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Watershed Events

A Bulletin on Sustaining Aquatic Ecosystems Fall 1995

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A special focus on measuring success under the watershed approach, and...

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Note from the Editors

This is the third issue of a series devoted to the watershed approach and reinvention. In the last issue, we discussed the "reinvention" of training needed to effect change. The feature article of this issue attempts to shed light on how Federal, State, local, and private agencies are "reinventing" the way that they define and measure success under the watershed approach.

As we reformulate our measurements of success, it is important for us to make sure that we are meeting the needs of the people that we serve. This will be the focus of our next issue. Please write to us about how agencies participate at the local project level and about the role local input plays in setting agency priorities.

The Watershed Approach and Reinvention-- Defining and Measuring Success

Although the land and water resource programs of different agencies focus on habitat and water quality for different purposes, the

watershed approach provides a common goal for all--a cleaner water environment that supports sustainable uses.

As a means to reach this common goal, the watershed approach encourages teams of local stakeholders to make decisions on the fate of their watersheds. Federal, State, local, and private agencies will participate as members of the team and share their program perspectives and resources in the development and implementation of action plans. To bring, and keep, all the stakeholders together, the teams must be able to define what the success of their efforts will be, and measure it over time. This will give all stakeholders shared satisfaction and realistic expectations.

This is indeed a "reinvention" that will require institutional change and, at times, cultural change. The following Federal, State, local, and private agencies share with us their efforts to define and measure success under the watershed approach. We welcome the first time contributions to this issue from the states of Illinois and Wisconsin. We look forward to hearing more from our partners at State, local, and private organizations. With the Government Performance and Results Act (GPRA) as the key driving force, the Environmental Protection Agency (EPA) is completing the National Goals Project. The project will establish a series of national environmental goals and milestones for measuring the success of EPA programs over the next ten years. For its share, the Office of Water has developed two-tier environmental indicators for the Clean Water Act and the Safe Drinking Water Act programs. Tier I indicators include: wetland acreage; waters meeting designated uses; and point source loadings to surface and ground waters. Shellfish bed closures, marine debris, and biological integrity are Tier II indicators.

In a memorandum dated September 11, 1995 proposing the indicators to his Regional colleagues, Bob Perciasepe, Assistant Administrator for Water, stated "One of my highest priorities is to integrate the use of environmental indicators into everything we do." Indicators will be incorporated into the current Regional Management Agreements and, when established, the National Environmental Performance Partnership System with the states. EPA is working with several pilot states to determine the best measures of success for state programs. The new system will give states accountability while simultaneously offering them program flexibility. *From the Regional perspective, with EPA Region 8 as an example...*

Nearly all watershed efforts have measures of success. These measures reflect goals to improve or protect the integrity of the aquatic ecosystem, including the ground/surface water interface. Measures of success range from chemical water quality change, such as a reduction in coliform bacteria or zinc concentration, to the return of targeted fish species to the watershed, to positive change in the structure of the macroinvertebrate community. Where the protection of a pristine area is of concern, measures include the development of conservation easements, the trend of biological indicators, or protection of riparian corridors in city or countywide plans.

Many environmental problems, however, have developed over a long period of time and will not be solved quickly. Therefore, interim measures of success are needed to evaluate watershed efforts. These measures are often related to the functioning of a stakeholder group, such as a watershed council. Examples of such measures include--coming to agreement on goals and objectives; supporting and finding a neutral watershed coordinator; increasing participation over time, especially by recalcitrant or suspicious stakeholders; monitoring activities coordinated among several agencies; establishing a volunteer monitoring effort; increasing public awareness about watershed issues; increasing trust among stakeholders; identifying a project that everyone can agree to support (or at least not object to); and development of a common database.

The goal of the Tennessee Valley Authority (TVA) is to ensure that each stream, river, and lake in the Tennessee Valley is ecologically healthy, biologically diverse, and supports its beneficial uses. TVA is accomplishing this goal through River Action Teams--self-managed teams of environmental engineers, aquatic biologists, and education specialists charged with protecting and improving the Valley's twelve subwatersheds.

River Action Teams conduct stream assessments to identify protection and improvement needs in their watershed. The teams also work with government officials, industries, and citizen groups to pinpoint pollution sources and fix problems. Their performance is measured by the number of hydrologic units with

- 1) current stream assessments,
- 2) problem causes identified,
- 3) correction/protection activities,
- 4) coalitions under development, and
- 5) coalitions in place.

TVA also measures improvements in reservoir ecological health based on indicators for algal production, dissolved oxygen, fish community health, benthos, and sediment toxicity. An overall reservoir health rating is calculated from these measurements and reported to the public through *RiverPulse*, an annual report on the condition of the Tennessee River and its tributaries. Current performance goals focus on reducing the total number of reservoirs in poor ecological health and increasing the number of tributary reservoirs in good ecological health.

In 1996, TVA plans to conduct customer surveys to obtain feedback on public attitudes related to water quality improvement and to evaluate the success of River Action Team efforts. This is critical, according to Wayne Poppe, Acting Manager of TVA's Clean Water

Initiative, because "the real measure of success comes when people's attitudes begin to change and they willingly accept responsibility for improving water resources."

As one of 21 agencies initially selected to comply with the Government Performance and Results Act, TVA is continuing to improve its performance indicators to make them more results-oriented and customer-focused. As a result of these efforts, TVA was recognized as one of the top ten "Exemplar" Reinventing Government models by the former director of OMB, Leon Panetta, and designated as a "Reinvention Laboratory" by Vice President Al Gore. In June 1995, TVA's Clean Water Initiative received the prestigious Hammer Award for excellence in reinventing government.

The United States Geological Survey (USGS) provides both short-and long-term, broad-scale assessments of the quality of the Nation's fresh water through its National Water-Quality Assessment (NAWQA) program. As part of USGS's mission, these assessments are designed to support the development and evaluation of management, regulatory, and monitoring decisions by Federal, State, and local agencies to protect, use, and enhance the Nation's water resources.

The short-term success of NAWQA is measured by its response to priority environmental and public health concerns. For example, NAWQA has investigated the occurrence of nutrients and pesticides in rivers and groundwater. Next, it will investigate volatile organic compounds, providing information necessary for a number of Federal water quality regulations.

The long-term objectives of the NAWQA program are to describe current water-quality conditions for a large part of the Nation's freshwater streams, rivers, and aquifers; describe how water quality is changing over time; and improve understanding of the primary natural and human factors that affect water quality conditions. Such data provides insight into the success of water quality management efforts and a direction for future planning. To measure the success of highway runoff control strategies, water quality experts need to gather a lot of data--on everything from land use, to traffic volume, to highway maintenance practices, to the effectiveness of existing stormwater drainage systems. Then they need to analyze the relationship between these sets of facts.

More and more state transportation agencies are working to meet this challenge. They are motivated by concern for protecting the habitat of endangered species, preventing and controlling soil erosion, and demonstrating compliance with national stormwater regulations.

Some transportation agencies are proposing specially-designed *master plans* that can gauge the success of future water quality efforts by identifying precisely where and how the state would treat its highway runoff within a sub-basin. These master plans favor a watershed approach as opposed to a "crisis-oriented," project-by-project planning strategy.

The following attributes make master plans an effective measuring device:

- Mitigation options will be identified, so project development becomes more efficient;
- Pre-selecting suitable mitigation sites will

Transfer interrupted!

of resources;

- Permitting processes will take less time;
- Early purchase of right-of-way mitigation sites will reduce long term project costs;

- Regulators prefer proactive rather than reactive resource management;
- Once the master plan is carried out, there will be fewer delays due to water quality issues
- Maintenance issues will be more easily incorporated into design.

The Nature Conservancy's (TNC) dogged focus on rare species serves as a keystone in its effort to construct a framework for measuring conservation success. Clearly, if all those species and ecological communities which comprise a natural landscape are thriving, we can conclude that conservation efforts are succeeding. While these ecological measures are both necessary and sufficient to assess conservation success in theory, in practice it is impracticable to monitor all species populations, everywhere. Therefore, a hierarchical structure incorporating both programmatic-level indices and direct measures of conservation impacts is needed to measure success.

TNC has identified several programmatic measures of success, incorporating questions such as--"Is there a strategically identified portfolio of well designed protected areas?"; "Is there perennial funding available for the care of these preserves?"; and "Is there support for conservation management among the local constituency?" The advantage of these measures is that they are relatively easy to quantify. The disadvantage is that they are not sufficient to assess the biological diversity of a landscape; the ultimate goal of

conservation efforts.

In comparison to programmatic measures of success, measures of conservation impact reflect changes that occur in ecological time. These measures can be direct measures of population health (population status and trends) or they can be indications of ecological processes (e.g., change in hydrological dynamics). Unlike programmatic measures, conservation impacts are often difficult to quantify, however, they offer the most direct indication of ecological health and conservation success. At the programmatic level, there are several efforts currently underway within the U.S. Army Corps of Engineers (Corps) to address the issue of performance measurements, although these are not necessarily tied specifically to a "watershed approach" or developed exclusively for the Corps' environmental program.

Selected as a pilot program under the auspices of the President's 1993 National Performance Review and the Government Performance and Results Act (GPRA), the Corps' National Operation and Maintenance (O&M) Plan of Improvement calls for performance measures in several "business functions"--hydropower, navigation, recreation, flood control, and environmental stewardship. One "product" of environmental stewardship is providing "optimally productive natural resources." Their efficient and effective delivery is defined through several performance measures, including:

the percent of Corps lands included in Fish and Wildlife Service Endangered Species Recovery Plans that are managed in accordance with plan specifications; the percent of wetland acres on Corps project lands that are protected through such actions as designation and management as environmentally sensitive areas; of Corps lands identified in the North American Waterfowl Habitat Management Plan as "High Priority Habitat Area of Major Concern," the percentage that are protected; and the percent of Corps-designated mitigation lands meeting mandated outputs in terms of fish and wildlife populations. As part of a broader effort, the Corps is also currently developing a comprehensive set of Civil Works Program performance measures covering all facets of its Civil Works mission. Performance measures applied to Civil Works projects would address four "products" of the environmental program: compliance with applicable environmental treaties, laws, executive orders, and regulations; mitigation for environmental resources affected; maintenance of environmental resources; and restoration of environmental resources. Development of performance measures for these environmental "products" is currently underway. Pursuing an effort to measure the success of the coastal management program nationwide, the National Oceanic Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resource Management recently selected a consortium of Sea Grant Colleges to study the effectiveness of the coastal program in meeting the core objectives of the Coastal Zone Management Act.

Led by Marc Hershmen of the University of Washington, the team will use outcome measures, such as changes in the rate of habitat loss nationwide, to quantify effectiveness. In cases where such data is not available, the team will use "process measures," such as management program policies, for the analysis. The team will look at three core coastal issues: 1) protection of natural resources; 2) public access to the coast; and 3) assistance to ports and other water dependent uses. The study will also look at how simplified regulatory procedures are and how expedited decision making is in connection with coastal programs. During Fall 1995, the team will conduct a national literature review. A survey of coastal states and territories will begin in early 1996, with the final analysis scheduled for release next September.

As another means of measuring success, a database illustrating money generated by the positive economic impact of coastal resources management will soon be available from NOAA. The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, is working on ways to better assess the impacts of its efforts on the long-term sustainability of natural resources and the economic, social, and cultural concerns of local communities.

Every five years, NRCS conducts the National Resources Inventory (NRI) on nonfederal, rural land in the United States. The NRI reflects the outcomes of agency activities. For example, the 1992 NRI report shows that farmers and ranchers reduced cropland erosion by about one-third from 1982 to 1992. An NRCS team is developing ecosystem health indicators, for use in conservation planning and assessing the effects of implementation. In addition, NRCS is developing indicators for water quality and quantity and aspects of human well-being, such as producer income, recreation value, and cultural resource value. NRCS's soil and snow survey and water supply forecasting programs are also serving as pilot studies under the Government Performance and Results Act (GPRA). The GPRA requires agencies to submit five-year strategic plans by 1997 and annual performance plans beginning in 1999.

NRCS also operates a database that stores 45 categories of information on each of its Public Law 83-566 Small Watershed Protection Program projects, including how many people benefit from the project; the acreage of enhanced wetlands; and the purposes of the project. This information can be used to assess where, and for what purposes, program funds are being used and to show the benefits associated with investments in water quality. The Illinois Environmental Protection Agency (Illinois EPA) is focusing on enabling and empowering local stakeholders to take charge of the fate of their watersheds. The agency will accomplish this mission through a holistic approach to watershed planning, focusing on all of the resource concerns within a watershed and coordinating Federal, State, and local involvement in watershed management activities. This is a unique approach to water quality protection in that a comprehensive watershed plan for the protection of drinking water (surface and ground water) and control of water pollution are being integrated. One aspect of this approach is to build some consensus statewide on what a watershed is, and why and how to protect it. The Illinois EPA will achieve this by scheduling a series of regional workshops to obtain input from local watershed practitioners for the development of a model watershed planning process.

A second aspect of this approach is to provide technical assistance tailored to each individual watershed. The Illinois EPA is prepared to answer questions such as--"What is the current condition of our watershed in relation to its uses?"; "What condition should our watershed be in to support such uses?"; and "What actions can we take to achieve this level of quality?"

The success of the state's watershed program will be judged on the ability of the Illinois EPA to energize local stakeholders to voice opinions and take action for watershed planning. Success is also contingent on the agency's capacity to provide technical assistance to communities as requested. The Bureau of Reclamation is currently designing watershed policy that will define and measure success on a case-by-case basis. Many of Reclamation's regional and area offices are already incorporating this concept in planning their projects.

Recognizing careful planning as a key element in the success of water quality projects, the Mid-Pacific Regional Office and the Pacific Northwest Regional Office are busy working to develop environmental impact statements for reclamation projects in local watersheds. The offices are cooperating with agencies associated with the projects to examine a variety of operational alternatives on a regional and site-specific scale. In addition, the Kansas-Nebraska Area Office is preparing a Resource Management Analysis as part of the contract renewal process for water service contracts on the Republican River. The analysis will define the existing goals of Federal, State, and local agencies and analyze watershed management alternatives.

The main goal of Reclamation's watershed activities is to maintain a healthy watershed system that simultaneously supports a viable aquatic species population and the economic benefits of its projects. As the agency continues to strive toward its mission of being the foremost figure in the realm of water resource management, measuring success is becoming a crucial task. In summary, these programs reveal that agencies are actively working to develop performance measures that are compatible with the watershed approach. Though the measures and efforts are different for each agency and level of government, the common ground that they share will allow their measures and efforts to become more and more consistent and cohesive over time.

For more information on measuring success, contact...

EPA: Elizabeth Jester Fellows (202) 260-7062

EPA Region 8: Karen Hamilton (303) 312-6270

TVA: Debbie Hubbs (615) 632-7559

USGS: Terry Thompson (703) 648-6857

FHWA: Ginny Finch (202) 366-4258

The Nature Conservancy: Bob Unnasch (703) 841-5386

U.S. Army Corps of Engineers: Leigh Skaggs (703) 355-3091

NOAA: Elleen Kane (301) 713-3086, ext.100

NRCS: John Sutton (202) 720-0122, or

Emma Corcoran (202) 690-3703

Illinois EPA: Joel Cross (217) 782-3362

Bureau of Reclamation: Carrie Carnes (202) 208-4663

Did You Know?

With 14.1 million acres of wetlands and deepwater habitats on its nonfederal land, Minnesota has more wetlands than any other state; about nine percent of the national total.

The average annual sheet and rill erosion rate on cropland declined from 4.1 tons/acre on 421 million acres in 1982 to 3.1 tons/acre on 382 million acres in 1992. More than 62 million acres of U.S. cropland--16 percent of the total--were irrigated in 1992.

Forty percent of all cropland erosion nationwide occurred in just five states from 1982 to 1992--Texas, Minnesota, Iowa, Montana, and Kansas.

From 1982 to 1992, wetland losses due to nonagricultural activities outpaced those due to agriculture.

Source: *National Resources Inventory, A summary of natural resource trends in the U.S. between 1982 and 1992*, USDA Natural Resources Conservation Service, April 1995.

Look at What's Been Done!

In Wisconsin, three water quality monitoring techniques are used to evaluate the success of nonpoint source control efforts. Under the Signs of Success (SOS) program, the Wisconsin Department of Natural Resources compares rural and urban stream sections adjacent to areas with Best Management Practice (BMP) nonpoint source controls, to those without them. Observations of riparian and in-stream habitat over a one to two year time span provide a quick gauge of the success of BMPs.

Critical Sites Monitoring provides a more intensive, one to three year monitoring effort, isolating a single barnyard and monitoring runoff above and below it with the use of automatic water sampling devices.

Master Monitoring Sites monitor habitat, aquatic insects, fish, and water over a ten year, plus, period in an attempt to detect changes on a watershed scale. Watersheds of various stream types (e.g., low gradient, high gradient, warm water, cold water) located throughout the state are monitored. For more information on the monitoring programs, contact Michael A. Miller, Water Resources Specialist, Wisconsin Department of Natural Resources, phone (608) 267-2753, fax (608) 267-2800.

With an average altitude of 50 feet below sea level, the protection of drinking water is a key environmental issue in the Netherlands. In an effort to prevent contamination of drinking water supplies by agrichemicals and manure from dairy operations, the Center for Agriculture and the Environment, based in Utrecht, Netherlands, developed a series of new farm management tools.

Known as "yardsticks," the tools allow farmers to calculate a numerical score to quantify the environmental impact of their management strategy. The score is based on the type of pesticide and fertilizer applied, the application rate per acre, the timing of each application, and the method used.

This breakdown allows farmers to calculate ways to improve their scores using the yardstick as a model. The yardstick scores also offer a measure of the performance of Best Management Practices, important to demonstrating the success of water quality protection efforts.

During the next year, the Institute for Agriculture and Trade Policy will begin experimenting with the pesticide and fertilizer yardsticks in the United States. For more information, contact Mark Ritchie, Executive Director, Institute for Agriculture and Trade Policy, Minneapolis, Minnesota, phone (612) 379-5980, fax (612) 379-5982. In partnership with other agencies and state and local governments, the U.S. Army Corps of Engineers is helping to restore the degraded Anacostia River watershed in the Washington, DC area. Employing the concepts of beneficial uses of dredged material, the Corps' Baltimore District dredged 3.3 miles of the river in 1992 in order to maintain its navigation channel. Approximately 150,000 cubic yards of the dredged material was then placed in Kenilworth Marsh and planted with 350,000 freshwater marsh species transplants.

For a total cost of \$1.9 million, the project restored 32 acres of functional wetlands, degraded into barren mudflats at low tide from years of sediment deposition, providing high quality fish and wildlife habitat. Kenilworth Marsh, managed by the National Park Service, is the last remaining freshwater tidal emergent wetland in the District of Columbia.

The Corps plans to dredge another 2.1 miles of the navigation channel in 1997. This time it will use the dredged material to restore 45 acres of tidal emergent wetlands in Kingman Lake (near Robert F. Kennedy Stadium) and 30 acres of river fringe wetlands. For more information, contact Steve Garbarino, Corps of Engineers Baltimore District, phone (410) 962-6750.

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them." Albert Einstein

News Bits

Don Brady, EPA Watershed Branch Chief, presented papers in August 1995 at the Second International Association of Water Quality Specialized Conference on Diffuse Pollution in Brno and Prague in the Czech Republic. Eastern European countries showed particular interest in applying the watershed approach for designing and implementing water quality programs in response to Brady's presentations entitled "Basic Comparison--

Legislative, Governmental, and Non-Governmental Bodies for Water Quality Management: An American View" and "The Watershed Approach." The Ohio River Valley Water Sanitation Commission has initiated a two-year study of the impacts of combined sewer overflows on the course of the Ohio River that runs through the Cincinnati/Northern Ohio area. The Commission is developing a water quality model for evaluating wet weather impacts. The model will be adaptable for evaluating other large river systems in communities across the country. Call ORSANCO, phone (513) 231-7719, for information. In Colorado, members of the Animas River Stakeholders group, formed in 1994, are working to restore the Upper Animas Basin. Over 100 years of mining in the basin contaminated the river with heavy metals to the point that stretches of it are lifeless. So far, the stakeholders have moved mine dumps, installed settling ponds and bulkheads, and used limestone to combat acid runoff. Funding and technical assistance for the restoration efforts has been provided by EPA, private sources, and mining companies.

A Clean Water Act rule issued on August 7, 1995 by EPA (*Federal Register*, August 7, 1995, p.40230) sets new stormwater compliance standards for Phase II stormwater dischargers, including commercial and retail establishments, light industries, institutions, and municipal storm sewers serving less than 100,000 people (Phase I stormwater requirements are not affected by the rule). Phase II facilities defined as "a significant contributor of pollutants to waters of the U.S.," (a.k.a. Phase II, Tier II) must apply for discharge permits by August 7, 2001, if still required by then-existing regulation. In the interim, EPA will work on developing a non-permit control strategy that will target environmental problems associated with these facilities. For a copy of the *Register* notice (6pp.), call 1-800-274-6737 and indicate your request for Doc. #03-883. At the May 12, "More Bang for our Bucks: Can Sustainable Agriculture Preserve Natural Resources and Farm Profits?" briefing sponsored by the Environmental and Energy Study Institute, Dennis Helsel of the U.S. Geological Survey discussed the benefits of wetlands in purifying agricultural runoff. He noted that in regions of poorly-drained, clay soils, surface water contamination should be targeted and in regions of well-drained, sandy soils, ground water should be the focus. Helsel stressed that agencies should measure their performance as a means of tracking the direction and speed of water quality improvements.

In a March 1995 survey conducted by the Council of State Governments, state environmental and natural resource agencies indicated that lack of funding, lack of public and scientific understanding, and opposition from special interests are likely to impede ecosystem projects. States also requested that EPA develop quantitative measures of progress, or environmental indicators, that relate to ecosystem protection goals and can be used to allocate funding according to environmental outcomes, as opposed to administrative measures. For more information about "Ecosystem Connections: Results of CSG Ecosystem Protection Questionnaire," contact the Council of State Governments, phone 1-800-800-1910, fax (606) 244-8001.

The Buffalo River Stewardship Foundation's preliminary socio-economic study on the Buffalo River (Arkansas) watershed compared the economic costs of agribusiness versus the recreational use of the river and concluded that recreation (including the river's intrinsic value) was worth more; \$47,452,400 compared to agribusiness's \$36,294,000. Susan Baker of the Harvard Institute of International Development and Foundation economist Jesse Gordon made six recommendations for policy to conserve the watershed. Among the recommendations are the use of conservation easement purchases and leases and a "tourism tax" (exempting local residents) earmarked for pollution reduction projects. For more information, write Jesse Gordon, BRSF, P.O. Box 5003-161, Harrison, AR 72602, or email to steward@wildfire1.com.

Representatives of the North Platte Valley and Lingle-Fort Laramie conservation districts, the Town of Torrington, the Goshen County Commissioners, and the United States Department of Agriculture's Natural Resources Conservation Service (NRCS) signed an official watershed plan during a ceremony at the Torrington, Wyoming Town Hall on September 15. Several urban and rural wells in the area have nitrate levels that exceed EPA's Maximum Contaminant Limit of 10 parts per million. Once funded, the plan will address sources of nitrate, focusing on improving irrigation systems, fertilizer application, and management of animal waste runoff. Contact NRCS for more information, phone (307) 532-4880 or (307) 533-4290.

A Federal Advisory Committee has been formed to provide recommendations to the EPA on how to address cross-cutting issues associated with urban wet weather discharges. One of the three workgroups will address urban watershed related issues. For more information, contact Will Hall, phone (202) 260-1458.

The U.S. EPA/Region 5 office has awarded a grant to Wayne County, Michigan for the Rouge River National Wet Weather Demonstration Project. The urbanized Rouge River watershed includes 48 communities with a combined population of over 1.5 million. The project will focus on two wet weather sources of pollution flowing to streams: 1) surface runoff from overland flow; and 2) runoff carried through storm drains and combined sewer overflows (CSOs). CSOs carry raw sewage and stormwater to wastewater treatment plants in the same pipe. Often the pipes become full during rain events or snowmelt and the effluent-laden stormwater is released directly to waterways to prevent it from backing up into homes.

TRAINING OPPORTUNITIES

Streambank Stabilization Workshop and Restoration Project--TVA's Chickamauga-Nickajack River Action Team has contracted with Bestmann Green Systems, Inc., to lead a streambank stabilization training workshop and ecological restoration project. Erosion along a 400 foot section of the eastern edge of North Chickamauga Creek threatens to undermine the parking lot of Chattanooga's North Chickamauga Creek Greenway. A two-day course will provide participants with specialized training and hands-on experience in innovative streambank stabilization and bioengineering methods (Contact Linda B. Harris, TVA: 423-751-6453).

Workshops on Cost Effectiveness and Incremental Cost Analyses (CE/ICA) for Environmental Planning--The U.S. Army Corps of Engineers, Institute for Water Resources, provides workshops describing CE/ICA analytical software tools for comparing the environmental outputs and economic costs of alternative plans for watershed and ecosystem planning (costs to be reimbursed by the workshop host). The format, including software demonstration, is offered as a half-day executive session or a full-day, hands-on session designed for those who are charged with completing the analyses (Contact Ken Orth: 703-355-0054). Statewide Watershed Management Course--In September, EPA's Office of Water sponsored a course in Philadelphia, Pennsylvania that focused on developing and applying a framework for statewide watershed management. Several EPA Region 3 states provided presentations on watershed management in their jurisdictions. In response to requests for a repeat presentation of the course and for a condensed version geared toward managers from water and other state agency programs, the Office of Water will sponsor similar workshops in other EPA Regional cities throughout 1996 (Contact Greg Currey: 202-260-1718).

***Watershed Events* welcomes the submission of training opportunities.**

FHWA Seeks Staff Water Quality Specialist for One-Year Assignment

The Federal Highway Administration's Natural and Cultural Resources Team is looking for a water quality specialist to join its staff. The candidate can apply for a federal agency detail, or he or she can apply under the Intergovernmental Personnel Act (IPA) covering exchanges among the federal government and state and local governments, universities, and tribal organizations. Assignment: one year. Location: Washington, D.C. Salary: up to GS 13 equivalent. Job duties: developing policy, developing and managing research projects, writing reports, working on interagency task forces, and providing technical assistance to field offices and state DOTs. For details, call Fred Bank at (202) 366-5004.

"Never doubt that a small group of thoughtful, committed citizens can change the world, indeed, it's the only thing that ever has."

Margaret Mead

New In Print

ecos, the environmental communique of the states, May/June 1995--This issue of *ecos*, published by the Council of State Governments (COG), provides a summary of ecosystem-based environmental initiatives on a state-by-state basis. Contact the Council of State Governments, phone 1-800-800-1910, fax (606) 244-8001. Or look up *ecos* on COG's home page on the World Wide Web, URL=<http://www.csg.org/ecos/environ.html>.

Info Access, Issue Number 54, June 1995, EPA 220-N-95-009--This issue of *Info Access* provides a listing of environmental World Wide Web sites and offers information on developing a library collection, knowledge management, and document delivery in the electronic era. *Info Access* will soon be available on EPA's Gopher and on EPA's website under "NEWS" at <http://www.epa.gov>. For a copy of the June issue of *Info Access*, contact Mary Hoffman at (919) 968-3849. For more information about the EPA Library Network, contact Jonda Byrd, National Library Network Program Manager, phone (513) 569-7183, or via email to byrd.jonda@epamail.epa.gov.

Chesapeake Bay: Introduction to an Ecosystem--The U.S. Fish and Wildlife Service, Chesapeake Bay Field Office developed this 30 page educational primer for the Chesapeake Bay Program. The primer discusses the interrelationship of soil, air, water, plants, and animals (including humans) that form the Chesapeake Bay ecosystem; the geologic history of the Bay; current problems facing the Bay and what individuals can do to help restore it; and includes descriptive "Bay Facts." For a free copy of the primer, contact the Chesapeake Bay Program at 1-800-YOUR-BAY.

Watershed Protection: A Statewide Approach (EPA 841-R-95-004)--This EPA publication describes how to implement a five-year, rotational watershed management plan for major state river basins. For a copy, contact NCEPI at (513) 489-8190.

Watershed Protection: A Project Focus (EPA 841-R-95-003)--This EPA publication describes how to implement the watershed protection approach for specific watersheds. For a copy, contact NCEPI at (513) 489-8190.

Evaluation of Environmental Investments Procedures Manual Interim: Cost Effectiveness and Incremental Cost Analysis (IWR Report #95-R-1)--This Corps interim manual provides step-by-step instructions for how cost effectiveness and incremental cost analysis can be used in restoration and mitigation planning and decision-making. The manual is accompanied by software that automates the procedure's calculations. For copies, fax requests to (703) 355-8435 (preferred), or call Arlene Nurthen, phone (703) 355-3042. For more information, contact Ridge Robinson, phone (703) 355-2786.

Trade-Off Analysis for Environmental Projects: An Annotated Bibliography (IWR Report #95-R-8)--This Corps literature review focuses on opportunities for using trade-off methodologies and group processes in environmental plan formulation and evaluation. For copies, fax requests to (703) 355-8435 (preferred), or call Arlene Nurthen, phone (703) 355-3042. For more information, contact Joy Muncy, phone (703) 355-0009.

Economic Valuation of Natural Resources: A Handbook for Coastal Resource Policymakers--This NOAA publication addresses basic economic concepts of environmental valuation, including willingness to pay, cost-effectiveness analysis, economic impact analysis, and sustainable development. Regional case studies present practical applications of concepts. For copies of the report, contact the NOAA Coastal Ocean Office, phone (301) 713-3338, fax (301) 713-4044.

Cumulative Impacts Assessment Guide for Michigan's Wetland Permit Program--This OCRM report includes a review and critique of existing techniques for assessing cumulative wetland impacts and provides recommendations for incorporating these impacts into the wetlands permit review process. The report also identifies data needed to assess cumulative impacts and provides information on decision-making that will withstand legal challenges. For a copy of the report, contact Kenneth Walker, OCRM Coastal Programs, phone (301) 713-3113, ext. 169.

New Publications of the U.S. Geological Survey--Free copies of this monthly catalog are available by written request to the U.S. Geological Survey, 582 National Center, Reston, VA 22092. The catalog is also accessible via the USGS's World Wide Web home page at URL=<http://www.usgs.gov>.

Cyber Space

The following is a listing of Internet resources which may be of interest to readers. To be added to the mailing list of "Internet Newsbrief," an electronic update service from the EPA Headquarters Library, contact Robin Murphy at ALL-IN-1 murphy.robin or at (202) 260-5080. Watershed Events appreciates Robin's contribution of these resources for readers.

RFF Seminar Series

URL=<http://www.rff.org>

Resources For the Future will present a Wednesday Seminar Series at their Washington, DC office for serious discussion and debate of environment and natural resource related policy and research issues. To subscribe to the electronic seminar mailing list, send the following message--Subscribe RFFSEM-L Your Full Name--to LISTSERV@AMERICAN.EDU.

National Environmental Information Resources Center

URL=<http://www.gwu.edu/~greenu/>

This cooperative effort of George Washington University and the U.S. EPA provides a listing of Internet resources on environmental topics, grouped by name and subject and a list of interactive discussion groups.

Superfund Program Information

URL=<http://www.epa.gov/docs/OSWERSuper/>

Guidelines for pesticide and toxic substances testing developed by EPA's Office of Prevention, Pesticides, and Toxic Substances in an effort to minimize variations in test procedures used to meet regulatory requirements.

Weed Killers by the Glass

http://www.ewg.org/Weed_Killer/Weed_home.html

Presents the results of a recent study completed by the Environmental Working Group of herbicide and pesticide contamination of tap water. The study, which began in May, tested tap water in 29 cities in the corn belt, Louisiana, and Maryland.

ARS Water Database

URL=<http://hydrolab.arsusda.gov/arswater.html>

The U.S. Department of Agriculture, Agricultural Research Service database provides precipitation and runoff data for small, agricultural watersheds throughout the United States useful in reconstructing storm hydrographs.

Coastal Marsh Project

URL=<http://perelandra.umd.edu/Marsh.html>

Sponsored by NASA's Mission to Earth and the University of Maryland, the project assesses the health of coastal marshes and identifies areas at risk using satellite imagery and cartographic information from the National Wetlands Inventory.

Chemical Fact Sheets

URL=<http://www.epa.gov/docs/chemfact/>

These Office of Prevention, Pesticides, and Toxic Substances fact sheets provide information on the production, use, environmental fate, health and environmental effects, and regulations pertaining to selected chemicals.

WaterWiser

URL=<http://www.waterwiser.org>

This cooperative effort of the American Water Works Association and the U.S. EPA provides bibliographies, articles, and a book listing on water conservation and efficiency. A forum for discussion, an events calendar, and links to other water resources are also offered.

Native Americans and the Environment

URL=http://minerva.cis.yale.edu/~lisamc/native_env.html

Provides bibliographies on topics such as land and water rights, fishing rights, natural resource management, and others. Links to resources on environmental racism, environmental justice, and environmental equity are also included.

U.S. Water News On-line

URL=<http://www.mother.com/uswaternews>

Print version of U.S. Water News, plus additional articles.

USGS On-Line Link

URL=<http://info.er.usgs.gov/>

Recent press releases are available under USGS Information Releases. Scientific information on the Nation's water resources is accessible by selecting the water icon.

NAWQA Program

URL=http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html

Information on the program, study units, and a bibliography. Or write to the Chief, NAWQA, U.S. Geological Survey, 413 National Center, Reston, VA 22092.

Bureau of Reclamation On-Line Link

URL=<http://www.usbr.gov> Recent press releases, speeches, and water resource data are available through Reclamation's home page.

While In Cyber Space...

Explore Watershed Highlights

A companion publication to Watershed Events is now available on the Internet on the EPA Office of Wetlands, Oceans, and Watersheds (OWOW) home page. Unlike Watershed Events, Watershed Highlights is not developed around a feature article. It is designed to provide a forum for individuals and organizations to share information relevant to watersheds.

Posted at least once a month, Watershed Highlights includes legislative information; Federal, State, and local program information; current best sellers; and oldies, but goodies related to the watershed approach and ecosystem management. There are two ways to access Watershed Highlights on the Internet:

1) Go to URL=<http://www.epa.gov/OWOW> and click on "What's New?"

2) or...Go to URL=<http://www.epa.gov/OWOW/NPS/wtrintro.html>

Readers are encouraged to submit information for Watershed Highlights and comments to John Pai at OWOW, via email to pai.john@epamail.epa.gov, or fax to (202) 260-2529.

NPS Information Exchange Moves to the 'Net

After nearly five years on-line, the modem-based water information bulletin board is phasing over to the NPS Information Exchange on the Internet. The new configuration will make use of file servers, list servers, gophers, and the World Wide Web. Many publications are readable on-line, most are available for file transfer, and some are "hot linked" to related information. Access to the NPS Information Exchange is available at:

URL=<http://www.epa.gov/OWOW/NPS/npsie.html>

In addition, NPSINFO, the NPS Information Exchange's email discussion group, opened in September. If you have an email account and you would like to subscribe to NPSINFO, send a message to:

listserv@unixmail.rtpnc.epa.gov

Include the following in the body of your message: subscribe NPSINFO yourfirstname yourlastname. After you subscribe, you will receive a welcome message explaining the discussion list and its help features. To post to the list, send messages to:

npsinfo@unixmail.rtpnc.epa.gov.

Introducing...

We have added a new feature in this issue of Watershed Events. We are introducing to our readers, the most relevant programs or activities under the watershed approach in different agencies; what the programs are and what they do. Hopefully, this new feature

will help our readers to take advantage of the services these programs and activities have to offer.

Watershed Events

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Elleen Kane, National Oceanic and Atmospheric Administration

Debbie Hubbs, Tennessee Valley Authority

Leigh Skaggs, U.S. Army Corps of Engineers

Terry Thompson, U.S. Geological Survey

Watershed Events is intended to update interested parties on the development and use of watershed protection approaches. These approaches consider the primary threats to human and ecosystem health within the watershed, involve those people most concerned or able to take actions to solve those problems, and then take corrective actions in an integrated and holistic manner.

Direct questions and comments about Watershed Events to:

John T. Pai

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Water Resource Programs of the

U.S. Army Corps of Engineers

Historically, the U.S. Army Corps of Engineers (Corps) water resources development program has been charged with improving and maintaining navigable waterways and reducing flood damages. Accompanying these primary missions are complementary programs for generating hydroelectric power, providing water supplies, protecting coastal shorelines, managing natural resources, and providing recreational opportunities.

The Corps' water resources program has changed significantly over the last two decades, however, shifting from construction of new projects to the improved operation of existing projects with increased concern for the environment. Environmental restoration is now a priority mission in the budgetary process and the Corps can participate in the modification of existing projects for the purposes of fish and wildlife habitat restoration.

Broadly, the Corps' role in environmental quality is supported by several federal laws, executive orders, and treaties, including the Fish and Wildlife Coordination Act of 1958, the National Environmental Policy Act of 1969, and the Water Resources Development Acts (WRDA) of 1986 and 1990. For example, Section 307(a) of WRDA 1990 establishes "no net loss of wetlands" and an "increase in the quality and quantity of the Nation's wetlands" as goals of the water resources development program.

The Corps may pursue specific environmental restoration activities under one of several generic legislative authorities. Section 1135 of the WRDA of 1986 authorizes the implementation of environmental restoration projects through structural or operational changes to completed Corps projects. The Section 1135 program is budgeted for up to \$25 million per year, with no single project to exceed \$5 million without Congressional authorization. Section 204 of WRDA 1992 authorizes the Corps to protect, restore, and create aquatic and ecologically related habitats, including wetlands, in connection with dredging for construction, operation, or maintenance of Corps navigation projects.

Section 1103 of WRDA 1986 gives the Corps authority to plan and implement restoration projects in support of the Upper Mississippi River Environmental Management Plan (UMRS-EMP), which was established to help balance increased commercial navigation on the Upper Mississippi River system with other economic, environmental, and recreational objectives. Habitat rehabilitation and enhancement projects, which focus on restoring high value fish and wildlife habitat, comprise the largest element of the UMRS-EMP.

The Coastal Wetlands Planning, Protection, and Restoration Act of 1990 authorizes several agencies, including the Corps, to implement restoration projects that provide for the long-term conservation of wetlands and dependent fish and wildlife populations in coastal areas. In addition, Corps authority for new individual studies and projects to restore ecological resources (for example, the Kissimmee River, Florida; the Anacostia River, Washington, DC and Maryland; and the Everglades, Florida) has been authorized by Water Resources Development Acts and Congressional Committee resolutions.

[For more information, contact Leigh Skaggs, U.S. Army Corps of Engineers, Institute for Water Resources, (703) 355-3091.]

Transportation Enhancements Fund

Water Quality Improvements

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) set aside a total of \$2.8 billion over six years for special projects which improve communities and the environment. The Transportation Enhancements initiative provides funding for 10 categories of projects--including mitigation of highway runoff. ISTEA gives new players in the transportation planning process--environmentalists, community groups, and others--input into how federal transportation funds are spent.

In Pennsylvania, for example, the state Department of Transportation established a special advisory committee of environmental groups to solicit and evaluate proposals for Enhancement projects and make recommendations.

As of June 1994, approximately \$650 million had been spent on Enhancement activities. The wide range of water projects funded through this program include erosion control, wetland restorations, highway runoff control, and fish ladders.

[For more information, contact Fred Skaer, FHWA, Office of Environment and Planning, phone (202) 366-2058.]

"The Nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value."

President Theodore Roosevelt

CONFERENCE SCHEDULE

December 12-15, 1995 National Agricultural Ecosystem Management Conference, New Orleans, LA (Contact Lyn Kirschner: 317-494-9555).

February 26-27, 1996 Urban Conservation 2000: A Virtual Reality, sponsored by the Soil and Water Conservation Society, Seattle, WA (Contact SWCS: 1-800-THE-SOIL, ext. 18. Or via <http://www.netins.net/showcase/swcs/>).

March 20-23, 1996 NALMS' Fifth Annual Southeastern Lakes Management Conference, Hilton Hotel,

Huntsville, AL (Contact Gary Springston, TVA: 423-751-7336).

April 21-26, 1996

American Institute of Hydrology, 1996 Annual Meeting, Boston, MA (Contact Dr. Guillermo J. Vicens, Camp Dresser & McKee Inc.: 617-252-8301).

June 10-14, 1996 Coast to Coast, 20 Years of Progress. Association of Floodplain Managers' 20th Annual National Conference, Catamaran Hotel, San Diego, CA (608-274-0123).

July 14-17, 1996

Watershed Restoration Management: Physical, Chemical, and Biological Considerations. American Water Resources Association Annual Symposium, Syracuse, NY (Contact Dr. Peter E. Black, SUNY College: 315-470-6571).

Revised: undefined