



Nonpoint Source *News-Notes*

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



Special Focus Issue: Controlling Nutrients Through Non-Regulatory State Efforts

Introduction: Using Non-Regulatory Initiatives to Control Nutrients

In this second part of a two-part special focus series, *Nonpoint Source News-Notes* explores non-regulatory programs and initiatives that states implement, using their annual Clean Water Act (CWA) section 319 allocations from the U.S. Environmental Protection Agency, to help control excess nutrients from nonpoint sources. The previous issue of *News-Notes*, published in June 2012 (issue #91), addressed state regulatory programs designed to control nutrients and other nonpoint source pollutants.

Importantly, both regulatory and non-regulatory approaches were envisioned by Congress when it amended the CWA in 1987 to address nonpoint sources of pollution through the CWA section 319



A farmer spreads poultry litter in Rockingham County, Virginia. Excess litter is eligible for the state's litter transport program (see [page 2](#)).

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program. Under section 319(b)(2), Congress expected states to establish their own nonpoint source management programs by implementing “non-regulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer and demonstration projects,” as appropriate. In other words, grant funds made available through CWA section 319 have been provided to support both state regulatory and non-regulatory approaches, as states see fit, for reducing nonpoint source pollution. State nonpoint source management programs are tailored to the specific needs and circumstances of each state. This issue of *News-Notes* presents examples of some useful non-regulatory approaches that states have chosen to adopt to control nonpoint source pollution primarily from agricultural sources.

Chesapeake Bay States Use Nutrient Transport Programs to Control Nutrients in Runoff

Focused efforts to address nutrient pollution are on the rise across the nation. Excess nitrogen and phosphorus can travel thousands of miles to coastal areas where the effects of the pollution are felt in the form of massive hypoxic zones with scarce oxygen and little life, such as those in the Gulf of Mexico and Chesapeake Bay. More than 100,000 miles of rivers and streams, close to 2.5 million acres of lakes, reservoirs and ponds, and more than 800 square miles of bays and estuaries in the United States have poor water quality because of nitrogen and phosphorus pollution.

In 2010, Delaware's Nutrient Relocation Program accounted for the transportation of 4.9 million pounds of total nitrogen and 3.7 million pounds of phosphorus as phosphate out of Delaware's priority nonpoint source watersheds—accounting for the largest nutrient load reductions reported nationally through EPA's Grants Reporting and Tracking System (www.epa.gov/nps/grts).

To help control nutrients in runoff, many farmers now develop and implement nutrient management plans, which can optimize crop yields and also protect the environment. Nutrient management plans identify the correct timing and amounts of nutrients that should be applied to fields, thereby reducing the chance for excess nutrients to be carried in runoff and pollute local waters. If available, farmers can use manure or litter generated by their cows or poultry as a source of fertilizer for their fields. However, the amount of manure and litter generated on a farm

can often exceed the amount that is needed to support the crops grown. To help farmers avoid stockpiling the unneeded manure, some states support nutrient transport programs that export excess manure to farms in other watersheds where the nutrients are needed. For example, several states in the Chesapeake Bay watershed operate poultry litter transport programs to reduce the amount of nutrients reaching local water bodies and the Bay.

Delaware's Nutrient Relocation Program provides financial reimbursement to farmers, brokers and trucking businesses for the transportation cost of relocating poultry litter from a Delaware farm to an alternative use project or another farm for land application. In 2010, Delaware's base

Clean Water Act section 319 grant funding provided \$200,000 for the program, which was supplemented by another \$100,000 from EPA's Chesapeake Bay Program. In 2010, Delaware's Nutrient Relocation Program accounted for the transportation of 4.9 million pounds of total nitrogen and 3.7 million pounds of phosphorus as phosphate out of Delaware's priority nonpoint source watersheds—accounting for the largest nutrient load reductions reported nationally through EPA's Grants Reporting and Tracking System (www.epa.gov/nps/grts). In the 10-year period after the program began in 2001, Delaware's Nutrient Relocation Program helped farmers relocate more than 820,000 tons of excess poultry litter (Figure 1).

For more details about Delaware's nutrient relocation program, see http://dda.delaware.gov/nutrients/nm_reloc.shtml.

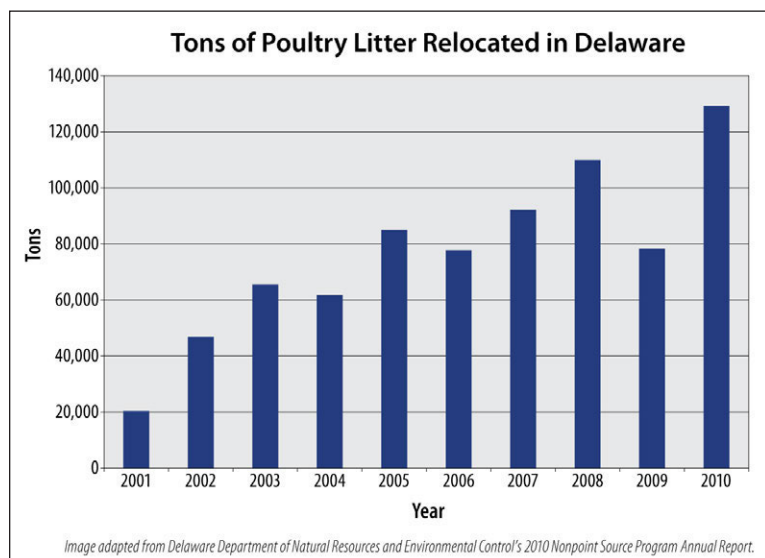


Figure 1. Delaware's Nutrient Relocation Program helped transport more than 820,000 tons of poultry litter between 2001 and 2010.

Delaware Success Story: Collaborative Efforts by Poultry Integrators Reduce Bacteria Loads

Runoff from agriculture operations and leaking septic systems contributed high levels of bacteria to the Little Assawoman Bay watershed, causing the bay to violate bacteria water quality standards. In response, the Delaware Department of Natural Resources and Environmental Control (DNREC) added the three-square-mile Little Assawoman Bay watershed to Delaware's Clean Water Act (CWA) section 303(d) list of impaired waters in 1996.

The Bay's watershed has one of the highest concentrations per land area of poultry growers in the state. In 2001 the nonprofit Center for the Inland Bays collaborated with Delmarva's major poultry integrators; the Delaware Nutrient Management Commission; DNREC's Nonpoint Source Program; and the Sussex Conservation District to develop the Little Assawoman Bay as a model watershed area. The project, known as the Poultry Integrators' Nutrient Effort, sought to accelerate compliance and certification programs mandated by Delaware's Nutrient Management Law. Operators implemented numerous agricultural BMPs in the watershed, including manure relocation and alternative use, dead bird disposal, heavy use area protection, manure conveyors and storage structures, nutrient management planning, cover crops and vegetative riparian buffers.

The efforts of the agricultural community paid off. By the end of 2006, monitoring data showed that Little Assawoman Bay met water quality standards for bacteria. On the basis of these data, DNREC removed it from Delaware's 2006 CWA section 303(d) list of impaired waters for bacteria. For more information, see http://water.epa.gov/polwaste/nps/success319/de_assa.cfm.

Virginia's Poultry Litter Transportation Incentive Program encourages transfers of poultry waste by subsidizing transportation costs (\$15 per ton) out of the Chesapeake Bay basin's areas of heavy waste concentration (Page and Rockingham Counties) and into areas of Virginia that are outside of the Chesapeake Bay basin (Figure 2) that need fertilizer, thus reducing nutrient loads to the Chesapeake Bay. The program was launched in 2007 using a grant from the National Fish and Wildlife Foundation, which funded a poultry litter hotline and "market maker" position within the Shenandoah Resource Conservation & Development Council. The program grew, and has been supported since then by up to \$100,000 per year from both the Virginia Department of Conservation and Recreation and the Virginia Poultry Federation. Prior to 2011, a \$5 per ton subsidy was provided for transport to outlying areas within the Chesapeake Bay watershed and \$12 for areas outside of the Bay watershed. During calendar year 2010, the program helped transport 6,003 tons of poultry litter away from areas of concentrated poultry production. In 2011

the subsidy increased to \$15 per ton, but the program now requires that litter be moved outside of the Bay watershed. The program's goal is to transport 5,000 tons of poultry litter out of the Chesapeake Bay watershed annually. For more information about Virginia's litter transport program, see www.dcr.virginia.gov/stormwater_management/nmlitter.shtml.

Maryland's Manure Transport Program, which was established by the state's 1999 Manure Management Law, helps livestock farmers cover the costs of transporting excess manure off their farms to other farms or facilities that can use the product safely. Under the program, animal producers with high soil phosphorus levels or farmers who have inadequate cropland area to fully utilize their manure may apply for grants to transport excess waste off-site. Cost share grants up to \$20 per ton are available through Maryland's agricultural cost share program. Because of

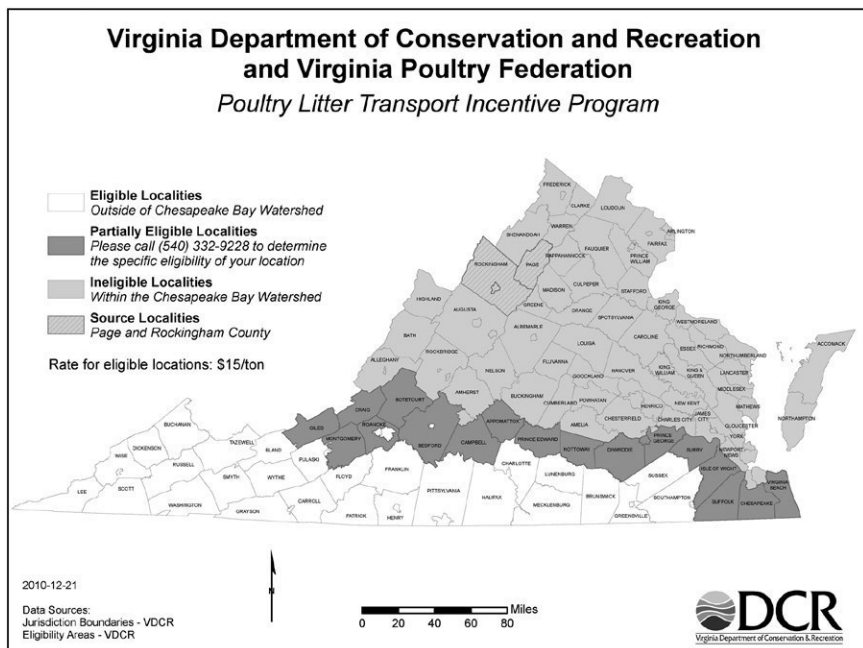


Figure 2. Counties in the southernmost portion of Virginia are eligible to receive poultry litter through the state's Poultry Litter Transport Incentive Program.

the state's good working relationship with the burgeoning poultry industry centered in Maryland's Eastern Shore, poultry companies provide 50 percent of the cost to transport poultry litter. To support Maryland's goal of transporting 20 percent of the poultry litter produced on the Lower Eastern Shore to other areas of the state, cost share mileage rates to transport poultry litter from distant counties may be provided at higher rates.

Since 1999, the program has helped to transport 718,924 tons of poultry litter and manure from areas with excess manure or high soil phosphorus levels to other farms or alternative use facilities that can use the product in an environmentally-sound manner. In fiscal year 2011, Maryland farmers transported 61,150 tons of manure to approved farms and businesses using \$354,012 in state grants. Nearly half of this manure was shipped out of the Chesapeake Bay Watershed. Delmarva poultry companies provided matching funds to transport poultry litter, bringing the total amount of financial support provided to farmers through the transport program to \$648,296. To learn more about Maryland's manure transport program, see www.mda.state.md.us/pdf/manuretransport.pdf.

State-Funded Technical Assistance and Coordination Programs Target Agriculture Nonpoint Source Pollution

As characterized in the most recent national report on the state of the nation's water quality (see http://ofmpub.epa.gov/waters10/attains_nation_cy.control#prob_source), agriculture is the leading source of impairments in assessed rivers and streams (approximately 38 percent), and the leading specified source of impairments in assessed lakes, ponds and reservoirs (approximately 17 percent). Virtually every state has programs that support controls on pollution from agriculture. A number of states devote significant resources to their state agriculture agencies or soil and water conservation districts (SWCDs)/commissions to implement non-regulatory agricultural nonpoint source programs or initiatives that either provide technical assistance or help to connect landowners with additional funding resources for best management practice (BMP) implementation. Examples of these statewide agricultural programs include:

Alabama's nonpoint source program supports two interagency staff positions connecting the Alabama Soil and Water Conservation Commission and the Alabama Department of the Environment (ADEM). These positions provide an integral partnering link between state and federal agricultural resource agencies (e.g., Natural Resources Conservation Service (NRCS),

Resource Conservation and Development Councils, ADEM and SWCDs) and the agricultural community. The first position, the Agricultural Water Quality Protection Coordinator, offers agricultural BMP expertise for watershed management plans, coordinates registrations for animal feeding operations (AFOs) and concentrated AFOs, provides voluntary complaint resolution assistance to ADEM and participates in citizen advisory committees. The second position, the Education and Outreach Specialist, promotes statewide nonpoint source education while delivering agricultural water quality protection and watershed management activities to the state's 67 SWCDs.

Indiana has two new statewide agricultural initiatives: (1) the Indiana On-Farm Network and (2) the Indiana Conservation Partnership (ICP). The Indiana Department of Agriculture created an On-Farm Network program (www.in.gov/isda/ofn) in 2010 using a NRCS Conservation Innovation Grant. Indiana's On-Farm Network is an offshoot of similar programs in Iowa and Chesapeake Bay states. The new On-Farm Network is a group of 17 crop producers in nine pilot watersheds (Figure 1) interested in economic research, stewardship and environmental protection. Participants use a variety of tools to assess nitrogen status of individual fields (results are available at www.in.gov/isda/ofn/results.htm); these data help the farmer—and others—identify opportunities to improve efficiency and profit while protecting the environment. The end result is farmer-driven adaptive management in real time. In addition, Indiana's ICP is an innovative partnership dedicated to improving the water quality of Indiana's streams, rivers and lakes (www.iaswcd.org/icp).

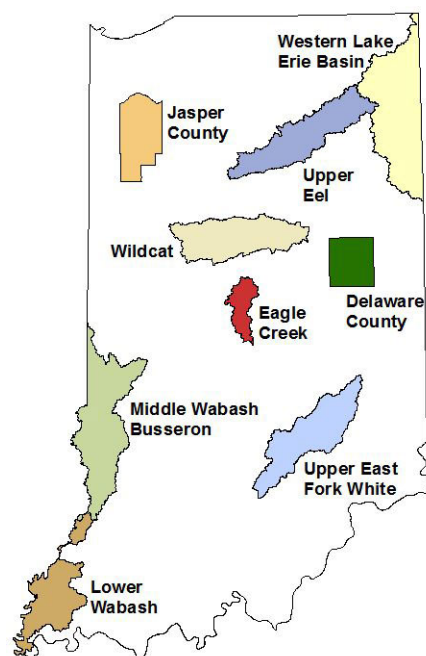


Figure 1. Indiana's On-Farm Network includes farmers in watersheds across the state.

Indiana's nonpoint source staff works cooperatively with multiplestate agencies, the state's Soil Conservation Board, Association of SWCDs, Purdue Cooperative Extension, the Farm Service Agency and the NRCS to achieve the ICP objectives, which include cooperatively promoting programs that will improve aquatic habitat quality and reduce the amount of sediment, nutrients and pesticides reaching Indiana's waters. In 2011 alone, ICP provided direct technical assistance to 96 farmers, helped to organize 76 events (field events, workshops, etc.), helped generate 12 articles in local and regional publications, and delivered 85 technical presentations that reached more than 4,700 people. For more information about ICP's accomplishments, see www.iaswcd.org/icp/pdfs/icp_handout.pdf.

Louisiana uses CWA section 319 funds to support the Master Farmer Program (www.lsuagcenter.com/en/environment/conservation/master_farmer), a statewide collaboration between Louisiana Department of Forestry, Louisiana Cooperative Extension/Louisiana State University Agricultural Center (LSU AgCenter), and NRCS. Launched in 2001, the program promotes the widespread use of voluntary approaches (e.g., implementing BMPs) to address environmental concerns related to agricultural practices (Figure 2). The program educates farmers and land-owners about water quality impacts from agriculture, the state's programs to address water quality and nonpoint source pollution, and the role that BMPs play in addressing agriculture-related water quality issues. To earn certification as a Master Farmer, an agricultural producer must complete a three-phase process:

- Phase 1. Complete eight hours classroom instruction on environmental stewardship related to water quality regulations, conservation practices and USDA conservation funding.
- Phase 2. Attend Model Farm Field Days, which include on-farm viewing of implemented, commodity-specific conservation practices.
- Phase 3. Develop and implement a farm-specific conservation plan.

Certification is granted for five years. To maintain certification, the Master Farmer must complete six hours of continuing education credits each year by attending workshops and field days. As of December 2011, 3,000 landowners and farmers have participated in the program, 2,000 have completed both Phase 1 and Phase 2, and 124 have completed all three phases necessary to be Certified Master Farmers.

Oregon's Department of Environmental Quality (ODEQ) has supported Pesticide Stewardship Partnerships (PSPs) across the state with CWA section 319 funds since 2000. The purpose of the PSP effort is to share local in-stream pesticide water quality data (analyzed and interpreted by ODEQ and the Oregon Department of Agriculture) with local and regional experts to inform the voluntary implementation of agricultural pesticide management practices to improve water quality. Data show that the program is achieving results. Between 2005 and 2007, local stakeholders and ODEQ formed PSPs in Oregon's Walla Walla, Clackamas, Pudding and Yamhill River watersheds. Watershed land uses include a broad range of agricultural crops, managed forest lands, and urban and rural residential landscapes. The most recent PSP project, initiated in 2011, is in the Amazon Creek watershed in and around Eugene, Oregon, and focuses largely on urban pesticides. Local and state partners involved in these projects included Oregon State University's Extension Service and Integrated Plant Protection Center, SWCDs, watershed councils, grower groups, tribal governments, agricultural chemical suppliers, and the Oregon departments of Agriculture and Forestry. Water quality monitoring has shown that concentrations of organophosphate insecticides have decreased within many of these watersheds since the projects began, most notably in the Walla Walla watershed (Figure 3). The PSP's approach of tracking legacy and current use pesticides

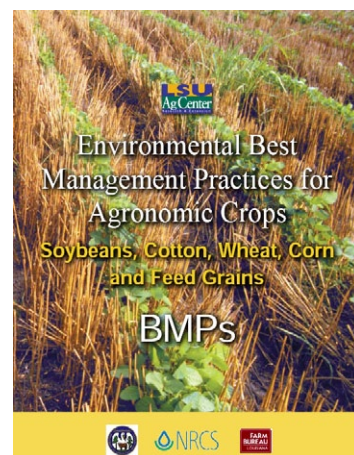


Figure 2. To assist agricultural producers with voluntary implementation of BMPs, the LSU AgCenter offers a series of detailed BMP manuals through the Master Farmer website. Manuals address agronomic crops (pictured above), aquaculture, beef, dairy, poultry, rice, sugarcane, sweet potatoes and swine production.

has also contributed to the leveraging of U.S. Department of Agriculture's Agricultural Water Enhancement Program funds (approximately \$1.5 million) in Zollner Creek, an area of intensive, diverse irrigated agriculture in the Pudding River subbasin of the Willamette Basin.

Utah's Department of Environmental Quality awarded \$344,000 in state nonpoint source funds in FY10 to the Utah Farm Bureau and the Utah Association of Conservation Districts to fund the state's Animal Feeding Operation (AFO) Strategy Program, which has been in place since 2001 and is currently being updated. Utah developed the AFO Strategy to help AFOs comply with environmental regulations. Utah assesses AFOs and identifies those that pose a risk of

discharging to waters of the state. The organizations then work with these producers to develop certified nutrient management plans (CNMP) for their farms. As of December 31, 2008, nearly 3,000 facilities had been assessed; of those, 393 were identified as AFOs with compliance problems. Almost all (98 percent) of the AFOs with compliance problems were reported to have had CNMPs prepared, subsequently enabling most (92 percent) to fully comply with environmental regulations. Although not required for all AFOs, Utah's AFO Strategy Program recommends that all producers develop CNMPs. To this end, Utah offers a 12-step guide and curriculum, available at <http://extension.usu.edu/waterquality/htm/agriculturewq/cnmp/>, that provides producers with instructions, online forms and examples of CNMPs. Producers use the guide to prepare a CNMP to be approved by a certified planner. Plus, the online curriculum helps producers develop most of the necessary documentation before meeting

with a certified planner, saving money in the process. In FY10, \$44,000 in CWA section 319 grant funds were used to help reach out to and educate AFO landowners about the state's AFO Strategy. Funds supported publishing pamphlets and fliers and holding producer workshops on rules and regulations associated with manure management.

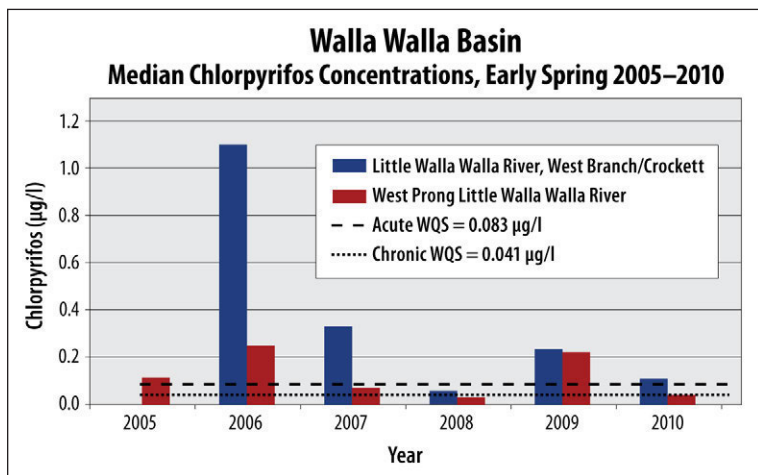


Figure 3. PSP efforts contributed to sharp declines in levels of the organophosphate insecticide chlorpyrifos in the Walla Walla River basin. (Image adapted from www.deq.state.or.us/wq/pubs/factsheets/community/pesticide.pdf)

Cost Share Programs Encourage Implementation

Most states engage in non-regulatory strategies as part of their efforts to control nutrients and other nonpoint source pollutants in agricultural runoff. At least 17 states (AR, DE, IA, FL, IL, MD, MN, NE, NM, NY, OK, OR, PA, SC, VA, VT, WI) have programs in place to provide cost

share assistance to farmers for implementing best management practices (BMPs). Many of these state programs are designed to augment cost-share funding of U.S. Department of Agriculture (USDA) conservation practices. For example, where USDA assistance for an Environmental Quality Incentives Program (EQIP) project covers 50 percent of the total cost, the state might provide 25 percent of the total cost, thereby reducing the farmers' portion of the cost from 50 percent to 25 percent. This significant savings can be enough to prompt BMP implementation by a farmer who otherwise would not have been able to participate. Examples of state programs include:

Iowa Department of Natural Resources nonpoint source program staff coordinate Clean Water Act (CWA) section 319 funding with USDA, Iowa Department of Agriculture and Lands, Iowa's Clean Water State Revolving Fund program, and the state Watershed Improvement Review Board to make conservation practices more affordable for farmers (Figure 1).



Figure 1. A grass filter strip helps prevent polluted runoff from reaching a small stream in Linn County, Iowa. (Photo courtesy of the Natural Resources Conservation Service)

Typically, USDA cost share for a conservation practice is 50 percent and the state's nonpoint source program will work with state and federal partners to provide an additional 25 percent of cost share requirement so that a landowner's financial responsibility is reduced by half. For example, between 1999 and 2008, the Rathbun Lake Watershed Project relied on EQIP and CWA section 319 funding to provide 75 percent cost share on private lands located within high priority areas of the watershed (i.e., areas contributing higher amounts of sediment and phosphorus to the lake). In limited cases where the water quality benefit warrants, a CWA section 319 grant can be used to provide a higher percentage of the total BMP cost.

Under the **Nebraska** Water Quality Special Initiative, a portion of USDA's EQIP funds are reserved to support nonpoint source program priority practices in priority areas. Nebraska Department of Environmental Quality, in turn, reserves some CWA section 319 funds to support EQIP projects that are funded under the Initiative. In general, EQIP pays for 50 percent of the practice. The remaining 50 percent may be subsidized with funds from CWA section 319, local Nebraska Resource Districts or other sources. Total EQIP, CWA section 319 and other federal funds cannot exceed 75 percent of total cost, thereby preserving the goal of having the landowner become personally invested in the practice.

The **New York** State Agricultural Nonpoint Source Abatement and Control Program provides cost share funding through the state's Environmental Protection Fund to correct and prevent water pollution from farms and farming activities. County Soil and Water Conservation Districts (SWCDs) apply for competitive grants on behalf of farmers and coordinate funded conservation projects. Grants can provide cost share of up to 75 percent of project costs or more if farmers actively contribute by conducting environmental planning or constructing BMPs. Since the program began in 1994, more than \$100 million has been awarded to 53 SWCDs across the state to help farmers implement more than 6,000 conservation projects that reduce and prevent agricultural sources of pollution. Farmers have contributed over \$47 million toward these state-sponsored projects and millions more through federal and local programs. State funds are also available for Agricultural Environmental Management (AEM) planning activities to identify farms and watersheds where improvements are needed. For more information about the AEM, see the article on [page 10](#) of this newsletter).

In **Oklahoma**, CWA section 319 and state funds are provided as cost share to landowners to implement BMPs to address water quality problems in priority watersheds. Local Watershed Advisory Groups recommend individual practices with the greatest likely water quality benefit, as well as cost share rates that are necessary to ensure voluntary adoption by local landowners. CWA section 319 and state funds are also used as equivalent cost share in areas where the USDA Farm Service Agency's Conservation Reserve Enhancement Program (CREP) projects are implemented but a portion of the watershed is ineligible for CREP (e.g., a semi-forested area where cattle are grazing and have stream access).



Figure 2. A farmer uses no-till equipment to plant corn in a cover crop of barley in Washington County, Virginia. (Photo courtesy of the Natural Resources Conservation Service)

The **Virginia** Department of Conservation and Recreation (DCR) supports an Agricultural BMP Cost Share Incentives Program funded through its Water Quality Improvement Fund. Virginia's program is often leveraged with USDA EQIP funding, reducing the landowner's expense to less than 30 percent of the total cost. In FY10, more than \$15 million was made available to agricultural producers across the state. Virginia's program focuses on efficient nutrient and sediment reduction from five priority BMPs: cover crops, conservation tillage (Figure 2), nutrient management plan development and implementation, livestock exclusion from streams, and the establishment of vegetative riparian buffers. DCR emphasizes these five priority BMPs for funding when issuing guidance to 47 local SWCDs across the state. Each SWCD receives a yearly program funding allocation and signs a cost share grant

agreement with DCR. SWCDs also receive a lesser amount of base level funding to implement any of the roughly 30 practices contained within the Virginia Agricultural BMP Cost Share Program manual. In addition to this program, Virginia also provides an agricultural BMP tax credit program to support voluntary installation of BMPs that will address Virginia's nonpoint source program objectives (up to 25 percent of the first \$70,000 spent on agricultural BMPs). To qualify for the tax credit, an agricultural producer must have an approved conservation plan and the BMPs must be inspected by a SWCD technician.

The **Vermont** Agency of Agriculture, Food and Markets receives an annual state appropriation to fund the BMP Cost Share Grant Program, which was established by state statute in support of Vermont farmers' "voluntary construction of on-farm improvements designed to abate nonpoint source agricultural waste discharges into the waters of the state of Vermont, consistent with goals of the Federal Water Pollution Control Act and with state water quality standards." The program can award a grant that reduces the producer's cost share to as low as 15 percent; however, the state grant cannot exceed 50 percent of the total cost. Factors include eligibility for USDA cost share assistance and whether the farmer has a nutrient management plan in place.

States Boost Capacity of Local Groups to Control Nonpoint Source Pollution

Many states take advantage of their Clean Water Act (CWA) section 319 funding to focus on programs that help build local capacity—helping organizations become more successful at effectively and efficiently achieving water quality results at the local level. State capacity building programs may be part of the state's nonpoint source education and outreach efforts, involve technical assistance, such as training programs, or provide tools or information resources, such as increased data access, that support watershed-based water quality efforts. Without organizational stability of locally active watershed groups or other organizations, and the unwavering application of local expertise, these groups can deploy local grant-supported projects that look good on paper but often fail in the real world. Ensuring capacity at the local level can determine whether a project will succeed or fail, either because the projects cannot deliver the 40 percent match that many states require, or they otherwise lack the organizational stability to deliver results.

Several examples of statewide efforts specifically designed to increase local capacity for nonpoint source projects, including projects addressing both agricultural and non-agricultural BMPs on a watershed scale, are provided below. There are many other statewide programs, including outreach, training, and volunteer monitoring, that also result in greater local capacity for watershed planning and implementation.

Indiana's Nonpoint Source Program uses CWA section 319 funds to support four Watershed Specialists. These individuals provide capacity-building support to local watershed groups statewide to help them become successful and sustainable. In FY2011, the Watershed Specialists supported approximately 100 active and developing watershed projects statewide—helping watershed groups and their project partners by conducting meetings, reviewing draft and final watershed management plans, developing and reviewing grant proposals, obtaining water quality data and developing watershed maps, connecting groups with other local organizations and agencies to complement planning efforts, and assisting watershed coordinators with overall watershed planning and implementation processes. By working with watershed groups on the local level, the Watershed Specialists seek to help groups become better integrated with local comprehensive planning efforts and less dependent on CWA section 319 grant funding. On a more regional scale, Watershed Specialists also coordinate with large watershed basin partnerships to promote integration and prioritization of local, smaller-scale watershed efforts.

In addition, the Indiana Watershed Leadership Academy (<http://engineering.purdue.edu/watersheds>) was created in 2005 to increase the capacity of watershed leaders to help community-based watershed groups manage watersheds and improve water quality. The Academy works in collaboration with numerous conservation partners throughout the state and is offered through Purdue University. Supported by CWA section 319 funds, the Academy helps groups create and

implement nine-element watershed-based plans (for more information on nine-element watershed plans, see the box on [page 14](#) of this newsletter). Since the Academy began, nearly 200 people have participated, learning skills in organization and communication, watershed technology, geographic information systems, policy, watershed science and leadership. The Academy has been instrumental in developing viable watershed groups that can develop nine-element watershed plans that, in turn, attract CWA section 319-funded projects in priority watersheds. Indiana's Watershed Specialists assist the Watershed Leadership Academy by serving on the steering committee and reviewing assignments and presentations by participants and webinar speakers.

Utah has developed a framework for local watershed steering committees and local watershed coordinators that increases local capacity for watershed planning/implementation and improves relationships with key partners. Nonpoint source program staff at the Utah Department of Environmental Quality (Division of Water Quality) and the Utah Department of Agriculture and Food work closely with existing watershed organizations, conservation district boards and others at the local level to establish watershed steering committees. The steering committees are the primary planning entities in watersheds across the state. CWA section 319-funded contracts typically pay the salaries of local watershed coordinators to manage and carry out projects. Local watershed coordinators develop relationships with watershed landowners and work to educate the public about how to protect and improve water quality. The local watershed coordinators help to organize and facilitate meetings and also oversee all project planning (including identifying funding sources), design, implementation and reporting within their watershed area. This geographically focused approach to local coordination is designed to reduce or eliminate redundancy in program activities. For example, in Utah's Upper Sevier Watershed, the local water coordinator participates in local conservation district meetings, supports the Upper Sevier Steering Committee activities, participates on the Sage Grouse Planning Committee, and serves as chairman of the Color County Cooperative Weed Management Area. By remaining involved with the active groups within the watershed, the coordinator can encourage cooperation. In fiscal year 2011, the local coordinator oversaw the completion of five projects, including removing an animal feeding operation from the riparian corridor, restoring streambanks, and improving irrigation efficiency to reduce pollutant-laden return flows. The coordinator managed numerous educational activities including producing a newsletter and holding a watershed tour, field day and workshops for local watershed groups.

West Virginia's legislature established the state's Stream Partners Program in 1996 as a cooperative effort of the state's Conservation Agency, Department of Environmental Protection (DEP) Division of Water and Waste Management, Department of Forestry, and Department of Natural Resources. The legislature appropriates \$100,000 annually from general revenue funds to be distributed by DEP as \$5,000 seed grants to organizations to enable them to implement watershed improvement projects. These grants are awarded with the approval of all four state agency directors. Also, the state provides CWA section 319 funds to support the West Virginia Watershed Network, an informal association of state and federal agencies and nonprofit groups committed to providing resources and support for watershed management across the state. As a result of these investments, West Virginia has built up a base of watershed groups and stakeholders capable of leading restoration efforts and providing matching funds for CWA section 319-funded implementation projects.

Illinois uses CWA section 319 funds and state funds appropriated to the Illinois Environmental Protection Agency (IL EPA) to develop and conduct a series of workshops designed to help state watershed groups learn how to create and implement effective watershed plans. For this effort, IL EPA selected to work through a partnership between the Illinois Lake Management Association and the Prairie Rivers Network – a well-established grassroots advocacy group with proven ability as an incubator of local watershed groups. This team crisscrossed the state holding workshops on many aspects of watershed planning. The workshops, held from February 2009 to March 2011, addressed a range of topics such as how to build partnerships, collect watershed data, secure funding and develop a third-party TMDL. The workshop topics were selected based on a 2008 survey of the needs of local watershed groups statewide conducted by the Prairie Rivers Network.

New York's Agricultural Environmental Management Program Helps Farmers Improve Water Quality

New York's Agricultural Environmental Management (AEM) Program (www.nys-soilandwater.org/aem) is an important statewide program that combines capacity building, education, coordination, technical assistance and cost-share funding to help farmers identify and address agricultural nonpoint source pollution. The AEM Program is a non-regulatory, incentive-based program that helps farmers develop and implement agricultural plans. The plans enable farmers to remain good stewards of the land, maintain the economic viability of the farm operation, and comply with federal, state and local regulations relating to water quality and other environmental concerns.

The program includes both state and local-level components. The New York State Department of Agriculture and Markets and the New York State Soil and Water Conservation Committee provide leadership at the state level, while soil and water conservation districts (SWCDs) provide local leadership. The flexibility of the AEM Program allows partners to address both statewide and specific local water quality needs. Originally launched in 1994, AEM was formalized into New York State law in August 2000.

AEM helps farmers install agricultural best management practices (BMPs) with funding support from the state's Nonpoint Source Abatement and Control Grant Program and U.S. Department of Agriculture (USDA) funding programs. As of 2010, the AEM program had more than 12,000 participating farms, with local programs established in 53 counties. AEM's competitive grants, funded through the State Environmental Protection Fund, have provided more than \$100 million to help farmers plan and implement over 6,000 conservation projects on more than 2,300 farms since 1994. Farmers have contributed over \$47 million toward state sponsored projects with millions more contributed through federal and local programs. In 2010, AEM helped to implement

AEM Helped to Restore Rudd Pond

Phosphorus and sediment runoff from agricultural activities and other nonpoint sources impaired the primary contact recreation use in Rudd Pond, a 70-acre waterbody in Dutchess County, New York (Figure 1). As a result, the New York State Department of Environmental Conservation (DEC) added the pond to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters. Between 1999 and 2004, the Dutchess County SWCD addressed the nutrient impairment through a three-tiered effort to reduce soil erosion and nutrient losses from three significant land uses in the watershed—agriculture, transportation and recreation.

The Dutchess County SWCD coordinated with the state's AEM Program to provide technical assistance and farm practice implementation guidance to the single significant farm operator in the watershed. The SWCD helped the farm operator develop a nutrient management plan and implement conservation tillage practices, which reduced soil erosion and nutrient runoff by limiting soil disturbance. The SWCD also worked with the farm operator to integrate improvements in crop residue management, thereby further reducing soil disturbance and nutrient loss. The SWCD worked with state park, town and county officials to adopt improved methods of recreational trail and road drainage ditch management to reduce sediment loss from recreational areas and roads surrounding the pond.

The SWCD's training and outreach activities resulted in increased BMP implementation, which mitigated soil erosion/sedimentation and nutrient loss from the land surrounding Rudd Pond. Annual water quality samples collected from 2004 through 2009 showed that pond's phosphorus levels met water quality standards; as a result, DEC removed Rudd Pond from the CWA section 303(d) list of impaired waters in 2010. For more information about the restoration of Rudd Pond, see http://water.epa.gov/polwaste/nps/success319/ny_rudd.cfm.



Figure 1. The eastern shore of Rudd Pond is in New York's Taconic State Park.

over \$10 million in projects, with an unprecedented direct farmer contribution of over \$7 million. State AEM funding also assisted with leveraging more than \$65 million in USDA conservation program funds. In total, more than 1,000 conservation projects were implemented to protect water quality on farms in 2010.

The primary goal of AEM is to protect and enhance the environment while maintaining the viability of agriculture in New York State. AEM also strives to document environmental stewardship activities that farmers have already undertaken; provide “one-stop-shopping” service to farmers to help them identify, apply for and combine various local, state and federal assistance and incentive programs; implement additional BMPs on farms consistent with the resources of each individual farm; and, among other goals, increase the awareness of non-farm community members of how farmers are already working to protect natural resources.

AEM in Action

To participate in the AEM program, a farmer must complete a five tier process. Under Tier I, a short questionnaire surveys the farmer’s current activities and future plans and begins to identify potential environmental concerns. Tier II involves completing worksheets that document current environmental stewardship while identifying and prioritizing environmental concerns. Tier III involves developing a conservation plan that is directly tailored toward the goals for the individual farm. This plan is mutually developed by the AEM coordinator, the farmer and several members of the cooperating agency staff. Under Tier IV, agricultural agencies and consultants provide the farmer with technical, educational and financial assistance to implement BMPs on the farm, using the USDA Natural Resources Conservation Service standards and guidance from professional engineers. The last tier includes ongoing evaluations to ensure that AEM helps protect both the environment and the viability of farm businesses.

If a potential environmental concern is identified through the AEM assessment process, farmers can then take steps to plan for, and implement, an appropriate course of action through the AEM approach, and all actions can remain confidential. The farmer is always the ultimate decision-maker, in cooperation with members of local AEM teams and qualified private consultants which help to ensure that farm business objectives are met while also achieving local, state and federal environmental and water quality goals.

Michigan Farmer Verification Program Encourages Stewardship

Michigan’s Agriculture Environmental Assurance Program (MAEAP) is one example of an innovative and proactive program that helps farms of all sizes and all commodities prevent or minimize agricultural pollution risks using a non-regulatory approach. This collaborative partnership, between the Michigan Department of Agriculture and Rural Development (MDARD), Michigan’s Environmental Assurance Advisory Council and the agricultural community, reduces farmers’ legal and environmental risks through education, the completion of a farm-specific risk assessment and associated practice changes, and an on-site verification that ensures that the farmer has implemented environmentally sound practices.

Program Emphasizes Collaboration and Cooperation

MAEAP (www.maeap.org) was first developed in 1997 by a coalition of farmers, commodity groups, state and federal agencies, universities, and conservation and environmental groups to provide a venue for farmers to become better educated about management options that could help protect natural resources, receive assistance to make needed changes, and be recognized for their efforts. Representatives from these groups are still involved in MAEAP’s work, serving on committees and reaching out to farmers. In 2011, Public Acts 1 and 2 codified MAEAP into law, providing incentives (see www.maeap.org/uploads/files/Pubs/MAEAP-Legislative-Postcard-2011.pdf) and a standardized framework for the program.

To become MAEAP verified, farmers must complete three comprehensive steps: (1) attending an educational seminar; (2) conducting a thorough, confidential on-farm risk assessment and

developing and implementing an action plan addressing potential environmental risks and (3) a site inspection completed by MDARD. The program encompasses three systems designed to help producers evaluate the environmental risks of their operation. Each system – farmstead, livestock, and cropping – examines a different aspect of a farm, as each has a different environmental impact.

- The Farmstead System addresses environmental risks of the entire farmstead, from safe fuel handling to the proper storage of fertilizers and pesticides. It focuses on protecting surface and groundwater. It is the one MAEAP system which can apply to every size and type of operation.
- The Livestock System primarily focuses on environmental issues related to livestock activities, including manure handling, storage and field application, as well as conservation practices to protect water quality and prevent soil erosion. The system concentrates on conservation practices, equipment, structures and activities associated with animal production and nutrient management.
- The Cropping System focuses on environmental issues related to cropping activities, such as irrigation and water use, soil conservation, and nutrient and pest management. The system has components focused on environmental issues related to manage diverse commodities.

By participating in all three systems, producers can comprehensively evaluate their entire farming operation for potential environmental risks.

Once the farmer completes the first two steps, a MDARD staff member inspects the farm to verify that it meets MAEAP program requirements related to applicable state and federal environmental regulations and Michigan Right to Farm guidelines, and that it adheres to an action plan. When successfully completed, the producer receives a certificate of environmental assurance and can display a MAEAP sign signifying that MAEAP partners recognize the farm is environmentally assured (Figures 1 and 2). To remain a MAEAP-verified farm, MDARD inspections must be conducted every three years and action steps must be followed to ensure compliance with water quality standards.



Figure 1. Tuckers Farm proudly displays its MAEAP-verified sign at a roadside stand, assuring potential customers that the farm uses environmentally sound practices.



Figure 2. A sign at the Lee family's farm in Shiawassee County indicates that the farm is verified for all three agriculture systems—cropping, livestock and farmstead.

MAEAP Continues to Grow

Every year, about 5,000 Michigan farmers attend educational programs geared toward environmental stewardship and MAEAP verification. More than 100 local coordinators and technical service providers (e.g., staff from Michigan State University Extension, the local soil conservation districts and the U.S. Department of Agriculture Natural Resources Conservation Service offices) are available to assist farmers as they move through the MAEAP process toward verification. More than 10,000 Michigan farms have started the verification process, with more than 1,100 farms verified to date. Annually, more than \$1.2 million is invested for best management practice implementation by farmers working toward MAEAP verification. MDARD

estimates that MAEAP helps to reduce the phosphorus loads reaching streams by over 340,450 pounds annually.

“Michigan is leading the way nationwide in effective stewardship practices with the voluntary, incentive-based MAEAP program,” said recently appointed MDARD Director Jamie Clover Adams. “This continued effort shows agricultural producers’ long term commitment to protecting the environment while maintaining economic success.”

[For more information, contact Jan Wilford, MAEAP Program Manager, Michigan Department of Agriculture and Rural Development, Phone: 517-241-4730; Email: wilfordj9@michigan.gov]

Emphasizing Basin-wide Planning in Kansas Strengthens Efforts to Reduce Agricultural Nonpoint Source Pollution

Kansas has improved its nonpoint source program by implementing a cross-agency framework that offers opportunities for the public and stakeholders to participate in decisions about protection and restoration at the watershed level. Launched in 2004, Kansas’ Watershed Restoration and Protection Strategy (WRAPS) Program (www.kswraps.org/watershed-plan) engages stakeholders within a particular watershed in a process to identify watershed restoration and protection needs and opportunities, establish management goals for the watershed community, create a cost-effective action plan to achieve goals and implement the action plan.

To begin developing a WRAPS group for a particular watershed, members of a WRAPS Leadership Team—a local core planning group—help guide the development of the WRAPS and ensure broad public participation. Such teams are typically comprised of volunteers and range in size from five to twelve members. Team membership typically includes a mix of watershed stakeholders, project cooperators and agency staff.

A local organization, office, or agency often serves as a host entity to provide administrative support and coordination for the development of a WRAPS group. Examples of host entities include county conservation districts, local governments, and others.

The local WRAPS Leadership Team guides participants through four phases of growth:

- Phase 1 - Development: Recruit stakeholders, determine interest, and document stakeholder decisions.
- Phase 2 - Assessment: Review watershed conditions and trends, develop expectations of the watershed and management measures in use, identify restoration and protection needs, and perform watershed modeling.
- Phase 3 - Planning: Establish goals, identify actions to achieve goals, develop cost estimates, select strategy, and identify stakeholder implementation strategies.
- Phase 4 - Implementation: Secure resources needed to execute plan, take actions (e.g., install best management practices), monitor and document progress, and revise plan as needed.

WRAPS represents a shift to a more citizen stakeholder-based approach that provides funds, guidance and technical assistance to local stakeholders to address watershed problems. Through WRAPS, Kansas has made great strides in addressing nutrient and other types of nonpoint source pollution. In the winter of 2008, Kansas drafted WRAPS guidance to help watershed project coordinators develop projects to write or re-write watershed plans to comply with the U.S. Environmental Protection Agency’s (EPA’s) nine-element watershed plan requirements (see box, next page), which increases eligibility for federal nonpoint source pollution control funding under the Clean Water Act (CWA) section 319 program. In the summer of 2009, Kansas hosted multiple workshops to educate watershed project coordinators on the planning requirements and made compliance a requirement to receive future funding through the WRAPS program. As of early 2012, 18 of the 25 active WRAPS groups had Kansas Department of Health and Environment-approved nine-element plans in place.

To guide the WRAPS program at the state level, a multi-agency WRAPS work group meets bimonthly to foster program implementation partnerships, provide administrative guidance, and to align program funding with state water quality priorities (such as implementation of the Kansas Surface Water Nutrient Reduction Plan). The WRAPS work group is made up of representatives from 13 state and federal agencies. Representatives of each member agency signed a Memorandum of Understanding to assure that financial, programmatic and technical assistance resources from their respective agencies are directed to priority water resource needs.

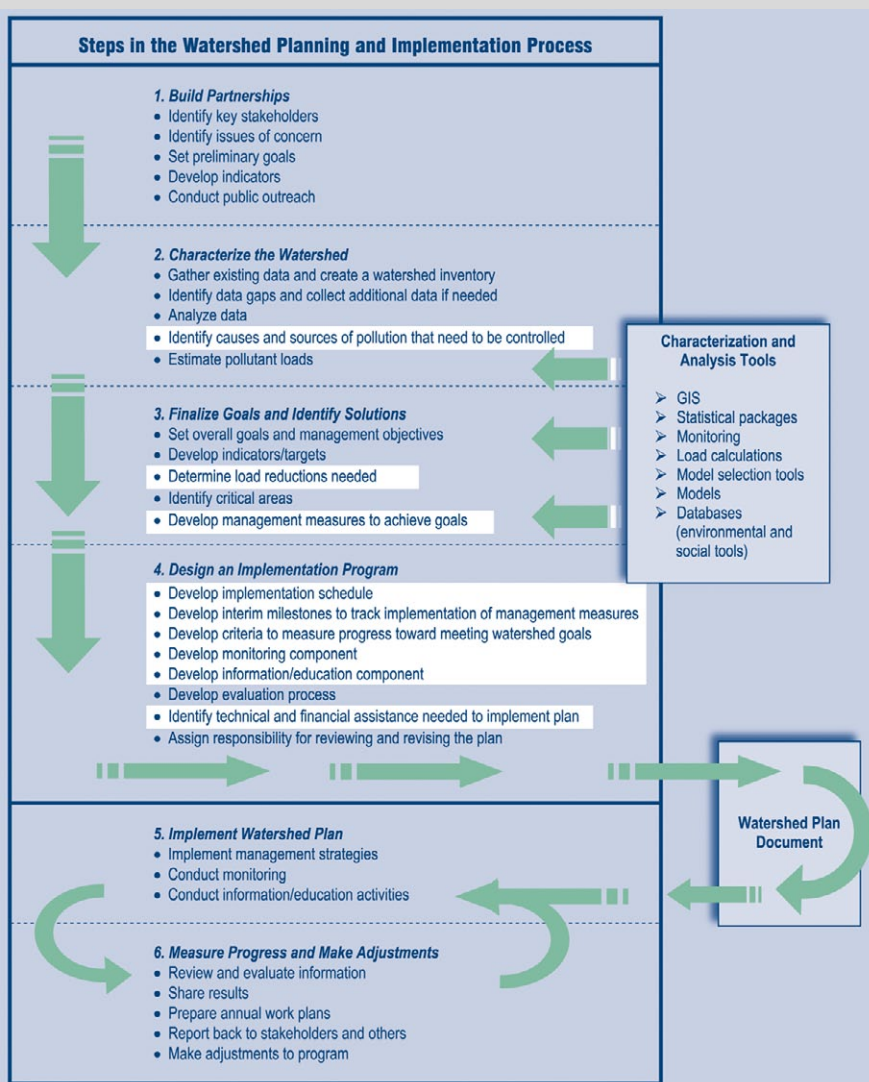
The WRAPS work group also reviews and recommends grant applications for funding. Applicants are given a funding cap based on state priority, local interest and past project performance (referred to as a Score Matrix). Based on the Score Matrix, the highest priority watershed projects are eligible for the most financial assistance. The WRAPS program grew from six pilot watershed projects in 2006 to 43 in 2010. The current estimated financial need to implement all of these nine-element watershed plans is over \$7 million annually (more than twice the FY11 CWA section 319 allocation for Kansas). KDHE established a \$2.6 million KS WRAPS fund for fiscal year 2012, using \$1.9 million of its FY2011 CWA section 319 grant funds and approximately \$700,000 of the fiscal year 2012 appropriations from the Kansas State Water Plan Fund. The WRAPS fund will continue to primarily support current project activities; therefore, KDHE anticipates limited opportunities to initiate new WRAPS development activities in the near future.

Developing and Implementing Nine-Element Watershed Plans

Beginning in 2004, EPA has required that watershed plans must contain nine key elements for any projects within that watershed to be eligible for CWA section 319 funds (see the nine elements highlighted in white in the adjacent "Steps in Watershed Planning and Implementation Process" flow chart). Moreover, EPA strongly recommends that any watershed plan intended to address water quality impairments should include these elements.

In many cases, state and local groups have already developed watershed plans for their rivers, lakes, streams, wetlands, estuaries and coastal waters. If these existing plans contain the nine elements, the state can use them to support CWA section 319 project work plans. If the existing watershed plans do not address the nine elements, these plans can be used as a starting point for producing updated plans that do contain the nine elements.

For more information on watershed planning, see EPA's *Handbook for Developing Watershed Plans to Restore and Protect Our Waters*, published in March 2008 (www.epa.gov/nps/watershed_handbook).



Kansas WRAPS Improves State Nonpoint Source Program

The multi-agency WRAPS work group structure has resulted in greater collaboration among agencies in addressing water quality issues throughout the state. For example, the WRAPS concept and the emphasis on developing and implementing watershed-based plans has been woven into the strategic plans of other state agencies, thus providing a single unified and stable voice throughout the state as water quality issues and needs arise.

The success of the WRAPS program has also prompted Kansas to develop new tools to support implementation of the nine-element watershed plan approach. For example, the state developed an online grant application and tracking system that revolves around the nine key elements of a watershed plan and enables a lateral transfer of information from the watershed-based plan to the WRAPS application.

Kansas Water Plan Funds

The Kansas State Water Plan Fund was established in 1989 to implement programs and projects that address issues identified in the *Kansas Water Plan*. The fund typically generates around \$20 to \$21 million dollars annually from a combination of sources including the State General Fund, Economic Development Initiative Fund, Clean Drinking Water Fee Fund, pollution fines, and fees for water use, fertilizer sales and pesticide registration. In many instances, State Water Plan funds are used in combination with other funding sources to support program activities and projects.

The WRAPS program has also resulted in the leveraging of existing resources toward high priority watersheds and the establishment of a foundation for creating new state resources. In fiscal year 2011, approximately \$550,000 in Kansas State Water Plan funds (for more information, see box) were allocated for WRAPS projects and additional cost-share in high-priority WRAPS watersheds. Also, projects in WRAPS watersheds are given priority as part of the ranking criteria when applying for funds from the Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program (EQIP). The Kansas nonpoint source program has recently entered into a memorandum of agreement with NRCS, the Kansas Department of Agriculture and other partners to provide financial resources aimed at funding new positions to meet increas-

ing landowner demand for technical and design assistance. WRAPS technical assistance needs are estimated annually and are considered in the annual workload analysis conducted by NRCS. The new resources resulting from the agreement have already resulted in a faster turnaround time in best management practice (BMP) design and an increase in the number of buffer cost-share applications.

WRAPS Program Yielding Tangible Successes

Collaboration between WRAPS projects and local partners is also paying off through measureable water quality improvements. Several WRAPS-related watershed successes were recently highlighted on EPA's Nonpoint Source Success Stories website (www.epa.gov/nps/success).

First, in the upper Fall River watershed (Figure 1), nonpoint source pollution from grazing affected water quality, prompting KDHE to add the river to the state's 1998 CWA section 303(d) list of impaired waters for low levels of dissolved oxygen (DO). In cooperation with the local Kansas WRAPS Upper Fall River Project, numerous project partners in Greenwood County implemented several agricultural BMPs throughout the watershed. River monitoring data collected between 2000 and 2011 show that waterbodies in the upper Fall River watershed now meet the DO criteria required to protect the designated use for aquatic life support. As a result, KDHE removed one segment (composed of nearly 144 miles of streams!) in the upper Fall River watershed from the 2010 list of impaired waters for the DO impairment. The project was supported by CWA section 319 funds, specifically a 2003 Upper Fall River WRAPS Development grant (\$34,950), a 2004 Upper Fall River WRAPS Assessment and Planning grant (\$49,850) and two Upper Fall River WRAPS Implementation grants in 2006 and 2007 (totaling \$119,200). Additional support was provided by the Kansas Department of Agriculture Division of Conservation (KDADOC), NRCS and local landowners.

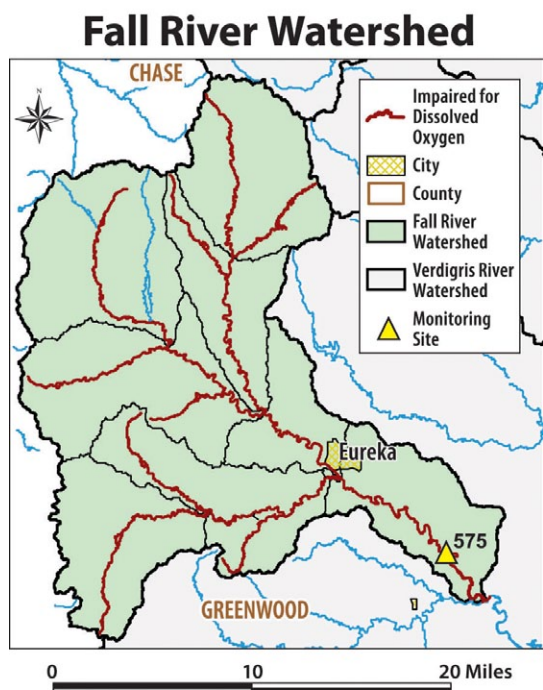


Figure 1. Approximately 144 miles of previously impaired waters in southeastern Kansas Fall River watershed were restored, thanks to the WRAPS program.

Second, in southeastern Kansas' Toronto Reservoir watershed, nonpoint source pollution from poor pasture management and livestock negatively affected water quality in approximately 19 miles of Walnut Creek and 11.7 miles of West Creek. As a result, KDHE added both creeks to the state's CWA section 303(d) list of impaired waters in 1998 for DO. In 2006, several organizations worked collaboratively with local landowners project partners to develop the Toronto WRAPS watershed plan, which aimed to address both the DO impairments in Walnut and West creeks and the nutrient, DO and siltation impairments found downstream in the Toronto Reservoir. The Toronto WRAPS identified a number of measures to prevent phosphorus contributions (a

suspected cause of the DO impairment) from livestock, cropland, rangeland and erosion of streambanks. Partners implemented numerous agricultural BMPs (Figure 2). Water quality monitoring data collected since 2002 show that both creeks now meet the water quality standard for DO. As a result, KDHE removed both creek segments from the state's 2010 list of impaired waters for DO. The project was supported by CWA section 319 funds, specifically a 2006 Toronto WRAPS Development grant (\$31,041), a 2007 Toronto WRAPS Assessment and Planning grant (\$112,076), and two Toronto WRAPS Implementation grants in 2009 and 2010 (totaling \$134,318). As in the Fall River restoration effort, additional support was provided by KDADOC, NRCS and local landowners.

Third, in the Kansas-Lower Republican River watershed, bacteria in runoff from cattle grazing areas caused Clarks Creek to violate water quality standards. As a result, the KDHE added Clarks Creek to its CWA section 303(d) list of impaired waters in 1998. In 2006 the Clarks Creek WRAPS Stakeholder Leadership Team partnered with staff from the Geary and Morris county conservation district offices to help landowners implement BMPs to reduce bacteria in runoff (Figure 3). The partners used outreach and education efforts, coupled with cost-share incentives, to encourage participation. Water quality improved as a result. Monitoring in 2008 indicated that bacteria levels in Clarks Creek had declined to acceptable levels, allowing KDHE to remove the creek from Kansas' list of impaired waters in 2010. Funding for these restoration efforts included an EPA education grant of \$8,700 and a total of \$163,960 in EPA CWA section 319 funding. The State Conservation Commission provided Kansas Water Plan Funds, and the NRCS EQIP and Conservation Reserve Program contributed additional funding for BMP implementation. The stakeholders completed the nine-element watershed plan for Clarks Creek in 2012 (see www.kswraps.org/files/attachments/clarkscreek_plansummary.pdf); since the creek has fully supported its designated uses since 2010, the plan is focused on protecting water quality.

[For more information about the Kansas WRAPS program, contact the Kansas Department of Health & Environment, Attn: WRAPS, 1000 SW Jackson, Suite 420, Topeka, KS 66612. Phone: 785-296-4195; Email: nps@kdhe.state.ks.us]

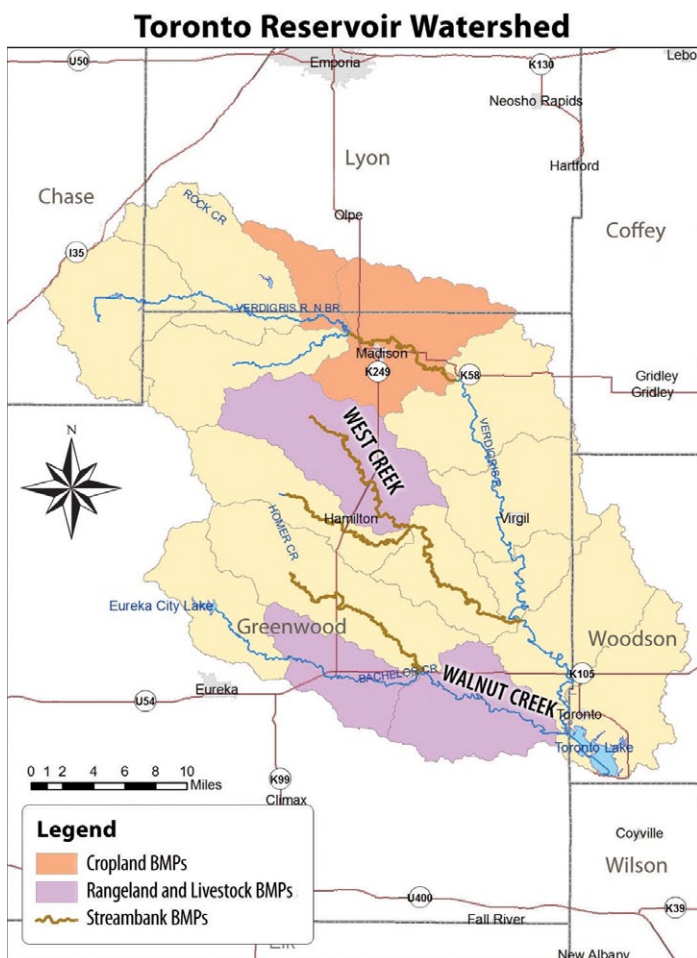


Figure 2. Landowners implemented numerous BMPs in the Walnut Creek and West Creek watersheds.



Figure 3. A Kansas farmer installed this alternative water supply tank to keep the cattle and their waste out of Clarks Creek.

Notes on the National Scene

USDA Advances Water Quality Conservation Nationwide

In May 2012, the U.S. Department of Agriculture (USDA) launched a new National Water Quality Initiative committed to improving between one and seven impaired watersheds in every U.S. state and territory—for a total of 157 watersheds nationwide. For fiscal year 2012, the USDA Natural Resources Conservation Service (NRCS) will make available at least \$33 million in financial assistance to farmers, ranchers and forest landowners in these 157 watersheds to implement conservation practices to improve water quality.

“The National Water Quality Initiative signifies a bold step by USDA to improve water quality in some very challenging watersheds,” USDA Secretary Tom Vilsack said. “American farmers are good stewards of the environment, and this initiative provides them with additional tools to protect and improve fish and wildlife habitat and water quality.”

Using funds from the Environmental Quality Incentives Program (EQIP), NRCS will provide financial and technical assistance to producers for implementing conservation practices such as cover crops, nutrient management, filter strips and terraces. In FY2012, five percent of EQIP funds were set aside for the National Water Quality Initiative. To deliver the initiative, NRCS State Technical Committees worked in collaboration with local partners and state conservation and water quality agencies to identify watersheds where on-farm investments have the best chance to improve water quality. NRCS will work with the U.S. Environmental Protection Agency and other federal and state partners to conduct water quality monitoring in participating watersheds, assess results, and adapt and improve the program over the long term.

The initiative builds on ongoing efforts in the Mississippi River Basin, Great Lakes, Chesapeake Bay and other landscape conservation initiatives underway across the United States. Key long-term goals for the new program include removing impaired waters from Clean Water Act section 303(d) list, preventing threatened waters from becoming impaired, and reducing pollutant loading to all surface waters. For more program details, including a national map showing the 157 watersheds selected for funding in fiscal year 2012, see <http://go.usa.gov/Vjl>.

Protecting Water Quality in Agricultural Watersheds: Lessons Learned from Conservation Effects Assessment Project

[Article excerpted and adapted with permission from issue number 137 of NWQEP NOTES (www.bae.ncsu.edu/programs/extension/wqg/issues/Default.htm), published by the North Carolina State University Water Quality Group.]

The U.S. Department of Agriculture (USDA) created the Conservation Effects Assessment Project (CEAP) in 2003 to help the Department better understand and optimize environmental benefits of conservation practices and programs. Cooperators involved in CEAP include the USDA Natural Resources Conservation Service (NRCS), Agricultural Research Service, National Institute of Food and Agriculture (NIFA), and Farm Service Agency. As part of CEAP, NIFA and NRCS funded 13 watershed-scale agricultural projects (2004 to 2006) focusing on relating water quality change to conservation practice implementation on crop and pasture land. The results of these studies and a synthesis of lessons learned were recently published online and in book form (see links at end of article).

NIFA-CEAP Watersheds: An Introduction

Many plot- and field-scale research studies have demonstrated that agricultural conservation practices reduce nonpoint source pollution. CEAP was designed to take the next step and generate information about the effects of multiple conservation practices at the watershed scale. The 13 projects selected for NIFA-CEAP (Figure 1) were retrospective studies; to be funded, they were required to have smaller-scale (8- to 12-digit hydrologic unit code) watersheds, a long-term (more than five years) record of water quality data, and georeferenced land use and conservation practice

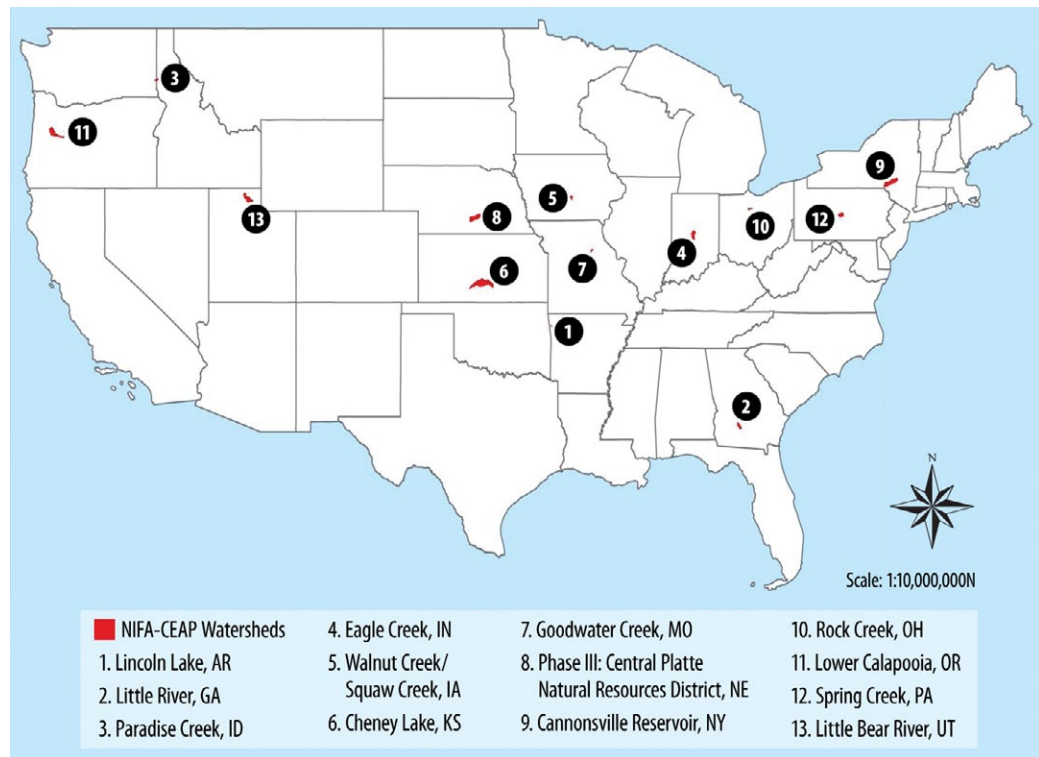


Figure 1. National Institute of Food and Agriculture-Conservation Effects Assessment Project Locations

information. In addition, each project watershed was expected to use socio-economic analysis to better understand the factors that influenced adoption of practices by farmers. The 13 projects selected for funding represent diverse agroecological environments across the United States. Each project was expected to answer the following four questions:

1. How do the timing, location, and suite of implemented agricultural conservation practices affect water quality at the watershed scale?
2. How do conservation practices implemented in a watershed interact with respect to their effects on water quality?
3. What social and economic factors facilitate or impede implementation of conservation practices?
4. What is the optimal set of conservation practices and their optimal placement within the watershed needed to achieve water quality goals? (Model development and use were expected to address this question.)

Learning from NIFA-CEAP: A Synthesis of Projects

In 2007 NIFA and NRCS funded a synthesis of the 13 NIFA-CEAP watersheds studies. Led by North Carolina State University (NCSU), in conjunction with four other universities and one consulting firm, the project partners relied on information from publications, presentations, fact sheets and key informant questionnaires to identify common themes and lessons learned from across the 13 watersheds. Synthesized lessons learned were expected to focus on three questions:

1. What are the key findings from projects that addressed the original four CEAP questions? How do these findings differ by location and agricultural production activities, social or economic factors? What patterns emerged from this effort?
2. What combinations of practices work to protect or improve water quality in different geographic settings?
3. What outreach techniques were most effective at communicating information for different audiences, achieving adoption of practices, and improving management and/or maintenance of practices in different geographic settings?

Of the many lessons identified and documented through synthesis of the 13 NIFA-CEAP studies, the synthesis report identifies the following 15 lessons as the most important:

1. Conservation planning must be done at the watershed scale with sufficient water quality data and may require modeling information.
2. Conservation efforts must be directed toward a common goal; identify and agree upon the pollutant(s) of concern and the sources of the pollutants before taking any actions.
3. Critical source areas must be identified and conservation practice implementation prioritized in those areas of the landscape that deliver a disproportionate amount of pollution.
4. Understand watershed farmers' attitudes toward agriculture and conservation practices to promote adoption; also, identify potential "downstream" partners/stakeholders' attitudes.
5. Post-implementation maintenance and sustained use of conservation practices must be ensured.
6. Technical assistance to farmers is most effective when delivered by a trusted local contact, including peer farmers, and is very people-intensive.
7. Reduced funding has eroded the ability of NRCS, extension, and soil and water conservation districts to deliver effective programming.
8. Economic incentives are often required if farmers are to adopt conservation practices that are not obviously profitable or compatible with current farming systems.
9. Conservation practice adoption is a multidimensional choice and, although economics are exceptionally important, many other factors affect the decision-making process.
10. Most conservation implementation projects should NOT conduct water quality monitoring in an attempt to link water quality change to practice implementation.
11. For projects that do conduct water quality monitoring, establish monitoring systems that are designed to specifically evaluate response to treatment and ensure such projects include necessary resources and expertise.
12. To link water quality response to land treatment changes, conservation practices must be monitored as intensively as water quality, and at the same temporal and spatial scales.
13. Knowledge of land use, management, and conservation practices is absolutely essential to understand effectiveness of conservation programs. Such data are often unavailable due to confidentiality restrictions or are incomplete in nature.
14. Watershed models are very complex. Select the correct model(s) and modify if necessary. Ensure sufficiently trained personnel, well-calibrated and validated models, and adequate water quality and land treatment data, including spatial and temporal changes of these data.
15. The scientific basis of modeling is still evolving. There are many deficiencies in our knowledge and in existing modeling tools for representation of critical natural processes and key management actions at the watershed scale. In general, the complexity and non-linear nature of watershed processes overwhelm the capacity of existing modeling tools to reveal the water quality impacts of conservation practices.

A Look at Nutrient Pollution Control in NIFA-CEAP Watersheds

The importance of controlling agricultural pollutants has rarely been so critical. Nutrient over-enrichment is degrading estuaries (e.g., Chesapeake Bay, Albermarle-Pamlico Sound), bays (e.g., Tampa Bay), and larger coastal areas (e.g., the Gulf of Mexico). In addition, many smaller lakes and reservoirs are also affected such that drinking water processing is more expensive. Lessons from NIFA-CEAP suggest that controlling nutrients will be more difficult than controlling sediment for several major reasons:

1. Farmers tend to abandon and discontinue management practices (such as nutrient management) more frequently than structural practices (such as terraces).

2. Farmers more frequently implement conservation practices to control pollutants they can see. For example, farmers can see soil losses and have great impetus to control soil erosion either through conservation tillage or terraces and grassed waterways.
3. Farmers often view nutrient applications as a way to avoid risk.
4. Conservation practices may have antagonistic outcomes. Examples include grassed waterways and terraces or conservation tillage. Several NIFA-CEAP projects indicated terraces and grassed waterways reduced soil loss but increased nitrate leaching. Another watershed project showed that removal of terraces to accommodate larger no-till machinery increased erosion.
5. Farmers have been installing drain tiles throughout the Midwest and even the south at unprecedented rates. Drain tiles change hydrology, increase the contributing source area, and provide a short circuit for nutrients, including phosphorus, to move into streams.
6. Climate change models and two NIFA-CEAP projects suggest there will be increased fall rainfall which might increase nutrient loading due to greater runoff and leaching.

NIFA-CEAP Study Information

“We learned many lessons through the synthesis of the NIFA-CEAP watersheds,” explained Dr. Deanna Osmond, North Carolina State University Professor of Soil Science and lead author of the study. “Prior watershed-scale projects, such as the Rural Clean Water Program or USEPA section 319 National Nonpoint Source Monitoring Program have come to many of the same conclusions as the lessons developed from NIFA-CEAP. Unfortunately, these lessons were RARELY incorporated into state and federal conservation programs. With dwindling federal and state

resources, it is imperative that these and past lessons learned be incorporated into current agricultural conservation programs, policies, and agency protocol if water resources are to be improved and protected. Otherwise, to quote George Santayana, ‘Those who cannot remember the past are condemned to repeat it,’ and, more importantly, we will not protect our natural resources.”

Detailed information about the synthesis study is available through the Soil and Water Conservation Society’s book *How to Build Better Agricultural Conservation Programs to Protect Water Quality: The NIFA-CEAP Experience* (see www.swcs.org/en/publications/building_better_agricultural_conservation_programs).

Additional resources about the NIFA-CEAP Synthesis are available online, and can be accessed through the NRCS *Synthesis Report: CEAP-NIFA Competitive Grant Watershed Studies* page at www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?&cid=stelprdb1047821. Available resources include:

- A two page summary highlighting the top findings and lessons learned from the synthesis study.
- A series of six fact sheets:
 1. Insights for Developing Successful Agricultural Watershed Projects
 2. Conservation Practice Implementation and Adoption to Protect Water Quality
 3. How Farmers and Ranchers Make Decisions on Conservation Practices
 4. Effective Education to Promote Conservation Practice Adoption
 5. Water Quality Monitoring for the Assessment of Watershed Projects, and
 6. Simulation Modeling for the Watershed-scale Assessment of Conservation Practices.

[For more information, contact Deanna Osmond, North Carolina State University, Department of Soil Science, P.O. Box 7619, Raleigh, North Carolina 27695-7619. Phone: 919-515-7303; Email: deanna_osmond@ncsu.edu.]

NIFA-CEAP Webcast Available

In May 2012, EPA hosted a free webcast titled “CEAP Watershed Synthesis: Lessons Learned.” Presenters included Roberta Parry, Senior Agricultural Advisor, EPA’s Office of Water; Lisa Duriancik, Coordinator, Conservation Effects Assessment Project, USDA Natural Resources Conservation Service, Resource Assessment Division; and Deanna Osmond, Professor and Department Extension Leader, Soil Science Department, NC State University. The archived version is available for viewing at www.epa.gov/watershedwebcasts.

Healthy Watersheds Initiative Action Plan Encourages Implementation

Local, state and federal governments currently invest billions of dollars annually to treat polluted water and restore degraded waterways. The U.S. Environmental Protection Agency's (EPA's) Healthy Watersheds Initiative (HWI), launched in 2009, has been encouraging local and state agencies to be proactive and place a stronger emphasis on protecting their remaining healthy watersheds as a way to save money and the environment. From 2009 to 2011, EPA and state and federal partners collaborated to develop a formal structure for the HWI and, in October 2011, released their HWI National Framework and Action Plan (www.epa.gov/healthywatersheds) to carry the program forward. Using the 2011 HWI resource as a guide, EPA is now working with states and other partners to identify healthy watersheds at the state scale and develop and implement comprehensive state "healthy watersheds" strategies that set priorities for protection and restoration.

The HWI represents a new construct for how EPA promotes the protection and restoration of chemical, physical and biological integrity of the nation's waters and aquatic ecosystems. "Historically, aquatic ecosystems protection at the state levels has been fragmented with different state agencies managing different components of the aquatic ecosystem (e.g., fish and wildlife, natural heritage, water quality)," explains EPA's Laura Gabanski. "HWI emphasizes protection of aquatic ecosystems as whole systems through increased coordination across agencies and with other partners." This approach acknowledges that aquatic ecosystems are dynamic and interconnected in the landscape (see box). Healthy, functioning watersheds provide the building blocks that anchor water quality restoration efforts.

Components of Healthy Watersheds Assessments

The systems approach to healthy watershed assessment and protection is based on an integrated evaluation of landscape condition, habitat, hydrology, geomorphology, water quality and biological condition. Ecological processes and natural disturbance regimes are addressed in the context of these components, which are briefly described below. For more information, refer to Chapter 2 of *Identifying and Protecting Healthy Watersheds: Concepts, Assessments, and Management Approaches* (Technical Document), available for download at http://water.epa.gov/polwaste/nps/watershed/hw_techdocument.cfm.

- **Landscape Condition.** Includes patterns of natural land cover, natural disturbance regimes, lateral and longitudinal connectivity of the aquatic environment, and continuity of landscape processes.
- **Habitat.** Includes aquatic, wetland, riparian, floodplain, lake and shoreline habitat. Considers hydrologic connectivity of habitat.
- **Hydrologic Regime.** Includes the quantity and timing of flow or water level fluctuation. Hydrology is highly dependent on the natural flow (including natural disturbance regimes such as fluctuating flow levels) and hydrologic connectivity, including surface and groundwater interactions.
- **Geomorphology.** Includes stream channels with natural geomorphic dynamics.
- **Water Quality.** Includes chemical and physical characteristics of water.
- **Biological Condition.** Includes biological communities' diversity, composition, relative abundance, trophic structure, condition and sensitive species.

HWI Action Plan

The Action Plan will guide EPA and its partners' efforts to protect and restore watersheds and aquatic ecosystems. The plan describes the HWI—including its vision, guiding principles, goals and objectives—and presents an implementation framework for actions by EPA headquarters, EPA regions and states. The HWI Action Plan is organized around three main goals:

Goal 1. Identify, protect and maintain a network of healthy watersheds and supportive green infrastructure habitat networks across the United States.

Goal 2. Integrate protection of healthy watersheds into EPA programs.

Goal 3. Increase awareness and understanding of the importance of protecting our remaining healthy watersheds and the range of management actions needed to protect and avoid adverse impacts to those healthy watersheds.

To achieve these goals, the plan outlines a timeline for a series of suggested partner actions. For example, under goal 1, states are asked to begin inventorying healthy watersheds using integrated assessments developed through collaboration across state agencies and with other partners (beginning in 2011). Under goal 2, EPA's regional offices are asked to implement demonstration projects showing how to incorporate healthy watersheds protection into EPA programs by 2014. Under goal 3, EPA headquarters has prepared a fact sheet and white paper on the economic benefits of protecting healthy watersheds. The fact sheet is available for download at http://water.epa.gov/polwaste/nps/watershed/ecoben_factsheet.cfm. EPA also offers a periodic newsletter to share information about the HWI (Figure 1). Many additional actions are already underway or are planned for the near future. For a complete list of roles and responsibilities, refer to the Action Plan.

Applying the HWI

Some states are already adopting a "healthy watersheds" approach. Virginia, for example, developed the Virginia Watershed Integrity Model as part of the Virginia Conservation Lands Needs Assessment. An image generated by the model shows the relative value of land as it contributes to watershed integrity (Figure 2). The model

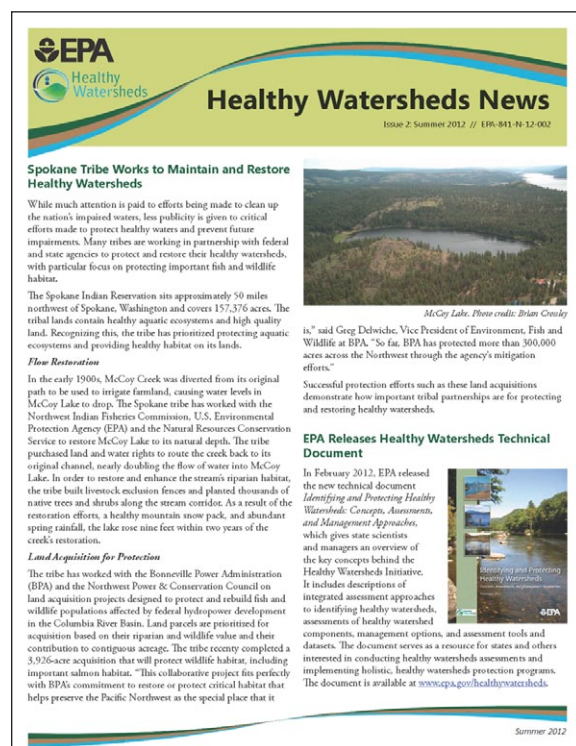


Figure 1. EPA's Healthy Watersheds News (<http://water.epa.gov/polwaste/nps/watershed/news.cfm>) reports on the successes of the HWI program and highlights Healthy Watersheds programs in selected states and regional aquatic ecosystems.

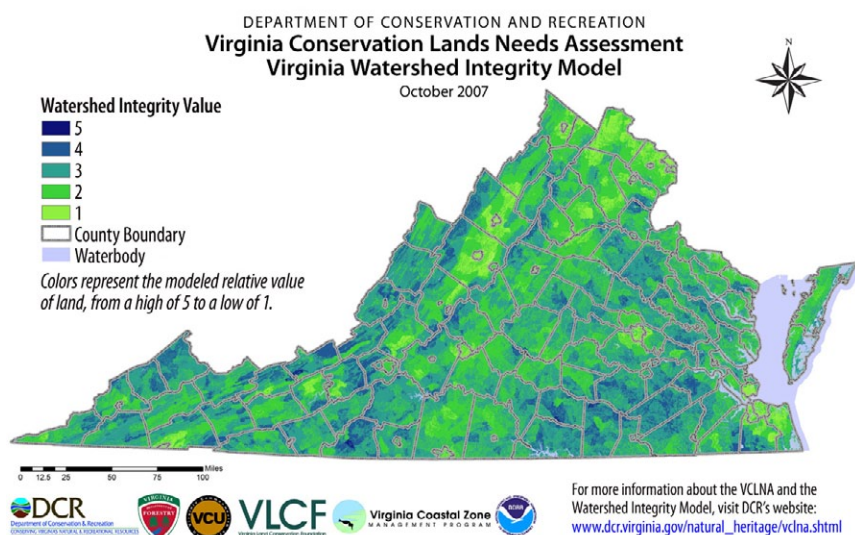


Figure 2. Virginia's Watershed Integrity Model generated an image of scores representing the relative value of land areas as they contribute to water quality or watershed integrity. Modeled values range from a high of 5 (dark blue) to a low of 1 (light green).

represents important terrestrial and aquatic features that should be conserved for watershed integrity based on the best available data. The model serves as part of a larger statewide green infrastructure plan, which aims to identify Virginia's conservation priorities and facilitate an integrated approach to planning and development. Also, as part of its Healthy Waters initiative, Virginia used a stream ecological integrity assessment known as the INteractive STream Assessment Resource (INSTAR) to identify healthy streams that need increased protection to prevent them from becoming compromised. For information about Virginia's approaches, see www.dcr.virginia.gov/natural_heritage/vclnawater.shtml and www.dcr.virginia.gov/stormwater_management/healthy_waters.

Similarly, Minnesota has developed a user-friendly, Web-based Watershed Assessment Tool that provides an overview of the ecological health of the state's 81 major watersheds (www.dnr.state.mn.us/watershed_tool). The tool uses five components to describe watershed health: hydrology, geomorphology, biology, connectivity and water quality. The combined mean scores (the average of the five component mean scores) closely reflect land uses throughout Minnesota—lower scores are found where permanent vegetation is removed for agricultural production and/or in urban areas (impervious surfaces). The Minnesota, Lower Mississippi and Red River basins, which are dominated by agricultural practices, have lower mean scores (less healthy) compared to the northeast portion of the state, which is largely forested (Figure 3). To track trends in watershed health, and report those trends to its citizens and local governments, Minnesota plans to recalculate all watershed index scores on a five-year basis.

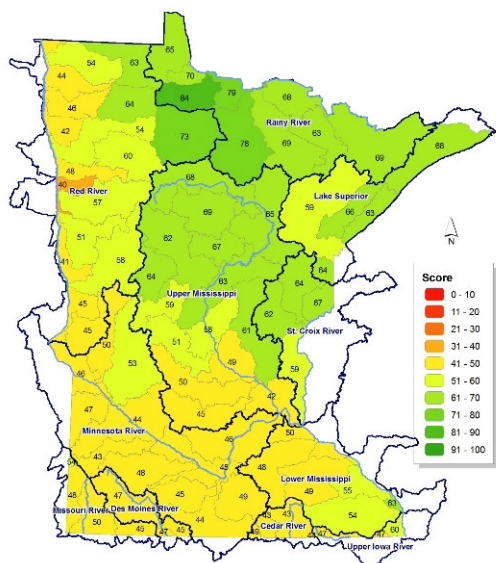


Figure 3. Minnesota's Watershed Assessment Tool generated a Watershed Health Index score for every major river basin. Dark green indicate higher scores (better watershed health); red indicates lower scores (poorer watershed health).

The EPA and The Nature Conservancy are working together to develop six healthy watershed program implementation projects in states across the country (Minnesota, Wisconsin, Washington, Tennessee, Virginia and in the New England region). These collaborative efforts are leveraging existing resources and programs across multiple agencies and organizations to develop and implement healthy watersheds protection strategies.

"States are very supportive of the HWI effort," notes Gabanski. "They recognize the benefits of strategically focusing available funds towards high priority protection and restoration actions that achieve environmental results more quickly and cost-effectively." Some states, like Minnesota and Virginia, have a head start. Other states are just beginning their efforts. "EPA is working with individual states to help them identify ways to coordinate across agencies and departments to implement HWI. Every state will use a different approach, but over time we expect some patterns to emerge," adds Gabanski. Based on information learned from the states' early HWI efforts, EPA plans to develop implementation guidance to supplement the materials available in the HWI National Framework and Action Plan.

[For more information, contact Laura Gabanski, USEPA, 1200 Pennsylvania Ave, N.W., Mail Code 4503T, Washington, DC 20460. Phone: 202-566-1179; Email: gabanski.laura@epa.gov]

Watershed Webcasts Provide Agricultural Focus

Since early 2006, the U.S. Environmental Protection Agency's (EPA's) Watershed Academy has sponsored free webcast seminars approximately once per 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 available after the live seminar for download. Roughly 70 webcasts are now available online at www.epa.gov/watershedwebcasts, covering topics such as agriculture, effective outreach campaigns, low impact development, pollutant trading, stormwater management and watershed plan development. A number of recent webcast seminars focused on agricultural issues, including:

U.S. Department of Agriculture's (USDA's) National Water Quality Initiative, held on July 10, 2012

This webcast provided information about USDA's National Water Quality Initiative (NWQI) program, which focuses best management practice implementation efforts in 157 priority watersheds across the United States in 2012. State agencies, key partners and USDA's Natural Resources Conservation Service (NRCS) State Technical Committees worked together to identify these 157 watersheds. This webcast highlighted how the NWQI is working, and emphasized ways that NRCS is collaborating with EPA, state water quality agencies and others to implement the NWQI. For more information on NWQI, see the article on [page 17](#).

Section 319 Agricultural Nonpoint Source Success Stories, held on June 14, 2012

The Clean Water Act (CWA) section 319 Nonpoint Source Management Program was established 25 years ago by the 1987 Amendments to the CWA. Under section 319, states, territories and tribes receive grants that support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, monitoring and other activities. This webcast highlighted agricultural nonpoint source success stories from Oklahoma, Virginia and Wisconsin. This webcast was part of EPA's series of Watershed Academy webcasts held in honor of the 40th anniversary of the CWA.

USDA's National Institute of Food and Agriculture-Conservation Effects Assessment Project (NIFA-CEAP) Watershed Synthesis: Lessons Learned, held on May 15, 2012

USDA's NIFA, in partnership with NRCS, established university-led watershed-scale research and extension projects in support of CEAP. This webcast highlighted a study led by North Carolina State University to analyze and synthesize key lessons learned from 13 watershed-scale projects on cropland and pastureland. The goal of CEAP watersheds is to better understand how the suite, timing and spatial distribution of conservation practices influence their effect on local water quality outcomes. The NIFA study also evaluated social and economic factors that influence implementation and maintenance of practices, as well as education critical to transferring knowledge to farmers, ranchers, community leaders and other stakeholders to improve practice effectiveness. This webcast also emphasized linkages between USDA's CEAP project and EPA's section 319 Nonpoint Source Program. For more information about the NIFA-CEAP synthesis project, see the article on [page 17](#) of this newsletter.

Nitrogen and Phosphorus Pollution and Harmful Algal Blooms in Lakes, held on January 26, 2011



Figure 1. Algal bloom on Ohio's Grand Lake St. Mary's in 2010. (Photo by Ohio EPA)

This webcast highlighted the connection between nutrients in lakes and harmful algal blooms. Large algal blooms can cause a loss of recreational uses such as fishing and swimming, can impair aquatic life uses, and, in some cases, can result in higher treatment costs for drinking water. The webcast identified why nutrients can be a problem, discussed top nutrient sources, proposed opportunities to control nutrients, and presented detailed case studies on Grand Lake St. Mary's in Ohio (Figure 1) and Lake Waco in Texas.

[For more information on EPA's Watershed Academy Webcasts, contact Anne Weinberg, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Mail Code 4503T, Washington, DC 20460. Phone: 202-566-1217; Email: weinberg.anne@epa.gov.]

Other Webcast Resources

EPA's Office of Wastewater Management's National Pollutant Discharge Elimination System (NPDES) Program sponsors a free webcast series for municipal stormwater managers. Recent webcasts included "EPA's Stormwater Pollution Prevention Webcast Series: Stormwater, Coal-Tar Sealcoat, and Polycyclic Aromatic Hydrocarbons (PAHs)" and "2012 Construction General Permit." Archived webcasts include topics such as stormwater, concentrated animal feeding operations, and combined sewer overflows. For more information about stormwater webcasts see http://cfpub.epa.gov/npdes/outreach.cfm?program_id=0&otype=1.

The National Livestock and Poultry Environmental Learning Center (www.extension.org/pages/8644/livestock-and-poultry-environmental-learning-center-webcast-series) offers monthly agriculture-related webcasts. Users may watch the webcasts live or download archived webcasts. Recent webcasts include "Nitrates in Groundwater," "Changing Management of Nutrients in the Chesapeake Bay Watershed," and "Adaptive Nutrient Management."

The Center for Watershed Protection's webcast series (www.cwp.org/our-work/training/webcasts.html) offers key information and resources for watershed practitioners and policy makers. Examples of recent webcasts include: "Retrofit This – A Guide to Retrofitting the World" (February 29, 2012), "Build This – Stormwater Retrofit Construction Issues" (April 18, 2012), and "Stream Restoration: Implementation You Can Take to the BANK" (June 20, 2012).

Reviews and Announcements

Adaptive Management Guide Available

In April 2012 the U.S. Department of the Interior released a new guide that provides federal, state, tribal and other natural resource managers with tools to more effectively address the complexities and uncertainties involved in natural resource management, especially under challenging conditions such as climate change. The *Adaptive Management Applications Guide* includes case studies showing the breadth of adaptive management applications at different scales and different levels of complexity—ranging from river flow management and protecting migratory birds to locating renewable energy projects. Case studies focus on four priority areas: climate change, water resources, energy and human impacts on the landscape. The *Application Guide* was designed to complement and build on the framework established by its companion document, *Adaptive Management: The U.S. Department of the Interior Technical Guide* (2009). Both documents may be downloaded at www.doi.gov/ppa/Adaptive-Management.cfm.

Army Identifies Net Zero Pilot Installations

In April 2012, the Army announced (see www.defense.gov/releases/release.aspx?releaseid=14420) the locations identified as pilot net zero installations. A net zero water installation limits the consumption of freshwater resources and returns water back to the same watershed to avoid impacting the quality and quantity of the groundwater and surface water resources of that region over the course of a year. The pilot net zero water installations include Aberdeen Proving Ground, Maryland; Camp Rilea, Oregon; Fort Buchanan, Puerto Rico; Fort Riley, Kansas; Joint Base Lewis-McChord, Washington; and Tobyhanna Army Depot, Pennsylvania.

Catalog of Federal Funding Sources for Watershed Protection Updated

EPA recently updated its Catalog of Federal Funding Sources for Watershed Protection (<http://cfpub.epa.gov/fedfund>), an online searchable database of 85 financial assistance sources (including grants, loans and cost-share opportunities) available to fund a variety of watershed protection projects.

Charles River Watershed Association Success Earns International Prize

In September 2011, the International River Foundation awarded the Charles River Watershed Association the 2011 Thiess International Riverprize (\$330,000) for excellence in river management. See www.rivernet.org/blog/11/2011/10/13/never-write-river-charles-river-comes-back.

Climate-Ready Training Modules Online

EPA's Climate Resilience Evaluation and Awareness Tool (CREAT) training modules are now available on the Web at <http://water.epa.gov/infrastructure/watersecurity/climate>. EPA developed the CREAT software through the agency's Climate-Ready Water Utilities initiative, which provides drinking water, wastewater and storm water utilities with practical tools, training and technical assistance to confront climate change through climate related risk assessment. With a better understanding of climate challenges, utilities can take the proactive steps needed for adapting to climate change impacts.

Coastal Condition Report IV Available

EPA has released the *National Coastal Condition Report IV* (<http://water.epa.gov/type/oceb/assessmonitor/nccr>), the fourth in a series of environmental assessments of U.S. coastal waters and the Great Lakes. The National Coastal Condition Report series summarizes the condition of ecological resources in the coastal waters of the United States based on data collected from 2003 to 2006 and highlights several exemplary federal, state, tribal and local programs that assess coastal

ecological and water quality conditions. This report relies heavily on coastal monitoring data provided by coastal states through the EPA National Coastal Assessment, which evaluates coastal condition by examining five indicators: water quality, sediment quality, benthic community condition, coastal habitat loss and fish tissue contaminants.

College Student Stormwater Design Competition Announced

EPA is launching a new design competition called the Campus RainWorks Challenge (http://water.epa.gov/infrastructure/greeninfrastructure/crw_challenge.cfm) to encourage student teams on college and university campuses across the country to develop innovative approaches to stormwater management. Student teams, working with faculty advisors, will submit design plans for a proposed green infrastructure project for their campus. Registration for the Campus RainWorks Challenge opened September 4, and entries must be submitted by December 14, 2012 for consideration. Winning entries will be selected by EPA and announced in April 2013.

Economic Benefits of Healthy Watersheds Fact Sheet Released

In April 2012 EPA released a new fact sheet outlining how maintaining the biological and physical integrity of watersheds can save money—including through reduced drinking water and wastewater treatment costs, by preventing the needs for expensive restoration activities, by sustaining revenue-generating recreational and tourism opportunities, and through increased property values. The fact sheet, *The Economic Benefits of Protecting Healthy Watersheds*, is available online at http://water.epa.gov/polwaste/nps/watershed/ecoben_factsheet.cfm. For more information about healthy watersheds, see the article on [page 21](#).

Ecosystem Services Web-Based Decision Support Tool Available

EPA's Ecosystem Services Research Program has developed a tutorial for using a conceptual systems framework to help capture, organize and visualize the environmental, social and economic factors that drive human activity and the effect of that activity on the environment and future provisioning of ecosystem goods and services. This set of tutorials provides an overview of incorporating systems thinking into decision-making; an introduction to the Driver-Pressure-State-Impact-Response (DPSIR) framework as one approach that can assist in the decision making process; and an overview of DPSIR tools, including concept mapping and keyword lists, which can be helpful in generating a DPSIR. For more information see www.epa.gov/ged/tutorial.

EPA Framework Helps Manage Stormwater and Wastewater

In June 2012 EPA issued a new framework (<http://cfpub.epa.gov/npdes/integratedplans.cfm>) to help local governments meet their Clean Water Act obligations. The *Integrated Municipal Stormwater and Wastewater Planning Approach Framework* helps EPA regional offices, states and local governments develop voluntary storm and wastewater management plans and implement effective integrated approaches that will protect public health by reducing overflows from wastewater systems and pollution from stormwater. EPA's framework outlines new flexibility to pursue innovative, cost-saving solutions, such as green infrastructure, and will help communities as they develop plans that prioritize their investments in storm and wastewater infrastructure.

EPA Issues Post-Construction Compliance Monitoring Guidance

EPA has issued final guidance (http://cfpub.epa.gov/npdes/home.cfm?program_id=5) on conducting effective post-construction compliance monitoring to assess the performance of measures implemented under long-term combined sewer overflow (CSO) control plans, as provided in EPA's 1994 CSO Control Policy. This guidance will assist CSO permittees in developing post construction compliance monitoring plans that collect sufficient data for evaluating the effectiveness of CSO controls and assessing compliance with the requirements of the Clean Water Act.

EPA Releases Primer on Using Biological Assessments to Support Water Quality Management

Released in October 2011, EPA's document serves as a primer on the role of biological assessments in a variety of water quality management program applications, including reporting on the condition of aquatic biota, developing biological criteria and assessing environmental results of management actions. The Primer provides information on new technical tools and approaches for developing strong biological assessment programs. It also outlines examples of how states and tribes apply biological assessment information (see http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/biocriteria/uses_index.cfm).

Forest Service Report Highlights Upcoming Management Actions

In February 2012 the U.S. Forest Service released *Increasing the Pace of Restoration and Job Creation on our National Forests* (www.fs.fed.us/publications/restoration/restoration.pdf), a report that outlines a strategy and series of actions for management on 193 million acres of national forests and grasslands managed by the U.S. Forest Service. Within the context of the overall restoration program, the strategy and actions are designed to expand the number of forest acres treated by 20 percent over the next three years and increase the pace of active forest management, including fuels reduction, reforestation, stream restoration, road decommissioning, replacing and improving culverts, forest thinning and harvesting, prescribed fire and a range of other techniques.

Green Infrastructure Fact Sheet Series Released

EPA has released a series of six fact sheets (http://water.epa.gov/infrastructure/greeninfrastructure/gi_regulatory.cfm#permittingseries) examining how to incorporate green infrastructure measures into NPDES wet weather programs. The series builds upon existing EPA authority, guidance and agreements to describe how EPA and state permitting and enforcement professionals can work with permittees to include green infrastructure measures as part of control programs. The six fact sheets and four supplements address stormwater permits, total maximum daily loads, combined sewer overflow long-term control plans and enforcement actions.

Green Infrastructure Report Examines Costs and Benefits

A new report, *Banking on Green: How Green Infrastructure Saves Municipalities Money and Provides Economic Benefits Community-wide* (www.asla.org/ContentDetail.aspx?id=31301), finds that green infrastructure solutions save taxpayer money and provide community benefits by managing stormwater where it falls. Released by the American Society of Landscape Architects, American Rivers, the Water Environment Federation, and ECONorthwest, the report found that green infrastructure (1) not only costs less, but also can further reduce costs of treating large amounts of polluted runoff; (2) helps municipalities reduce energy expenses; (3) reduces flooding and related flood damage; and (4) improves public health by reducing bacteria and pollution in rivers and streams, thereby preventing gastrointestinal illnesses in swimmers and boaters.

Improved Online Fish Advisory Tool Locator Available

EPA has developed three interactive online search and mapping tools that allow users to perform more advanced searches of fish advisory and fish tissue data in the National Listing of Fish Advisories database. The search tools include a "where you live" basic search for advisories issued for water bodies in the state and local area and two advanced interactive maps and searches for technical users to obtain more detailed information. To access the tools, visit EPA's updated fish consumption advisories website at <http://fishadvisoryonline.epa.gov/Advisories.aspx>.

Land Grant – Sea Grant National Conference Proceedings Online

Extensive conference proceedings for the 2012 Land Grant – Sea Grant National Water Conference are online at www.usawaterquality.org/conferences/2012. Information includes full presentations and posters discussing topics such as agriculture and water quality, issues in developing watersheds, education needs and watershed assessment approaches.

New Nutrient Pollution Outreach Materials Available

To help raise awareness about nutrient pollution problems, EPA now offers new educational materials on its nutrient pollution website (<http://water.epa.gov/polwaste/nutrientoutreach.cfm>). Resources include a (1) Community Outreach Toolkit, designed to help watershed groups, non-governmental organizations, states and federal partners educate the media about nutrient pollution; (2) a nutrient pollution video, targeted to raise awareness about nutrient problem; (3) a postcard/poster, showing a before and after photo of Lake Erie to illustrate the impacts of nutrient pollution; and (4) a Future Farmers of America Curriculum, to share information with young farmers about source water protection and management practices that can help control runoff to protect surface and groundwater.

Report Indicates Decline in Urban Forest Cover

Tree cover in urban areas of the United States is declining at a rate of about four million trees per year over the past five years, according to a U.S. Forest Service study published in early 2012 (see <http://nrs.fs.fed.us/pubs/40114>). Tree cover in 17 of the 20 cities analyzed in the study declined. Urban tree loss was attributed to conversion to either grass or ground cover (47 percent), impervious cover (29 percent) or bare soil (23 percent). Tree cover ranged from a high of 53.9 percent in Atlanta to a low of 9.6 percent in Denver, while total impervious cover varied from 61.1 percent in New York City to 17.7 percent in Nashville. Cities with the greatest annual increase in impervious cover were Los Angeles, Houston and Albuquerque.

Six New Publications Released in Conservation Strategy Toolkit

The Association of Fish and Wildlife Agencies has released six new publications in its award-winning North American Conservation Education Strategy Tool Kit for Achieving Excellence. The new publications include *Fostering Outdoor Observation Skills*, *Landscape Investigations Guidelines*, *Schoolyard Biodiversity Investigations Educator Guide*, *Project-Based Learning Model*, *Outdoor Skills Education Handbook*, and *Sustainable Tomorrow: Applying Systems Thinking to Environmental Education Curricula, for Grades 9-12*. These and other publications are available for free download (http://jjcdev.com/~fishwild/?section=conservation_education_toolkit).

SoilWeb Smartphone App Accesses Soil Survey Information

A new smartphone application, or “app,” is available as a free download for both iPhone and Android users to access soil survey information. The app, SoilWeb (<http://casoilresource.lawr.ucdavis.edu/drupal/node/886>), combines online soil survey information with the GPS capabilities of smartphones. The SoilWeb app is a portable version of the University of California-Davis’ Soil Resource Lab’s Web-based interface to digital soil survey data from USDA’s Natural Resources Conservation Service. Because the app provides soil survey information in a mobile form, it is particularly useful for those working in the field.

Study Indicates Nutrient Credit Trading Could Cut Bay Clean Up Costs

Nutrient Credit Trading for the Chesapeake Bay: An Economic Study, released by the Chesapeake Bay Commission (www.chesbay.us/nutrienttrading.htm) in May 2012, indicates that nutrient credit trading could significantly trim the cost of cleaning up the Chesapeake Bay. Nutrient credit trading is a system that enables one pollution source to meet its pollution reduction goals by purchasing those reductions from another source. The economic analysis showed that nutrient credit

trading could save from 20 percent to as much as 80 percent of costs to meet pollution reduction goals called for in the Chesapeake Bay TMDL, the federal “pollution diet” to clean up the Bay. State and local governments must reduce nitrogen and phosphorus pollution from farms, wastewater treatment plants, stormwater systems and other sources to meet these goals by 2025. The study recommends that governments define trading rules and protocols, provide information and technical assistance, and ensure compliance and enforcement to maximize cost benefits and guarantee trading programs actually deliver pollution reductions. To date, four Chesapeake Bay watershed states – Maryland, Pennsylvania, Virginia and West Virginia – have initiated water quality trading programs.

Toolkit for Working with Rural Volunteers Developed

A team of partners from the Office of Surface Mining, AmeriCorps VISTA (Volunteers in Service to America), and community/watershed improvement organizations conducted place-based research on volunteerism in 34 rural communities. The research results were developed into a toolkit designed to help groups recruit, manage and retain volunteers in rural areas. The toolkit, available for free online at www.ruralvolunteer.org, offers a survey for distribution and analysis, a summary of 25 difference volunteer practices that work, and a dozen worksheets, templates and checklists. The toolkit establishes a complete framework necessary for sustainable volunteer management for groups with limited resources.

Updated 2012 National Wetland Plant List Posted

In May 2012 the U.S. Army Corps of Engineers, in partnership with other federal agencies, released an updated National Wetland Plant List. This national list of wetland plants provides general botanical information about wetland plants and is used extensively by federal and state agencies, the scientific and academic communities, and the private sector in wetland delineations and the planning and monitoring of wetland mitigation and restoration sites. The list is available at http://wetland_plants.usace.army.mil.

WERF SELECT BMP Tool Available

SELECT is an Excel-based planning level tool (www.werf.org/select) that enables a stormwater manager to examine the effectiveness of alternative scenarios for controlling stormwater pollution and the whole life cost associated with each scenario. Thus, the manager can make more informed decisions on which practices to permit with some confidence that they will meet imposed TMDL limits and can also have some confidence that the capital costs and operation and maintenance costs involved in implementing BMPs are known.

Recent and Relevant Periodical Articles

Groups Piping up about Threat of Many Small Drains to Water Quality

By Lara Lutz, *Chesapeake Bay Journal*, November 2011.

(www.bayjournal.com/article/groups_piping_up_about_threat_of_many_small_drains_to_water_quality)

In 2010 and 2011, the Center for Watershed Protection studied several urban Maryland streams to investigate pollution flowing into them from storm drains. Their findings suggest that relatively small pipes releasing untreated sewage into streams may collectively be sending more nutrients to Bay tributaries than previously suspected. In some cases, field teams with the Center for Watershed Protection found far more outfall pipes than were identified on maps. Approximately 41 percent of all pipes surveyed measured less than 36 inches in diameter, which means they would most likely be overlooked by existing monitoring programs. Plus, while stormwater pipes flush especially large loads of pollution into streams during wet weather, many of the pipes surveyed had flows during dry weather, too.

Nitrate in the Mississippi River and its tributaries, 1980 to 2008

By Lori A. Sprague, Robert M. Hirsch, and Brent T. Aulenbach; in the August 2011 issue of the *Environmental Science and Technology* journal.
(<http://pubs.acs.org/doi/abs/10.1021/es201221s>)

This article discusses a statistical review of nitrate data from 1980 to 2008. The study showed little consistent progress in reducing riverine nitrate since 1980; flow-normalized concentration and flux are increasing in some areas of the Mississippi River basin, based on results of the Weighted Regression on Time, Discharge, and Season (WRTDS) statistical method. At most monitoring sites, concentrations increased more at low and moderate streamflows than at high streamflows, suggesting that increasing nitrogen concentrations in groundwater are having an effect on river concentrations.

Subsurface Gravel Wetlands for Stormwater Management

By Robert M. Roseen, Thomas P. Ballesterio, James Houle, and Alison Watts; in the Water Environment Federation's *Stormwater Report*, July 5, 2010 (Volume 2, Number 7).
(www.wef.org/AWK/pages_cs2.aspx?id=8589934997)

This article describes the University of New Hampshire Stormwater Center's (UNHSC's) six-year study of how effectively subsurface gravel wetlands can remove nutrients from runoff. UNHSC's data show that average nitrate removal in gravel wetland systems is greater than 75 percent annually and 85 percent in the summer. The wetlands remove more than 95 percent of total suspended solids and have a phosphorus removal efficiency of 58 percent.

Websites Worth a Bookmark

BEach Advisory and Closing Online Notification (BEACON)
(<http://watersgeo.epa.gov/beacon2>)

Beginning in the summer of 2012, U.S. Environmental Protection Agency's (EPA's) improved website for beach advisories and closings has allowed the public to more quickly and easily access the most current water quality and pollution testing information for more than 6,000 U.S. beaches. The website, called BEACON, has the capability to update as frequently as every two hours based on new data provided by states, territories and tribes. Users have access to mapped location data for beaches and water monitoring stations, monitoring results for various pollutants such as bacteria and algae, and data on public notification of beach water quality advisories and closures. For the first time, users can also access reports that combine notifications and water quality monitoring data. The enhanced system also uses enhanced map navigation and report display tools.

Water is Worth It (<http://water.epa.gov/action/cleanwater40c/index.cfm>)

EPA developed this website to mark the 40th anniversary of the Clean Water Act. This year EPA and others will highlight the tremendous progress in reducing water pollution since 1972, noting the many milestones along the way, examining the ways that the job is far from over, and presenting the tough challenges we face today and in the future. The webpage serves as the central location for information, activities, news and networking about 40th anniversary events.

Climate Change and Water (<http://water.epa.gov/scitech/climatechange/>)

EPA developed this website to share information about the effects of climate change on water resources. EPA is working with state, tribal, and local governments and public and private stakeholders to understand the science, develop tools, and implement actions to respond to the water resource impacts of climate change and to reduce emissions of greenhouse gases. The site also provides EPA's 2012 *Response to Climate Change strategy* document, which presents five long-term

visions designed to shape EPA's future work on climate change and water issues based on the growing understanding of climate change. Each of these vision areas identifies a range of long-term goals and the strategic actions that need to be taken in the coming years to achieve those goals.

The Water We Drink (www.nesc.wvu.edu/waterwedrink)

The Rural Community Assistance Partnership and the National Environmental Services Center partnered to create this website to support their "The Water We Drink: Small Community Outreach Campaign." The website offers free articles and educational resources about maintaining safe, sustainable, and secure water supplies in small and rural communities. This outreach campaign is a joint effort to provide information and increase awareness about crucial water issues, especially for rural and small community decision-makers and water and wastewater board members.

Calendar

October 2012

For an updated events calendar,
see www.epa.gov/newsnotes/calendar.htm.

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| 14–17 | <i>20th Annual Nonpoint Source Monitoring Workshop; Secrets of Success: Making the Most of Available Resources</i> , Tulsa, OK (http://npsmonitoring.tetrattech-ffx.com/index.htm) |
| 15–17 | <i>Urban Water Sustainability Leadership Conference</i> , Cincinnati, OH (www.cleanwateramericaalliance.org/activities/urban-water-sustainability-council/) |
| 15–18 | <i>Stream Restoration the Southeast: Innovations for Ecology</i> , Wilmington, NC (www.bae.ncsu.edu/programs/extension/wqg/srp/conference/index.html) |
| 16–17 | <i>National Ground Water Association's Focus Conference on Gulf Coast Groundwater Issues</i> , Baton Rouge, LA (www.ngwa.org/Events-Education/conferences/5010/Pages/5010oct12.aspx) |
| 16–18 | <i>7th Biennial Bay-Delta Science Conference, Ecosystem Reconciliation: Realities Facing the San Francisco Estuary</i> , Sacramento, CA (http://scienceconf.deltacouncil.ca.gov) |
| 20–24 | <i>6th National Conference on Coastal and Estuarine Habitat Restoration</i> , Tampa, FL (www.estuaries.org/conference/) |
| 21–24 | <i>2012 ASA, CSSA, and SSSA International Annual Meetings: Visions for a Sustainable Planet</i> , Cincinnati, OH (www.acsmeetings.org) |
| 25–26 | <i>National Ground Water Association Conference on Great Plains Aquifers: Beyond the Ogallala</i> , Omaha, NE (www.ngwa.org/Events-Education/conferences/5028/Pages/5028oct12.aspx) |

November 2012

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| 2–6 | <i>Irrigation Show and Education Conference</i> , Orlando, FL (www.irrigation.org/irrigationshow) |
| 4–8 | <i>Water Quality Technology Conference and Exposition: Rising to Greatness on Waves of Opportunity</i> , Toronto, Ontario, Canada (www.awwa.org/Conferences/wqtc.cfm?ItemNumber=32120&navItemNumber=3545) |
| 5–7 | <i>CASQA 8th Annual Conference: Solving the Stormwater Compliance Puzzle</i> , San Diego, CA (http://stormwaterconference.com) |
| 7–9 | <i>North American Lake Management Society's 32nd Annual International Symposium</i> , Madison, WI (www.nalms.org) |
| 8–9 | <i>Upper Colorado River Basin Water Conference</i> , Grand Junction, CO (www.coloradomesa.edu/watercenter/UpperColoradoRiverBasinWaterForum.html) |

Contribute to Nonpoint Source News-Notes

Do you have an article or idea to share? Want to ask a question or need more information? Please contact *NPS News-Notes*, c/o Don Waye, by mail at U.S. EPA, Mail Code 4503-T, 1200 Pennsylvania Ave., NW, Washington, DC 20460, or by email at waye.don@epa.gov.

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