



Nonpoint Source News-Notes

December 2007, #83

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



Notes on the National Scene

New Water Quality Trading Guide Available

The U.S. Environmental Protection Agency (EPA) recently released a guidance manual that explains how to design and implement water quality trading programs for point and nonpoint source pollution sources. The *Water Quality Trading Toolkit for Permit Writers* will help the regulated community develop water quality trading programs consistent with EPA's 2003 *National Water Quality Trading Policy*. This new resource will also provide stakeholders with detailed guidance on the fundamental concepts of trading, which can accelerate water quality improvement and reduce compliance costs.

"EPA's Trading Toolkit is the first-ever 'how-to' manual on water quality trading," says Assistant Administrator for Water Benjamin H. Grumbles. "This Toolkit will be useful not only for permit writers but for anyone interested in designing a trading program to improve water quality. It is part of EPA's efforts to support and encourage innovation for water quality progress."

Support for Water Quality Trading is Growing

EPA issued its *National Water Quality Trading Policy* in January 2003, signaling EPA support for this innovative, market-based



Seattle project aims to encourage low impact development. See page 7.

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approach to improving water quality. In 2004, EPA issued the *Water Quality Trading Assessment Handbook*, which provides guidance on how stakeholders can determine whether trading is environmentally and economically feasible in their watershed. The new *Water Quality Trading Toolkit for Permit Writers* (Toolkit) is the next step in EPA's support for trading. Through the May 2006 Second National Water Quality Trading Conference, co-sponsored by EPA and U.S. Department of Agriculture's Natural Resources Conservation Service, stakeholders expressed the need for more guidance on how to design and implement trading programs. The Toolkit responds to this need by expanding on EPA's trading policy, providing guidance on design and implementation, and featuring real-life examples.

What is water quality trading?

Water quality trading is a voluntary option that regulated point sources can use to meet their NPDES permit limits. Trading can accelerate water quality improvement and reduce compliance costs. Through water quality trading, facilities that face higher pollutant control costs to meet their regulatory obligations can purchase pollutant reduction credits from other sources that can generate these reductions at lower cost, thus achieving the same or better overall water quality improvement. In most cases, trading takes place on a watershed level under a pollutant cap (the total pollutant load that can be assimilated by a waterbody without exceeding water quality standards) developed through the Total Maximum Daily Load process or a similar type of water quality analysis that produces information on pollutant loadings and resulting water quality conditions. Water quality trading is typically focused on nitrogen and phosphorus levels, though other pollutants may be considered for trading on a case-by-case basis.

EPA hopes the Toolkit will help to kick-start the creation of successful water quality trading programs throughout the nation. As National Pollution Discharge Elimination System (NPDES) permittees become more aware of the potential benefits of water quality trading, EPA believes that they will more frequently request that permitting authorities incorporate trading provisions into their permits. Although the Toolkit primarily targets state, tribal, and EPA NPDES permitting authorities, it might also be useful to other stakeholders interested in water quality trading and the NPDES permitting process.

Toolkit Organization and Instructions

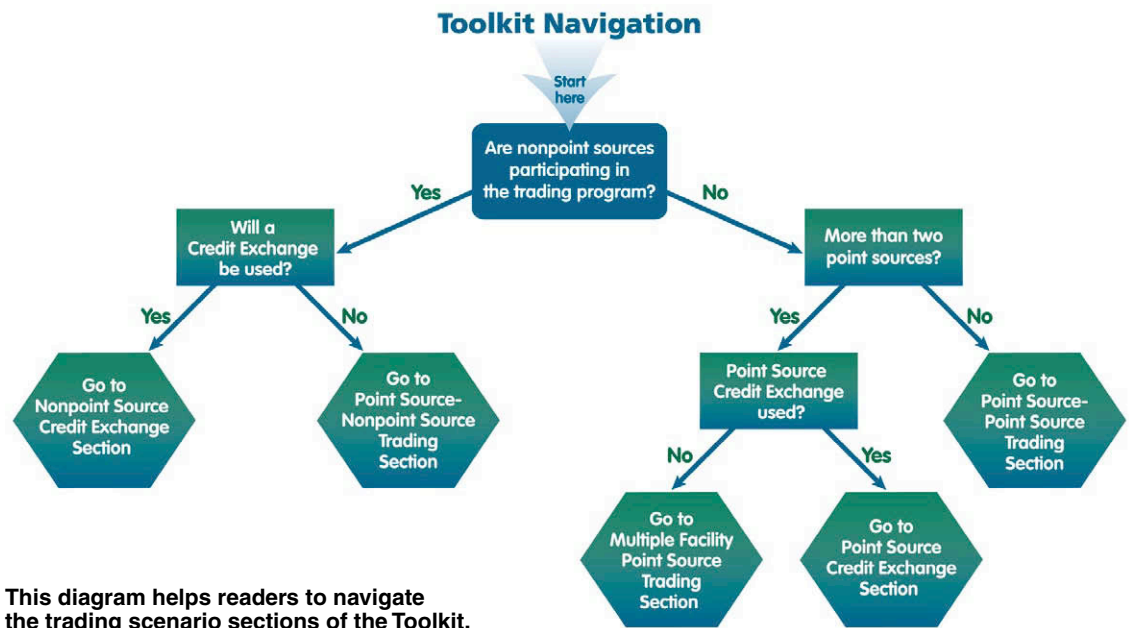
The Toolkit is a multi-part manual that includes two main topic areas and a number of appendices. The first topic area of the Toolkit, "Fundamentals of Water Quality Trading," addresses broad water quality trading policy issues; this applies to all Toolkit users. Within the "Fundamentals" topic area, the "Overview of Water Quality Trading" section addresses the role of NPDES permitting authorities in water quality trading and the legal and policy framework for water quality trading. The "Fundamentals" topic area also includes a section called "Essential Trading Information for Permit Writers," which discusses specific water quality trading issues relevant to NPDES permitting authorities. Issues addressed in this section include the type of pollutants to be traded, definition of a

pollutant reduction credit, circumstances conducive to trading, baselines for water quality trading, trading ratios, timing and duration of credits, and the geographic scope of trades. EPA encourages all Toolkit users to thoroughly understand the policy and technical issues addressed in the first topic area before proceeding to the second topic area.

The second topic area in the manual addresses a number of specific trading scenarios. Water quality trading scenarios fall into two major categories: (1) point source–point source trading and (2) point source–nonpoint source trading. Point source–point source trading includes single point source–single point source trading, multiple facility point source trading, and point source credit exchanges. Point source–nonpoint source trading includes single point source–nonpoint source trading and nonpoint source credit exchanges.

Each trading scenario section walks NPDES permitting authorities through the normal process of developing the components of a NPDES permit and provides the tools they need to incorporate water quality trading into that process. Each section within this part of the Toolkit contains two important components that supplement the narrative: (1) a hypothetical trading example and (2) real-world examples that apply the trading concepts discussed in the section.

The manual's intent is to allow the Toolkit user to review only the information that applies to the specific trading scenario of interest. For example, a permitting authority developing conditions in a NPDES permit to authorize and facilitate trading between a single point source and single nonpoint source would first review the "Overview of Water Quality Trading" and "Essential Trading Information for Permit Writers" sections in the first part of the manual, and then review just the



“Point Source - Nonpoint Source Trading Scenario” for specifics pertaining to trading between point and nonpoint sources. The manual includes a diagram (see figure) that helps readers identify the trading scenario that best suits their situation.

The Toolkit includes a number of additional helpful resources, including a “Keys to Success Poster” (PDF format), 12 detailed case studies of existing trading programs, a copy of EPA’s 2003 *National Water Quality Trading Policy*, and a document explaining how the Clean Water State Revolving Fund and Clean Water Act section 319 funds can be used to support water quality trading. The appendices also include sample water quality trading forms and templates, as well as checklists that permit writers can use when developing permits for each of the different types of trading scenarios. To ensure consistency and minimize redundancy, the Toolkit refers users to existing EPA guidance on water quality trading and NPDES permit development and issuance whenever possible.

One Size Does Not Fit All

EPA recognizes that individual water quality trading programs must be tailored to meet the needs of the dischargers and stakeholders in the watersheds for which they are developed. Because each watershed is unique, water quality trading programs may exist in many different forms. The Toolkit attempts to equip program developers and permit writers with an understanding of the issues involved in water quality trading and the types of program characteristics that are best suited to address them. The fact that a particular trading program design or element is not represented in the Toolkit does not necessarily mean that it is not appropriate or would not be supported by EPA.

New Water Quality Trading Program Maps on the Web

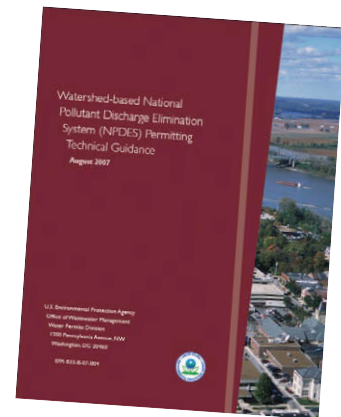
EPA recently added a new resource to its water quality trading Web site. Now, visitors can explore interactive maps showing locations and types of trading programs around the country (www.epa.gov/waterqualitytrading/tradingmap.html). With a click of the mouse, visitors can access information about state level trading programs and other trading programs that have traded at least once.

The Toolkit is available on EPA’s Water Quality Trading Web site at www.epa.gov/waterqualitytrading/WQTToolkit.html. A limited number of hard copies are also available through the National Service Center for Environmental Publications at www.epa.gov/nscep (request publication # EPA833-R-07-004). EPA invites public comment on the Toolkit through the Web site, and will consider these comments for future Toolkit updates. More information about water quality trading, including links to other trading resources, is available at www.epa.gov/waterqualitytrading.

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EPA Guidance Expands on Watershed-based NPDES Permitting

U.S. Environmental Protection Agency (EPA) recently released a new resource for permitting authorities and others involved in the National Pollutant Discharge Elimination System (NPDES) program. This document, the *Watershed-based National Pollutant Discharge Elimination System Permitting Technical Guidance* (Technical Guidance), helps NPDES authorities develop and issue NPDES permits that fit into an overall watershed planning and management approach with input from watershed stakeholders.



Why is this Guidance Needed?

For more than a decade, EPA has supported and encouraged a watershed approach to addressing water quality problems. On December 3, 2002, Tracy Mehan, who was then serving as EPA's Office of Water Assistant Administrator, issued a policy memo entitled *Committing EPA's Water Program to Advancing the Watershed Approach* (see www.epa.gov/watershed/memo.html). This policy memo not only reaffirmed EPA's commitment to the watershed approach, but also re-energized efforts to ensure that EPA as a whole fully integrates the approach into its programs and supports regulatory authorities that implement water programs on a watershed basis.

In December 2003, EPA issued the *Watershed-based National Pollutant Discharge Elimination System Permitting Implementation Guidance* (Implementation Guidance) that describes EPA's recommended steps and ideas for watershed-based permitting implementation under the NPDES permit program. This approach, aimed at achieving new efficiencies and environmental results through the NPDES program, provides a process for considering all stressors within a hydrologically defined drainage basin or other geographic area (e.g., municipality), rather than addressing individual pollutant sources on a discharge-by discharge basis. The Implementation Guidance followed a long series of EPA guidance, policy, and training supporting a watershed-based approach to addressing water quality concerns.

New Document Offers More Detail

The 2007 Technical Guidance is a supplement to the 2003 Implementation Guidance and provides greater detail concerning a number of permit development and issuance questions not addressed previously. The new guidance document consists of three chapters, each of which is summarized below.

- Chapter 1 – *Approaches to Water Quality Management Using an NPDES Watershed Framework*. This Chapter discusses the role of the NPDES program in an overall watershed approach and presents a tool called the NPDES Watershed Navigator (Navigator). The Navigator is simply a series of questions to guide permitting authorities and others through the process of analyzing watershed data and determining how to develop a framework for structuring and managing implementation of the NPDES program so that the entire watershed is considered in the permit development process.
- Chapter 2 – *Guide for Multisource Watershed-based NPDES Permitting*. One of the potential outcomes of the process described in Chapter 1 is a decision to develop a multisource watershed-based permit, which is a permit that would allow point sources in a watershed to apply for and obtain permit coverage under the same permit for one or more pollutants. Chapter 2 presents permitting options designed to ensure that sources achieve and maintain water quality-based effluent limitations (WQBELs) derived from applicable water quality standards while providing opportunities for reducing implementation costs and improving administrative efficiencies using a watershed-based approach. The options presented give the permitting authority maximum flexibility to customize a multisource watershed-based permit while meeting federal, state, or local requirements and site-specific concerns.
- Chapter 3 – *Watershed-based NPDES Permitting Case Studies*. In this chapter, EPA presents a series of case studies describing how watershed approaches have been implemented across the

country. Please note that many of the NPDES implementation options discussed in this document (e.g., synchronizing permit issuance or expiration dates or water quality trading), as well as implementation of other water resource programs that may be used to meet watershed goals (e.g., water quality standards assessment or watershed management planning under the CWA section 319 nonpoint source program), are addressed in other guidance or training provided by EPA and other agencies. Although most of the approaches and programs discussed in this document are not new, this is the first time that EPA has developed an integrated guidance regarding their relationship to the NPDES program within a watershed framework.

Where appropriate, this document points readers to existing resources that provide additional technical assistance in implementing specific watershed-based approaches. For example, EPA's *Water Quality Trading Toolkit for Permit Writers* (for more information, see page 1 in this issues of News-Notes) complements this Technical Guidance and helps facilitate incorporating water quality trading into NPDES permits. Also, EPA's Watershed Academy provides a variety of training related to watershed planning and management (for more information, see page 16 in this issues of News-Notes). For other watershed-based permitting resources offered by EPA, see <http://cfpub.epa.gov/npdes/wqbasedpermitting/wsp permitting.cfm>.

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Lifting of Liability Encourages Good Samaritans

The U.S. Environmental Protection Agency (EPA) has issued a new policy that reduces legal uncertainties for organizations that want to help restore watersheds by cleaning up abandoned mine sites on private land. These sites are frequently difficult to clean up because, in many cases, the parties responsible for the pollution from abandoned mine sites no longer exist or are not financially viable. Federal land management agencies are reclaiming the most problematic mine sites on public lands—but lack the funding to clean up the thousands of abandoned mines on privately owned lands.

What are Abandoned Mines?

Abandoned mines typically include inactive hardrock mines. These sites do not have a financially viable party that is potentially liable to either perform or pay for environmental clean up actions under applicable law. At many of these abandoned mine sites and processing areas, disturbed rock and waste piles contain high levels of sulfides and heavy metals. These piles, when exposed to air and water, undergo physical and chemical reactions that create acid drainage. As this drainage runs through mineral-rich rock, it often picks up other metals such as arsenic, cadmium, lead, mercury and zinc. When this runoff enters local streams and rivers, it can severely degrade water quality and damage or destroy insect, plant, and animal life. An estimated 500,000 abandoned mines exist in the United States, most of which are former hardrock mines in the West. Thousands of watersheds and stream miles are affected by drainage and runoff from these sites.

Fortunately, groups such as nonprofit organizations and local governments are often willing to clean up these abandoned mine sites—even though they are not responsible for the pollution. However, prior to the new policy, many of these “Good Samaritans” were reluctant to move forward with a clean-up project because they were concerned that they may be held liable under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act.

A project launched in 2004 by Trout Unlimited helped to bring the Good Samaritan liability issue to the forefront. Trout Unlimited wanted to clean up an abandoned mine site along the American Fork River in Utah to help restore the river's native trout population. Before performing the cleanup, Trout Unlimited and its partners approached EPA to discuss the legal options for addressing the stakeholders' liability concerns while cleaning up the waste rock and tailings. The stakeholders sought assurances from EPA that they would not incur legal liability for the historic mine pollution by conducting a limited cleanup of the waste rock and tailings. In this case, Trout Unlimited and EPA determined that the most appropriate legal

option to carry out the cleanup of waste rock and tailings was a CERCLA administrative settlement agreement. Developing this agreement was time-intensive, and EPA recognized the need to develop a more streamlined approach for when other Good Samaritans made similar requests. As a result, EPA used the Trout Unlimited agreement as a model for the new Good Samaritan policy and tools.

Why was Liability a Concern to Stakeholders?

CERCLA, or “Superfund” as it is commonly called, has language that can be interpreted to mean that a volunteer conducting a partial clean up could become responsible for the entire cleanup. In addition, potential Good Samaritans were also concerned about the possibility of being sued by a third party as a result of the work done at an abandoned mine site. This left Good Samaritans wanting to help, but unwilling to take the risk.

Now, under a new policy and set of model tools, EPA and volunteer parties will be able to enter into “Good Samaritan settlement agreements.” These agreements provide key legal protections to Good Samaritans as non-labile parties, including a federal covenant not to sue under CERCLA. The agreements also provide protection from third-party contribution suits. To this end, EPA has developed a model Good Samaritan settlement agreement, as well as a model Good Samaritan comfort letter to encourage Good Samaritans to perform approved work at orphan mine sites without having to invest time and resources in negotiating a formal settlement agreement with the federal government. These straightforward, non-negotiable documents can be issued relatively quickly at EPA’s Regional office level.

EPA designed the new tools to preserve CERCLA’s fundamental principle that responsible parties should pay for cleanups as intended by Congress. These tools do not absolve responsible parties of their existing liability for pollution. More information about the Good Samaritan initiative and tools is available at www.epa.gov/goodsamaritan. Information about the Good Samaritan Clean Watershed Act, which established the new policy, can be found at www.epa.gov/goodsamaritan/legislation.html.

CWA Uncertainties Unresolved

Despite progress under CERCLA, uncertainties about potential liability under the Clean Water Act (CWA) remain. Good Samaritans are unsure about potentially incurring long-term Clean Water Act responsibility for existing point sources such as draining adits. Adits are nearly horizontal passages leading from mines that can be large sources of mine drainage water. Good Samaritans fear that treating contaminated water may create “new” point sources, thereby triggering National Pollutant Discharge Elimination System (NPDES) permit requirements. Finally, Good Samaritans anticipate difficulty complying with NPDES permit requirements for either existing or new point sources because they may be unable to treat contaminated water to meet effluent limits protective of existing state-set water quality standards. These three concerns leave Good Samaritans uneasy about the prospect of Clean Water Act citizen suits arising from managing and treating contaminated water. EPA is working to resolve these issues, which will require a time-consuming statutory change. In the interim, much can be accomplished under the new CERCLA agreements.

Good Samaritans Already Making a Difference

Trout Unlimited’s Good Samaritan efforts have not only influenced EPA policy, but also paid off for Utah’s American Fork River. In June 2007, EPA Region 8 awarded Trout Unlimited with EPA’s Environmental Achievement Award for its work on an abandoned mine site along the river. Once the CERCLA settlement agreement was reached with EPA, Trout Unlimited and its partners implemented a series of clean up activities at the site, which is on both private and public land and lies between Provo and Salt Lake City in Utah. The site had been mined for silver, copper, gold, and lead from 1870 through the 1950s. Drainage from the mine itself, as well as runoff from waste rock and tailings, contributed pollution to the American Fork River.

In 2003, the Forest Service performed a cleanup, removing tailings and restoring the public lands. In 2005, Trout Unlimited, acting as a Good Samaritan, worked with Snowbird Ski Resort, the current owner of the private property portion, and Tiffany & Co. Foundation, to clean up 33,000 cubic yards of mine waste rock and tailings with elevated levels of heavy metals. These wastes are now safely encapsulated in a permanent repository constructed near the Pacific Mine on Snowbird Ski Resort’s property.

Tiffany & Co. Foundation provided financial support for the project. Additional funding to perform that cleanup was obtained through Congressional appropriations, and the Natural Resources Conservation Service managed the federal grants. Thanks to the clean-up project, the American

Fork River can again support rare, native Bonneville cutthroat trout in a 10-mile stretch downstream of the mine.

Unfortunately, because of persistent uncertainties about Clean Water Act liability, Trout Unlimited elected to not treat contaminated water from the draining adits at the Live Yankee Mine, located farther up the American Fork Canyon. As a result, the water quality immediately downstream of the draining adit remains impaired. EPA sees the Live Yankee Mine example as a missed opportunity to improve water quality. On the other hand, EPA can now use this example to help advance efforts in Congress to make necessary adjustments to the Clean Water Act.

In the meantime, EPA hopes that additional Good Samaritans will hear about EPA's new policy and tools and come forward to help clean up abandoned mine sites. "Through EPA's administrative action," explains EPA Administrator Stephen L. Johnson, "we are reducing the threat of litigation from voluntary hardrock mine cleanups and allowing America's Good Samaritans to finally get their shovels into the dirt."

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Notes from the States, Tribes, and Localities

Puget Sound Partnership Clears the Way for LID

As more municipalities recognize the benefits of low impact development (LID), the days of relying solely on storm drains, pipes, and ponds to manage stormwater are drawing to a close. However, these same municipalities historically designed their local ordinances and regulations with these types of traditional stormwater management techniques in mind. In many cases, these ordinances now obstruct developers' attempts to integrate low impact techniques into their designs. In response, many organizations across the nation are beginning to work with municipalities to make needed changes. One state agency in the Puget Sound watershed—the Puget Sound Partnership (Partnership)—is committed to increasing the use of the LID approach in new development and redesign projects. To facilitate this effort, the Partnership has launched an innovative project to help identify and change codes and regulations that impede the use of LID throughout the Puget Sound watershed.



This Seattle town home development uses pervious pavers in alleyways to reduce runoff. The goal of the Local Regulations Assistance Project is to facilitate low impact development projects such as this throughout the Puget Sound region.

Most jurisdictions in the Puget Sound watershed have been learning for years about the potential benefits of using LID techniques. Beginning in 2001, the Partnership (then known as the Puget Sound Action Team,) began offering LID conferences and educational materials to planners, engineers, developers, and local officials to encourage the acceptance of LID practices. The Partnership's new Local Regulation Assistance Project, launched in 2005, takes this effort to the next level. Now, rather than just sharing information with local jurisdictions about the benefits of LID, staff from the Partnership and an engineering firm are helping numerous jurisdictions to understand how these benefits can be applied, and how they can revise specific regulations and development standards to allow for, encourage, or even require the use of LID. The Partnership is clearing the way for LID implementation throughout the region.

The Partnership's effort is no small task; in fact, it might be the largest of its kind. "I haven't heard of anyone else doing this type of work on this scale," explains Bruce Wulkan, the Partnership's Stormwater and Combined Sewer Overflows program manager. "Most groups only work with one or two governments at a time. We're working with as many as eleven." The Puget Sound watershed encompasses more than 13,000 square miles of land in northwest Washington. The region is home to approximately 3.5 million people in 12 counties, 110 cities, and 15 tribal nations.

What is LID?

As explained in the Partnership's popular *Low Impact Development Technical Guidance Manual for Puget Sound*, LID is a "stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of onsite natural features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic functions." The manual (available at www.psp.wa.gov/our_work/stormwater/lid/lid_manual.htm) is designed to help planners, installers, builders, and developers better understand how LID techniques can help manage stormwater.

About two-thirds of the region's jurisdictions are populous enough to be subject to federal stormwater permits required by the Clean Water Act. The permits (National Pollutant Discharge Elimination System Municipal Stormwater Permits) are issued by the Washington Department of Ecology, and require permittees to adopt ordinances to allow for LID. The *Puget Sound Water Quality Management Plan*, the region's comprehensive plan to protect the Sound under the U.S. Environmental

Protection Agency's (EPA's) National Estuary Program, also directs all jurisdictions in the Puget Sound basin to allow and encourage LID. Here is where it gets tricky. In addition to being subject to the federal permit and overarching regional directive, each jurisdiction is also governed by its own established regulations and ordinances that specify standards and requirements for stormwater management and building design. Most of these standards and requirements are outdated, and still rely on conventional pipe and pond strategies. Faced with an array of competing priorities, few jurisdictions had sufficient staff resources to take on the task of revising their regulations to make them LID-friendly.

How does the program work?

In 2005, the Action Team (now Partnership) hired an engineering firm—AHBL Engineering—to help develop and support the Local Regulation Assistance Project, and invited local jurisdictions to apply for assistance under the program. The Partnership requires the jurisdiction to show commitment to consider adopting recommendations provided to them. This might include letters of support from the public works and

planning directors, elected officials, and others, plus a commitment to convene a team of staff from various departments, such as public works, roads, planning, and fire and safety. Wulkan explains, "We need to know that the jurisdiction is committed to bringing in LID, working with us for several months, and bringing the recommendations to elected bodies for consideration of adoption."

The Partnership received applications from 20 jurisdictions in 2005 and 11 jurisdictions in 2006. Of those, the Partnership selected five cities and six counties in 2005, and seven cities and one county in 2006. Once selected, jurisdiction staff met with staff members from the Partnership and AHBL and discussed local conditions, needs and interests, and identified specific regulations and development standards that might need to be revised. AHBL staff then developed numerous drafts of rewritten regulations, new ordinances, maintenance guidance, and engineering drawings that facilitate the use of LID. For a final product, AHBL provided each participating local government with a large binder and a CD-ROM containing:

- Summaries of assistance provided to all the participating local governments.
- Regulations reviewed.
- Recommendations for specific language changes (provided in strikeout/underline format).
- New ordinances.
- Engineering drawings.
- Maintenance considerations.
- Other helpful information, such as current research.

Summaries of the information provided to each participating jurisdiction are available at www.psp.wa.gov/our_work/stormwater/lid.htm (see "What's being done now?").

Of the group of 11 jurisdictions participating in the 2005 project, six jurisdictions have already made substantial legislative and regulatory changes based on AHBL's recommendations. The City of Bellingham, WA, for instance, has adopted new stormwater regulations and is currently modifying ordinances to encourage LID (for more information, see box).

Each jurisdiction is unique, notes Wulkan, but similarities have emerged, making the work somewhat easier over time. For instance, AHBL and the Partnership know what obstacles to look for in a jurisdiction's codes related to stormwater management, percent of impervious surface, and

landscaping requirements. In some cases, the team has already created model codes and regulation language changes that they can recommend.

As LID grows in popularity and more projects are called LID, jurisdictions faced another dilemma—what exactly is an acceptable LID project proposal? What specific traits should it possess? “The jurisdictions asked us to better define what constitutes, or defines, a LID project, and to provide criteria to help them identify a proposed project as LID,” explains Wulkan. In response, the Partnership and AHBL worked with technical experts to develop minimum standards for LID projects in various development density categories. For example, in a residential area designated for 10 or more dwelling units per acre, a project meets LID qualifications if it includes no more than 60 percent impervious surface, retains or restores at least 20 percent of the site in native vegetation, uses sufficient LID techniques to warrant reducing the conventional stormwater volume by 50 or 60 percent (depending on soils), and meets the region’s standards for flow control and treatment. These standards are now included in every binder presented to the jurisdictions.

How is the program funded?

The program received \$45,000 in 2005 and \$50,000 in 2006 from the Washington Department of Ecology’s Direct Implementation Fund (DIF)—these funds are derived from EPA’s Clean Water Act section 319 grant program. EPA Region 10 and the State Water Quality Account provided additional funds: \$66,000 in 2005 and \$54,000 in 2006. The Washington legislature has expanded this successful program for the 2007-09 biennium. Thanks to an increase in designated funding, the Partnership now has \$500,000 over a two-year period to provide more local regulatory assistance and LID training throughout the region. The partnership hopes to begin working with an additional 11 to 13 jurisdictions beginning in late 2007.

Further aiding the LID cause, the Washington State Department of Ecology will be providing nearly \$18 million in grants to local governments for the 2007-09 biennium to demonstrate and monitor the effectiveness of various LID techniques, retrofit existing stormwater infrastructure, and address non-stormwater discharges into systems. “These targeted grants will help many of the jurisdictions actually implement some of the recommendations received from the Local Regulation Assistance Project,” explains Wulkan.

After the Local Regulation Assistance Project: The City of Bellingham, WA

The City of Bellingham, WA, was one of the first eleven jurisdictions to participate in the Local Regulation Assistance Project. Bellingham is on the eastern coast of Puget Sound, approximately 90 miles north of Seattle and one hour south of Vancouver, British Columbia. Because of its environmentally sensitive location on Puget Sound, the city had already been working to incorporate allowances for LID into its ordinances and regulations. The City jumped at the chance to participate in the project.

Bill Reilly, with the City of Bellingham’s public works engineering department, found the Local Regulation Assistance Project to be very helpful. “Our city was in the process of changing and updating stormwater regulations, and it helped to have assistance from people with LID technical expertise. It made my job much easier.” The City has since adopted their new stormwater regulations, which included the latest Washington Department of Ecology LID standards.

The new stormwater regulations encourage using LID techniques to help control stormwater runoff. The development community is supportive of the new changes taking place in Bellingham, notes Reilly. “They appreciate the new flexibility provided by the revised regulations.”

The City is currently working to incorporate many of AHBL’s other recommendations. For instance, the planning department is in the process of changing street ordinances to allow narrower streets and one-way streets in subdivisions. In addition, the City is considering applying a strict LID requirement citywide; currently it has a strict standard in place only for particularly environmentally sensitive areas. In the meantime, the City is permitting developers to undertake a number of “pilot projects” that incorporate many LID elements not yet outlined in ordinances.

One additional benefit of the project, noted Reilly, is that it forced all of the different departments to come together to work for a common goal. “Everyone had to meet to discuss the issues and to figure out what to do. When else would you have people from very different departments—such as streets, fire, public works, and planning—all gathered around the table talking about LID?” This effort paved the way for better communication between departments about ongoing and future LID efforts. For more information, contact Bill Reilly at 360-676-6961 or by e-mail at wreilly@cob.org.

Looking ahead

The Partnership anticipates offering the Local Regulation Assistance Project for the foreseeable future—until all interested and committed jurisdictions have the opportunity to participate. Interest in the program and its application region-wide continues to grow as local communities, planners, builders, and regulators look for cost-effective and more environmentally sound ways to develop land and manage stormwater. As citizens learn more about LID and see it applied elsewhere in the region, they begin encouraging their local officials to promote more environmentally friendly development in their town. Fortunately, many local elected officials have already been through LID training events, understand the benefits of LID, and are very supportive of efforts to incorporate LID throughout their jurisdiction.

The water resources and quality of life in the beautiful Puget Sound region, like many in the country, are seriously threatened by stormwater runoff, explains Wulkan. “Many jurisdictions are simply tired of the high cost of stormwater management and the limited effectiveness of ponds at avoiding stormwater-related problems. Everyone’s very anxious to participate in the project. It’s really a win-win situation—LID makes a community a more beautiful place, waters are better protected, citizens are happier, and it often saves money.”

[For more information, contact Bruce Wulkan, Program Manager: Stormwater and CSOs, Puget Sound Partnership, P.O. Box 40900, Olympia, Washington 98504-0900. Phone: 360-725-5455; E-mail: bruce.wulkan@psp.wa.gov]

Where Has Your Little Dog Gone?

The Tampa Bay Estuary Program (TBEP) is using the “pictures don’t lie” approach in its effort to reduce pet waste pollution and its effect on water quality. During a recent pilot project in a small neighborhood park, the TBEP developed a poster that showed the locations of dog waste piles left along park paths during an initial visual assessment. The TBEP then used the map as a key component of a monthly pet waste information station set up at the park. The visual and written information provided seemed to have an impact; the most recent data indicate that the number of dog waste piles in the park has declined significantly since the start of the project.



This map shows the number and extent of dog waste piles found in a small park in June 2006.

TBEP initiated the project out of concern about high fecal coliform levels in a number of Tampa Bay tributaries. The Hillsborough River near downtown Tampa, for example, has bacterial counts 50 percent higher than health standards in some portions. Research in the watershed is showing that pet waste may be a far more significant contributor to this problem than previously thought. People don’t realize that the average pile of dog waste contains 3 billion fecal coliform bacteria, plus other, sometimes dangerous, microorganisms. “Most people don’t stop and think about how their pet contributes to the cumulative impact—and they have never seen the link between dog waste, public health, and water quality,” explains Nanette O’Hara, Public Outreach Coordinator for the TBEP.

They Need to See It to Believe It

O’Hara decided to try a new education tactic—using a digital map to help people visualize the problem of dog waste. O’Hara designed a pilot program to track the impact of this and other educational efforts in Rivercrest Park, a small neighborhood park along Tampa’s Hillsborough River. Each month, beginning in June 2006 and continuing through May 2007, O’Hara used a hand-held GPS (Global Positioning System) unit to map the locations of dog waste piles found along the park’s pathways. Using the data from the first month, she developed a large poster (see image) to show park visitors and others the extent of the potential pollution left by dogs.

Where Has
Your Little Dog
Gone?
(continued)

“Peer pressure is our best ally”

O’Hara hosted an information station in the park once a month beginning in August 2006 and continuing through May 2007. There, she displayed the dog waste pile location poster, distributed fact sheets and other materials about pet waste, and answered questions. “The poster was my most effective visual aid during the project,” notes O’Hara. “People tend to think only of how their individual dog might have an impact. The poster made them see the problem on a larger scale.”

To attract visitors to the booth, she gave away small items such as refrigerator magnets with a poop scoop message, doggie clean-up bags, and a fire hydrant-shaped clean-up bag dispenser that attaches to a leash. To help with the outreach effort, the City of Tampa Parks and Recreation Department installed a number of clean-up bag distribution stations throughout the park. O’Hara also gave a presentation to the local neighborhood association, published an article in the association’s newsletter, and participated on a neighborhood blog.

Pooches for the Planet

The Tampa Bay Estuary Program recently launched the “Pooches for the Planet” campaign to increase awareness of the public health and water quality impacts of dog waste. The campaign motto, “Clean Waters. Clean Yards. And Clean Shoes!,” is bound to catch people’s attention and bring a smile to their faces. The TBEP “Pooches” Web site (www.tbep.org/scoopthepoop.html) offers information about the program, plus tip cards, door hangers, and flyers that may be downloaded. A “Pooches for the Planet Neighborhood Kit” is available to people who wish to start a neighborhood Pooches group of their own. In addition, TBEP provides free educational materials to animal shelters, pet stores, veterinarians and others who can help spread the word about the need to pick up after pets.



The outreach project made a significant difference. O’Hara’s mapping data show that the number of dog waste piles is down by 48 percent in the park, and down by 20 percent along the greenway leading to the park. “Peer pressure is our best ally,” explains O’Hara. “We saw the greatest reduction in dog waste piles in the main area of the park—where more people tend to be. We saw less of a reduction along the greenway area, which is more isolated and where there is less peer pressure to do the right thing.”

O’Hara believes that the installation of the new clean-up bag distribution stations has played a key role in the reduction. In fact, in the early part of the project, the number of dog waste piles had actually increased in the greenway. In response, O’Hara worked with the Parks and Recreation Department to have an additional bag station installed along the greenway. Soon after installation, O’Hara’s data showed that dog waste piles decreased to 20 percent below that noted in her initial baseline survey.

Successful Campaign Expands

Based on the success of the pilot program, TBEP recently launched a “Pooches for the Planet” campaign (see box). Neighborhood groups that want to conduct a pet waste education program can get a free kit containing materials they can distribute in their own parks and common areas. TBEP staffers will provide a training session to familiarize volunteers with the environmental and public health impacts of pet waste, so they can pass on this information through neighborhood outreach.

O’Hara is currently working with a number of individuals and groups that are interested in the program. So far, people from two neighborhoods are considering launching full Pooches for the Planet programs. A number of other people have requested and distributed materials in their neighborhood, but are not yet willing to commit to hosting periodic “information stations.” O’Hara hopes that, as word gets out about the program, neighborhood associations and groups such as scouts and 4-H clubs will come forward to lead pet waste awareness and reduction programs throughout the Tampa Bay watershed. A slide presentation about the project is available online at www.epa.gov/ciconference/previous/2007/proceedings.htm.

[For more information, contact Nanette O’Hara, Public Outreach Coordinator, Tampa Bay Estuary Program, 100 8th Avenue S.E., MS I-1/NEP, St. Petersburg, FL 33701. Phone: 727-893-2765; E-mail: nanette@tbep.org]

Less Pesticide, Fewer Fruit Flies in California

California has put more than \$500 million and tons of insecticides into eradicating exotic fruit flies wherever and whenever they've appeared in the state over the last 40 years. Why such effort to control insects that are about the size of a kernel of corn? Because if just one species of exotic fruit fly, such as the Mediterranean fruit fly—*Ceratitis capitata*, commonly called the “medfly”—becomes established, it could cost California more than \$1.4 billion a year in lost markets, export sanctions, treatment costs, and reduced crop yields, in addition to the loss of 14,000 jobs.

A risk that big leads to the use of a lot of insecticide. But in the last seven decades, California has been able to cut its pesticide use by as much as 8,000-fold and still keep these tiny but destructive pests from becoming permanent state residents by putting to work the results of the USDA's Agricultural Research Service's (ARS) fruit fly program.

Aloha, Fruit Flies

Many of the fruit fly control measures being used by California had their genesis in research from ARS' U.S. Pacific Basin Agricultural Research Center (PBARC) in Hilo, Hawaii, and the agency's Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas. Because Hawaii has been infested since the late 1800s by a variety of exotic fruit flies, including medfly, melon fly, oriental fruit fly, and Malaysian fruit fly, the islands are an ideal location for developing and testing control methods. There is no chance of further spread and there are lots of fruit flies to control.



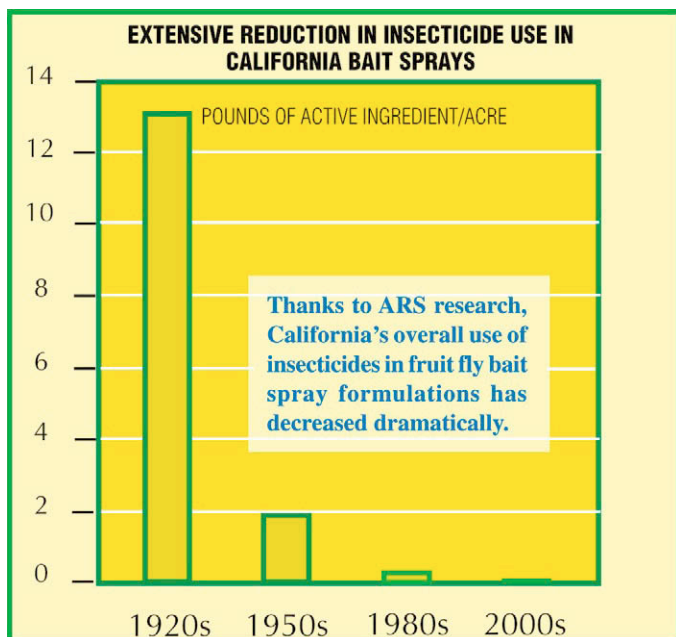
Mediterranean fruit fly, a worldwide agricultural pest (photo by Scott Bauer).

Improved ways of producing sterile male fruit flies released to short-circuit the breeding cycle, new biocontrols such as augmentative releases of parasitic wasps, and better ways to manage crops to minimize fruit fly infestation are all techniques that have come from PBARC research. In particular, more effective and more species-specific lures and baits that have come from ARS research are what have made deep reductions in insecticide use possible in California and Florida.

“Back in the 1930s, California sprayed lead arsenate at a rate as high as 2 pounds of active ingredient (AI) per tree—about 260 pounds AI per acre—and still did not succeed in eradicating walnut husk fruit fly infestations,” explains Robert V. Dowell, program supervisor for the Integrated Pest Control Branch of the California Department of Food and Agriculture (CDFA). “Later, we used a combination of removing infested host trees and spraying DDT or diazinon at a rate of 2-4 pounds AI per acre, which was successful against the Mexican fruit fly. It was quite a load of pesticide on the environment, but it was the best we had at the time, and it had to be done.”

By the mid-1950s, ARS research allowed CDFA to switch from cover sprays to a lure/bait mixed with malathion at 0.5 pound AI per acre, which eliminates fruit flies. Further ARS research from the 1960s to the 1990s showed that the amount of malathion used could be reduced to 0.2 pound AI per acre and then down to 0.1 pound AI per acre and still eradicate fruit fly infestations. “Those bait drops were about 10-20 percent malathion and actually provided a lethal dose if the insects simply walked across the bait, which was good because the lure itself wasn't very tempting for fruit flies to eat,” Dowell says. In the 1990s, ARS developed a new bait that more readily attracted medflies, smelling more like a gourmet dinner to them.

Now the new bait is being combined with a more environmentally friendly insecticide, developed by Dow AgroSciences LLC, called “spinosad.” In ARS lab tests, it took only 5.0 parts



per million of spinosad to kill medflies, and the compound is basically not lethal by contact, only by ingestion. The effective dose is as little as 0.00025 pounds AI per acre.

“What we do today is knock the population down with the bait plus spinosad and then flood the area with sterile males to disrupt the mating cycle of any stray medflies that might be left,” Dowell says. “ARS came up with the sterile male method and has developed the diets and rearing techniques that make the technique economical and efficient. “ARS has simply made it possible to keep medflies out of California and Florida for the past five decades,” Dowell summarized.

Areawide's the Key

Medflies are not the only fruit fly species that the states are keeping at bay: *Bactrocera* species like the oriental fruit fly and melon fly are as big a threat. “We started out fighting *Bactrocera* fruit flies the same way we did medflies—using cover doses of pesticides like diazinon,” Dowell recounts. “Then ARS research showed us how we could use less pesticide and still have eradication.”

In 2001, PBARC began the next major step in fruit fly control by developing an areawide integrated pest management (IPM) program in Hawaii. It combined all the techniques that ARS has developed over the years into a single program designed to use as little insecticide as possible but still stop the spread of fruit flies. This includes use of methyl eugenol for oriental fruit fly and cuelure for melon fly. These powerful parapheromones attract male fruit flies from far away so they can be removed from the population.

To eradicate two major genera of pest fruit flies, *Bactrocera* and *Dacus*, California is mixing methyl eugenol with a low dose of the insecticide Naled and a thickener and applying about 10 milliliters of the mixture to 600-900 sites per square mile, mostly telephone and utility poles. This program has been successful against 130 infestations, according to Dowell, using only 0.008 pound AI/acre. That's a 250-fold reduction in insecticide for these species. The results from ARS' areawide IPM research have also allowed California to shrink the area around an infestation that has to be treated with ground spraying from a half-mile radius to an eighth-mile—a 94 percent reduction in area treated.

The State of California has been using methyl eugenol and cuelure as monitoring and detection agents and as a component in its *Bactrocera* eradication programs under special authority from the U.S. Environmental Protection Agency (EPA). There currently is no EPA registration for their general use as control agents by growers and homeowners. ARS has been using them in Hawaii as biopesticides on farms and in home gardens under an EPA research permit as ARS, the University of Hawaii, and the Hawaii Department of Agriculture have been devising the areawide IPM program. Details about this research are available at www.fruitfly.hawaii.edu.

The areawide program has been so successful and stimulated such interest that several companies have filed applications with EPA for general end-use permits for methyl eugenol and cuelure as potential biopesticides for growers and gardeners.

The Fight Continues

ARS isn't resting on its laurels. Roger Vargas, an ARS research entomologist at PBARC, and his colleagues are looking at ways to further reduce the amount of pesticide needed to control exotic fruit flies. “We are testing a lure/bait called ‘SPLAT-MAT,’ which consists of SPLAT, a waxy emulsion matrix product that combines methyl eugenol or cuelure with low doses of spinosad as the toxicant,” explains Vargas. “SPLAT-MAT can be sprayed instead of confined to traps, and the waxy formulation makes it exceptionally long lasting and rainfast.” SPLAT-MAT attracts and kills only male fruit flies, so it is designated as a “male annihilation technique” (MAT).

Protein baits and more effective lures that attract male or female fruit flies are also being developed by ARS for use within the SPLAT/spinosad basic formulation, promising even more effective fruit fly control products in the future.

[This article was excerpted from the May/June 2007 issue of the USDA's Agricultural Research Service's Agricultural Research magazine. To read the entire article, see www.ars.usda.gov/is/AR/archive/may07/flies0507.htm]

Notes on Watershed Management

Nutrient Pollution Drives Frog Deformities by Increasing Parasites

A recent study shows that nutrients in nonpoint source runoff can fuel parasitic infections that trigger frog deformities in North American ponds and lakes. Deformed frogs first gained international attention in the mid-1990s when a group of Minnesota schoolchildren discovered a pond where more than half of the leopard frogs had missing or extra limbs (pictures are available at www.pca.state.mn.us/hot/frogphotos.html). Since then, reports of deformed amphibians have become widespread in the United States, leading to speculation they were being caused by factors like pesticides, increased ultraviolet radiation, or parasitic infection.



Elevated nutrient levels in waterbodies drive parasitic infections that in turn cause frog deformities such as this.

The new study, led by Pieter Johnson with the University of Colorado at Boulder (UC-Boulder), showed that increased levels of nitrogen and phosphorus cause sharp hikes in the abundance and reproduction of a snail species that hosts microscopic parasites known as trematodes. The nutrients stimulate algae growth, increasing snail populations and the number of infectious parasites released by snails into ponds and lakes. The parasites subsequently form cysts in the developing limbs of tadpoles and causing missing limbs, extra limbs, and other severe malformations. Predators such as wading birds complete the parasite's life cycle by consuming infected frogs and spreading the parasite back into the ecosystem through defecation. An artist's rendition of the life cycle, plus information about each life cycle stage, is available at www.greenmuseum.org/c/vban/trematode.php.

“This is the first study to show that nutrient enrichment drives the abundance of these parasites, increasing levels of amphibian infection and subsequent malformations,” said Johnson. “The research has implications for both worldwide amphibian declines and for a wide array of diseases potentially linked to nutrient pollution, including cholera, malaria, West Nile virus, and diseases affecting coral reefs.”

While parasite infection is now recognized as a major cause of such deformities, the environmental factors responsible for increases in parasite abundance had largely remained a mystery until the study was undertaken, Johnson said. “One of our main goals was to understand how parasites are going to respond to land-use changes and ecosystem alterations,” he said. “What we found is that nitrogen and phosphorus pollution from agriculture, cattle grazing, and domestic runoff has the potential to significantly promote parasitic infection and deformities in frogs.”

Study Design

The research team built 36 artificial ponds in central Wisconsin similar to farm stock tanks—a common breeding site of frogs and salamanders—and stocked each with selected numbers of snails and tadpoles of the green frog. In addition to adding nutrients, the researchers took on the role of birds in the trematode life cycle by adding parasite eggs to the tanks, then measuring the subsequent ecological responses. In ponds with added nutrients, snail biomass increased by 50 percent and the snails increased parasite egg production by up to eight-fold, he said. The infection rate in frogs rose by two to five times in those tanks, Johnson said.

As few as 12 trematode larvae, known as cercariae, can kill or deform a single tadpole by burrowing into their limb regions and disrupting normal leg development, he said. A single infected snail can produce more than 1,000 cercariae in one night. Frogs that become deformed rarely survive long in the wild, he said. “We were able to watch nutrient pollution move through the life cycle of the parasite as it cascaded through the food web,” he said. “Since most human diseases involve multiple hosts, understanding how increased nutrient pollution affects freshwater and marine food webs to influence disease is an emerging frontier in ecological research.”

Nutrient Pollution
Drives Frog
Deformities
by Increasing
Parasites
(continued)

A recent study of more than 6,000 species of amphibians worldwide concluded that 32 percent were threatened and 43 percent were declining in population. While the causes range from habitat loss to emerging disease, Johnson explained, the researchers are now exploring how nutrient pollution and limb malformations contribute to the pattern.

Johnson is lead author of a paper, "Aquatic eutrophication promotes pathogenic infection in amphibians," published online in the September 24, 2007 issue of the *Proceedings of the National Academy of Sciences* (a copy of the paper is available at www.colorado.edu/eeb/facultysites/pieter/publications.htm). The paper's co-authors include Jonathan Chase from Washington University; Katherine Dosch, Richard Hartson, Daniel Sutherland, and Stephen Carpenter from the University of Wisconsin; Jackson Gross from the Southern California Coastal Water Research Project; and Don Larson from the University of Alaska. For more information about the study, see www.colorado.edu/eeb/facultysites/pieter. A podcast of Johnson describing the results of the study is available at www.colorado.edu/news/podcasts.

[For more information, contact Pieter Johnson, Department of Ecology and Evolutionary Biology, N344 Ramaley, University of Colorado, 334 UCB, Boulder, CO 80309-0334. Phone: 303-492-5623; E-mail: Pieter.Johnson@colorado.edu]

Researchers Develop Models to Assess Wetland Health

Smithsonian scientists recently reported a promising method of wetland assessment that will help environmental managers quickly take stock of wetlands across an entire watershed. Tools for this kind of rapid watershed-scale assessment—relying on a few easily measurable key factors—have been previously unavailable to managers.

In three papers published in the September 2007 issue of the journal *Wetlands*, Dennis Whigham, Donald Weller, and Thomas Jordan of the Smithsonian Environmental Research Center (SERC) and their colleagues present the results of a large-scale study that combines field studies and remote-sensing data to assess the ecological functioning of wetlands in a landscape. The researchers based their study on an approach previously developed for assessing individual sites, called the Hydrogeomorphic (HGM) approach, in which ecological conditions are inferred from readily observable indicators, such as plant species present and the degree of human disturbance.

What is the Hydrogeomorphic (HGM) Approach?

The HGM Approach is a wetland assessment procedure that first classifies wetlands based on their hydrogeomorphic characteristics (i.e., landscape setting, water source, hydrodynamics); second, it uses reference wetlands to establish the range of functioning of the wetland; and third, it uses a relative index of function, calibrated to reference wetlands, to assess wetland functions. This increases the resolution, allows for replicability, and reduces the amount of time needed to conduct the assessment. The HGM Approach utilizes reference wetlands as the means for establishing the scale, or index, against which other wetlands of the same type in a particular geographic area (reference domain) can be compared to determine their functional capacity. Reference wetlands are selected to reflect the range of conditions in a particular geographic area that a particular wetland type may exhibit, from relatively undisturbed to highly degraded. For more information, see www.epa.gov/owow/wetlands/science/hgm.html.

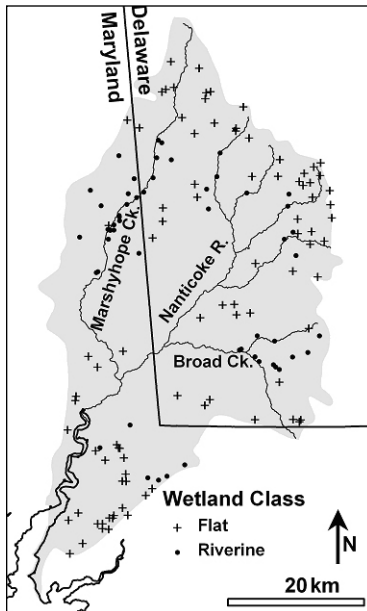
"We took these methods for assessing wetland functions and expanded them to a whole-landscape scale, which is something that has not been effectively done before," said Whigham, who coordinated the project. "These days, most land managers are not asking how to understand what is going on in an individual wetland, they want to manage resources at a much larger scale."

For this study, the researchers focused on non-tidal wetlands in the Nanticoke River watershed of Maryland and Delaware. Draining into the Chesapeake Bay, the Nanticoke system is one of the most biologically important and wetland-rich watersheds in the mid-Atlantic region. Wetlands are found along streams (riverine wetlands) and in poorly drained uplands called "flats."

During the first year of the project, the researchers visited wetlands of both types, taking field measurements and observations according to the HGM protocol at more than 100 sites. They used the data to formulate models to rate the condition of the sites, which ranged from nearly undisturbed to highly degraded. The sites were chosen according to a statistical procedure developed by U.S. Environmental Protection Agency (EPA) to ensure that they were representative of the entire landscape.

Researchers
Develop
Models to
Assess Wetland
Health
(continued)

For a subset of the sites, the researchers took a closer look at one important ecological function of wetlands: the cycling of nutrients, particularly nitrogen. Many watersheds are overloaded in nutrients due to runoff from agricultural fields and other sources. The result is diminished water quality. But soils in healthy wetlands contain bacteria that remove excess nitrogen by a process called denitrification and can restore water quality. “We found that you can predict denitrification potential from some fairly easy-to-measure properties of the soil, such as percent organic matter or pH,” said Jordan, who led this portion of the study.



This map of the Nanticoke River watershed shows the location of reference sites selected and sampled in 1999. Data collected at the reference sites were used to develop and test hydrogeomorphic (HGM) function models that were used to evaluate more than 130 wetlands in the watershed in 2000.

As a final step, the researchers took the results of the field assessments and compared them with digital maps and remotely sensed data, such as satellite land cover images. “The idea was to develop statistical models that would successfully predict what was observed in the field,” said Weller, whose lab performed the analysis. “Once you’ve developed the models, you then can assess additional wetlands without having to go out and sample them,” he added. While the models cannot predict the precise conditions at a given site, they can provide enough information to identify potentially degraded areas and help guide management priorities in a watershed.

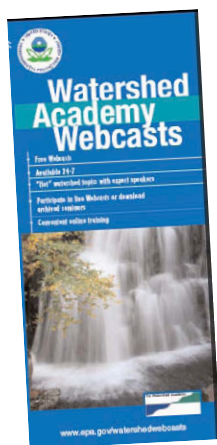
The Nanticoke River Watershed Wetland Study is an EPA-funded cooperative research project between SERC and The Nature Conservancy. More information about the project is available at www.serc.si.edu/labs/plant_ecology/landscape_nanticoke.jsp. A recent announcement regarding the project may be found at www.serc.si.edu/for_media/releases_2007/2007_wetlands.jsp.

[For more information, contact Dennis Whigham, Smithsonian Environmental Research Center, P.O. Box 28, Edgewater, MD 21037. Phone: 443-482-2226; E-mail: whighamd@si.edu]

Notes on Education

Watershed Webcasts Offer Something for Everyone

Since early 2006, the U.S. Environmental Protection Agency’s Watershed Academy has sponsored free webcast seminars approximately once a month. These seminars, hosted by expert instructors, are designed to train local watershed organizations, municipal leaders, and others about key watershed topics. During the webcasts, trainees simultaneously log on to the Web and/or participate by phone. For those not able to register for a live webcast, EPA makes a streaming audio version of the training (with slides) available after the live seminar for download. See www.epa.gov/watershedwebcasts for more information. Almost 30 webcasts are now available, covering topics such as social marketing, effective outreach campaigns, low impact development, pollutant trading, water quality monitoring, stormwater management, and watershed plan development. A colorful flyer about the webcasts is available for download at www.epa.gov/watershedwebcasts/351-trifoldA.pdf.



Some of the most recent webcast seminars include:

- **Watershed Financing – Moving Beyond Grants**, held October 17, 2007. Tim Jones of EPA’s Coastal Management Branch and the World Resources Institute’s Dan Nees discussed how watershed groups can create a watershed-financing plan that identifies and leverages sustainable funding sources. The speakers explored the essential elements of developing a watershed finance strategy and key steps in the financing planning process. They also offered case studies showing successful watershed finance plans in action. For more information on watershed financing, see www.epa.gov/owow/funding.html.
- **Water, Energy, and Climate Change**, held October 3, 2007. Susan Kaderka of the National Wildlife Federation and River Network’s Don Elder discussed the impacts of climate change on water resources and identified opportunities to save both water and energy. For more resources about this topic, see the seminar Web site at www.cluin.org/conf/tio/owwecc/resource.cfm.

- ***Wetlands: Condition, Loss and Restoration***, held September 26, 2007.
Kerry St. Pe, Director of the Barrataria-Terrebonne National Estuary Program and Marc Curullo, Habitat Specialist with Massachusetts Office of Coastal Zone Management, discussed methods for assessing the condition of wetlands, measuring wetlands loss, and techniques for restoring coastal wetlands. For more information about wetlands, see www.epa.gov/owow/wetlands.
- ***Earth Gauge™: Conveying Environmental Information through the TV Weather Report***, held August 15, 2007.
Sara Espinoza of the National Environmental Education Foundation (NEEF) and Joe Witte of ABC 7 WJLA-TV presented information about NEEF's Earth Gauge™ program and the general effort to help meteorologists better incorporate environmental content into their news weathercasts. In partnership with the American Meteorological Society and others, NEEF is expanding the local weather report beyond the forecast by helping to transform broadcast meteorologists into "station scientists." NEEF's Earth Gauge™ program provides meteorologists with free, weekly environmental information for use on-air, which makes the connection between the local three-day forecast and environmental impacts on the community, while also giving viewers simple actions to take at home. For more information about Earth Gauge™, see www.earthgauge.net/wp.
- ***Acid Mine Drainage (AMD) & ART: Combining Science and Art***, held on July 18, 2007.
This webcast discussed a project called AMD & ART, a project that successfully combined both good science and art to make a difference in eastern coal country. Dr. T. Allan Comp, volunteer founder/director of the now-completed project, discussed how he mobilized a community and a team of scientists, artists and VISTA volunteers to implement treatment systems that also serve as recreational sites, art parks, educational centers, and historical sites. For more information about the AMD & ART project, see www.amdandart.org.
- ***Using STORET Data to Characterize Your Watershed***, held on June 21, 2007.
The National STORET Data Warehouse is EPA's Internet-available repository of water quality data. It contains physical, chemical and biological water quality collected by federal agencies, states, tribes, watershed organizations, and universities. This webcast provided a brief overview of the STORET program and discussed the importance of data management to watershed protection. Speakers offered a quick primer on how to access data from the STORET warehouse and use that data to characterize a watershed. They also discussed future developments in STORET—particularly those relevant to watershed organizations. For more information about STORET, see www.epa.gov/storet.
- ***Long-Term Stewardship of Wetlands Mitigation Sites***, held on May 23rd, 2007.
Land trusts and other conservation organizations often take over the long-term stewardship responsibilities for wetlands, streams, and other aquatic resources that are restored, enhanced, created or preserved as compensatory mitigation under Section 404 of the Clean Water Act. Before taking on such responsibility, these organizations should be well armed with the skills necessary to navigate the Section 404 program. This webcast discussed the basics of the Section 404 program as well as the basics of compensatory mitigation, including mitigation policy, mitigation methods, and mitigation mechanisms. Speakers also provided an overview of the roles and risks of becoming involved in mitigation. Finally, the speakers reviewed methods used to evaluate stewardship tasks, calculate an adequate long-term stewardship endowment, and guarantee long-term funding. For more information about compensatory mitigation, see www.epa.gov/wetlandsmitigation.
- ***The Watershed Plan Builder: EPA's New Interactive Web-based Tool Designed to Promote the Development of Comprehensive Watershed Plans***, held on May 2, 2007.
EPA recently developed a Web-based tool called Watershed Plan Builder (<http://iaspub.epa.gov/watershedplan/index.jsp>), which is designed to help organizations develop integrated watershed plans to meet state and EPA requirements and promote water quality improvement. The Plan Builder leads users through a series of steps to produce a customized narrative outline of

a watershed plan for a specific watershed, populated with the relevant datasets, information resources and analysis tools. This webcast provided background on the development of the tool, gave an overview of the Plan Builder contents, and then demonstrated how to navigate through the Plan Builder. Plan Builder was discussed in more detail in *News-Notes* issue #82, available at www.epa.gov/newsnotes.

- **Key EPA Internet Tools for Watershed Management**, held on March 28, 2007. This webcast demonstrated how to access EPA's online resources pertaining to the nation's waterbodies, so watershed organizations could more easily obtain necessary information. While some of the online tools are straightforward and perform simple functions, others offer capability for multiple-step queries to report information. Using simple screen shots and step-by-step explanations, the webcast hosts explained how to do queries from some key EPA water-related databases, such as water quality standards, 303(d) listed impaired waters, assessed waters, STORET (water quality monitoring information) and discharge monitoring reports from permitted dischargers. The session also demonstrated the use of EnviroMapper, an online mapping application that provides an interactive data query interface to display water-related information on a map. For more information about EPA's Internet Tools for Watershed Management, see www.epa.gov/watershed/wacademy/epatools.
- **Implementing TMDLs and Trading Through the National Estuary Program**, held on February 21, 2007. The National Estuary Program (NEP), established as part of the 1987 amendments to the Clean Water Act, promotes comprehensive planning efforts and actions to help protect 28 designated estuaries deemed to be threatened by pollution, development, or overuse. The NEP uses a proven approach of focusing on specific watersheds, using science to inform decision-making, emphasizing collaborative problem solving, and involving the public. This webcast provided an overview of the NEP and showed how it implements another key Clean Water Act program—the Total Maximum Daily Load (TMDL) program. The webcast featured a case study of the Long Island Sound NEP, which has successfully used its Comprehensive Conservation and Management Plan (CCMP) as the basis for developing a TMDL. The webcast also discussed the innovative trading program used in Long Island Sound that is reducing nitrogen loads. For more information on the National Estuary Program, see www.epa.gov/nep.

Other Webcast Resources

The **Izaak Walton League of America** held a wetlands webcast series in 2006. These remain available for free download and viewing at <http://itre.ncsu.edu/cte/TechTransfer/Teleconferences/iwla2006.asp>. Topics included "Conserving Wetlands through Land Management" and "Alternative Practices for Highway Stormwater Management."

The **National Livestock and Poultry Environmental Learning Center** (<http://lpe.unl.edu>) offers monthly agriculture-related webcasts. Users may watch the webcasts live or download archived webcasts. Recent webcasts include "Value of Manure in Land Application Systems," "Vegetative Treatment Systems for Barnyard and Open Lot Runoff," and "Pathogens in Animal Manure—Should We Be Concerned?"

Nutrient Scientific Technical Exchange Partnership and Support (N-STEPS) is a partnership among academic, state, and federal agencies to provide technical support to state and tribal agencies for the development of nutrient criteria. The N-STEPS Web site offers a number of archived webcasts available for downloading at <http://n-steps.tetratex-ffx.com/webcasts.cfm>. Examples of recent webcasts include "Conditional Probability Revisited & Applied Aquatic Life Use Endpoints for Nutrient Criteria Development" (September 28, 2007), "Focus on States! Nutrient Criteria Development Efforts in Kansas and Tennessee" (September 12, 2007), and "It's Not Just Phosphorus That Controls Trophic State in Fresh Waters" (June 13, 2007).

The **U.S. EPA Office of Wastewater Management's National Pollutant Discharge Elimination System (NPDES) Program** sponsors a free webcast series for municipal stormwater managers. The series runs one new stormwater webcast approximately every other month. Recent webcasts included "Illicit Discharge Detection and Elimination Investigations 201," "Municipal Stormwater Compliance," "Social Marketing," and "Post-Construction 201." Archived webcasts include topics such as stormwater, concentrated animal feeding operations (CAFO), and combined sewer overflows. For more information about this series, see www.epa.gov/npdes/training.

EPA anticipates holding additional webcasts almost every month for the foreseeable future. For more information about past or future webcasts, please visit www.epa.gov/watershedwebcasts.

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Reviews and Announcements

Publications and Reports

2002 305(b) Water Quality Report to Congress Released

The U.S. Environmental Protection Agency (EPA) recently published the *National Water Quality Inventory: Report to Congress, 2002 Reporting Cycle*. This Report to Congress summarizes information reported by the states in 2002 describing the condition of their assessed waters, as required under section 305(b) of the Clean Water Act. It is based on electronic information contained in the National Assessment Database for the 2002 reporting cycle. In 2002, states reported that about 45 percent of assessed stream miles, 47 percent of assessed lake acres, and 32 percent of assessed bay and estuarine square miles were not clean enough to support uses such as fishing and swimming. About 30 percent of U.S. waters were assessed by the states for this report. Leading causes of impairment in assessed waters include excess levels of nutrients, metals (primarily mercury), sediment and organic enrichment. Top sources of impairment cited by states include agricultural activities (crop production, grazing, and animal feeding operations), hydrologic modifications (water diversions, channelization, and streambank destabilization), atmospheric deposition, industry, and unknown or unspecified sources. For more information, see www.epa.gov/305b/2002report.

Book Examines Environmental Benefits of Conservation on Cropland

The Soil and Water Conservation Society (SWCS) recently released *Environmental Benefits of Conservation on Cropland: The Status of Our Knowledge*. This 326-page book explores current knowledge about cropland conservation. It examines what we do and don't know about the environmental effects of current conservation practices applied to cropland. The book includes chapters by leading experts on soil management, water management, nutrient management, pest management, and landscape management practices. It addresses the environmental effects of conservation practices related to water quality, soil quality, water conservation, and air quality. It provides guidance for conservationists who provide technical assistance to farmers. It offers important input for policymakers, especially with regard to Farm Bill policy. Finally, it presents the scientific foundation for the U.S. Department of Agriculture's (USDA) Conservation Effects Assessment Project (CEAP), outlines a framework for future research, and serves as an educational reference and sourcebook. The book is available for \$49 from the SWCS store (<http://store.swcs.org>).

Book Explores Wetland Drainage, Restoration, and Repair

A new book by Thomas Biebighauser, *Wetland Drainage, Restoration, and Repair*, explains how to construct a wetland in an easy-to-understand format that is useful to everyone from the professional to the beginner. The book offers clear direction, real life examples, and photographs that supplement a step-by-step approach on how to build various types of wetlands that look and function like natural ecosystems on widely different landscapes. The first half of the book describes the techniques used to eliminate wetlands in the past, and how readers can learn to recognize former wetlands and reverse the damage done by these ancient drainage efforts. The second half of the book demonstrates how to construct wetlands and explains how they can provide valuable habitat. The book is available for \$50 from the University Press of Kentucky and from online booksellers. For more information, see www.kentuckypress.com/viewbook.cfm?Category_ID=1&Group=197&ID=1396.

CADDIS 2007 Equips Scientists with New Resources

U.S. Environmental Protection Agency (EPA) recently launched CADDIS 2007, an updated version of its “Causal Analysis/Diagnosis Decision Information System (CADDIS)” Web resource. Available at www.epa.gov/caddis, CADDIS 2007 guides users through EPA’s Stressor Identification process, with interactive tools and methods, worksheets, and examples to help scientists and engineers evaluate causes of biological impairment observed in aquatic systems such as streams, lakes, and estuaries. EPA released the first version of CADDIS in 2006, which included a step-by-step guide to conducting causal analysis, downloadable worksheets and examples, a library of conceptual models, and links to useful information sources. Issue #78 of EPA’s *Nonpoint Source News-Notes* detailed the initial release of CADDIS—read more at www.epa.gov/NewsNotes/issue78/78issue.pdf. For more information, contact the CADDIS team at caddis@epa.gov.

CWP Releases New Watershed Management Tools

The Center for Watershed Protection (CWP) recently released three new watershed management tools:

- *The Importance of Protecting Vulnerable Streams and Wetlands at the Local Level*. Article 6 in CWP’s *Wetlands and Watersheds Article Series*. This article makes the case for expanded local protection of vulnerable streams and wetlands that may not be fully protected by state or federal law due to their perceived isolation from perennial or navigable waters. This article summarizes state and local approaches to closing this gap. Article 6 is available as a free download at www.cwp.org/wetlands/articles.htm.
 - *Urban Stormwater Retrofit Practices*. CWP recently released *Urban Stormwater Retrofit Practices*, which is Manual 3 of its Urban Subwatershed Restoration Manual Series. This new manual reflects CWP’s experience with retrofitting more than 25 urban watersheds across the country. The manual outlines the basics of retrofits; describes 13 locations where they can be found; and presents rapid methods to explore options, design, and deliver retrofits to meet a wide range of subwatershed objectives. This 400+ page guidance is available as a free download at www.cwp.org.
 - *Pollutant Removal Database Report, Version 3*. CWP recently released an analysis for its newly updated National Pollutant Removal Performance Database. The National Pollutant Removal Performance Database, Version 2 (2000) consisted of 139 individual best management practice (BMP) performance studies published through 2000. CWP recently added an additional 27 studies published through 2006. Version 3’s database was statistically analyzed to derive the median and quartile removal values for each major group of stormwater BMPs. The *Pollutant Removal Database Report, Version 3*, is a brief technical paper presenting the data as box-and-whisker plots for the various pollutants found in stormwater runoff. The report may be downloaded for free at www.cwp.org.
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Conservation Reserve Program Benefits Reviewed

The University of Missouri-Columbia’s Food and Agricultural Policy Research Institute recently released a report titled *Estimating Water Quality, Air Quality, and Soil Carbon Benefits of the Conservation Reserve Program (CRP)*. This report helps to outline the benefits of CRP by estimating how field and buffer practices affect the amount of soil and nutrients leaving the field. These estimates provide an indication of the benefits due to enhanced water and air quality and increased carbon sequestration. To download the report, see www.fsa.usda.gov/Internet/FSA_File/606586_hr.pdf.

Dirt and Gravel Roads Maintenance Manual Published

Dirt and gravel roads are increasingly being recognized as having a significant impact on water resources. *Environmentally Sensitive Maintenance for Dirt and Gravel Roads* is a new 300-page manual that identifies, documents, and encourages the use of environmentally sensitive maintenance of dirt and gravel roads. Pennsylvania State University created this document, with EPA

grant assistance, for both road maintenance professionals and for others interested in integrating environmental concerns into their unpaved roads program. The document provides insight into using natural systems and innovative technologies to reduce erosion, sediment, and dust pollution while more effectively and efficiently maintaining dirt and gravel roads and gives the users an array of environmentally sensitive maintenance “tools” and practices. An electronic version of the document is available at www.epa.gov/owow/nps/sensitive/sensitive.html. Printed copies of the manual can be obtained from Chris Solloway at EPA's Office of Water (E-mail: solloway.chris@epa.gov).

EPA Issues Technical Document on Using Load Duration Curves in TMDL Development

EPA recently released *An Approach for Using Load Duration Curves in the Development of TMDLs*, a new, 74-page technical document that provides an overview on the use of duration curves for developing Total Maximum Daily Loads (TMDLs). The duration curve approach allows for characterizing water quality conditions at different flow regimes. The method provides a visual display of the relationship between stream flow and water quality. The document describes basic steps needed to develop duration curves, which identify loading capacities, load and wasteload allocations, margins of safety, and seasonal variations. It is written for TMDL practitioners who are already familiar with relevant technical approaches and legal requirements. The document, available at www.epa.gov/owow/tmdl/duration_curve_guide_aug2007.pdf, also discusses some considerations and limitations in using the approach, and includes several case examples. EPA developed this document in response to a November 2006 EPA memorandum, available at www.epa.gov/owow/tmdl/dailyloadsguidance.html. This memo indicated that EPA would issue additional technical guidance providing specific information regarding the establishment of daily loads for specific pollutants that will take into consideration the averaging period of the pollutant, the type of water body, and the type of sources the TMDL needs to address.

Guide Describes Native Warm-Season Grass Management

The University of Tennessee Extension recently published *A Landowner's Guide to Native Warm-Season Grasses in the Mid-South*. Available at www.utextension.utk.edu/publications/pbfiles/PB1746.pdf, the guide describes how to identify, manage and establish warm-season grasses in the mid-South.

Two New Publications from the National Association of Counties Available

The National Association of Counties (NACo) has updated a publication entitled *Using GIS Tools to Link Land Use Decisions to Water Resource Protection*. The guide provides practical case studies, a list of commonly available tools, and a newly created tools assessment section. *County Wetlands Data Guidebook* is another new NACo publication, which provides a practical introduction to wetlands data and is designed to help county officials obtain and utilize wetlands data and maps for county purposes. These publications are available now at www.naco.org/techassistance under “Water Quality.” NACo developed these resources with financial assistance from EPA.

NALMS Releases New Fundamentals of Urban Runoff Management Document

The North American Lake Management Society (NALMS) recently released the second edition of *Fundamentals of Urban Runoff Management: Technical and Institutional Issues*. This document updates an earlier 1994 edition, and was prepared with support from EPA's Office of Wastewater Management and the Nonpoint Source Control Branch in EPA's Office of Wetlands, Oceans, and Watersheds. The update is important because of the tremendous amount of new information available as well as the significant shift in stormwater program direction from the historic mitigation-based approach to a more source-based approach. Copies of the document are available at www.nalms.org.

Recreational Water Quality Criteria Report Released

EPA recently released the proceedings of a March 2007 Experts Scientific Workshop, at which 44 U.S. and international experts discussed critical research and science needs for developing new

or revised recreational ambient water quality criteria by 2012. Designed to protect swimmers from illnesses due to exposure to pathogens in recreational waters, the existing criteria are more than 20 years old. Since then, scientists have learned much about molecular biology, virology, and analytical chemistry. This new information will help build a stronger scientific foundation for up-to-date recreational water quality criteria. The report summarizing the experts' conclusions in seven topic areas is now available at www.epa.gov/waterscience/criteria/recreation.

Report Examines Nutrient Enrichment in the Nation's Estuaries

The National Oceanic and Atmospheric Administration (NOAA) recently released a comprehensive assessment of estuarine eutrophication, or nutrient pollution, which clearly indicates linkages between upstream activities and coastal ecosystem health. The NOAA report, *Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change, National Estuarine Eutrophication Assessment Update* is an update of the *1999 National Estuarine Eutrophication Assessment*, examining eutrophic conditions in 141 U.S. estuaries, and how and why conditions have changed in the decade between the early 1990s and early 2000s. Of the 99 estuaries that had adequate data for evaluation, 64 estuaries have moderate- to high-level nutrient related impacts. The report predicts that conditions in 65 percent of the nation's estuaries are likely to worsen in the next decade, while only 20 percent will improve. The remaining 15 percent will remain unchanged. The report highlights the need to establish more federal, state, local and industry partnerships that will work together to find well-balanced solutions that provide measurable benefits to all involved. The report also points to several case studies where there is cause for optimism that aggressive management can reverse the trend. To view the report, see <http://ccma.nos.noaa.gov/publications/eutrouupdate>.

Online Tools and Resources

Combined Sewer Overflow Planning Tool Released

EPA recently released *The Long-Term Control Plan-EZ (LTCP-EZ) Template: A Planning Tool for Combined Sewer Overflow (CSO) Control in Small Communities*, a new planning tool for small communities that must develop an LTCP to address water pollution problems related to CSOs. This tool provides a framework for the organization and completion of an LTCP. It includes step-by-step instructions and a detailed template. For a copy of the planning tool, see www.epa.gov/npdes/cso.

New Funding Sources added to the Catalog of Federal Funding for Watershed Protection

EPA recently added thirteen new funding sources to The Catalog of Federal Funding Sources for Watershed Protection Web site (www.epa.gov/watershedfunding). This searchable database provides information about federal financial assistance sources (e.g., grants, loans, cost-sharing programs) available to fund a variety of watershed protection projects, including nonpoint source pollution projects. The thirteen new programs include:

- Community-based Marine Debris Prevention and Removal Grants (NOAA)
- Open Rivers Initiative (NOAA)
- U.S Army Corps of Engineers (USACE) Snagging and Clearing for Flood Control
- Shore Damage Attributable to Federal Navigation Works (USACE)
- Beneficial Uses of Dredged Material (USACE)
- Small Flood Damage Reduction Projects (USACE)
- Aquatic Ecosystem Restoration (USACE)
- Project Modifications for Improvement of the Environment (USACE)
- Gulf of Mexico Program (EPA)
- Communities for a Renewed Environment Program (EPA)
- Small Business Innovation Research (U.S. Department of Agriculture)

- Water 2025 Challenge Grant Program (U.S. Department of the Interior)
 - Rivers, Trails, and Conservation Assistance Program (National Park Service)
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Saving America's Streams and Streamside Lands Video Now Online

A Virginia Tech Media production (28 mins, 2001) on streamside erosion and the connection between healthy streams, good water quality, stream aquatic life, and healthy wildlife is now available for viewing online at www.researchchannel.org/prog/displayevent.aspx?rID=3723. This video explains how good farming practices, such as leaving a natural buffer strip and fencing livestock, can protect aquatic life and water quality. It also encourages Americans to adopt a local stream or become a stream watcher to help improve water quality. More information about the video is available at www.cnr.vt.edu/extension/fw/fisheries/postersvideos.

USDA Releases Fertilizer Use Information Online

The U.S. Department of Agriculture (USDA) Economic Research Service recently released a series of spreadsheets detailing almost 50 years of data (1960-2006) on fertilizer consumption in the United States by plant nutrient and major types of product, as well as consumption of mixed fertilizers, secondary nutrients, and micronutrients. The spreadsheets include information about the share of crop area receiving fertilizer and fertilizer use per receiving acre, by nutrient, for states that are major producers of corn, cotton, soybeans, and wheat. Additional data include fertilizer farm prices and indices of wholesale fertilizer price. Spreadsheets are available for download at www.ers.usda.gov/Data/FertilizerUse.

Wastewater and Drinking Water Financing Tool Launched

EPA recently launched the Financing Alternatives Comparison Tool (FACT), a financial analysis tool to help municipalities, utilities, and environmental organizations identify the most cost effective method or financing option to fund a project under the Clean Water State Revolving Fund (CWSRF) program—including nonpoint source management projects. The CWSRF program is available to fund a wide variety of water quality projects including all types of nonpoint source, watershed protection or restoration, and estuary management projects, as well as more traditional municipal wastewater treatment projects. FACT, which may be downloaded to a desktop and requires Microsoft Access 2000 or later, compares the costs associated with various financing options for projects and produces a comprehensive analysis that incorporates financing, regulatory, and other important costs. FACT will help potential borrowers carefully weigh their financing options. For more information, see www.epa.gov/owm/cwfinance/cwsrf/fact.htm.

Watershed and Wetland Protection Information Kit Available

The *Watershed and Wetland Protection Information Kit for County Officials* is a collection of online resources that can assist county and local officials with efforts to protect and restore the multiple benefits of their community's water resources. The information kit was produced by the Center for Watershed Protection and the National Association of Counties with support from EPA and is available online at www.cwp.org/wetlands/naco.htm.

Announcements

Clean Water Act Definition of "Waters of the United States" Issued

EPA and the Corps of Engineers have jointly issued a legal memorandum that interprets the June 19, 2006 Supreme Court decision in the consolidated cases *Rapanos v. U.S.* and *Carabell v. U.S.* (known as the "*Rapanos*" decision). The guidance is being released to Corps of Engineers and EPA field offices to ensure nationwide predictability, reliability, and consistency in identifying wetlands, streams and rivers subject to the Clean Water Act (CWA). The EPA/Corps guidance reflects the agencies' intent to provide maximum protection for the Nation's aquatic resources under the CWA

as interpreted by the Supreme Court in *Rapanos*. To ensure such decisions are made in a timely manner, the agencies have released concurrently with the guidance a Memorandum of Agreement laying out a process with specific short timeframes, when necessary, for reaching interagency agreements on jurisdictional calls. For more information, see www.epa.gov/owow/wetlands/guidance/CWAwaters.html.

Florida Adopts Statewide Urban Turf Fertilizer Rule

The Florida Department of Agriculture and Consumer Services (DACS) recently adopted a statewide Urban Turf Fertilizer Rule. The rule limits the phosphorus and nitrogen content in fertilizers for urban turf and lawns, significantly reducing the amount of nitrogen and phosphorus applied in urban areas and limiting the amount of those compounds reaching Florida's water resources. DACS expects a 20 to 25 percent reduction in nitrogen and a 15 percent reduction in phosphorus in every bag of fertilizer sold to the public. The new rule requires that all fertilizer products labeled for use on urban turf, sports turf, and lawns be limited to the amount of nitrogen and phosphorus needed to support healthy turf maintenance. DACS developed the new law with input from the University of Florida's Institute of Food and Agricultural Sciences, the Florida Department of Environmental Protection, the state's five water management districts, the Florida League of Cities, Florida Association of Counties, fertilizer manufacturers and concerned citizens. For more information, see www.doacs.state.fl.us/press/2007/08302007.html.

Stormwater and the Clean Watersheds Needs Survey

This year, EPA will begin working with stormwater Phase I and II communities and state permitting authorities to better document stormwater capital needs (costs for stormwater infrastructure that will be needed during the next twenty years) in the *Clean Watersheds Needs Survey* (CWNS). The CWNS is a report to Congress (issued every four years) on the capital needs for wastewater, stormwater, and nonpoint sources. While stormwater has been a listed category in the CWNS for some time, reporting of these needs by urban communities, including Phase I and II communities, has been very limited. In preparation for the 2008 CWNS, EPA wants to work closely with community stormwater managers to better document and report these important needs. In order to help improve reporting and reach out to local government managers, EPA held a series of webcasts on the CWNS process. For more information, see www.epa.gov/cwns/cwns2008.htm.

Recent and Relevant Periodical Articles

Chickens Dieting to Help Delaware's Waterways

By Tracey Bryant (www.udel.edu/PR/UDaily/2008/jul/diet073107.html). This article, posted on the University of Delaware's on-line news journal *UDaily*, examines the results of a recent project aimed to reduce the amount of phosphorus in poultry litter by adding the enzyme phytase to poultry feed. According to recent analyses by David Hansen, UD assistant professor of soil and environmental quality, a ton of Delaware poultry litter now contains about 19 pounds of phosphorus, compared to 25 to 30 pounds just five years ago. The 30 to 40 percent reduction is credited to phytase-modified diets and other nutrient management practices adopted by poultry farmers under Delaware's Nutrient Management Law of 1999. As a result, the phosphorus load to the environment has been reduced by two million to three million pounds per year.

An Evaluation of the Reduced Environmental Impact from High-Density Development

By Randel Lemoine (www.stormh2o.com/sw0710_evaluation.html). This article, published in the October 2007 issue of *Stormwater*, outlines a high-density development assessment project performed by the City of Grand Rapids, Michigan. The City's project expands upon a 2006 U.S. Environmental Protection Agency report titled *Protecting Water Resources with Higher-Density Development* (publication # EPA 231-R-06-001). The City of Grand Rapids evaluated the water resource impacts for higher densities and different types of development than was addressed in

EPA's report. The project helped the City to estimate the appropriate density thresholds to define high-density development and establish a standard evaluation method for granting a waiver or reduction in stormwater regulations for high-density developments.

Metal Emissions from Brake Linings and Tires

By Hjortenkrans, Bergback, and Haggard (<http://pubs.acs.org/cgi-bin/sample.cgi/esthag/asap/pdf/es070198o.pdf>). This article, published in the August 1, 2007 issue of *Environmental Science & Technology*, reports that particles worn away from automobile brake linings and tires continue to be major sources of potentially toxic metal emissions in urban areas, despite new regulations and auto industry efforts to reduce use of the metals. The study's authors compared metal emissions from brake linings and tires to other metal emission sources in Stockholm, Sweden during 1995 and from 1998-2005. During this period, copper and zinc emissions from brake linings remained relatively unchanged at high levels that make them a major source of these metals, the researchers said. Brake linings were also a source of another toxic metal, antimony. By contrast, lead and cadmium emissions from brake linings decreased by one-tenth during this period. The study found that metal emissions from tire tread rubber declined between 1995 and 2005, as manufacturers reduced metal concentrations in tire treads. Tires, however, remained one of the largest sources of zinc and an important source of cadmium. Summary information for the article is available at www.sciencedaily.com/releases/2007/07/070723115419.htm.

Parking Spaces Outnumber Drivers 3 To 1: Drive Pollution and Warming

In *Science Daily* (www.sciencedaily.com/releases/2007/09/070911155501.htm). This article, featured in the September 12, 2007 issue of *Science Daily*, reports on a Purdue University study that surveyed the total area devoted to parking in a midsize Midwestern county and compared it to the number of resident drivers. The study showed that parking spaces outnumbered resident drivers 3-to-1 and outnumbered resident families 11-to-1. The researchers found the total parking area to be larger than 1,000 football fields, or covering more than two square miles. Because of the stormwater runoff and heat contributed by vast expanses of parking lots, researchers encourage developers to use more combined-use or shared parking lots.

Whatever Happened to Pfiesteria?

By Fincham, Goldman, and Greer (www.mdsg.umd.edu/CQ). The August 2007 issue of *Chesapeake Quarterly*, Maryland Sea Grant's magazine, contains six articles exploring the Mid-Atlantic coast's 1997 *Pfiesteria piscicida* outbreak. The articles examine how the media storm began, why and how many people got sick, whether *Pfiesteria* produces a toxin, if another fish killer might have been to blame, and whether copper could have been connected to the outbreak.

Web Sites Worth a Bookmark

EPA Student Center (www.epa.gov/students)

This environmental education network site is designed by EPA for students in grades 5-8. It includes links to information that EPA and others have developed about ecosystems, conservation, water, waste and recycling, human health, and community environmental topics. The site provides links to environmental activities and offers information about environmental careers, clubs, contests, and scholarships. EPA offers a number of similar Web sites for students of other ages and for teachers and researchers—see www.epa.gov/epahome/educational.htm for links.

Tribal Portal (www.epa.gov/tribalportal)

EPA recently launched a new Web site that will help the tribal community and the public to locate tribal environmental information and data through a single Web-based access point. The new tribal portal site allows EPA to consolidate and share environmental information through a central, easy-

to-navigate structure. The site currently offers a basic information section containing details about policies, executive orders, newsletters, and presidential documents. It also offers information areas for grants and funding, laws and regulations, tribal programs, and tribal contacts.

Wastewater in Small Communities (www.epa.gov/owm/mab/smcomm)

EPA's Office of Wastewater Management provides financial, technical and programmatic assistance to help small communities achieve adequate wastewater services. EPA launched this new Web site to help small communities achieve and maintain sustainable wastewater services. This new site provides information about grants, funding resources, technical assistance, and training. A variety of tools are also available on this site to help small communities plan, design, build, and maintain their wastewater infrastructure.

Water Quality Criteria for Nitrogen and Phosphorus Pollution (www.epa.gov/waterscience/criteria/nutrient)

EPA's Office of Water recently updated this Web site to include several new tools to help fight "nutrient pollution" (high loadings of nitrogen and phosphorus) into our waters. The redesigned site includes scientific literature reviews, monitoring data, guidance manuals, and webcasts to help states establish numeric water quality criteria for nitrogen and phosphorus. The site offers a clearinghouse of water treatment technologies and land-use practices, and includes answers to states' questions about how to use the criteria.

Calendar

January 2008

- 16-18 *Climate Change: Science and Solutions*, Washington, DC. For more information, see <http://ncseonline.org/2008conference>.
- 23-25 *Ecological Farming Conference—“Root Values: Connecting Ecology, Community, and the Land,”* Pacific Grove, CA. For more information, see www.eco-farm.org.
- 26-31 *Society for Range Management/American Forage & Grasslands Council—2008 Joint Meeting*, Louisville, KY. For more information, see www.rangelands.org/events.shtml.
- 28-30 *Southern Weed Science Society Annual Meeting*, Jacksonville, FL. For more information, see www.swss.ws/Meetings/2008/08_Meeting.html.
- 28-31 *Fire in the Southwest: Integrating Fire into Management of Changing Ecosystems*, Tucson, AZ. For more information, see www.humboldt.edu/swfire.

February 2008

- 3-7 *USDA-CSREES National Water Conference 2008*, Sparks, NV. For more information, see www.soil.ncsu.edu/swetc/waterconf/2008/home08.htm.
- 7-9 *7th Annual New Partners for Smart Growth: Building Safe, Healthy, and Livable Communities*, Washington, DC. For more information, see www.newpartners.org.
- 9-12 *US Composting Council 16th Annual Conference & Trade Show*, Oakland, CA. For more information, see www.compostingcouncil.org.
- 10-13 *2008 Sustainable Water Sources: Conservation and Resources Planning*, Reno, NV. For more information, see www.awwa.org/conferences/sources.
- 13-14 *Invasive Species in Natural Areas: A Conference on Impacts and Management*, Missoula, MT. For more information, see www.weedcenter.org/jobs_events/Invasive_Spp_Conference_Flier2.pdf.
- 18-21 *International Erosion Control Association—EC08*, Orlando, FL. For more information, see www.ieca.org/conference/annual/ec.asp.
- 21-22 *International Conference on Stormwater and Urban Water Systems Modeling*, Toronto, Ontario. For more information, see www.computationalhydraulics.com/Training/Conferences/conferencetoronto.html.
- 21-22 *26th Annual Water Law Conference*, San Diego, CA. For more information, see www.abanet.org/environ/programs/waterlaw/2008.

March 2008

- 5-6 *High Altitude Revegetation Workshop*, Fort Collins, CO. For more information, see www.highaltitudereveg.org/HAR/Workshop2008.html.
- 10-13 *18th Annual AEHS Meeting & West Coast Conference on Soils, Sediments, and Water*, San Diego, CA. For more information, see www.aehs.com/conferences/westcoast.
- 11-13 *Western Society of Weed Science Annual Meeting, Anaheim*, CA. For more information, see www.wsweedscience.org.
- 17-19 *AWRA Spring Specialty Conference: GIS and Water Resources V*, San Mateo, CA. For more information, see www.awra.org/meetings/San_Mateo2008.
- 24-26 *Sixth Southern Forestry and Natural Resource Management GIS Conference*, Orlando, FL. For more information, see <http://soforgis.net/2008>.
- 30-Apr 3 *2008 Ground Water Summit*, Memphis, TN. For more information, see www.ngwa.org/2008summit.
- 31-Apr 2 *Urban Water Management*, Louisville, KY. For more information, see www.urbanwatermgt.com.

April 2008

- 6-8 *American Water Works Association's Water Security Congress*, Cincinnati, OH. For more information, see www.awwa.org/Conferences/Congress.
- 13-16 *Solutions to Coastal Disasters Conference*, Oahu, HI. For more information, see <http://content.asce.org/conferences/cd2008>.

May 2008

- 2-6 *River Rally 2008*, Huron, OH. For more information, see www.rivernetwork.org/rally/future-locations.php.
- 5-7 *California Nonpoint Source Conference—Integrated Watershed Management: Reducing Nonpoint Source Pollution*, San Diego, CA. For more information, see www.swrcb.ca.gov/nps/conference2008.html.
- 6-9 *National Mitigation & Ecosystem Banking Conference*, Jacksonville, FL. For more information, see www.mitigationbankingconference.com.
- 18-22 *6th National Monitoring Conference—Monitoring: Key to Understanding Our Waters*, Atlantic City, NJ. For more information, see www.wef.org/ConferencesTraining/Conferences/Co-sponsoredEvents/NatlMonitoringConf.htm.
- 19-21 *New England Interstate Water Pollution Control Commission's 19th Annual Nonpoint Source Pollution Conference: "Progress through Partnerships: Collaborating to Protect Our Watersheds,"* Groton, Connecticut. For more information, see www.neiwppcc.org/npsconference.
- 20-23 *6th Natural Resource Extension Professionals Conference*, Madison, WI. For more information, see www.anrep.org.
- 26-30 *Society of Wetland Scientists: "Capitalizing on Wetlands" International Conference*, Washington, DC. For more information, see www.sws.org/2008_meeting.

June 2008

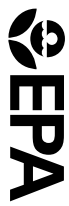
- 8-12 *ACE08—American Water Works Association's Annual Conference & Exposition*, Atlanta, GA. For more information, see www.awwa.org/ace08.
- 23-27 *20th Salt Water Intrusion Meeting*, Naples, FL. For more information, see www.conference.ifas.ufl.edu/swim.
- 29-Jul 2 *American Society of Agricultural and Biological Engineers' Annual International Meeting*, Providence, RI. For more information, see www.asabe.org/meetings/aim2008.
- 30-Jul 1 *AWRA Summer Specialty Conference—Riparian Ecosystems and Buffers: Working at the Waters Edge*. For more information, see www.awra.org/meetings/Virginia_Beach2008.

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