used during those times. Not surprisingly, in 1799 civic

"I write to you using Schuylkill River water as ink. I am thinking of bottling it for sale."

*Local Entrepreneur, Philadelphia
Early 1800s*

leaders devised a plan to use the pristine waters of the Schuylkill for the public water supply (having rejected water from the Delaware as too polluted by the city's wastewater).

To keep the Schuylkill clean, city officials pursued two courses of action. They used the law to close upstream industries contaminating the river. In 1885 Philadelphia began to purchase parcels of land adjacent to the river, above the Fairmount Waterworks, to

Watershed Assistance Grants Application for Year 2000 Now Available

Watershed Assistance Grants support the growth and sustainability of local watershed partnerships in the United States. This year grant awards will range from \$1,500 to \$30,000. Grants may be made directly to incorporated watershed partnerships, nonprofits, tribes, local governments, or an agency that is an active participant in a watershed partnership. Applications must be postmarked no later than August 15, 2000. Watershed Assistance Grants are a direct result of the Clean Water Action Plan (February 1998).

For additional information, visit www.rivernetwork.org/wag.htm or call Abby Feinstein at River Network, (503) 241-3506, or send an e-mail to wag@rivernetwork.org.



shield its waters from industrial and residential development.

These strategies worked, up to a point. By the end of the 19th Century, though, population and industrial growth and its associated wastes, which went untreated into the river, overwhelmed the Schuylkill. Despite the use of filters and other treatment techniques, the city's water supply continued to deteriorate into the 1960s.

This sad history did, however, have a bright side by establishing three central principles that shape current watershed management. First, unchecked contamination can defeat any engineering solution. Second, it's better not to put waste into a river than to try to remove the waste later. Third, limiting development in the watershed is a powerful

means of controlling pollution.

Today, Philadelphia enjoys the benefits of federal laws and regulations to control

pollution including the Clean Water Act. Since 1975 the city has invested \$874 million to expand and improve its three wastewater plants; those plants continue to be upgraded as new technologies become available. However, the Philadelphia Water Department's watershed efforts reach beyond the city limits and beyond point sources. Current efforts include:

Leader of a Watershed-Wide Source Water Assessment for the 200-square-mile Schuylkill River Watershed. This

watershed assessment will include 42 drinking water intakes representing 18 different community water systems and will be composed of an overall report for the whole watershed and individual reports for each drinking water intake. The Department's Watershed Division is doing a similar assessment on the tidal Delaware River.

Support of TMDL Development in the Seven City Watershed. The Watershed Division actively supports efforts to complete Total Maximum Daily Loads (TMDLs), in the watershed by supplying sampling data and analyses, funding gauging stations, and providing technical assistance to the agencies completing the TMDLs.

Involvement in Community-Based Watershed Restoration. As part of the Belmont River intake protection project, the Watershed Division is working with citizens to do streambank restoration, public education, and revegetation to protect the Belmont River drinking water intake, which has been threatened by an increasing Canada goose population.

Investment in upstream water quality studies. Among several studies, the Watershed Division is doing water quality studies and investigations of the Delaware and Lehigh River watersheds to track the source of a particular contaminant, MIB (2-methyl iso borneol), that causes taste and odor problems and increases treatment costs.

For more information, contact Chris Crockett, Philadelphia Water Department, (215) 685-6234.

Watershed Protection, a Concept from the Past, Promises High-Quality Water for Greenville in the Future

Nestled in the foothills of the Blue Ridge Mountains of northwestern South Carolina, the city of Greenville draws source water from three beautiful mountain lakes.

Decades before it was fashionable to be concerned with "source water protection," the Commissioners of the Greenville Water System purchased all land inside the boundaries of the Table Rock and Poinsett Watersheds. The Water System has 100 per cent ownership of nearly 30,000 acres.

They knew then what we all preach today: Prevention is the first and best method of treatment. Land for the Table Rock watershed was purchased in the 1920s. After a dam and transmission pipeline were installed, the reservoir began supplying high-quality source water in 1930. As the need for greater supply grew, the Commissioners similarly purchased all land within the Poinsett Watershed in the 1950s. This source has been in service since 1961.

Over the years, the Greenville area has grown dramatically from a textile manufacturing community into a diverse technical, manufacturing, and professional center. Recognizing the potential for development pressure reaching toward the watershed areas, the Commissioners and the City of Greenville jointly appointed a panel of citizens to study the geology, biology, and zoology of the areas and report on the most appropriate method to preserve and protect these valuable resources. Largely as a result of this report, all land in and around each watershed was placed in a Conservation Easement with The Nature Conservancy in 1993.

No agricultural activities, development, timber harvesting, or public recreation is permitted within the boundaries of either watershed. Water System personnel regularly patrol the properties, and trespassers are prosecuted. Consequently, the old growth forests provide nature's own filtration and raw water turbidity seldom exceeds 1 nephelometric turbidity unit (NTU).

Greenville's third water supply source is Lake Keowee, some 30 miles to the west. The lake, built by Duke Power Company in the 1960s as part of its electric power generation system, will ultimately provide 150 million gallons



per day. Only limited development currently exists along the shoreline. Water drawn from Lake Keowee is very similar in quality characteristics to the water in the Table Rock and Poinsett Watersheds. A joint committee was formed to preserve and protect the Keowee Watershed. The Keowee Watershed Alliance is composed of homebuilders, residents, county and state government officials, environmentalists, Duke Power Company representatives, and personnel from the Greenville Water System. The Alliance is developing position statements on issues such as wastewater management, growth management, riparian area preservation, and community education.

Old ideas that stand the test of time inevitably yield benefits. Greenville is no exception. Dedication to protecting its watersheds continues to benefit the Greenville area with low rates,

outstanding source water, and ecological masterpieces saved for future generations.

For more information, contact L. B. Stovall, General Manager, Greenville Water System, (864)-241-6155.

Guarding Ecological Integrity Produces Benefits for a Virginia Public Water Supply

What began as a monitoring program to protect the ecological integrity of the Swift Creek Reservoir resulted in benefits to the public water supply. The 4.6-billion-gallon drinking water reservoir, impounded in Chesterfield County, Virginia, in 1965, has experienced significant suburban development in its direct drainage area over the last 30 years. Taste and odor problems at the reservoir's Swift Creek Water Plant and concerns over pending watershed development led to the creation of a reservoir and watershed monitoring program in 1991. The goal of the program was to determine the current ecological state of the reservoir and provide data to determine sustainable levels of watershed development.

The monitoring program grew into a comprehensive effort over a period of about 5 years. During that time, expert consultant and analytical assistance, as well as collaboration with Hands Across the Lake, a citizen organization, were needed. With continued citizen input and some expert consulting, the assimilation of most of the work in-house greatly reduced costs and allowed the monitoring program to become a more stable and sustainable effort.

Monitoring in the reservoir centers on biological activity, as well as physico-chemical parameters, the potential for disinfectant by-product formation, odor, and nutrients. Nutrient inputs, as well as chemical and biological indicators, are monitored in the tributaries. The observed

algal activity and trophic states have established the conditions to be maintained.

The program provides raw water quality data for gauging treatment needs and determining best management practices to be used with future development. This approach will allow the maintenance of the existing ecological state and the detection of inadequacies from future development. The public water supply will directly benefit. The program will prevent increased water plant disinfection requirements, as well as general treatment challenges, thereby minimizing disinfectant use, disinfectant by-product formation, and undesirable taste and odor in the treated water.

For more information, contact Weedon Cloe, Stephanie Feaser, Carmen Hein-Harmon, David Sirois, Roy Covington, or George DuVal, Chesterfield County Utilities Department, Chesterfield County, Virginia.

Wattles and Workshops: Agencies Strive to Protect the Skaneateles Lake Watershed

States have begun to implement the ambitious Source Water Assessment Program mandated under the Safe Drinking Water Act of 1996. For every public water system (ground water-based as well as surface water-based), states must (1) delineate the area contributing water to the well (or intake), (2) develop an inventory of potential pollution sources within that area, and (3) evaluate the susceptibility of the water supply to the identified threats. These assessments will provide a rational basis for future source water protection efforts.

For a surface water-based public water supply that has been granted a filtration avoidance waiver, the area contributing water to the intake—the watershed—has usually already been delineated and, in many cases, fully characterized.

For such watersheds, not only are the assessments essentially complete, but protection efforts are well under way.



The 59-square-mile Skaneateles Lake Watershed is a good example of a source water protection program that is successfully maintaining good water quality. The lake, which is one of Central New York's glacially carved Finger Lakes, supplies water to the city of Syracuse and several villages in Onondaga County. An average of 42 million gallons per day is drawn through two 54-inch-diameter steel intakes at the northern end of the 16-mile-long lake. Water taken from the lake is not filtered except by coarse screens, and chlorination (plus fluoridation) is the only treatment.

Point source discharges into the lake are prohibited, so major threats are pathogens, pesticides, nutrients, and sediments arising from nonpoint sources. The Cornell Cooperative Extension (CCE) and the Onondaga County Soil & Water Conservation District (SWCD), with funding from the City of Syracuse Department of Water, have developed numerous programs, outreach materials, and workshops to raise awareness about source water protection and other watershed issues.

Working together, they successfully adapted Farm*A*Syst and Home*A*Syst materials to reduce nonpoint source pollution from farms, homes, and lawns. The SWCD promoted the total exclusion of livestock from streams by using fencing and providing alternative water sources. They also assisted in the construction of vegetative buffers between farms and road ditches that might otherwise convey runoff to the lake and experimented with using high-surface-area timber waste (bark, chips, and mulch) to pretreat waste and wastewater from dairy farm operations.

Cooperating farms in the watershed have worked with the SWCD on a "Tiered Approach to Whole Farm Planning." This approach involves the development and implementation of a plan that promotes both the environmental objectives of the watershed and the business objectives of the farming operation.

The CCE has held workshops on septic system maintenance, offering vouchers for septic tank pumping to homeowners who attend. Erosion control demonstration projects, such as the planting of willow "wattles" (bundles of cuttings from species that readily sprout a continuous network of soil-stabilizing roots), have been conducted on the property of lakeside homeowners. CEE also has hosted workshops for owners of large tracts of forested land to acquaint them with forest stewardship and best management practices for timber harvesting.

For a more comprehensive description of this model watershed program, visit www.cce.cornell.edu/nondaga/watersheds/skaneateles.htm or contact Stephen Gould, EPA Region II, (212) 637-3822.

Drought of 1999 Spurs Water Supply Planning for the New Millennium

The drought of 1999 reminded the people in the Passaic River watershed of the need to be concerned about the future of their water supplies. Data collected over the years show that problems have existed with both the quality and quantity of water supplies in this watershed, which drains northern New Jersey and southern New York. The Passaic River Coalition maintains that 10 measurable objectives are necessary to maintain adequate water supplies for future users.

To sustain reliable quantities of water for water supplies . . .

See Spurs, page 6

Spurs, from page 5

Increase, or at a minimum, maintain recharge to ground water and ground water levels. Recharge is the seepage or infiltration of storm water into the ground. Ground water is water that may be pumped out of the ground through wells and used for water supplies. Most of the water supplies in the Highlands and Central Passaic River Basin come from the ground. In the past, however, more water has been used than has been replenished through recharge. To reduce the “mining” of ground water (withdrawal without replenishment), water is now being imported from other watersheds. Unless ground water supplies are replenished through recharge, the amount of water available for use in the future will decrease.

Maintain stream base flow. Stream base flow, the water that flows in the river long after the rain has stopped, comes from the ground. If more water is pumped out of the ground than is replenished through recharge, stream base flows are diminished. Much of the surface water from the headwaters of the Passaic River Basin is withdrawn downstream for water supplies. Base flows in the tributary rivers must be maintained to sustain adequate surface water supplies.

Reduce consumptive uses of water. Consumptive uses of water are uses that evaporate water back into the air, so that it can't be reused. Watering



Cornell Cooperative Extension and Onondaga County SWCD have adapted Farm*A*Syst materials to help educate farmers about keeping livestock out of streams.

Three Aspects to Be Considered in Water Supply Planning:

1. Sustaining reliable quantities of water for water supplies
2. Protecting the quality of water supplies
3. Improving both the quality and quantity of water available for water supplies

lawns, which transpire the water into the air, is a consumptive use. There are many ways that people can save water by using less. Water conservation should be encouraged.

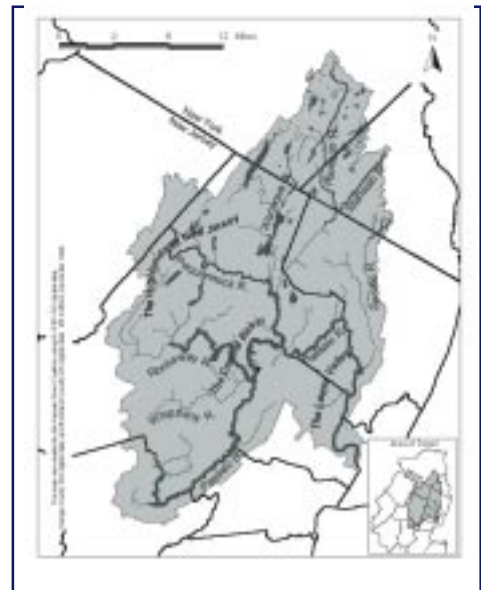
Increase reuse of water within the Passaic River Basin. As the watershed has become more developed, more and more water has been pumped out of the ground, but much of this water has not been returned to the ground. Instead it is piped off to a sewage treatment plant and discharged to a river downstream from where the water was taken out of the ground. This is a depletive use of water. If treated wastewater was reused in the watershed, more water would be available for use in the future.

Sustain water supplies by reducing reliance on sources of water from outside the Passaic River Basin. Rain that falls on other watersheds is being imported into the watersheds of the Highlands and Central Passaic River Basin for use as water supplies. The lower Passaic, which is one of the most densely populated portions of the United States, has depended on its water supplies coming from the upper watershed for more than 100 years. Consequently, with the increased growth and water needs in the upper area, a dilemma has been created. If water is imported into an upstream area and consumed, it is no longer available for urban users. If the imported water is used, treated, and then discharged into the Passaic

River, the water can be reused but its quality has been diminished. Thus, the importation of water supplies reduces the quantity of water and degrades the quality of the water available for downstream users. These problems become particularly critical under drought conditions.

To protect the quality of water supplies . . .

Reduce contamination of ground water. When well water becomes contaminated, less water is available for use. And remediation of the contamination is costly and usually



takes a long time. The Well Head Protection Program is intended to prevent contamination of well water. Such programs should be implemented throughout the watershed. In addition, a number of wells in the watershed are already contaminated. A commitment to clean up the ground water from which these wells are drawing should be established.

Reduce or, at a minimum, maintain nitrogen and phosphorus loadings to ground water and surface water. If nitrogen and/or phosphorus loadings were to increase, existing water quality would become more degraded and it would become more difficult and costly to treat water supplies. The levels of

these two nutrients have a critical, controlling effect on the aquatic biota living in a stream and are probably the best chemical indicators of changes in stream health. By reducing nitrogen and phosphorus loadings, desirable aquatic organisms will be sustained and the proliferation of undesirable organisms hindered. Nonpoint source management techniques, efficient management of point source discharges, and stream corridor protection and restoration can reduce nitrogen and phosphorus loadings.

To improve both the quality and quantity of water available for water supplies . . .

Improve ecological functioning of wetlands and stream corridors. Wetlands and vegetated stream corridors improve water quality by removing nitrogen and phosphorus and other pollutants from water. They also store water so it can be released slowly to maintain base flow. There are areas in the watershed that were once functional wetlands and stream corridors but are no longer. These areas should be restored to their natural functions.

Maintain or improve aquatic communities and their habitats, including

wetland communities. This objective emphasizes the need to consider the many benefits that aquatic biota can provide in cleaning up water supplies as well as providing recreational and aesthetic benefits.

Reduce damages from flooding by restoring natural functions. Flooding in areas that do not normally flood is an indicator that storm water is not being appropriately stored in the ground, in ponds and reservoirs, or in wetlands. The restoration of floodway areas to their natural functions will not only reduce flood damages but also allow floodwaters to be stored and released downstream at a later date so that the water can be captured and used.



The development of management strategies to achieve these objectives is what watershed planning is all about. If water supplies are to be maintained throughout the Passaic River, citizens and agencies must understand why these objectives are critical and they must work together to meet them.

For more information, contact Ella F. Filippone, Ph.D., Executive Administrator, and Anne L. Kruger, Ph.D., Senior Scientist, Passaic River Coalition, 246 Madisonville Road, Basking Ridge, NJ 07920, (908) 766-7550.

The Water We Share: A Park and Reservoir With a Message

Of the 26 drinking water reservoirs in the city of Bellevue, Washington, the

new Cherry Crest Reservoir is the first one combined with a park. The 3-million-gallon concrete reservoir, built mostly underground, is cleverly hidden beneath sports courts and a plaza and surrounded by play equipment, picnic tables, and walking paths. Knowing that this multiuse site would attract visitors daily, the city's Utilities Department saw an exciting opportunity to promote water stewardship in the community.

Water conservation has long been a high priority in the city. With the 1999 listing of chinook salmon as threatened under the Endangered Species Act, conservation messages are even more critical because the less water people

use, the more water there is for salmon. Utilities Department staff worked with Partners in Design of Seattle to come up with an interpretive plan that engages and educates visitors, yet blends aesthetically with the Cherry Crest neighborhood.

Now, when visitors come to play tennis or have a picnic, they are greeted by a bronze plaque that welcomes them

to the site, orients them to the water reservoir, and reminds them that water is a precious resource to be shared and protected by everyone. Further along the walk they encounter a bronze ribbon that reads, "Water tells us we are one. It weaves together all living things and unites us with the earth." Other educational messages and thought-provoking water stories can be found throughout the park.

The park's main attractions are 10 colorful metal sculptures of watershed inhabitants—humans, animals, and plants—each with a different message. One informs visitors that Bellevue's drinking water comes from the protected Tolt and Cedar river watersheds. Others remind visitors that the earth today contains the same amount of

See Message, page 8

New Guidebook on the Clean Water Act

River Network has a new primer to help guide individuals, river groups, and watershed partnerships through the complexities of the Clean Water Act. *The Clean Water Act: An Owner's Manual* explains the law in easy-to-understand English and describes how it can be applied to protect and restore local watersheds.

Visit www.rivernet.org or call (503) 241-3506 for ordering information. (e-mail: jhamilla@rivernet.org) The publication is \$25 for non-members.



When visitors come to play tennis or have a picnic, they are greeted by a bronze plaque that welcomes them to Cherry Crest Reservoir in Bellevue, Washington.

From Message, page 7

water as when dinosaurs roamed the planet, that water renews itself in the never-ending process called the water cycle, and that all inhabitants of the watershed need water to live.

Because water messages are displayed at different points in the park rather than on one large display, visitors can take in a little information at a time and discover something new each time they come. The goal is to help visitors make the connection between drinking water, surface water, and the need to be stewards of our watersheds.

For more information, contact Wendy Skony, Utilities Department Public Information Officer, City of Bellevue, phone (425) 452-5215 or e-mail Skony@ci.bellevue.wa.us.

Missouri Rises to the Challenge: A Duo of Success Stories

Two lakes in Missouri—Mark Twain Lake and Table Rock Lake—have water quality success stories to tell. An important drinking water source in northeast Missouri, Mark Twain Lake is threatened by agri-chemicals, nutrients, and sediment. Runoff is a major problem in the 18,000-acre lake and is exacerbated by the lake's large drainage area. Sedimentation, the result of soil erosion from many sources, means higher costs for water treatment, premature filling of water impoundments, and loss of aquatic

habitat. And pesticides moving into water supplies can result in contaminant levels above federal and state drinking water standards.

More than two years ago it was determined that the water quality of Mark Twain Lake was declining due to increased levels of atrazine, a pesticide used on nearby crops. In 1998 the Department of Natural Resources (DNR) placed the lake on the state's list of impaired waters under section 303(d) of the Clean Water Act and worked to come up with a solution. They recognized that correcting a problem of this magnitude would take more than just one agency and would require cooperation and support of the local citizens and officials in Ralls and Monroe counties, as well as other government entities.

The University of Missouri Extension Center and Natural Resources Conser-

vation Service (NRCS) joined together to improve awareness of water quality issues. The Mark Twain Water Quality Initiative, an alliance of farmers, soil and water conservation districts, government, agri-business, community officials, private industries, and special-interest groups, was thus born. The Initiative is dedicated to preserving the water quality of Mark Twain Lake and six other public water supply reservoirs. DNR and EPA have provided funds for the project under section 319 of the Clean Water Act, and NRCS has also provided assistance. In addition, the Farm Services Agency, landowners, and agri-chemical industries participate. A parks and soil sales tax administered by the DNR's Soil and Water Conservation Program has helped support conservation practices to prevent soil erosion.

The benefits resulting from DNR and its many partners working as a team are reduced sediment and atrazine going into the lake. This has led to clearer water that is more aesthetically pleasing and water that is safer for swimming, fishing, and drinking. "One reason for the decreased levels of atrazine in the water is that the Mark Twain area has been clearly targeted for prevention of nonpoint source pollution by proactively involving landowners and the public," said Wanda Eubanks of the Mark Twain Water Quality Initiative. "The wide range of partners has made



the task of repairing Mark Twain Lake a truly cooperative undertaking.” Thanks to these cooperative efforts, DNR was able to remove Mark Twain Lake from Missouri’s 2000 list of impaired waters.

Table Rock Lake is a success of a different sort because it has generated interest and concern for one of southern Missouri’s greatest attractions. Table Rock Lake has historically had some of the clearest water in Missouri. Today, the residents in that area express general concern over water quality in the basin. “In fact, 80 percent of respondents to a phone survey done by the James River Basin Partnership (JRBP) in 1997 said the lake and river were more polluted than they were 10 years ago,” said Pamela Anderson, director of the JRBP.

This reduction in water clarity could be one reason there has been so much support and interest in improving the quality of Table Rock Lake. One of DNR’s partners is the James River Basin Partnership (JRBP), an influential not-for-profit organization dedicated to educating citizens in and near the James River Watershed on the wise use and preservation of water resources. The JRBP is composed of a diverse group of concerned citizens representing interests from the watershed as a whole, including agriculture, governments, businesses, and private individuals. They coordinate with NRCS on the James River Watershed Assessment and offer educational programs to children.

Table Rock Lake has been added to the year 2000 303(d) list due to both point and nonpoint source pollutants. One notable pollutant found in Table Rock

Lake is phosphorus. The Missouri Clean Water Commission has recently enacted a new rule limiting the amount of phosphorus allowed in wastewater discharges effective November 30, 1999. It will take some time to see the benefits of this rule, but it is one step in the right direction.

DNR director Steve Mahfood noted, “People immediately see the need to protect the water quality of Table Rock Lake for health and environmental reasons. But it’s also important to protect this natural resource for its beauty and what it adds to the quality of life.” The lake also has a tremendous economic impact on the area. In 1998, 5.8 million people visited the Branson area, adding an estimated \$1.2 billion to the area economy.

University of Missouri-Columbia Professor Jack Jones has been studying the water quality of Table Rock Lake since 1978. He believes that increases in nutrient loadings from recent agricultural and human development within the basin have resulted in increased algae and reduced water clarity. “Changes of this type are readily apparent to the general public because lake transparency is universally interpreted as a direct measure of water quality,” according to Jones. “Lake water with reduced water clarity has less aesthetic appeal and diminished utility for most human uses.”

For more information, contact Bob Ball, Water Quality Coordinator, USDA-Natural Resources Conservation Service, Parkade Center, Suite 250; 601 Business Loop 70 West; Columbia, MO 65203-2546; phone (573) 876-0900, e-mail bob.ball@mo.usda.gov.

Consumer Confidence Reports

By July 1, most Americans will have received a second "Consumer Confidence Report" on the quality of their local drinking water. Approximately 253 million Americans received their first annual drinking water report by Oct. 19, 1999, the first federal deadline for the annual reports. Consumer Confidence Reports are the centerpiece of the Administration's public right-to-know requirements under the 1996 Safe Drinking Act.

Water systems are now providing consumers with snapshots of their local drinking water quality, including the source of their drinking water, contaminants detected and actions taken when necessary. Ninety-two percent of the 54,000 community water systems across the country have now reported to their customers. EPA is taking administrative actions to assure that the eight percent noncomplying systems provide the reports to the public.

EPA, in collaboration with states, associations and local water boards, also has distributed public service announcements and ad campaigns to alert Americans that they should receive reports about their drinking water quality every year. More information on the Consumer Confidence Report Rule can be found at: www.epa.gov/ogwdw/ccr1.html.

National Drinking Water Source Contamination Prevention Meeting

EPA's Office of Ground Water and Drinking Water will hold a meeting on September 11, 2000 from 9:00 am to 3:00 pm at the Embassy Suites Hotel in Alexandria, VA, to discuss the development of a national drinking water source contamination prevention strategy. The strategy will help prevent the contamination of lakes, rivers, springs, and aquifers that serve as drinking water sources. For more information, contact the Safe Drinking Water Hotline at (804) 426-4791 or email hotline-sdwa@epa.gov.

Protecting Against Flood Damage

Floodplain Acquisition Offers Most Cost-Effective Solution to Flash Flooding in Cumberland, Maryland

Maryland's Natural Resource Conservation Service, in partnership with the Board of Commissioners of Allegany County, Maryland, and the Allegany County Soil Conservation District, recently completed plans for the Dry Run Watershed. The watershed plan calls for floodplain acquisition and stream restoration measures to alleviate flash flooding in the community of Bowman's Addition, just north of Cumberland, Maryland. After detailed planning and economic analysis, other flood control alternatives, such as dams, channelization, floodwalls, dikes, flood warning systems, floodproofing, and building relocation, were ruled out. The project was planned and funded under the authority of the Small Watershed Program, PL 83-566.

Floodplain acquisition involves the purchase and demolition of buildings in the floodplain. Property owners who are interested in participating have their land and buildings appraised for fair market value, and an offer of purchase

is made. Owners who agree to participate vacate their property, and the buildings are demolished. The foundations of the demolished houses are then backfilled and seeded. After the buyout phase is complete, stream restoration measures are implemented where feasible.

Residents in the floodplain were surveyed by mail regarding their willingness to participate in the Dry Run Watershed project. The response was overwhelmingly positive, with 45 out of 60 residents expressing interest.

The benefits and costs of several flood control measures for the watershed were analyzed, and floodplain acquisition emerged as the most effective solution with the highest benefit-cost ratio. While other flood control alternatives analyzed were significantly less expensive than floodplain acquisition, they could not provide an acceptable level of flood control given the unique topographical features in the watershed.

For more information, contact John Long at (410) 757-0861 or e-mail at john.long@md.usda.gov. The Maryland NRCS web site is at www.md.nrcs.usda.gov.

Several Broad Categories of Economic Benefits Were Estimated for the Dry Run Watershed Project:

Residential Flood Damage Reduction. Benefits include flood damages avoided to the buildings' structure and contents, as well as yards, driveways, garages, and automobiles.

Increased Property Values. Stream restoration measures and vegetative buffers can beautify residential areas, increasing the potential market value of nearby properties.

Reduction in Emergency Expenditures. Emergency measures necessitated by large storms, such as removal of deposits from streambeds and repair of access roads and bridges undercut by high floodwater, can be reduced.

Reduction in Lost Income. Benefits include the time homeowners would have to spend away from their jobs to repair flood damages and recover from large storms.

Reduced Flood Insurance Costs. Reductions in flood insurance administrative costs are direct benefits. In cases involving floodplain acquisition, flood insurance policies may be terminated, reducing costs to the government.

Floodplain Easements Reduce Flood Impacts in North Dakota

An innovative program is helping to reduce the economic and environmental risks of farming floodplains in North Dakota. Since the first sign-up in July of 1997, nearly 300 landowners in the Red River Basin have applied for assistance under a new floodplain easement program. A total of 12,315 acres of floodplain easements have been or are currently being secured. In fact, many landowners have even expressed an interest in restoring their lands to pre-settlement or preagronomic conditions.

The Emergency Watershed Protection (EWP) Floodplain Easement Program became available through the Federal Agricultural Improvement Reform Act (FAIRA), popularly known as the 1996 Farm Bill. The Farm Bill added

Watershed Protection and Flood Prevention Program

The PL 83-566 program, authorized in 1954, provides structural, nonstructural, and land treatment solutions to natural resource problems facing communities. The purposes of the program include flood prevention, reduction of erosion and sedimentation, water quality improvement, fish and wildlife habitat improvement, recreational opportunities, and water supply. Visit the Natural Resource Conservation Service's web site at www.ftw.nrcs.usda.gov/programs.html to find out more about the Watershed Protection and Flood Prevention program.

Key Findings and Policy Options in the Erosion Hazards Report Released by the Federal Emergency Management Agency

Findings:

- Development in several high-risk coastal areas studied has increased by more than 60 percent over the last 20 years.
- Only about half of homeowners in high-erosion areas on the Atlantic and Gulf coasts currently hold flood insurance policies.
- Assuming that enrollment in the federal flood insurance program holds steady, payout for erosion-related losses over the next few decades is likely to be about \$80 million per year.
- 338,000 structures are located within 500 feet of the shoreline.
- Fifty percent of these structures are located on the Atlantic coast, 13 percent on the Gulf, 20 percent on the Pacific coast, and 17 percent on the Great Lakes.

Policy Options:

- Prepare and disseminate maps showing areas subject to erosion.
- Create Coastal High Hazard Zones that include both flood and erosion risks.
- Impose a mandatory surcharge for erosion on flood insurance in Coastal High Hazard Zones.
- Combine erosion surcharges with regulatory measures such as setbacks to reduce damages.
- Require communities to impose building standards appropriate for future flood conditions expected because of erosion.
- Provide relocation assistance and/or buyouts.

authority for the Natural Resources Conservation Service to purchase floodplain easements. The purpose of the easements is to provide a nontraditional, nonstructural alternative to floodplain management. Easements are considered an effective alternative in reducing risks to life and property on land that frequently floods. The program's primary goal in North Dakota is to restore the hydrology of the floodplain and its native plant community while offering the landowner economic and social incentives.

EWP could not have been more timely. The 1990s brought repeated flooding to

the North Basin of the Red River Basin. Some landowners along the river and its tributaries experienced out-of-bank flows 6 out of 10 years. The Devils Lake Basin, a subbasin of the Red River Basin, also experienced more than a 20-foot rise in the lake level since 1993. After the devastating spring flooding of 1997, a new conservation program was desperately needed to assist landowners in reducing flooding impacts.

Through the EWP program, the economic hardships and environmental impacts caused by repeated flooding have been

successfully alleviated, particularly in Walsh and Pembina counties. Requests for assistance continue to exceed supplemental funding made available through the EWP program. With this new flood control alternative, program participants will now be able to enjoy the natural floodplain.

"We also know that more and more Americans are moving and building in at-risk areas. This [Erosion Hazards] report highlights the need for all of us to begin to make decisions about what we are going to do to protect our natural resources."

- James Lee Witt, Director
Federal Emergency Management Agency

Bio-Reactor Wetland System Cleans Water, Air and Attracts Wildlife

It's a wetland, a wildlife refuge, and a working waste treatment plant. It cleans water, reduces odor, and saves operating costs. What "it" is is a series of seven wetlands, specially designed to efficiently treat waste through the use of proprietary bacteria. The first of their kind in the Midwest, the bio-reactor wetlands were built by Steve Kerns of Clearfield, Iowa, in 1996. The entire treatment system, which uses 5 acres of former pasture ground, holds about 3.5 acres of surface water and is designed to contain two 500-year storms. Each wetland, which was prestocked with special manure-consuming bacteria, is maintained at a depth of 24 to 30 inches. The bacteria are self-sustaining and can survive Iowa winters.

After completing the 120-day cycle through the system, wastewater from the hog operation is cleaner than what most Iowa cities are allowed to discharge. According to the most recent five-day test results, the biochemical oxygen demand dropped 99.9 percent from the top cell to the bottom cell. BOD is a measure of biological activity. The lower the number, the less pollution potential. Kern's wetland BOD levels are 8.7 parts per million. His goal was 30. Nitrate levels are next to nothing and are lower than Iowa's drinking water standards. "This is a win, win, win situation," said Kerns, who owns a 300-sow seed-stock operation. It's produced clean water and air, fewer costs, and more wildlife."

The USDA Natural Resources Conservation Service and Designed Organics, Inc., of Des Moines helped design and implement Kern's manure management system. Construction cost about \$10,000. The bacteria were donated. Kerns first investigated building the system of terraces as an alternative to hauling and applying 2 million gallons of manure each year. He had applied manure twice a year at an approximate cost of \$10,000 to \$20,000 annually. "Our biggest challenge was finding windows of opportunity to apply manure," Kerns said. "We had concerns about compaction and planting schedules. Wear and tear on local roads was also becoming more of a concern." Based on the application cost savings, Kerns estimates the wetlands paid for themselves within the first 18 months. But the wetlands are cutting more than costs.

"There has been about a 50 percent reduction in odor," Kerns said. "We didn't plan for that—it was just an added bonus." Another supplemental benefit is the wildlife that now reside at the Kerns farm. "The wetlands have pulled in about 150 ducks and three sets of Canada geese. And I've seen lots of foxes lately," he said.

For more information, contact Laura Greiner, Communications Specialist, USDA-Natural Resources Conservation Service, Des Moines, Iowa.

Updates...

High Political Drama Surrounds Final TMDL Rule

EPA Administrator Carol Browner signed a final rule to strengthen the Total Maximum Daily Load (TMDL) program on July 11. This important national program, established under section 303(d) of the Clean Water Act, provides the framework for identifying and cleaning up polluted waterbodies. The rulemaking had been under development for several years.

A TMDL is a "pollution budget" designed to restore the health of a waterbody not meeting state water quality standards. Over 20,000 waterbodies across America have been identified as polluted by states, territories, and authorized tribes.

The rule is subject to a rider, which was attached to the Fiscal Year 2001 Military Construction/Supplemental Appropriations bill, expressly prohibits EPA from using any funds to implement new rules to the TMDL program. Because the bill was still awaiting the President's signature when the Administrator signed the rule, the rider did not prevent promulgation of the rule. However, as a consequence, the final rule will not become effective until October 1, 2001. While implementation of the new rule is interrupted by the enactment of the rider, the program will operate under the "old" rules.

In August 1999, EPA proposed changes to its existing regulations to clarify and strengthen the authorities of EPA, states, territories, and authorized tribes to implement the TMDL program. EPA considered more than 34,000 comments on the proposed rulemaking and talked with hundreds of people in public outreach and information-sharing sessions. EPA made many final changes

to the regulations as a result of public comment, including dropping the requirement to list "threatened" waters, eliminating the requirement that states give higher priority to certain impaired waters, and removing forestry provisions that would have allowed for new permitting authority to address point source discharges of stormwater that cause significant pollution problems.

The final rule will:

- Strengthen states' abilities to clean up polluted waters by identifying pollution reductions needed to meet clean water standards;
- Provide for a comprehensive listing of all the Nation's polluted waters (i.e., those that fail to meet state water quality standards);
- Encourage cost-effective clean-up by ensuring all sources of pollution are considered in the development of cleanup plans;
- Assure that TMDLs include implementation plans that define specific actions and schedules for meeting clean water goals.

Furthermore, cleanup plans must provide "reasonable assurances" that measures to address the pollution, including polluted runoff will be implemented, and controls for polluted runoff are to be implemented within five years, when practicable. The public will also have increased input into the TMDL process through the opportunity to comment on the methodology, lists, prioritized schedules and TMDLs prior to submission to EPA.

For additional information, visit the TMDL web site www.epa.gov/owow/tmdl.

Regional Watershed Roundtables

The federal agencies involved in the Clean Water Action Plan (CWAP) are providing

assistance to nonprofit organizations to convene regional watershed round-tables across the country. Below are snapshots of roundtables convened in May.

Great Lakes Roundtable, May 9-11

The Conservation Technology Information Center hosted a roundtable in Chicago that focused on urban sprawl and smart growth. Participants were educated on the potential impacts of urbanization on local watersheds. In addition, the roundtable provided training on financing and techniques for watershed protection and restoration projects.

Rocky Mountain Roundtable, May 15-17

The Montana Watercourse convened a roundtable in Chico Hot Springs, Montana, that brought together local, state, and federal watershed stakeholders from the Dakotas, Colorado, Utah, Montana, and Wyoming. Local watershed practitioners identified the need for sustainable funding sources for the operation and maintenance of local watershed organizations, including the hiring of local watershed coordinators, as a top priority.

California Roundtable, May 17

The Watershed Management Council hosted the last of four roundtables in Davis, California. These roundtables assembled local watershed groups and state and federal agencies to identify commonalities among diverse watershed approaches and to suggest how a robust, collaborative framework for watershed management in California could be shaped.

For more information about upcoming watershed roundtables, visit the Clean Water Action web site at www.cleanwater.gov. The regional watershed roundtables will culminate with the National Watershed Forum in 2001 (Clean Water Plan/Action Item 108).

New Resources

Publications

The National Water Quality Inventory: 1998 Report to Congress.
(June 2000) EPA-841-F-00-006

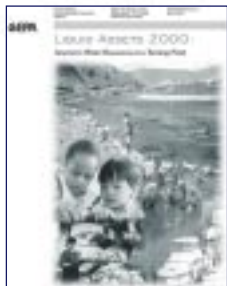
Biennial report prepared under section 305(b) of the Clean Water Act summarizes state-reported water quality conditions in streams, lakes, estuaries, wetlands, coastal waters, and ground water. Additional information, including a fact sheet and the full report, is available on the internet at www.epa.gov/ow, under "What's New," or by calling EPA's National Service Center for Environmental Publications at 1-800-490-9198.

Atlas of America's Polluted Waters.
(May 2000) EPA-840-B-00-002.

Provides a map of each state depicting surface waters that do not meet state water quality standards, as reported under Section 303(d) of the Clean Water Act. It is available on the internet at www.epa.gov/owow/tmdl/atlas or by calling 1-800-490-9198.

Liquid Assets 2000: America's Water Resources at a Turning Point. (May 2000) EPA-840-B-00-001.

Provides a snapshot of the economic value of clean water, the problems we face in the new millennium, and the actions we must take to protect and restore the nation's water resources. It is available on the internet at www.epa.gov/ow/liquidassets or by calling 1-800-490-9198.



Videos/CD Roms

Control of Rural Road Runoff: A Video Asks for Partnerships

The Boquet River and AuSable River, with headwaters in the high peaks of the New York Adirondack Park and mouths at Lake Champlain, were until recently prime trout and salmon rivers. Both rivers now face near-critical levels of sand embeddedness (sand from winter deicing agents, shoulder ditching, and culverts and storm drains without settling basins that packs between substrate cobbles and can smother fish eggs and aquatic insects). Armed with a small implementation grant from the Lake Champlain Basin Program, the Boquet River Association (BRASS), in Elizabethtown, New York, went out to help rural road superintendents control runoff. When touring proposed sites with road department personnel, the organization quickly realized that hardware and changes in road maintenance would not solve the problem.

BRASS found its most useful role was to assist highway superintendents by negotiating with landowners and other jurisdictions, applying for permits, seeking technical help, looking for volunteer assistance, and building partnerships. The Association made a 24-minute video in which local highway superintendents, environmental groups, elected officials, sportsmen, engineers, and agency personnel talk frankly about the problems and impact of sediment runoff. To obtain a copy of *Looking for Answers: Developing Partnerships for the Control of Sediment Runoff from Rural Roads*, send \$15 (check, PO, VISA, MC, or AmEx) to Videosyncracies, Inc., 73 Main Street, Suite 39, Montpelier, VT 05602.

Waters to the Sea CD ROM Links History, Ecology, and Water Quality

Hamline University's Center for Global Environmental Education in St. Paul, Minnesota, has released a new educational CD-ROM, "Waters to the Sea: Rivers of the Upper Mississippi." This project teaches students in grades 4 to 9 about diverse science and social studies concepts. Virtual journeys down three Upper Mississippi watersheds take users from prehistoric times up to the present through prairie, deciduous forest, and coniferous forest ecoregions. Each journey investigates the impacts of human land-use activities within each watershed. Users also conduct water-quality tests on simulated water samples. Twenty-four short videos, landscape panoramas, hundreds of historic photos, and numerous engaging multimedia activities provide for a rich learning experience.

The program costs \$39.95 plus shipping and handling. Contact the Center for Global Environmental Education. Phone: 651-523-2480; e-mail: cgee@hamline.edu; web <http://cgee.hamline.edu/waters2thesea>

New Video Explains Riparian Functions

Whether the riparian area is along a coastal or a desert stream, it plays a pivotal role in the health of our watersheds. "Life on the Edge: Improving Riparian Function," a new 12-minute video from the Oregon State University Extension Service, shows viewers:

- How this transition zone between water's edge and the uplands provides food and cover for fish and wildlife, controls erosion, filters runoff, and produces the ingredients for fish habitat and stream channel stability.

From Videos, page 13

- What land-use practices can impact riparian areas.
- The techniques landowners, volunteers, and professional resource managers are using to improve and protect riparian function.

The video costs \$19.95 (including shipping). Order by e-mailing puborders@orst.edu or send a check or money order payable to Oregon State University to: Publication Orders, Extension & Station Communications, Oregon State University, 422 Kerr Administration Building, Corvallis, OR 97331-2119.

Education/Models

Improving Water Quality Through Land Use Education: An Emerging National NEMO Network

Nonpoint Education for Municipal Officials (NEMO) is a University of Connecticut educational program for local land use decision makers that addresses the links between land use and natural resources, particularly water resources. The NEMO project believes that natural resource health is a reflection of land use practices and that land use is a local issue that is best improved through professional, research-based outreach education. NEMO is in its ninth year of operation and has helped scores of Connecticut

towns achieve changes to local land use plans, regulations, and practices. These changes in land use practice include anything from parking lot and site design to road layout and design to open space planning to regional watershed plans and interjurisdictional agreements.

News of NEMO's success has spread nationwide. Fifteen states have adapted the program, with another 13 states in some stage of program planning. This informal confederation of NEMO projects has led to the creation of a **National NEMO Network** to share experiences, tools, and techniques. Member projects in the Network are not necessarily clones of the Connecticut program. Each project has a slightly different natural resource emphasis (urbanization, ground water protection, coastal wetlands) and geographic focus. The diversity of interests and focus is due, in part, to the flexibility of the NEMO educational approach.

The National NEMO Network is advised by an Interagency Work Group made up of EPA, USDA, NOAA, and NASA staff, as well as representatives of professional and client organizations like the American Planning Association and the National Association of Counties. Currently, the Interagency Work Group is working on a Charter to further the goals and support the mission of the National NEMO Network.

For more information about NEMO and the National NEMO Network, visit <http://nemo.uconn.edu> or contact Chet Arnold (Project Director) or John Rozum (National Coordinator) at (860) 345-4511.

Web Sites

Web Site Encourages Raising Fish in Classrooms

In 1993 the U.S. Fish & Wildlife Service in New Hampshire created an interdisciplinary middle school curriculum titled *Adopt-A-Salmon Family*. The curriculum allows teachers and students an adventure in studying watershed issues, as well as the excitement of rearing and releasing Atlantic salmon. Although strong in science concepts, the materials also provide opportunities for lessons in language arts, fine arts, mathematics, social studies, technical education, ethics, and recreation. The curriculum is being used in more than 100 schools in the Northeast.

The Boquet River Association received an EPA Environmental Education grant to expand the curriculum to include landlocked Atlantic salmon, brook trout, land use history, and geomorphology of the Adirondack and Lake Champlain region, with a greater emphasis on habitat as the limiting

factor for healthy fisheries in many of the nation's streams and rivers. The new materials are being tested in seven public middle schools. These studies fit into new state educational standards that promote critical thinking, problem-solving, and the realism and immediacy of backyard environmental issues. The materials are available on the web at www.boquetriver.org.

NEW ON THE WEB



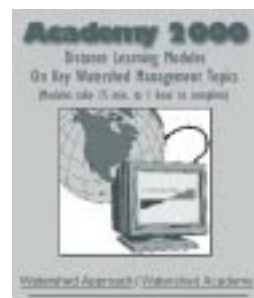
Photo by Dave Davis

Restoration Web Site

Check out this new web site dedicated to river corridor and wetland restoration. The site provides definitions, tools, funding sources, and project ideas, as well as links to other valuable restoration sites. www.epa.gov/owow/wetlands/restore/.

Watershed Academy Pilots On-Line Certificate

OWOW is now offering a Watershed Training Certificate for successful completion of a series of 15 specific on-line watershed training modules (10 required, 5 elective). Many new modules are under construction and will be completed during the summer of 2000. General areas covered include *Introductory Modules, Watershed Ecology, Watershed Change, Analysis and Planning, Management Practices, and Community/Institutional/Social Context*. www.epa.gov/owow/watershed/wacademy/acad2000.html



EVENTS

AUGUST

- 7-11 *Water Quality Standards Academy*, Arlington, VA. Sponsored by EPA. Contact Greg Smith at (614) 487-1040; web site: www.epa.gov/ost/announce/academy.
- 27-30 *Riparian Ecology and Management in Multi-Land Use Watersheds. American Water Resources Assoc. Summer Specialty International Conference*, Portland, OR. Contact AWRA at (703) 904-1225; awrahq@aol.com; web site: www.awra.org.
- 29-Sep. 1 *National Community Involvement Conference*, San Francisco, CA. Sponsored by EPA. Contact Jori Copeland at (202) 260-1905; copeland.jori@epa.gov; web site: www.epa.gov/superfund/tools/ciconf/2000ciconference/index.htm

SEPTEMBER

- 6-8 *Field Workshop on Ground Water-Surface Water Interactions*, Polson, MT. Visit www.umt.edu/biologu/flbs or e-mail flbs@selway.umt.edu
- 8-9 *Mississippi River Basin Alliance Annual Conference and Membership Meeting*, Memphis, TN. Contact MRBA at (612)870-3441, mrbaoffice@mrba.org, web site: www.mrba.org.
- 11-15 *Working at a Watershed Level*, Bloomington, IN. Contact Malissa McAlister at (606) 244-8000; mcalister@csg.org; web site: www.statesnews.org/ecos/working.htm.

- 24-27 *AML Reclamation 2000: Reflecting on the Past-Assessing the Future*, Steamboat Springs, CO. Hosted by the State of Colorado Department of Natural Resources' Division of Minerals and Geology. Phone: (303) 866-4097; web site: www.onenet.net/~naampl/conf2000.htm.
- 11-14 *8th National Nonpoint Source Monitoring Workshop*, Hartford, CT. Contact John Clausen at (860) 486-2840; jclausen@canr.uconn.edu; web site: ww.ce.uconn.edu/nps.html.

OCTOBER

- 17-21 *Spanning Cultural and Ecological Diversity Through Environmental Education*, South Padre Island, TX. Sponsored by the North American Association for Environmental Education. Contact Brenda Weiser at (281) 283-3950; weiser@cl.uh.edu; web site: www.naaee.org.
- 29-Nov. 2 *Wetlands Regulatory Workshop*, Atlantic City, NJ. Sponsored by EPA. Contact Ralph Spagnolo at (215) 814-2718; spagnolo.ralph@epa.gov.
- 30-Nov. 10 *Healthy Watersheds: Community-based Partnerships for Environmental Decision-Making Seminar*, Aurora CO. Sponsored by the United States Office of Personnel Management. Contact Phyllis O'Meara at (303) 671-1034; paomeara@opm.gov.

NOVEMBER

- 8-10 *NALMS 2000: Celebrating 20 Years of People Linking Lake and Watershed Management*, Miami, FL. Sponsored by the North American Lake Management Society. Contact Pamela Leasure at (727) 464-4425; pleasure@co.pinellas.fl.us or nalms@nalms.org; web site: www.nalms.org.
- 13-15 *Asking the Right Questions: Evaluating the Impact of Groundwater Education*, Nebraska City, NE. Sponsored by The Groundwater Foundation. Contact Cindy Kreifels at (800) 858-4844; cindy@groundwater.org.
- 27-30 *Managing Watersheds in the New Century*, Monterey, CA. Sponsored by the Watershed Management Council. Phone: (510) 273-9066; wmc@watershed.org; web site: watershed.org/wmc.

Call for Poster Abstracts

The Nature Conservancy is soliciting abstracts for "Managing River Flows for Biodiversity—A Conference on Science, Policy and Conservation Action." This conference will be held July 30-August 2, 2001, at Colorado State University in Fort Collins, CO. Attendees will have an opportunity to examine the real and perceived conflicts between meeting ecosystem needs and human demands for water; discuss the state of science with respect to flow requirements for biodiversity conservation; and hear case studies where practitioners are working to meet human demands for water while also providing for ecosystem health.

Abstracts must be submitted by December 31, 2000. Posters may cover themes related to managing river flows for biodiversity, including case studies on particular flow restoration efforts. All abstracts should be submitted to Nicole Silk by e-mail (nsilk@tnc.org).

More information about the conference will soon be available at www.freshwaters.org.

Runoff Is Leading Cause of Impairment According to 1998 National Water Quality Inventory

In the newly released 1998 National Water Quality Inventory, states, tribes, territories, and interstate commissions report that in 1998 about 40% of U.S. streams, lakes, and estuaries assessed were not clean enough to support uses such as fishing and swimming. About 32% of U.S. waters were assessed for this national inventory of water quality. Leading pollutants in impaired waters include siltation, bacteria, nutrients, and metals. Runoff from agricultural lands and urban areas are the primary sources of these pollutants. Although the United States has made significant progress in cleaning up polluted waters over the past 30 years, much remains to be done to restore and protect the Nation's waters. The full report is available at www.epa.gov/ow, under "What's New," or by calling EPA's National Service Center for Environmental Publications at 1-800-490-9198. Ask for EPA-841-F-00-006.

President Announces New Oceans Executive Order

On May 25, President Clinton issued a new Executive Order that directs EPA to better protect beaches, coasts, and ocean waters from pollution. In developing new Clean Water Act regulations that strengthen water quality protection for coastal and ocean waters, EPA may set higher levels of protection in especially valued or vulnerable areas. In addition, the Executive Order strengthens and expands the system of Marine Protected Areas.

President Clinton also directed the Secretary of Commerce and the Secretary of the Interior to develop a plan to permanently protect the coral reefs of the Northwest Hawaiian Islands, which represent nearly 70 percent of the coral reefs in U.S. waters.

The new Executive Order was announced on Assateague Island, in the watershed of the Maryland Coastal Bays National Estuary Program (NEP). The President complimented the work of the NEP and other coastal protection programs and described how the New Executive Order would enhance the important coastal environmental work already begun. For more information, visit www.epa.gov/owow/oceans/protecting_oceans.

Views expressed in *Watershed Events* do not necessarily reflect those of EPA. In addition, mention of commercial products or publications does not constitute endorsement or recommendation for use by EPA.



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