



Nonpoint Source News-Notes

March 2015, #97

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

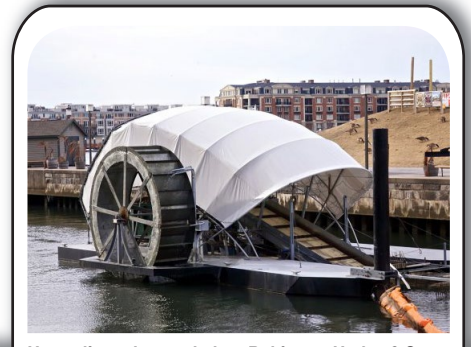


Notes on the National Scene

2014 Farm Act Continues Commitment to Conservation

The Agricultural Act of 2014, also known as the 2014 Farm Act or Farm Bill, was signed into law on February 7, 2014. The 2014 law continues a strong overall commitment to conservation. However, unlike the previous two Farm Acts passed by Congress in 2002 and 2008, the 2014 Farm Act does not include an increase in overall funding for conservation programs. Between 2014 and 2018, the Congressional Budget Office estimates mandatory conservation spending of \$28 billion under the 2014 Farm Act, or about \$200 million less than what would have been projected if the programs and provisions of the 2008 Farm Act had been extended.

The 2014 Farm Act links conservation compliance (or crop insurance premium assistance and compliance) with wetlands and highly erodible lands conservation provisions. Under this new Farm Bill, a farmer



Have aliens descended on Baltimore Harbor? See page 10.

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Note: Issue #92 (October 2012) was the final printed issue of *Nonpoint Source News-Notes*. Beginning with Issue #93, all issues will be available on EPA's *Nonpoint Source News-Notes* website for viewing and download. If you have not already done so, please subscribe to the News-Notes notification service (instructions available at www.epa.gov/newsnotes) and we will notify you by email when each new issue becomes available.

or producer can become ineligible for the crop insurance program if he or she fails to comply with conservation compliance provisions. The 2014 Farm Act also creates a new Sod saver provision designed to help protect existing native grasslands in six Northern Plains states: Montana, North Dakota, South Dakota, Minnesota, Iowa and Nebraska. A producer choosing to convert any of the remaining native grasslands in these six states to cropland will receive reduced crop insurance subsidies (50 percentage points less than the premium subsidy that would otherwise apply) and be subject to other limitations on crop insurance during the first four years of crop production.

New Law Consolidates Conservation Programs

The 2014 Farm Act reduces the number of conservation programs from 23 to 13. Many smaller, more specialized programs were combined to form new programs, folded into existing programs, or simply repealed. After program consolidations, 97 percent of conservation funding mandated in the 2014 Farm Act will go to the five largest programs: the Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), Agricultural Conservation Easement Program, and the new Regional Conservation Partnership Program (see box on next page). Within these five programs, the 2014 Farm Act continues the trend of recent Farm Acts toward increasing the share of conservation funding devoted to working land programs (programs that support conservation on land in agricultural production), while reducing the share of funding for land retirement. This means that funding for conservation easements, particularly wetland easements, will decline significantly—a departure from recent trends.

Funding Continues To Shift Toward Working Land

The 2014 Act continues a decade-long trend toward increased funding for conservation on working agricultural land, albeit at the expense of funding for conservation easements. EQIP and CSP support the adoption of conservation practices or activities on land used for crop production and grazing. CSP specifically provides payments that reward farmers who have already demonstrated stewardship by using conservation practices on their farms. Combined funding for these two

programs is projected to account for more than half of mandatory spending on major conservation programs during 2014–2018. These two programs and their predecessors accounted for just over 40 percent of spending during 2008–2013 and 32 percent during 2003–2007.

Working land programs can fund a wide range of practices to address unique resource concerns including conservation tillage, nutrient management, field-edge buffers and many more. In EQIP, 60 percent of funds are reserved for livestock-related practices including manure handling systems, fencing livestock out of streams, and rotational grazing, to name a few. Under the 2014 Farm Act, at least 5 percent of EQIP funds are also reserved for wildlife habitat-related practices to incorporate functions of the Wildlife Habitat Incentives Program, which was repealed by the 2014 Act.

The trend toward greater funding for working land programs recognizes that land retirement is not the ultimate solution for agricultural environmental problems because of economic, social and ecological constraints. Land retirement programs, even at peak acreage, included roughly 10 percent of U.S. cropland. Soil erosion, nutrient and pesticide runoff, air pollutant emissions, habitat degradation and other resource concerns require a broader approach, involving a larger

Conservation Program Changes: Highlights

New and Consolidated Nationwide Programs:

- **Agricultural Conservation Easement Program.** Retains most of the easement program provisions in the Wetlands Reserve Program, the Grasslands Reserve Program and the Farmland Protection Program (although funding is significantly reduced).
- **Regional Conservation Partnership Program.** Incorporates provisions of the Agricultural Water Enhancement Program, Cooperative Conservation Partnership Initiative, Chesapeake Bay Watershed Program and the Great Lakes Basin Program.
- **Environmental Quality Incentives Program.** Incorporates provisions of the Wildlife Habitat Incentives Program.
- **Conservation Stewardship Program.** Continues financial assistance to producers who meet stewardship requirements, but now requires producers to meet the stewardship threshold for two resource concerns (e.g., soil quality, water quality, air quality) instead of only one.
- **Conservation Reserve Program.** Incorporates grazing contracts from the Grasslands Reserve Program.

Repealed Programs (Provisions Dropped from 2014 Farm Bill):

- Comprehensive Conservation Enhancement Program
- Emergency Forestry Conservation Reserve Program
- Environmental Easement Program

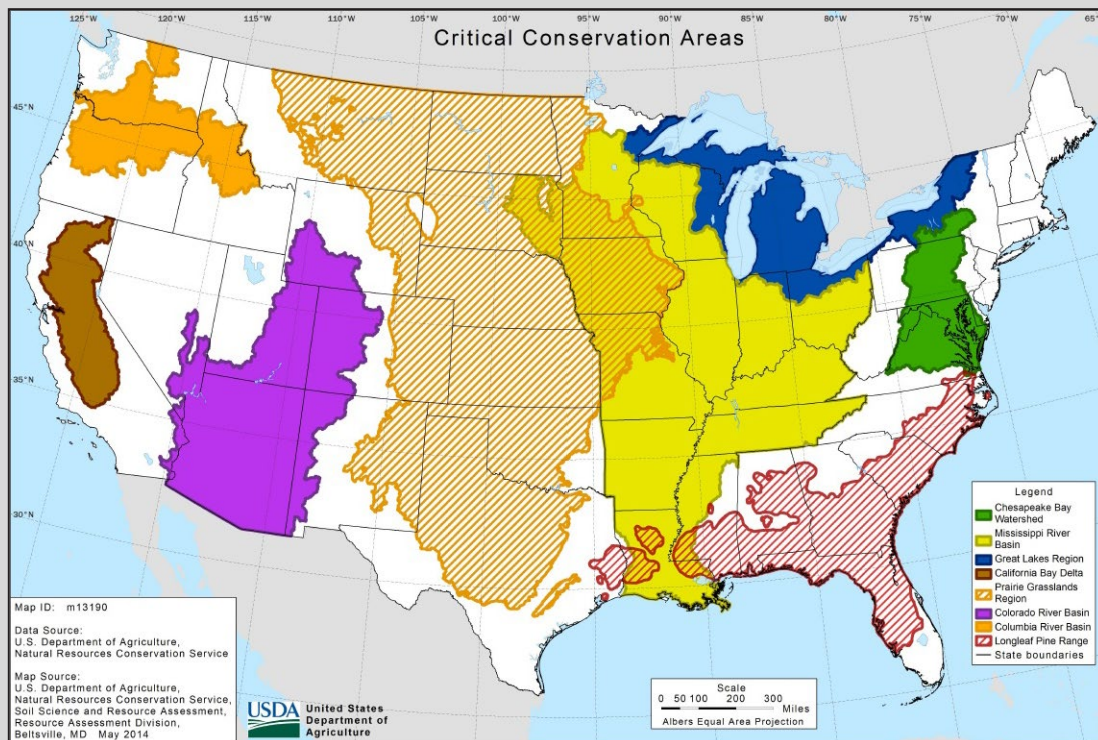
Regional Conservation Partnership Program Enhances Cooperation

The Regional Conservation Partnership Program (RCPP), established by the 2014 Farm Bill, promotes coordination between the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and conservation partners as they deliver conservation assistance to producers and landowners. RCPP combines the authorities of four former conservation programs: the Agricultural Water Enhancement Program, the Chesapeake Bay Watershed Program, the Cooperative Conservation Partnership Initiative and the Great Lakes Basin Program.

Conservation partners can include states, farm organizations, conservation districts, municipalities, tribes, irrigation districts and universities. Groups propose conservation objectives, the geographic area to be covered, and practices to be supported, as well as provide a significant portion of overall funding. Projects are selected by the U.S. Secretary of Agriculture from proposals offered by potential partner groups, with high priority given to proposals that include multistate areas; help producers avoid regulation; include a high proportion of producers in the covered area; significantly leverage nonfederal financial and technical resources; address regional, state or national conservation priorities; and use innovative conservation methods. Successful projects include plans for tracking the success of practices and evaluating outcomes through monitoring or modeling.

Funding for RCPP is allocated to projects in three different categories:

- **National:** Nationwide and multistate projects will receive 40 percent of RCPP funding.
- **State:** Projects occurring in a single state will receive 25 percent of RCPP funding.
- **Critical Conservation Areas:** Projects occurring within eight geographic areas (see map) chosen by the Secretary of Agriculture will receive 35 percent of RCPP funding.



As part of the RCPP, the Secretary of Agriculture has designated Critical Conservation Areas (CCAs) that represent an opportunity for many stakeholders to come together at a regional level to address common natural resource goals while maintaining or improving agricultural productivity. Each CCA has an overarching goal that includes addressing priority resource concerns that are common throughout the area.

Conservation partners submitted nearly 600 pre-proposals in 2014. After reviewing the pre-proposals, NRCS invited the top candidates to submit a full proposal. Partners submitted 210 full proposals requesting \$1.4 billion—four times the available 2014 funding. In January 2015, the U.S. Secretary of Agriculture announced the final selection of 115 projects, representing all 50 states and the Commonwealth of Puerto Rico. The projects will receive more than \$370 million in federal funding, and are leveraging an additional estimated \$400 million in partner contributions to improve the nation's water quality, support wildlife habitat and enhance the environment. More information on the selected projects is available on the [NRCS' RCPP website](#).

share of agricultural land. Policy makers recognize that conservation practices on working land could often address these issues at a lower cost when compared to land retirement.

The 2014 Farm Act combines the Wetland Reserve Program (WRP) with the Farmland Protection Program and Grassland Reserve Program to create the Agricultural Conservation Easement Program. The WRP previously supported wetland restoration. The Farmland Protection

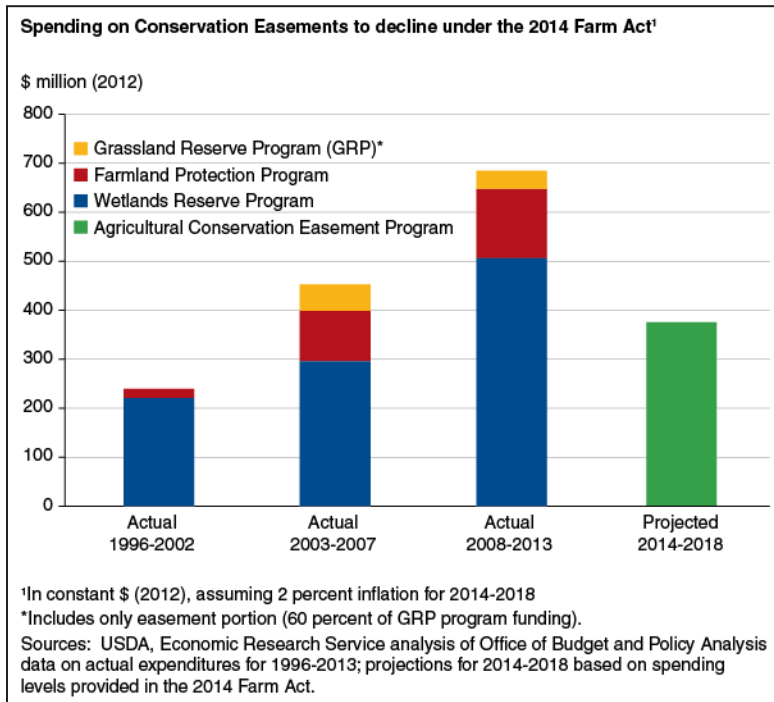
Program had provided funding to state programs that purchased permanent easements against the development of farmland (often called purchase of development rights programs). Finally, the Grassland Reserve Program had offered a range of contracts and easements designed to improve grassland and protect it against conversion to other uses. Under the 2008 Farm Act (2008–2012), these three programs received annual funding, on average, of more than \$710 million (in 2012 dollars), but the consolidated program is slated to receive only \$375 million per year under the 2014 Farm Act (in 2012 dollars, assuming 2 percent inflation for 2014–2018). WRP was the largest of the three programs, with an average annual funding of just over \$500 million for 2008–2013. Even in the unlikely event that Agricultural Conservation Easement Program funds are spent entirely on wetland easements, the new Farm Act significantly reduces overall funding for wetland protection.

The Regional Conservation Partnership Program, another new program in the 2014 Farm Act, is

designed to leverage conservation funding from partners while focusing conservation efforts on local, state or regional resource conservation or environmental problems. The new program replaces four repealed programs designed to address multistate regional problems. For 2014–2018, the Regional Conservation Partnership Program will receive \$100 million per year, plus another 7 percent of the funding budgeted for the EQIP, CSP, Agricultural Conservation Easement Program and Healthy Forest Reserve Program (these funds will be directed through Regional Conservation Partnership Program partnerships; for more details, see box on previous page).

For more information see [Your Guide to the New Farm Bill Conservation Programs](#) or the USDA NRCS' [2014 Farm Bill website](#).

[Article adapted from: 2014 Farm Act Continues Most Previous Trends In Conservation, by Roger Claassen, featured in the May 2014 issue of Amber Waves, the USDA Economic Research Service's monthly magazine.]



Guide Highlights 10 Planning Steps Needed for Transforming Neighborhoods With Green Infrastructure

In October 2014 the U.S. EPA's Office of Sustainable Communities released a report, [Enhancing Sustainable Communities With Green Infrastructure: A Guide to Help Communities Better Manage Stormwater while Achieving Other Environmental, Public Health, Social and Economic Benefits](#).

The report aims to help local governments, water utilities, nonprofit organizations, neighborhood groups and other stakeholders integrate green infrastructure strategies into plans that can transform their communities. EPA developed the resource in response to concerns that green infrastructure implementation is often limited by technical, regulatory, financial and institutional obstacles. This report serves as a guide to develop a plan that can overcome these obstacles for

neighborhoods, towns, cities and regions of all sizes. It also can help stakeholders create a vision for how green infrastructure can enhance their communities beyond reducing stormwater runoff, and directs readers to other resources containing more detailed information tailored to communities' particular climate, goals and circumstances.

Developing a Sustainable Communities and Green Infrastructure Plan

To most effectively attain the benefits of green infrastructure, stakeholders should collaborate to develop a good plan of action that can transform a community vision into reality. Specific components of the plan will vary from place to place, but plan developers should consider the following 10 key steps that can help the plan succeed. The report examines each of the following steps in detail, and supplements each with examples of communities that have applied these steps in their own planning processes.



1. Organize stakeholders.

The strategies that support sustainable communities and green infrastructure are diverse and are linked to many aspects of a community, providing many different potential sources of stakeholders. Ongoing involvement of stakeholders throughout the community is important to maintain enthusiasm and support for development and implementation of the plan. Communities should identify a lead stakeholder—an individual, organization or entity to take the lead in developing a sustainable communities and green infrastructure plan. In addition, participation and support from local government is crucial. Local governments manage streets, parking lots, publicly owned open spaces and other places that can often accommodate green infrastructure. Local governments can also ensure that policies and programs are consistent with the community's vision, and the city's demonstrated leadership and commitment to the plan objectives help keep stakeholders engaged.

2. Develop a community vision.

Green infrastructure is an important component of many types of local plans at the neighborhood, city and regional levels, including those for water resource management, hazard mitigation, climate adaptation and resilience, sustainability, environmental justice and economic development. However, many communities are also developing stand-alone green infrastructure plans that complement other efforts. Whether green infrastructure is one aspect of a broader plan or is the central purpose of a plan, and whether the plan focuses on a neighborhood or an entire region, the first step in a planning effort is typically developing a vision for what the community will look like once the plan is fully implemented. The vision brings people together to determine a common view of the future and guides the plan and its implementation.

3. Establish goals.

In many communities, the initial impetus for developing a sustainable communities and green infrastructure plan might be to manage stormwater and improve water quality, and the plan's goals would naturally include improvement in watershed health indicators. For example, the primary goal might be to assist in eliminating combined sewer overflows or to have water clean enough to allow fishing or swimming in the community's rivers, lakes and coastal waters. However, regardless of the initial reason for developing a plan, one of the main advantages of green infrastructure is that implementation can achieve a diverse array of community goals, such as improving the local economy, revitalizing struggling neighborhoods and commercial corridors, improving quality of life for residents and reducing flooding.

4. Assess assets and opportunities.

Planning for sustainable communities and green infrastructure involves assessing the community's existing conditions and opportunities for green infrastructure implementation. The type of data collected will vary depending on the community's goals, but often includes elements such as the amount of impervious surface; the number and surface area of roads, parking lots and buildings that could incorporate green infrastructure; land ownership and use, including vacant and contaminated properties; existing green space and trails; watershed boundaries; condition of water bodies; and rainfall amounts and patterns, soil type, topography, depth to ground water, and other factors that affect green infrastructure design and functionality. This information can help communities select the most appropriate sites for green infrastructure and design the most effective green infrastructure solutions for particular sites.

5. Identify approaches to adding green infrastructure.

Stakeholders need to identify a variety of approaches and opportunities to incorporate green infrastructure into their community—on both public and private land, using both incentives and requirements. These approaches might include: (1) using existing public land, (2) acquiring additional public land, (3) providing incentives for implementing green infrastructure on private land, and (4) requiring green infrastructure on private land.



A rain garden collects and treats parking lot runoff in this commercial shopping center in southern Maryland.

6. Factor brownfields and hazardous waste sites into planning.

Past industrial and commercial activity has left a legacy of soil and water pollution at sites across the country. Thousands of potentially contaminated properties, or brownfields, are located in densely populated neighborhoods, often near places where residents gather and children play. When cleaned up, brownfields and hazardous waste sites can become attractive locations for green infrastructure, which can help convert a neighborhood liability into a community asset.

7. Plan for long-term operations and maintenance.

All stormwater infrastructure requires maintenance, including structural repairs and replacement and removal of trash, sediment and debris. Gray and green infrastructure both require establishment

of clear responsibilities for maintenance, a funding mechanism and an inspection system. Best practices for both types of infrastructure also include having established maintenance and inspection schedules with a system in place for tracking activities, standard maintenance protocols, an operations and maintenance training program, and a database indicating where the infrastructure is located.

8. Develop strategies for funding.

To fulfill its sustainable communities and green infrastructure vision, a community needs to have a way to pay for implementing the plan. A plan based on a communitywide vision can generate enthusiasm from funders and reduce opposition to new fees or taxes. Federal and state funding programs help kick-start a local effort but are generally not sufficient to cover all costs for plan implementation. Communities usually need to rely on locally generated money as a long-term funding source. Most successful models for locally funded implementation of a large-scale green infrastructure plan establish a dedicated revenue source for capital projects, operations and maintenance. Often this source can be a stormwater utility. Property owners pay the utility through a fee on their water bill for the cost of managing stormwater flowing from the property.

9. Identify federal government resources.

The federal government has numerous funding and technical assistance programs that could help communities implement a sustainable communities and green infrastructure plan.

10. Monitor and measure progress.

Plan developers should include a process to measure how well sustainable communities and green infrastructure approaches help the community achieve its environmental, social and economic

goals. Performance metrics can be used to communicate with stakeholders about implementation progress, demonstrate ongoing commitment to the community vision, encourage accountability, and suggest course corrections that can help ensure continued progress toward goals. Involving stakeholders in choosing performance metrics and setting up the monitoring process can help ensure that residents and property owners, particularly those in disadvantaged communities, understand and support the goals.

Other Resources

To highlight the report's release, in October 2014, Joel Beauvais, the Associate Administrator for EPA's Office of Policy, wrote a [blog post](#) highlighting how green infrastructure is helping to transform neighborhoods in Cleveland, Ohio, and across the nation. For more information about the report, along with other resources for your community, visit EPA's [Smart Growth website](#).

Many Sampled Streams Exceed Aquatic Life Benchmarks for Pesticides

Although pesticide levels seldom exceeded human health benchmarks, pesticides continue to be a concern for aquatic life in many U.S. rivers and streams in agricultural and urban areas, according to a new [U.S. Geological Survey \(USGS\) study](#) published last September. The 2014 study analyzed data collected over two decades (1992–2011). More than a half billion pounds of pesticides are used annually in the U.S. to increase crop production and reduce insect-borne disease.



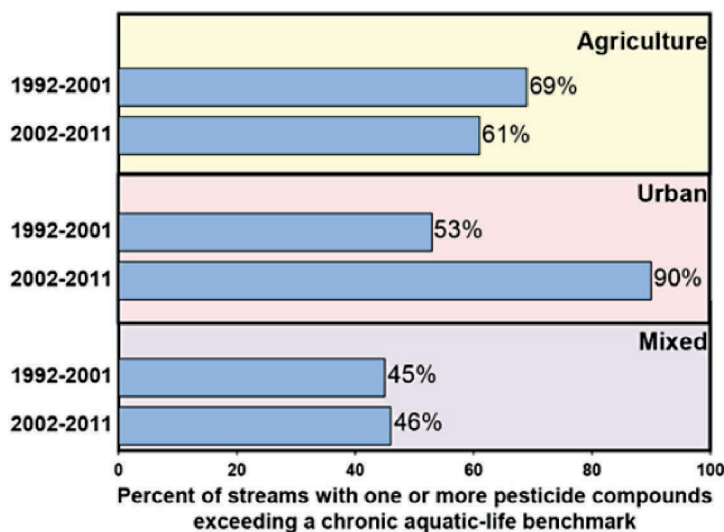
A crayfish captured in a Virginia river.

USGS collected water samples nationwide from 182 streams and rivers during 1992–2001 and from 125 streams and rivers during 2002–2011. USGS collected the samples throughout the year, including during both high-flow and low-flow conditions. Sampling was most intensive during the time of highest pesticide use and runoff—generally weekly or twice monthly for a 4- to 9-month period.

The level of pesticides in water is largely influenced by the surrounding land uses. Water analyses showed that the proportion of streams with one or more pesticides exceeding an aquatic life benchmark was similar between the two decades for streams and rivers draining agricultural and mixed-land use areas, but much greater during the 2002–2011 period for streams draining urban areas. Exceedances in urban streams increased from 53 percent during the first decade of monitoring to 90 percent during the second decade, largely as a result of the greater presence of fipronil and dichlorvos.

Most Prevalent Pesticides

The specific pesticides most frequently detected in water included herbicides used heavily in agriculture, herbicides with major nonagricultural uses, and several insecticides. Three herbicides mainly used for agricultural purposes—atrazine, metolachlor and acetochlor—were among the



most frequently detected in agricultural streams and were more frequently detected in agricultural streams than in urban streams. In contrast, three herbicides commonly used in urban areas—simazine, prometon and tebuthiuron—were detected more often in urban streams than in agricultural streams. Finally, insecticides were found much more frequently in urban streams than in most agricultural streams. Diazinon, chlorpyrifos, carbaryl and fipronil were most frequently detected in urban streams. Overall, results for each individual pesticide reveal a unique pattern of distribution resulting from its primary uses, the distributions of land uses and crops, and the chemical and physical properties of the pesticide. Since 1992 widespread trends in concentrations of individual pesticides have varied, mainly driven by shifts in pesticide use due to regulatory changes, market forces and introduction of new pesticides.

For example, levels of diazinon, one of the most frequently detected insecticides during the 1990s, decreased from the late 1990s through 2011 because of reduced agricultural use and the U.S. Environmental Protection Agency's regulatory phase-out of diazinon for urban uses. In contrast, fipronil, an insecticide that disrupts the central nervous system of insects, was the pesticide most frequently found at levels of potential concern for aquatic organisms in urban streams during 2002–2011. Fipronil registration and subsequent use in the U.S. began during the late 1990s and it was used as an alternative to organophosphate insecticides for residential and commercial applications during the early 2000s.

“The information gained through this important research is critical to the evaluation of the risks associated with existing levels of pesticides,” said William Werkheiser, USGS Associate Director for Water.

Sampling Scope Smaller Than Ideal

According to the USGS, the potential for adverse effects on aquatic life is likely underestimated in these results because resource constraints limited the scope of monitoring to less than half of the more than 400 pesticides currently used in agriculture each year. In addition, this assessment focused on pesticides dissolved in water, whereas some hydrophobic pesticides that were outside the scope of this study, such as legacy organochlorines and pyrethroid insecticides, are important as contaminants of sediment and tissues and should be considered when undergoing more thorough evaluations of stream ecosystems. Since these pesticides were left out of this assessment, the USGS believes that this study underestimates the potential for harmful effects on aquatic life.

The USGS National Water Quality Assessment Program is continually working to fill these data gaps by adding new pesticides that come into use, such as the neonicotinoid and pyrethroid insecticides, improving characterization of short-term acute exposures, and enhancing evaluations of sediment and other environmental media.

This analysis is presented in “[Pesticides in U.S. Streams and Rivers: Occurrence and trends during 1992–2011](#),” a feature article in the September 2014 edition of the *Environmental Science and Technology* journal. The article and additional information including data, reports and maps on pesticide status, trends and use are available online on the USGS' [Pesticide National Synthesis Project website](#).

Methylmercury Found in 25 Percent of U.S. Waters Tested

A 2014 U.S. Geological Survey (USGS) report, [Mercury in the Nation's Streams—Levels, Trends and Implications](#), presents a comprehensive assessment of mercury contamination in streams across the United States. It highlights the importance of environmental processes, monitoring, and control strategies for understanding and reducing stream mercury levels. The report summarizes selected stream studies conducted by the USGS since the late 1990s, while also drawing on scientific literature and datasets from other sources.

Previous national mercury assessments by other agencies have focused largely on lakes. Although numerous studies of mercury in streams have been conducted at local and regional scales, recent USGS studies provide the most comprehensive assessment of streams across the United States and yield insights about the importance of watershed characteristics relative to mercury inputs. The report also summarizes information from other environments (e.g., lakes, wetlands, soil, atmosphere, glacial ice) to help readers understand how mercury varies in space and time.

What is Methylmercury?

Methylmercury is a toxic organic compound that bioaccumulates in the food web. The highest concentrations can be found in predator fish such as bass, mackerel, northern pike, shark, swordfish and tuna, and potentially in humans who consume large quantities of affected predator fish. Methylmercury is created by combining inorganic mercury (released into the atmosphere by certain industrial activities) with natural processes and sources, particularly where mercury enters

aquatic ecosystems and becomes methylated by anaerobic organisms in low-oxygen environments, such as wetlands.

Mercury contamination in fish is the primary reason for issuing fish consumption advisories; these exist in every state. Much of the mercury originates from combustion of coal and can travel long distances in the atmosphere before being deposited. This can result in mercury-contaminated fish in areas with no obvious source of mercury pollution.

Report's Key Findings

- **Methylmercury concentrations in fish exceeded the U.S. Environmental Protection Agency criterion for the protection of human health at about one in four streams across the United States.** Fish methylmercury concentrations exceeded 0.3 parts per million—the U.S. Environmental Protection Agency [fish tissue mercury criterion](#) for the protection of human health—in predator fish (i.e., a fish at the top of the food web) from about one-fourth of nearly 300 streams sampled in a nationwide survey. In response to the widespread contamination of fish, mercury has been effectively removed from many products and waste streams, resulting in about a 60 percent decrease in emissions in the United States since 1990. However, to reduce mercury levels in fish to fully meet human health criteria, further reductions in mercury emissions are necessary.
- **Wetlands increase the amount of inorganic mercury converted to methylmercury, the form that accumulates to harmful levels in fish.** Wetland characteristics, such as limited dissolved oxygen concentrations and abundant organic matter, provide favorable environments for microorganisms to affect the conversion of inorganic mercury to methylmercury. Thus, wetland construction or restoration (for example, to improve habitat or to filter nutrients and sediment) should balance the potential for increased methylmercury production against the anticipated ecological and water quality benefits of the wetlands. In fact, across the United States, methylmercury concentrations in streams and in fish generally were highest in undeveloped areas with abundant wetlands, which provide ideal conditions for methylmercury production. In contrast, methylmercury levels in largemouth bass from urban streams were the lowest of all land uses and land covers studied. This occurred even though inorganic mercury inputs were higher in urban settings than in agricultural, undeveloped or mixed land use/land cover settings. Methylmercury concentrations were lower than expected in urban streams because factors conducive to methylmercury production, such as the amount of wetlands and dissolved organic carbon, also generally are low in these ecosystems. These findings contrast starkly with those for many other contaminants in rivers and streams, which tend to be high in urban and agricultural areas.
- **In contrast to other environmental contaminants, mercury emission reduction strategies need to consider global mercury sources in addition to domestic sources.** Reductions in domestic mercury emissions are likely to result in lower mercury levels in fish in the eastern United States, where domestic emissions contribute a large portion of atmospherically deposited mercury. In contrast, emission controls will provide smaller benefits in the western United States, where reduced domestic emissions might be offset by increased emissions from Asia. Implementation of the recently adopted [U.S. Mercury and Air Toxics Standards](#) and worldwide [Minamata Convention](#) goals should lead to reductions in both U.S. and global mercury emissions.
- **Existing mercury monitoring programs focus mostly on methylmercury concentrations in fish, and they lack design elements and data to link these levels to mercury sources.** Most programs do not track methylmercury concentrations in fish over time in ways that support rigorous, nationally consistent trend assessments. Given the complexities of mercury emissions, transport pathways and ecological factors that influence the extent of methylmercury contamination in fish, a multimedia monitoring approach is critical to track the effectiveness of management actions intended to reduce mercury emissions and resulting environmental mercury levels.

*Methylmercury
Found in 25
Percent of U.S.
Waters Tested
(continued)*

The report explores several topics in detail, including: (1) why mercury in fish is a concern, (2) how mercury moves through ecosystems, (3) where the highest concentrations exist across the country, and (4) how mercury levels vary over time.

“Understanding the source of mercury, and how mercury is transported and transformed within stream ecosystems, can help water resource managers identify which watersheds are most vulnerable to mercury contamination. They can then prioritize monitoring and management actions,” said William Werkheiser, USGS Associate Director for Water.

This report is one within a series of publications, *The Quality of Our Nation’s Waters*, which describe major findings of the USGS on water quality issues of regional and national concern. The information in this series is intended primarily for those interested or involved in resource management and protection, conservation, regulation and policymaking at regional and national levels. In addition, the information should be of interest to those at a local level who wish to know more about the general quality of streams and groundwater in areas near where they live and how that quality compares with other areas across the United States.. The USGS hopes this report offers valuable information that will foster increased citizen awareness and involvement in the protection and restoration of U.S. waters.

Notes from the States, Tribes and Localities

River Litter is No Match for Baltimore’s Inner Harbor Water Wheel

Litter carried into waterways by stormwater runoff presents both environmental and aesthetic challenges for cities around the world. The city of Baltimore, Maryland, is addressing this problem in an innovative and attention-grabbing way. In May 2014 the city launched its Inner Harbor Water Wheel, a floating solar- and water-powered trash collecting system capable of removing 50,000 pounds of trash daily. Looking like a cross between a water snail and a floating space ship, the Water Wheel has become a media sensation and tourist favorite. The best part? The Water Wheel is proving to be extremely successful at its job.



The Inner Harbor Water Wheel intercepts trash floating in a Baltimore, Maryland river before it can enter Baltimore’s Inner Harbor.

The Water Wheel harnesses the power of both water and sunlight to pick up litter and debris flowing down the Jones Falls River, an urban stream that empties into Baltimore’s Inner Harbor. How does it work? The Water Wheel includes two upstream-facing trash containment booms that intercept trash carried on the surface of the water (see diagram for details). The current of the Jones Falls River pushes the trash along the booms, which ultimately direct the trash to a conveyor belt. The river current provides power to turn the Water Wheel’s paddle wheel, which moves a conveyor belt that lifts the trash and debris out of the water and deposits it in a dumpster barge. A solar panel array provides additional power to keep the machine running when the water current is too slow to turn the paddle wheel. When the dumpster barge is full, it is towed away by boat and a new dumpster is put in place.

A [YouTube video](#) is available that shows the Water Wheel in action and offers an up-close tour of the different sections of the barge.

Between May 2014 and early January 2015, the Water Wheel intercepted more than 140 tons of trash before it could enter Baltimore Harbor, including:

- 83,750 plastic bottles
- 105,159 polystyrene containers
- 4,193,000 cigarette butts
- 2,117 glass bottles

- 39,850 grocery bags
- 73,299 chip bags
- 274 sports balls

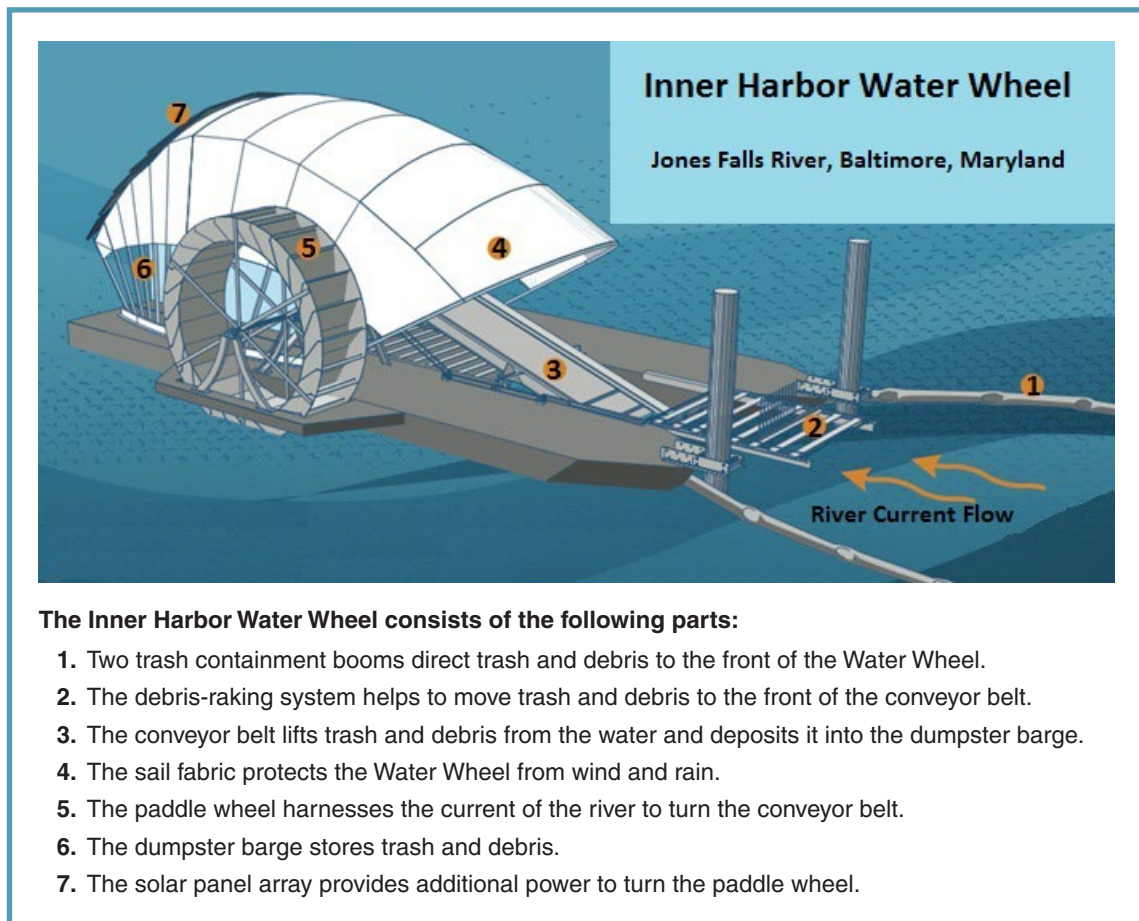
Water Wheel is One Part of the Solution

The Water Wheel is one element of a larger ongoing effort to clean up Baltimore Harbor. In 2009, Baltimore's Waterfront Partnership—a coalition of property owners, city officials, nonprofit organizations and citizens committed to restoring and protecting Baltimore Harbor—launched its [Healthy Harbor Initiative](#), an effort to improve the Harbor so it will be both swimmable and fishable by 2020. In 2011, the Partnership published a plan, *Healthy Harbor Baltimore: Creating a Cleaner, Greener Future for Our Neighborhoods, Streams & Harbor*, which outlines specific solutions to address the Harbor's key problems of trash, sewage leaks and stormwater runoff.

To bring the Water Wheel to life, the Partnership cooperated with Clearwater Mills, LLC, and the design firm of Ziger/Snead. Construction was funded by Constellation Energy, the Maryland Port Authority, Brown Advisory, The Abell Foundation, and Marriott Hotels. For more pictures and diagrams, see the Ziger/Snead [Water Wheel project website](#).

Water Wheel to Provide a Source of Revenue

In early February 2015, the Mayor of Baltimore, Stephanie Rawlings-Blake, announced a [tentative agreement](#) that will allow the trash collected by the Water Wheel to fuel electricity for Baltimore homes. By doing so, the city of Baltimore will become the first city in the world to use litter reclaimed from its waterways to generate electricity. "This unique process will protect our harbor, while simultaneously creating renewable energy out of our trash," said Mayor Rawlings-Blake.



Although the city plans to take advantage of the litter collected, the ultimate goal is to reduce the amount of litter that reaches the Inner Harbor, notes Baltimore Public Works Director Rudolph S. Chow. "All of our partners encourage all of our citizens and visitors to join with us in stopping litter at its sources so that we will no longer need to collect it from our waterways." The Watershed Partnership's Healthy Harbor plan will be working toward this goal using innovative technologies like the Water Wheel, as well as education and outreach efforts within the watersheds draining into Baltimore's Inner Harbor. For more information, see the [Healthy Harbor Baltimore website](#).

Watershed Approach is Key to Restoring Estuarine Waters in Southern Louisiana

State, local and federal water resource agencies in partnership with local landowners have dedicated years to improving water quality in southern Louisiana's Lake Arthur and Lower Mermentau River watershed. Now, thanks to extensive planning and implementation efforts, they are seeing big results.

The Louisiana Department of Environmental Quality (LDEQ) classifies the tidally dominated estuarine waters of the Lake Arthur and Lower Mermentau River assessment unit (AU) as basin subsegment 050402 (Figure 1). The predominant land uses in the AU's 29,200-acre watershed are rice crop (32 percent), water (20 percent), pasture/hay field (20 percent) and freshwater marsh (12 percent).

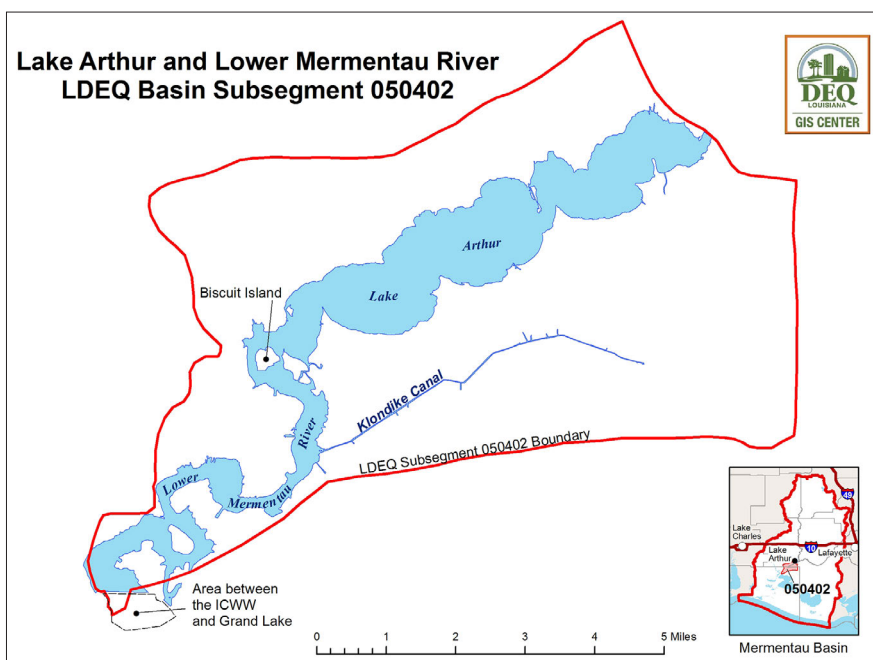


Figure 1. Southern Louisiana's Lower Mermentau River flows through Lake Arthur before discharging into Grand Lake. Together these two water bodies comprise LDEQ basin subsegment 050402.

In the late 1990s, LDEQ's ambient water quality data indicated high concentrations of total suspended solids (TSS), turbidity and nutrients, as well as low dissolved oxygen (DO) concentrations in the Lower Mermentau River and Lake Arthur. The DO criterion for the Lower Mermentau River requires that no more than 10 percent of monthly samples may fall below 5.0 milligrams per liter (mg/L). In 1998 DO values remained below the state's criterion of 5.0 mg/L for seven months of the year; the lowest value, 2.37 mg/L, occurred in August. Although Louisiana does not currently have a numeric criterion for TSS, the U.S. Environmental Protection Agency (EPA) recommends a maximum TSS guideline of 29 mg/L to ensure support of the fish and wildlife propagation (FWP) designated use. LDEQ's ambient water quality data indicated that TSS values exceeded the guideline during June and November of 1998. Likewise, the

state does not currently have numeric criteria for nutrients; it does, however, provide narrative criteria requiring that the naturally occurring range of nitrogen and phosphorus be maintained. The criteria use site-specific studies to establish limits for nutrients to avoid aquatic growth that would create a public nuisance or interfere with designated water uses.

On the basis of these data and other water quality assessments, LDEQ added the Lake Arthur and Lower Mermentau River AU to the 1999 Clean Water Action section 303(d) list of impaired waters for failing to support its FWP designated use due to low DO and high TSS, nutrients, turbidity, oil and grease, and ammonia. The suspected sources of impairment included minor municipal point sources, crop production, petroleum activities, individual septic tanks and flow alterations/modifications.

In 2001 EPA completed a total maximum daily load (TMDL) for turbidity, TSS and siltation for the Mermentau River Basin, including the Lake Arthur and Lower Mermentau River AU. The

TMDL identified fluvial erosion processes as the dominant contributor to high turbidity, TSS and siltation levels. In 2002 EPA completed a TMDL for DO, nutrients and ammonia in portions of the Lower Mermentau River Basin, including the Lake Arthur and Lower Mermentau River AU. This TMDL indicated that a 40 percent reduction in oxygen-demanding substances (e.g., carbonaceous biological oxygen demand, ammonia nitrogen, organic nitrogen, sediment oxygen demand) would be necessary to meet the state's DO water quality standard. The TMDL also indicated that DO would likely improve if nutrient concentrations were reduced.

Landowner Participation Key to Planning Efforts

From 2002 through 2011, the U.S. Department of Agriculture's (USDA's) Natural Resources Conservation Service (NRCS) partnered with watershed landowners to develop comprehensive resource management systems—plans that included sets of approved conservation practices necessary to achieve conservation goals. The practices included irrigation water management, residue and nutrient management, conservation crop rotation, grade stabilization structures and wetland wildlife habitat management. Through USDA's ranking criteria, lands that drain directly to the Lower Mermentau River and Lake Arthur were prioritized for cost-share and technical assistance.

NRCS partnered with the Gulf Coast Soil and Water Conservation District (SWCD), Vermilion SWCD and Jefferson Davis SWCD to provide technical and/or cost-share assistance to help 23 Lower Mermentau and Lake Arthur watershed landowners implement BMPs on approximately 2,645 acres: 1,551 acres on rice fields, 742 acres on crawfish operations, 193 acres on soybean fields and 158 acres on pastures. The BMPs included residue management (seasonal) on approximately 1,307 acres, conservation crop rotation on 1,242 acres, irrigation water management on 1,711 acres, integrated pest management on 1,265 acres, nutrient management on 1,006 acres, wetland wildlife habitat on 884 acres and prescribed grazing on 125 acres. Landowners often applied multiple BMPs on the same acreage. Funding for BMPs included approximately \$264,158 in USDA Farm Bill funds and \$85,800 in EPA CWA section 319 funds (provided by LDEQ).

Long-Term Dedication Pays Off

LDEQ collected water quality data in the Lower Mermentau River at Lake Arthur during four sampling periods: 1998, 2003, 2007 and 2010/2011. Between the 1998 and 2010/2011 sampling periods, average annual DO concentrations increased from 4.7 mg/L to 7.8 mg/L. In all but one month, DO levels during the 2010/2011 sampling period remained above 5.0 mg/L, thereby meeting the DO criterion necessary to fully support the Lower Mermentau River's FWP designated use (Figure 2).

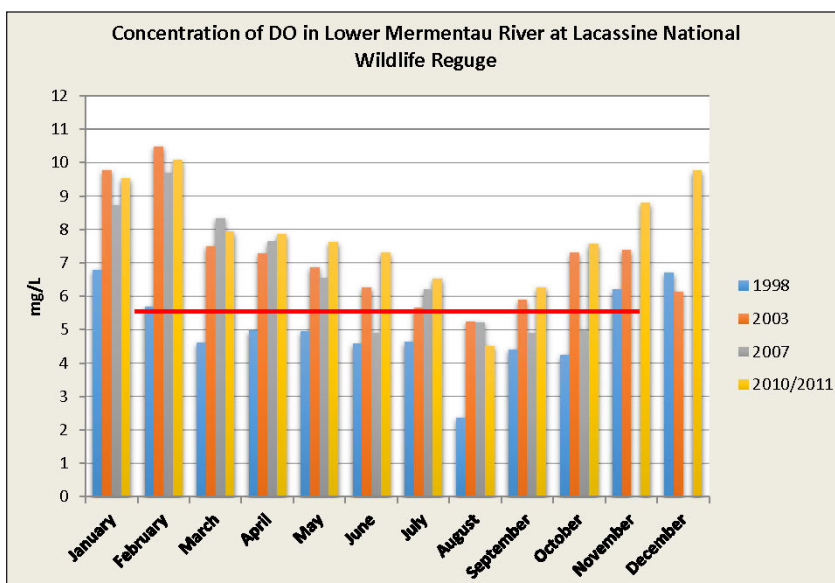


Figure 2. Dissolved oxygen concentrations in the Lower Mermentau River at the Lacassine National Wildlife Refuge monitoring site.

TSS values exceeded EPA's guideline maximum of 29 mg/L during June and November 1998, but they have remained below this level in all sampling periods since that time. Average annual TSS concentrations declined from 27.5 mg/L in 1998 to 12.3 mg/L in 2010/2011. In addition, monitoring data collected since 1998 show that average annual TP concentrations decreased from 0.27 mg/L in 1998 to 0.13 mg/L in 2010/2011. On the basis of these monitoring data, LDEQ removed the impairments on the Lower Mermentau River and Lake Arthur AU, including sediment/siltation, TSS, turbidity and ammonia (removed from the state's 2010 list of impaired waters) and DO, nitrate/nitrite and TP (removed from the 2012 list of impaired waters). LDEQ reported this successful water quality restoration project on EPA's [Nonpoint Source Success Stories website](#) in 2014.

Watershed Approach is Key to Restoring Estuarine Waters in Southern Louisiana (continued)

Contracts with landowners will remain in place through 2018, so water quality should continue to improve in the Lower Mermentau River and Lake Arthur (Figure 3). Using CWA section 319 funds, LDEQ hired a watershed coordinator to work with stakeholders on an implementation plan to continue activities and programs focused on further reducing nonpoint source pollution sources in the watershed.

[For more information, contact Gwendolyn Berthelot, Louisiana Department of Environmental Quality, P.O. Box 4314, Baton Rouge, LA 70821-4314. Phone: 225-219-0879; Email: gwendolyn.berthelot@la.gov]



Figure 3. The water quality in Lake Arthur, seen here, has improved as a result of widespread and sustained nonpoint source pollution control efforts.

Notes on Education

BUBBA Highlights Innovative Stormwater Management

Want to win a BUBBA? If, within the last five years, you've installed an urban stormwater management project that uses natural features or innovative practices, you might be eligible. In 2014 the Chesapeake Stormwater Network (Network) launched its Best Urban BMP in the Bay Award (BUBBA) contest to recognize community leaders who have formulated new and innovative techniques for managing stormwater in the Chesapeake Bay watershed. Beginning in 2015, projects outside of the Chesapeake Bay watershed will also be eligible for the contest.

The Network developed its BUBBA contest to showcase innovative best management practices and low impact design, with the intention of promoting the use of unique, effective solutions to stormwater management challenges throughout the Bay watershed and beyond. To be considered for a BUBBA, a project must have been installed within the five-year period leading up to the contest and cannot be a proprietary practice (local reproductions of proprietary technology are acceptable).

Unlike many contests that focus on the design phase of potential projects, the BUBBAs recognize practices that are in place and already functioning. As a result, the contest is raising the visibility of projects that are actively improving water quality across the Bay watershed. By involving Network members and the public in the voting processes, the contest engages the Network's existing members, attracts new members, and serves as a public outreach and education tool.

"The contest created a fun buzz about stormwater management," said Tom Schueler, the Network's executive director, "and that's not always easy to do."

The BUBBA's Inaugural Year

In 2014, people around the Chesapeake Bay watershed submitted 76 innovative stormwater management projects for consideration. Out of these submissions, a team of qualified jurors selected 18 finalists—a first, second and third place winner for each of six categories. The Network posted the six first-place projects on its website and then invited its members and the public to review the projects and vote for their favorite. More than 1,800 people voted. The project receiving the most public votes received a \$5,000 grand prize and was declared the 2014 BUBBA. The six categories available in 2014 included:

1. Best Homeowner BMP. This category included practices installed on a residential property (generally costing less than \$5,000). In 2014, the Harn Aqueduct Rain Garden won first place in this category for its use of conservation landscaping to treat runoff from the property, improve water quality and provide habitat while enhancing aesthetics (Figure 1).



Figure 1. Jeff and Joan Harn's home has a walk-out patio (left photo). The poorly drained property was under constant threat of basement flooding before the project. Because the only available space for a rain garden was located uphill from the patio and existing downspouts, the homeowners opted to build a short aqueduct to deliver roof runoff to the rain garden (middle and right photos).

2. Best Innovative BMP. This category included unconventional or unique ways of treating or managing stormwater. The winning BMP in 2014 uses the power of algae driven by photosynthesis to remove nutrients and pollutants from water at the Maryland Port Administration's Dundalk Marine Terminal (Figure 2).



Figure 2. The Algal Turf Scrubbers project is a retrofit solution for treating nutrient-impaired waters. The system relies on native filamentous algae to remove nitrogen and phosphorus from the water as it flows along a raceway. The algae is harvested and used as a cogeneration fuel source at an incinerator.

3. Best Ultra-Urban BMP. This category included practices that were built in redevelopment or infill projects in urban areas with more than 75 percent site impervious cover. The 2014 winner of this category, the city of Lancaster, Pennsylvania, transformed a dangerous intersection into a public amenity. The project calmed traffic and increased pedestrian safety by narrowing the traffic lane. Stormwater management features included permeable paver parking areas and patio, curb extensions and rain gardens, and a cistern that captures stormwater from the roof of a brewery adjacent to the intersection (Figures 3 and 4). This project won the public's vote for the best overall project—earning the \$5,000 grand prize and the title of "2014 BUBBA."

4. Best Combination of BMPs in a Series. This category included projects that used two or more BMPs or LID practices in a series to treat stormwater. Successful projects in this category demonstrated their ability to function during heavy rainfall events and provided a link between the built environment and the natural landscape. The 2014 winning project included a green roof, pervious pavers, rain harvesting practices and bioretention facilities at Morgan State University's Center for Built Environment and Infrastructure Studies in Baltimore, Maryland.



Figure 3. The city of Lancaster, Pennsylvania, implemented the grand prize-winning redesign of the Plum and Walnut Intersection at the Lancaster Brewing Company. The city removed a designated turn lane (left photo) and used the new space for rain gardens, a permeable patio and permeable parking spaces (right).

5. Best Habitat Creation in a BMP. This category included projects that treated stormwater while also providing a unique blend of aquatic or upland wildlife habitat (greater than one acre). The 2014 winner was a restored wetland at the Davidsonville Wildlife Sanctuary (in Maryland) which captures and holds runoff and hosts an array of unusual native plants.

6. Best Stream Restoration. This category included projects in stream corridors that were designed specifically to improve the function, stability and ecosystem services of an urban stream. The winning project in 2014 included three stream restoration elements in Clements Creek, north of Annapolis, Maryland.



Figure 4. The city of Lancaster included curb extensions and rain gardens in its award-winning ultra-urban BMP project to increase pedestrian safety and treat stormwater runoff. The permeable parking spaces are visible in the background.

2014 Contest Was Inexpensive and Effective

The Network carried out the 2014 contest for approximately \$20,000. Costs included about \$10,000 in Network staff time—\$3,000 for website development and \$7,000 for prizes. Sponsorships from stormwater-related businesses in the Bay watershed are offsetting the costs for the 2015 contest.

Overall implementation costs were kept to a minimum, thanks to the generosity of stormwater professionals around the Bay. First, a four-person volunteer steering committee composed of stormwater experts worked together to craft the contest's rules and structure. Once finalized, the Network advertised the contest to its 7,000 members, who then dispersed the information to others who might have been interested.

To enter the contest, a project representative submitted the project's technical specifications (e.g., drainage area, runoff volume treated, percent imperviousness of drainage area), a narrative, and at least four photographs, including one photograph of the site before the project was implemented. Once all submissions were received, the steering committee completed a preliminary screening of the projects and developed a list of 10 finalists for each of the six categories. The committee forwarded each category-specific list to a two-person team of volunteer jurors selected from people with pertinent stormwater experience and expertise.

Each juror reviewed the submissions for their category (requiring approximately six hours) and then coordinated via phone (approximately two hours) with the other team members to select the first, second and third place projects. The first place project from each category moved on as a finalist to the public voting portion of the contest. The Network invited its members and the general public to vote online for the grand prize BUBBA winner.

Every contest participant received a certificate recognizing their efforts, explained Cecilia Lane, the Network's stormwater coordinator. "Also, each finalist received a gift certificate to a local native plant nursery—that allowed us to funnel resources back into stormwater protection projects in the Bay watershed."

BUBBAs Expand

The success of the inaugural BUBBA contest is prompting the Network to repeat the contest in 2015, with one big change—the addition of a new "Best Innovative BMP Outside of the Bay" category, which encourages project submissions from places outside of the Chesapeake Bay watershed.

"There are many innovative projects out there. We'd like to learn about them so we can adopt and apply them in the Chesapeake Bay watershed," notes Schueler.

Submissions for the 2015 contest were due in mid-February. Winners will be announced in late spring. Like last year, the public will be invited to vote for this year's grand prize project—and the coveted title of 2015 BUBBA. Keep your eye on the [BUBBA website!](#)

[For more information, contact Cecilia Lane, Stormwater Coordinator, Chesapeake Stormwater Network, 8030 Main Street, 3rd Floor, Ellicott City, MD 21043. Phone: 410-750-7635; Email: watershedgal@hotmail.com.]

Canoemobile: Connecting Urban Youth with Local Rivers

Remember the Bookmobile, the library-on-wheels that brought books and other materials to far-flung residential areas? Well, now imagine you live in the inner city, surrounded by buildings and pavement, with little access to the natural world. What if, one day, nature-on-wheels arrived at your school? That is the concept behind Wilderness Inquiry's popular Canoemobile program, launched in 2010. Every year, the group disperses its three Canoemobiles (each comprised of a van, a trailer, six 24-foot Voyageur canoes and seven staff members) to cities across the country, connecting thousands of urban youth with nature.

A Day on the Water

In 2014, Canoemobiles visited nearly 30 communities and served more than 9,000 participants, including 2,000 people in the Delaware River basin alone (Figure 1). Although somewhat variable depending on the location and partner organizations' expertise and priorities, a typical Canoemobile field trip consists of a canoe tour and land-based activities. When they first arrive, students are welcomed and engage in a group activity. Then, they are split into smaller groups; some stay on land and some head to the water. Those preparing for canoeing find suitable life jackets and paddles, split into boat groups of nine participants and one Wilderness Inquiry outdoor educator/boat captain, review safety rules, and learn the basics of paddling. Next, groups of students paddle on the river for 30 minutes to an hour, learning to work together with their boat group while experiencing the local river and exploring new wildlife and historic places. The students on land participate in a series of experiential learning activities, such as water quality testing, team building, and fish and wildlife identification.



Figure 1. Students canoe along the Delaware River in Philadelphia. In a two-week period in October 2014, Canoemobile engaged more than 2,000 people in the Delaware River Basin cities of Camden and Chester in New Jersey, Philadelphia and Reading in Pennsylvania, and Wilmington in Delaware. Supported by a \$59,333 Urban Waters Small Grant from the U.S. Environmental Protection Agency, Wilderness Inquiry and many partners provided opportunities for youth to experience their local waterways. During the two weeks, 32 schools and youth-serving organizations participated, with support from 24 program partners, eight hosting organizations and three marine safety organizations.

“It is incredible to witness the transformation that happens throughout the course of a few hours,” explains Ashley Pethan, Wilderness Inquiry's Canoemobile Coordinator. “Many students arrive bored or worried or scared. Once they start walking to the dock to get into the boat, it gets real for them. They are actually going to get in a canoe with nine other people and paddle on the river—one they have likely seen from afar or driven over on bridges hundreds of times. Loading the boat is always a bit tricky, with people moving, not fully understanding how their movements affect the boat and the others around them. This is usually the time when people, of all ages, are most fearful. Then, finally, they launch from the dock. After a few uneasy, uncoordinated strokes, the group starts to feel how stable the canoes are. They get a feel for it, paddling in tandem, and really cruising on the river. When returning to the dock, every single one of them wants to stay out on the water.”

Lasting Impacts

The Canoemobile program typically returns to the same cities annually, often staying longer in subsequent years and expanding its number of youth participants. Ideally, the Canoemobile also serves as a catalyst for community partners to collaborate and provide high-quality environmental education to underserved urban youth. Each local Canoemobile event is led by a unique combination of partners, including schools, nonprofit organizations, businesses, and city, state and federal agencies. After successful completion of Canoemobile programming, these partners often continue working together to enhance youth engagement on their public lands and urban waters.

For example, in 2014, Canoemobile joined an annual community event hosted at a park on the Christina River in Wilmington, Delaware (Figure 2). “More than 200 community members had the opportunity to paddle on the river, most for the first time, expressing that they never knew opportunities like this existed,” explains Pethan. Now, after the event, the hosting organization (Old Brandywine Village., Inc., a community organization) is considering constructing a permanent dock to offer year-round paddling experiences in a community with a limited number of access points to river recreation. In addition, Pethan notes, “this event has sparked conversations with local nonprofits about ways to incorporate Canoemobile programming and other outdoor education opportunities into existing youth programs within the community.”



Figure 2. Canoemobile takes community members for a paddle on the Christina River at the 2014 Brandywine Village Fair in Wilmington, Delaware.

The design of the Canoemobile program also helps to facilitate lasting engagement by individuals. The program is modeled after a Minnesota program called the Urban Wilderness Canoe Adventures (UWCA). The UWCA conducts opportunities within the framework of the [Pyramid of Engagement model](#), a step-wise continuum of outdoor experiences that starts with introductory day trips, progresses to overnights and longer trips farther away from home, and culminates with internships, college scholarships and

careers within the outdoor sector. The Canoemobile program replicates this pyramid by providing thousands of introductory outdoor experiences on urban waterways. As the Canoemobile becomes more established in a given community, Wilderness Inquiry and other partners begin to offer additional experiences to allow the participants to work up the pyramid. “In many cases, youth that have participated in a Canoemobile day experience meet a nonprofit organization or land management agency that sparks their interest and they get plugged into the opportunities that organization offers,” notes Pethan.

Flexible Funding Reflects Community Diversity

Funding sources differ in every city. Some community partners build the Canoemobile experience into their annual budgets. In other project areas, Wilderness Inquiry has long-term grants or cost-share agreements that cover the program, or Wilderness Inquiry and its partners identify different funding sources each year. In most cities, the funding comes from a combination of several sources, explains Pethan. “Wilderness Inquiry and its partners offer resources and support in their respective expertise to split costs across all those involved.”

These educational and financial contributions by program partners have been vital to Canoemobile's success. The students' enthusiasm and obvious joy keep the partners committed to the cause. "We hope the Canoemobile experience has sparked curiosity, pushed comfort zones and inspired connection with the outdoors and with each other," says Pethan. "And, of course, we hope they learned something!"

To see if Canoemobile already serves an area near you, refer to the online [map and schedule](#).

[For more information contact Ashley Pethan, Canoemobile Coordinator, Wilderness Inquiry, 808 14th Avenue, SE, Minneapolis, MN 55414. Phone: 612-676-9400; Email: ashley@wildernessinquiry.org]

Reviews and Announcements

Agricultural Nonpoint Source Pollution

Federal Agencies Sharing Data to Better Quantify Conservation Benefits

The U.S. Department of the Interior (DOI) and the U.S. Department of Agriculture (USDA) have launched a new partnership agreement that will help provide a clear picture of the benefits of farmers' conservation practices on U.S. water quality by developing conservation intensity data sheets that reflect the value of conservation actions. Under this partnership, the DOI's U.S. Geological Survey (USGS) and the USDA's Natural Resources Conservation Service (NRCS) will share data to help quantify the benefits of voluntary agricultural practices at a watershed scale. This information will strengthen the effectiveness of state and federal nutrient reduction strategies while protecting the privacy of individual farmers. The agreement was announced at the Mississippi River Gulf of Mexico Watershed Nutrient Task Force's October 2014 public meeting. For more information see the USGS' [October 21, 2014 news release](#).

Data Resources

EPA Releases Updated Rainfall Erosivity Factor Calculator

EPA has published an [updated calculator](#) to help construction sites calculate their rainfall erosivity factor used in the Revised Universal Soil Loss Equation, or RUSLE. The updated calculator uses data from the NRCS RUSLE, Version 2 (RUSLE2) database. National Pollutant Discharge Elimination System (NPDES) permitting authorities have the option to waive stormwater permitting requirements for small construction sites with a low erosivity potential. If allowed by the NPDES permitting authority, this calculator can be used by small construction sites to determine their eligibility for a low erosivity waiver. Operators of small construction sites in areas where the U.S. Environmental Protection Agency (EPA) is the NPDES permitting authority might qualify for the waiver if the "R" factor is less than 5.0 during the period of construction activity, at the discretion of the permitting authority. For more information about the construction rainfall erosivity waiver, see EPA's [Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver fact sheet](#).

Grasslands Tool Available Online

In mid-2014 the Commission for Environmental Cooperation—an intergovernmental organization to support cooperation among the North American Free Trade Agreement partners, the United States, Mexico and Canada—released an [online tool](#) that provides information on approximately 100 beneficial grassland management practices. Ranging from local techniques to national and continental approaches, the tool contains practical and innovative ideas for conserving and restoring native grasslands as well as boosting ranchers' economic stability. The beneficial management practices were identified by analyzing grassland stewardship-related publications, reports and documents acquired from ranchers, ranching associations, conservation organizations, government programs and academic institutions that were published between 1993 and 2013. The practices range from using effective rest periods after grazing to participating in apprenticeship programs, and all offer tangible strategies to help sustain healthy grasslands and ranching communities.

New Search Engine Enhances Access to USDA Research

The USDA's National Agricultural Library (NAL) recently unveiled [PubAg](#), a user-friendly search engine that gives the public free access to research published by USDA scientists. PubAg is a new portal for literature searches and full-text access of more than 40,000 scientific journal articles by USDA researchers, mostly from 1997 to 2014. New articles by USDA researchers will be added almost daily, and older articles might be added if resources allow.

North America WaterWatch Website Launched

In a joint effort, the USGS and the Water Survey of Canada (WSC) have produced the [North America WaterWatch](#) (NAWW), an online website that displays streamflow conditions throughout much of North America. The site provides a fast, easy-to-use, cartography-based, central Web interface for users to access real-time streamflow conditions for both Canada (at about 1,000 stations) and the United States (at about 8,000 stations). The NAWW site is arranged similarly to [USGS Water Watch](#). Real-time instantaneous flow data are compared against historical daily streamflow percentiles at hydrometric monitoring stations. The stations are then color coded on a map to indicate current flow conditions in relation to normal conditions based on statistical thresholds (i.e., much below normal, below normal, normal, above normal, much above normal, high).

Roadway Water Management Webcasts Available

EPA's Office of Wastewater Management and the Federal Highway Administration's Office of Project Development and Environmental Review have joined together to develop a [series of webcasts](#) highlighting transportation-related water quality issues. Past webcasts are available for download, and include:

- Innovative Transportation Stormwater Management: Green Infrastructure in Road Projects (March 2014)
- Roadway Design and Maintenance of Post-Construction Stormwater Controls (June 2014)
- Winter Roadway Deicing/Anti-icing Operations: Approaches to Help Keep Roads Clear and Waters Clean (November 2014)

Stormwater

EPA Releases New Low Impact Development Barrier Busters Fact Sheet

In October 2014 EPA released the latest fact sheet in its low impact development (LID) [Barrier Busters](#) series. This fact sheet series is primarily intended for state and local decision makers who are considering adopting LID, but who have questions or concerns about possible obstacles. The latest fact sheet, [Soil Constraints and Low Impact Development: Careful Planning Helps LID Work in Clay Soils](#), highlights important issues to consider when trying to implement LID in areas with soil that is compacted or has a high clay content.

Green Infrastructure Collaborative Formed

In October 2014 EPA joined with federal agencies, nongovernmental organizations and private-sector entities to form the [Green Infrastructure Collaborative](#), a network to help communities implement green infrastructure for stormwater control. The collaborative will build capacity for green infrastructure implementation by providing a platform for national stakeholders to: (1) leverage joint efforts to promote the multiple community benefits of green infrastructure, (2) build and share knowledge around emerging green infrastructure technologies and policy issues, and (3) facilitate shared inquiry into the best ways to encourage adoption of green infrastructure technologies at the local level.

New Getting to Green Financing Options Guide Available

In December 2014 EPA released a new guide, [Getting to Green: Paying for Green Infrastructure, Finance Options and Resources for Local Decision-Makers](#). The document summarizes various

funding sources that can be tapped to support stormwater management programs or finance individual projects. The document includes several examples of municipal programs that have used the different funding source types. It also offers additional resources such as a comparative matrix that describes the advantages and disadvantages of funding source types.

United Nations Environment Program Releases Green Infrastructure Guide

The Green Infrastructure Guide for Water Management: Ecosystem-based Management Approaches for Water-Related Infrastructure Projects was released in September 2014 as part of World Water Week. The guide was developed through a collaboration of numerous partners, including the United Nations Environment Program's DHI Centre on Water and Environment, the International Union for Conservation of Nature, The Nature Conservancy and the World Resources Institute. The guide emphasizes that green infrastructure solutions in water management can be viable and cost-effective alternatives to gray water infrastructure, and can support goals across multiple policy areas, including efforts to adapt to climate change.

Watershed Management

Great Lakes Restoration Action Plan Updated

In September 2014 EPA released a new [Great Lakes Restoration Initiative \(GLRI\) Action Plan](#) that outlines the steps federal agencies will take during the next 5 years to protect water quality, control invasive species and restore habitat in the largest freshwater surface water system in the world. The GLRI Action Plan summarizes federal actions planned during fiscal years 2015–2019 using GLRI funding. The actions will build on restoration and protection work carried out under the first GLRI Action Plan, launched in 2010. GLRI resources have been used to double the acreage enrolled in agricultural conservation programs in watersheds where phosphorus runoff contributes to harmful algal blooms in western Lake Erie, Saginaw Bay and Green Bay. So far, GLRI resources have been used to fund more than 2,000 projects to improve water quality, to protect and restore native habitat and species, to prevent and control invasive species, and to address other Great Lakes environmental problems. The Great Lakes Interagency Task Force is chaired by the EPA Administrator and includes the White House Council on Environmental Quality and the U.S. departments of Agriculture, Commerce, Defense, Health and Human Services, Homeland Security, Housing and Urban Development, Interior, State and Transportation.

Report Highlights Need for Nutrient Monitoring in the Mississippi Watershed

In September 2014 EPA's Office of Inspector General published the [results of a review](#) of the steps EPA and states in the Mississippi River Watershed are taking to reduce nutrients contributing to the Gulf of Mexico hypoxic zone. EPA is working to reduce the size of the Gulf of Mexico hypoxic zone principally by encouraging states to develop and implement nutrient reduction strategies. The review suggests that this approach has some promising aspects that could improve local waterways. States have developed partnerships and identified priority watersheds. At the time of the review (early 2014), most of the states had not completed nutrient reduction strategies. In addition, few of the states in the sample had committed to specific reduction targets or timelines. Some states have expressed concern over their limited ability to monitor water quality and measure the progress of the strategies. Without this information, EPA will be unable to determine the level of progress toward achieving basin-wide pollution reduction goals. Therefore, the report recommends that the Assistant Administrator for Water work with state and federal Mississippi River/Gulf of Mexico Watershed Nutrient Task Force members to develop and enhance monitoring and assessment systems that will track the environmental results of state nutrient reduction activities, including their contribution to reducing the size of the Gulf of Mexico hypoxic zone.

U.S. Rivers are Becoming Less Acidic

A study by the USGS revealed that several large rivers in the U.S. are less acidic because of the decline in acid inputs including industrial waste, acid mine drainage and atmospheric deposition. The study showed that alkalinity, a measurement of a river's capacity to neutralize acid

inputs, has increased over the past 65 years in 14 of the 23 rivers assessed. Reduced acidity levels were especially common in rivers in the Northeast (e.g., the Delaware and Schuylkill rivers), the Midwest (e.g., the Illinois and Ohio rivers), and the Great Plains (Missouri River). This study, [Long-term trends in alkalinity in large rivers of the conterminous U.S. in relation to acidification, agriculture, and hydrologic modification](#), was published in the journal *Science for the Total Environment* in August 2014. Information on USGS' long-term water-quality monitoring can be accessed at the [National Water Quality Assessment Program website](#).

Wetlands

Mississippi Wetlands Reduce Pesticides

Isolated lakes in the Mississippi Delta can be transformed into farmer-friendly landscape features that trap agricultural pollutants. These findings by the USDA Agricultural Research Service (ARS) can help producers control the impacts of field runoff on downstream water bodies as far south as the Gulf of Mexico. The ARS led a series of studies that evaluated how effectively an experimental wetland along Mississippi's Coldwater River trapped common crop pesticides. Results showed that only 24 hours were required for pesticide concentrations near an upstream weir to drop almost 65 percent, while only trace amounts of the pesticide were detected at a downstream weir. Pesticide concentrations became undetectable at the upstream weir 21 days later. Read more about this work in the [September 2014 issue of *Agricultural Research* magazine](#).

Other

Environmental Services Center Releases Water Resource Articles

West Virginia University's National Environmental Services Center has published three new water resources management articles online. First, [Maintaining Septic Systems Can Help Community Residents Save Money and Protect Local Waters and Public Health](#) describes resources and strategies local officials can use to educate community residents about caring for and maintaining their septic systems. Second, [Is Design-Build the Future for the Water Sector?](#) discusses the concept of design-build—a technique widely used in large construction projects where one contractor is used for both the design and construction of a project, thereby restricting responsibility to a single entity. Finally, [Managing Our Water Resources for People, the Economy and Nature: It's All Connected](#) provides an overview of integrated water resource management, a holistic approach to managing water now and in the future.

Glyphosate is Widespread in U.S. Waters

USGS scientists [report](#) that glyphosate, known commercially as Round-up (Monsanto) and by many other trade names, and its degradation product AMPA (aminomethylphosphonic acid) are transported off-site from agricultural and urban sources and occur widely in the environment. This study, the largest and most comprehensive assessment of the environmental occurrence of glyphosate and AMPA in the United States conducted to date, summarizes the results of 3,732 environmental samples collected between 2001 and 2010 from 38 states. Glyphosate by itself is no more than slightly toxic to birds, fish and aquatic invertebrates, and it exhibits relatively low oral and dermal acute toxicity to humans. Recent studies, however, have documented the potential for other health effects. Many studies indicate that commercial glyphosate formulations can be more toxic than pure glyphosate due to the toxicity and/or action of additives, such as surfactants (detergents). Most observed concentrations of glyphosate were well below existing health benchmarks and levels of concern for humans or wildlife, and none exceeded the EPA's Maximum Contaminant Level or the Canadian short-term or long-term freshwater aquatic life standards. However, the results indicate that glyphosate and AMPA frequently add to the chronic low-level exposures by plants and animals to mixtures of pesticides and pesticide degradation products in a wide range of ecosystems in the United States. More information about the study was provided in an [article](#) included in the April 2014 issue of the *Journal of American Water Resources*. This article was one of 13 in the April

issue, which focused on contaminants of emerging concern in U.S. waters. Links to abstracts for all the articles are available on [USGS' website](#).

New Agreement Will Reduce Copper in Motor Vehicle Brake Pads

EPA, the automotive industry and the states signed an agreement in January 2015 to reduce the use of copper and other materials in motor vehicle brake pads. The [Copper-Free Brake Initiative](#) calls for cutting copper in brake pads to less than 5 percent by 2021 and 0.5 percent by 2025. This voluntary initiative also calls for cutting the amount of mercury, lead, cadmium, asbestiform fibers and chromium-6 salts in motor vehicle brake pads. These steps will decrease runoff of these materials from roads into the nation's streams, rivers and lakes, where these materials can harm fish, amphibians and plants. This initiative includes cooperation between entities to conduct research, share information and promote education and outreach.

Rainwater Harvesting Academic Literature Review Available

In February 2014 the Water Resources Research Institute of the University of North Carolina released [Rainwater Harvesting: A Comprehensive Review of Literature](#). The report examines the global research on rainwater harvesting and groups its findings into seven topic areas: water quality, microbial characteristics, systems modeling, reduction of potable water consumption, economic and social aspects, stormwater management, and examples of incentive programs and legislation that promote rainwater harvesting.

Report Highlights Land and Water Conservation Fund Project Success Stories

A [report](#) developed by the Trust for Public Land for the USDA Forest Service highlights six unique communities across the country. It showcases how Land and Water Conservation Fund investments have assisted local projects. Success stories highlight areas in California, New Hampshire, South Dakota, Georgia, Montana, Washington and Oregon. For information about Land and Water Conservation Fund-related work, read the [Land Conservation Strengthens Rural Communities: Examples of the Land and Water Conservation Fund at Work](#) blog.

USGS Modeling Effort Improves Understanding of Dissolved Solids in U.S. Rivers

In May 2014 the USGS released [Dissolved Solids Sources, Loads, Yields and Concentrations in Streams of the Conterminous United States](#). Dissolved solids concentrations in water can adversely affect the environment and agricultural, domestic, municipal and industrial water users. As a result, the USGS' National Water Quality Assessment Program developed a SPATIally-Referenced Regression on Watershed Attributes (SPARROW) model that has improved the understanding of sources, loads, yields and concentrations of dissolved solids in streams of the conterminous United States. Results show that the predominant source of dissolved solids yielded from incremental catchments (e.g., small watersheds, typically less than 39 square miles) and delivered to local streams is geologic materials (89 percent), road deicers (5 percent), pasture lands (3 percent), urban lands (2 percent) and cultivated lands (1 percent). Whereas incremental catchments with dissolved solids that originated predominantly from geologic sources or from urban lands are found across much of the United States, those originating predominantly from road deicers are largely found in the Northeast, and those originating predominantly from cultivated or pasture lands are largely found in the West.

West Virginia Releases Acid Mine Drainage Watershed Manual

The West Virginia Department of Environmental Protection's Nonpoint Source Program recently released a new report, [Operation and Maintenance of Passive Acid Mine Drainage Treatment Systems: A Framework for Watershed Groups](#). Designed for watershed groups, the report discusses the fate of many active and passive treatment systems that were installed to address acid mine drainage. The purpose of this report is to encourage watershed groups to develop plans for the operation and maintenance of all their projects and to gather resources necessary to carry out those plans over the long term.

Recent and Relevant Periodical Articles

Giving North Carolina Realtors Credit for Educating Coastal Property Owners

This [article](#), presented in the Summer 2014 issue of the National Oceanic and Atmospheric Administration's newsletter *Digital Coast*, describes North Carolina programs that are providing continuing education credits for real estate agents working in coastal areas. The first training program, Low Impact Development for Water Quality Protection, shares information about stormwater management and low impact development. The information is reinforced as participants play a game in which they use candy as money to buy solutions for pollution reduction (e.g., conservation easements and green roofs). Additional training is being offered on shoreline stabilization and barrier island development, highlighting the environmental benefits of fragile coastal environments and explaining the necessity of certain regulations and permit requirements.

Restoring the World's Largest Freshwater System

This [article](#), presented in the October 2014 issue of the journal *Stormwater*, describes the Great Lakes Restoration Initiative and how it can improve and protect the environmental quality of the Great Lakes system. The GLRI promotes collaboration between multiple U.S. states, as well as between the United States and Canada. The article describes numerous ongoing GLRI efforts.

Scientific Report Shows Strong Connection between Wetlands, Streams, Rivers and Estuaries

This January 2015 [blog entry](#), written by Lek Kadeli, the Acting Assistant Administrator in EPA's Office of Research and Development, discusses the findings of a new EPA report, [Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence](#). EPA researchers examined more than 1,200 peer-reviewed, published scientific studies to learn how small streams and wetlands connect to larger, downstream water bodies.

Websites Worth a Bookmark

EPA's Agriculture Website (<http://www.epa.gov/agriculture/>)

This site offers the latest news from EPA related to agriculture, including policy updates, the latest research findings, announcements of awards and recognition, and availability of funding sources and resource documents.

EPA's EnviroAtlas (<http://enviroatlas.epa.gov/enviroatlas/>)

EPA's EnviroAtlas is a Web-based interactive tool that integrates more than 300 separate data layers. The tool helps decision makers understand the implications of planning and policy decisions on fragile ecosystems, as well as the effects on the communities who depend on goods and services from these ecosystems. EnviroAtlas is designed for people from all levels of government, professionals, researchers, educators, non-governmental organizations and anyone interested in considering the benefits or impacts of a decision, such as siting a new road or city park.

Smart Growth Network (<http://www.smartgrowth.org>)

More than 40 organizations constitute the Smart Growth Network (SGN), including environmental groups, historic preservation organizations, professional organizations, developers, real estate interests, and local and state government entities. The SGN website provides a forum for sharing information, innovative policies, tools and ideas for ways to grow that boost the economy, protect the environment and enhance community vitality.

Calendar

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

March 2015

3/15–18

[American Water Works Association, Sustainable Water Management Conference](#), Portland, OR

3/30–4/1

[American Water Resources Association Spring Specialty Conference on Water for Urban Areas: Managing Risks and Building Resiliency](#), Los Angeles, CA

April 2015

4/17

[10th Annual Regional Stormwater Seminar—MS4 Permits: Getting Maximum Effectiveness out of “Minimum” Measures](#), Atlanta, GA

4/28–29

[New England Interstate Water Pollution Control Commission’s 26th Annual Nonpoint Source Pollution Conference—The Watershed Approach: Addressing Today’s Challenges with an Eye on the Future](#), Freeport, ME

May 2015

5/1–4

[River Rally](#), Santa Ana Pueblo, NM.

5/5–8

[2015 National Mitigation & Ecosystem Banking Conference](#), Orlando, FL

5/17–20

[14th National Watershed Conference: National Watershed Program Partner Summit](#), Fort Worth, TX

5/31–6/4

[Society of Wetland Scientists 2015 Annual Meeting](#), Providence, RI

June 2015

6/1–2

[Grey to Green 2015: Exploring the Economics of Urban Agriculture and Resistance](#), Toronto, Ontario, Canada

6/24–27

[Association for Environmental Studies and Sciences 2015 Conference: Confronting Frontiers, Borders, and Boundaries](#), San Diego, CA

July 2015

7/26–28

[Water Environment Federation’s Nutrient Symposium 2015](#), San Jose, CA

7/26–29

[Soil and Water Conservation Society International Annual Conference](#), Greensboro, NC

August 2015

8/2–6

[StormCon 2015](#), Austin, TX

8/5–7

[American Society of Civil Engineers Watershed Management Symposium](#), Reston, VA

September 2015

9/22–23

[National Ground Water Association’s Upper Great Plains Groundwater Conference](#), Cheyenne, WY

9/26–30

[WEFTEC](#), Chicago, IL

October 2015

10/5–8

[CitiesAlive: 13th Annual Green Roof and Wall Conference](#), New York, NY

10/14–15

[The Villanova Urban Stormwater Partnership’s 9th Stormwater Management Symposium](#), Villanova, PA

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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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