Nonpoint Source
News-Notes

October 2016, #100

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

EPA United States Environmental Protection Agency

Issue #100 EPA Celebrates a *News-Notes* Milestone

Notes on the National Scene

Tracking Change Through Time: 100 Issues of News-Notes

This month marks the publication of *Nonpoint Source News-Notes'* 100th issue. The U.S. Environmental Protection Agency (EPA) launched the very first issue of *News-Notes* exactly 27 years ago, in October 1989. Since that time, *News-Notes* has recorded remarkable changes in nonpoint source (NPS) pollution priorities, science and awareness. When *News-Notes* started, the Internet was brand new. Nobody had websites or email. Information was gleaned the old-fashioned way—through books, magazines, journals, newspapers, letters, and phone calls. Back then, NPS pollution control programs largely targeted agricultural sources. Now, almost 30 years later, NPS pollution control efforts are directed at everything from agricultural, timber and urban impacts to emerging contaminants such as pharmaceuticals—and we have access to seemingly unlimited amounts of information.

News-Notes has evolved with the times. Now only available as an online publication, *News-Notes* continues to strive to provide the latest information about new publications, tools, data, regulations and science that might help our readers, while also taking time to celebrate NPS and watershed protection successes that show us why we all continue to work for cleaner waters. How has the NPS world changed? Read on.

Scientists check for spilled oil in marsh soil. See page 9.

Inside this Issue

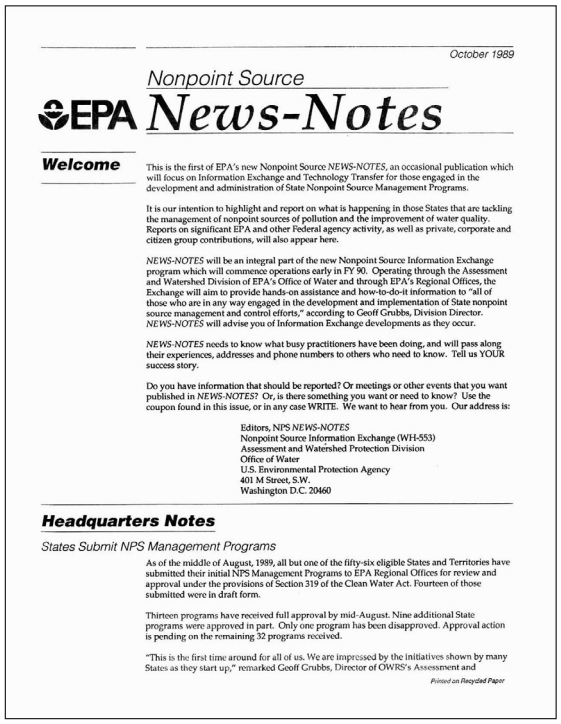
Stay informed! To receive an email alerting you that a new issue of EPA's *Nonpoint Source News-Notes* has been posted online (approximately three times per year), please subscribe to the *News-Notes* notification service (instructions available at www.epa.gov/newsnotes).

The Early Years

The first issues of News-Notes focused on the fledgling NPS programs at the state and federal levels, highlighted states' efforts to address their priority pollution sources, and discussed helpful tools (e.g., publications or computer diskettes accessible only through the mail).

Highlights from Issue 1 (October 1989) include:

- States submit their very first statewide NPS management plans for EPA approval.
- EPA develops its first annual NPS Report to Congress, as well as its first *Water Quality of the Nation's Lakes* report.
- EPA and the U.S. Department of Agriculture hold a joint conference to discuss collaboration on NPS issues.
- EPA releases *Nonpoint Sources: Agenda for the Future*, which highlights EPA's commitment to a national NPS program.



October 1989

Nonpoint Source

EPA *News-Notes*

Welcome

This is the first of EPA's new Nonpoint Source *NEWS-NOTES*, an occasional publication which will focus on Information Exchange and Technology Transfer for those engaged in the development and administration of State Nonpoint Source Management Programs.

It is our intention to highlight and report on what is happening in those States that are tackling the management of nonpoint sources of pollution and the improvement of water quality. Reports on significant EPA and other Federal agency activity, as well as private, corporate and citizen group contributions, will also appear here.

NEWS-NOTES will be an integral part of the new Nonpoint Source Information Exchange program which will commence operations early in FY 90. Operating through the Assessment and Watershed Division of EPA's Office of Water and through EPA's Regional Offices, the Exchange will aim to provide hands-on assistance and how-to-do-it information to "all of those who are in any way engaged in the development and implementation of State nonpoint source management and control efforts," according to Geoff Grubbs, Division Director. *NEWS-NOTES* will advise you of Information Exchange developments as they occur.

NEWS-NOTES needs to know what busy practitioners have been doing, and will pass along their experiences, addresses and phone numbers to others who need to know. Tell us YOUR success story.

Do you have information that should be reported? Or meetings or other events that you want published in *NEWS-NOTES*? Or, is there something you want or need to know? Use the coupon found in this issue, or in any case WRITE. We want to hear from you. Our address is:

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Headquarters Notes

States Submit NPS Management Programs

As of the middle of August, 1989, all but one of the fifty-six eligible States and Territories have submitted their initial NPS Management Programs to EPA Regional Offices for review and approval under the provisions of Section 319 of the Clean Water Act. Fourteen of those submitted were in draft form.

Thirteen programs have received full approval by mid-August. Nine additional State programs were approved in part. Only one program has been disapproved. Approval action is pending on the remaining 32 programs received.

"This is the first time around for all of us. We are impressed by the initiatives shown by many States as they start up," remarked Geoff Grubbs, Director of OWRS's Assessment and

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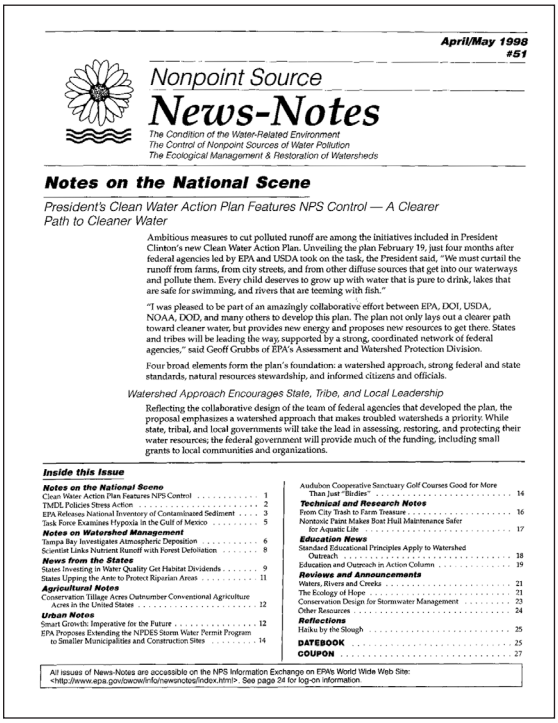
***NPS News-Notes* Issue #1 (1989)**

Highlights from Issue 2 (December 1989) include:

- Congress appropriates $40 million to implement a national NPS Program, which allows funds to be made available to states with EPA-approved NPS programs.
- All 56 eligible state and territories had submitted NPS programs to EPA. As of November 20, 1989, EPA had approved 35 of these programs: 16 in full, 19 in part.

The Late Nineties and Beyond

The pace of *News-Notes* publication has slowed over the years, shifting from a high of six to eight issues per year in 1990–1993 to about three issues per year more recently. As a result, the middle issue (Issue 50) was published in the late 1990s—only about 10 years after *News-Notes* was launched. To better capture the mid-point of *News-Notes*' publishing past, we examine the 1998–2002 time period. By then the Internet had arrived, and many of the articles and resources included Web addresses to guide readers to additional information. Although some focus remained on agricultural NPS pollution sources, we start to see more attention given to the water quality and health benefits afforded by the watershed approach—and the introduction of the low impact development/smart growth movement. More information is being conveyed online, and older tools and techniques are being repurposed to be more efficient or to be used in new, innovative ways.



April/May 1998
#51

Nonpoint Source

News-Notes

The Condition of the Water-Related Environment
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Notes on the National Scene

President's Clean Water Action Plan Features NPS Control — A Clearer Path to Cleaner Water

Ambitious measures to cut polluted runoff are among the initiatives included in President Clinton's new Clean Water Action Plan. Unveiling the plan February 19, just four months after federal agencies led by EPA and USDA took on the task, the President said, "We must curtail the runoff from farms, from city streets, and from other diffuse sources that get into our waterways and pollute them. Every child deserves to grow up with water that is pure to drink, lakes that are safe for swimming, and rivers that are teeming with fish."

"I was pleased to be part of an amazingly collaborative effort between EPA, DOI, USDA, NOAA, DOD, and many others to develop this plan. The plan not only lays out a clearer path toward cleaner water, but provides new energy and proposes new resources to get there. States and tribes will be leading the way, supported by a strong, coordinated network of federal agencies," said Geoff Grubbs of EPA's Assessment and Watershed Protection Division.

Four broad elements form the plan's foundation: a watershed approach, strong federal and state standards, natural resources stewardship, and informed citizens and officials.

Watershed Approach Encourages State, Tribe, and Local Leadership

Reflecting the collaborative design of the team of federal agencies that developed the plan, the proposal emphasizes a watershed approach that makes troubled watersheds a priority. While state, tribal, and local governments will take the lead in assessing, restoring, and protecting their water resources; the federal government will provide much of the funding, including small grants to local communities and organizations.

Inside this Issue

All issues of News-Notes are accessible on the NPS Information Exchange on EPA's World Wide Web Site: <http://www.epa.gov/owow/info/newsnotes/index.html>. See page 24 for log-on information.

***NPS News-Notes* Issue #51 (1998)**

Highlights from Issue 51 (April/May 1998) include**:**

- President Bill Clinton unveils a new Clean Water Action Plan, which focused on a watershed approach, strong federal and state standards, natural resources stewardship, and informed citizens and officials.
- The Mississippi River/Gulf of Mexico Watershed Nutrient Task Force met for the first time to discuss problems with hypoxia in the Gulf of Mexico.
- To help protect water quality, states are finding ways to protect stream buffers in residential and agricultural areas, such as by purchasing easements and designing new regulations.

Tracking Change Through Time: 100 Issues of News-Notes (continued)

Highlights from Issue 60 (March 2000) include:

- EPA issues final National Pollutant Discharge Elimination System Stormwater Phase II Rules for small urbanized areas and construction sites covering fewer than five acres.
- Cities and states are moving forward with green building techniques such as rooftop gardens and permeable pavements to save money and improve the environment.
- The Core 4 approach—integrating conservation tillage, crop nutrient management, weed and pest management, and conservation buffers—can help farmers reduce pollution and maintain or improve their bottom line.

Highlights from Issue 67 (January 2002) include:

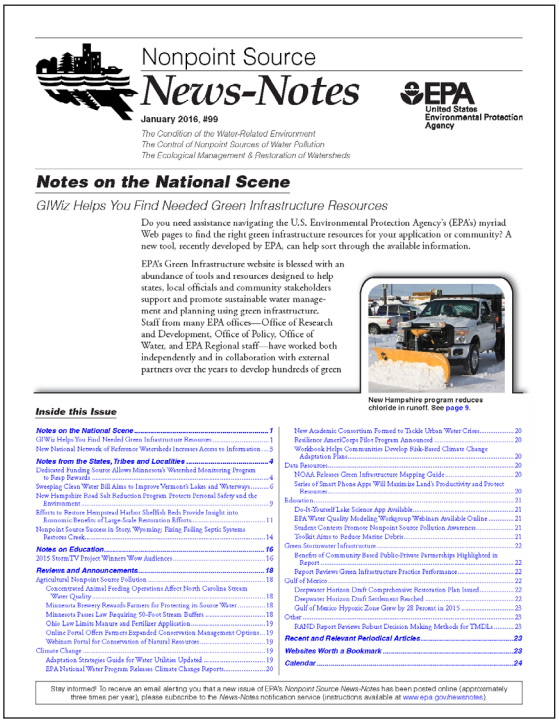
- States and local governments are implementing smart growth practices—finding alternatives to traditional development by applying a comprehensive water resource planning approach and better site design.
- Low impact development is quickly becoming accepted as an effective approach to stormwater management and environmental protection.
- The Conservation Fund's first Web-based workshop (i.e., "distance learning") reaches a wide audience across the nation.

Present Day

These days *News-Notes* still retains much of the same look, but continues to evolve with the state of the science and technology. Every article and announcement includes numerous links to additional information. Articles still address agricultural issues, but many more discuss stormwater runoff, low impact development and green stormwater infrastructure—as well as tools and data sources available to support watershed work, including protection efforts to maintain healthy watersheds. Some past concerns, such as the microbe Pfiesteria (see Issue 50), have faded from prominence, only to be replaced by new problems, such as the discovery of pharmaceuticals (see Issue 94) and other emerging contaminants of concern in streams.

Highlights from our most recent issue, Issue 99 (January 2016), include:

- EPA releases the beta version of Green Infrastructure Wizard (GIWiz), which helps users sort through EPA's myriad tools and resources to find the ones they need.
- Federal partners release a Web-based resource that provides quality-assured data and information for reference watersheds and stream monitoring sites across the United States.
- Fourth annual stormwater video competition highlights programs and practices that are helping utilities and governments control stormwater pollution.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GIWiz Helps You Find Needed Green Infrastructure Resources
Do you need assistance navigating the U.S. Environmental Protection Agency's (EPA's) myriad Web pages to find the right green infrastructure resources for your application or community? A new tool, recently developed by EPA, can help sort through the available information.
EPA's Green Infrastructure website is blessed with an abundance of tools and resources designed to help states, local officials and community stakeholders support and promote sustainable water management and planning using green infrastructure. Staff from many EPA offices—Office of Research and Development, Office of Policy, Office of Water, and EPA Regional staff—have worked both independently and in collaboration with external partners over the years to develop hundreds of green
New Hampshire program reduces chloride in runoff. See page 9.
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***NPS News-Notes* Issue #99 (2016)**

Our current issue, Issue 100, includes information about recently released resources that will help water managers achieve their goals—such as a new tool to help localities remove obstacles to smart growth and three Web-based templates designed to help states develop wetland water quality standards—as well as updated information about the next steps in the cleanup effort for the 2010 BP *Deepwater Horizon* oil spill in the Gulf of Mexico, among other topics.

Do you want to see how far we've come in the NPS pollution control arena? EPA will soon

Tracking Change Through Time: 100 Issues of News-Notes (continued)

release on its NPS website a report titled *National Nonpoint Source Program—a catalyst for water quality improvements*, which highlights effective NPS activities underway across the nation. It provides a snapshot of strategies that state agencies, territories and tribes are using to tackle the spectrum of water quality issues related to NPS pollution, and highlights our accomplishments to date. To better understand the long and often difficult journey that led up to the water quality successes being documented in the 2016 NPS highlights report, we need only look back through the past 100 issues of *News-Notes*. Over nearly 30 years and 3,000 pages, *News-Notes* has chronicled the NPS program's early days, described the many obstacles we've overcome along the way, celebrated our successes and exciting discoveries, and prepared us for the challenges we'll continue to face as we move into the future.

Want to read more?

Access archived issues at www.epa.gov/newsnotes.

Tool Helps Rural Communities Assess Opportunities for Smart Growth

Rural communities cover much of the United States, but often grow at a slower rate and have fewer economic resources than metropolitan areas. Smart growth approaches to development can help these places strengthen their economies while protecting both their environment and the health of their residents. To help small communities identify and prioritize strategies for reaching their economic, social and environmental goals, in 2015 the U.S. Environmental Protection Agency (EPA) released a guide titled *Smart Growth Self-Assessment for Rural Communities* (Figure 1). This document contains descriptions of strategies that rural communities can use to evaluate their existing policies, plans, codes and zoning regulations to identify ways to promote sound development practices through strategic plans, policies, incentives and community engagement.

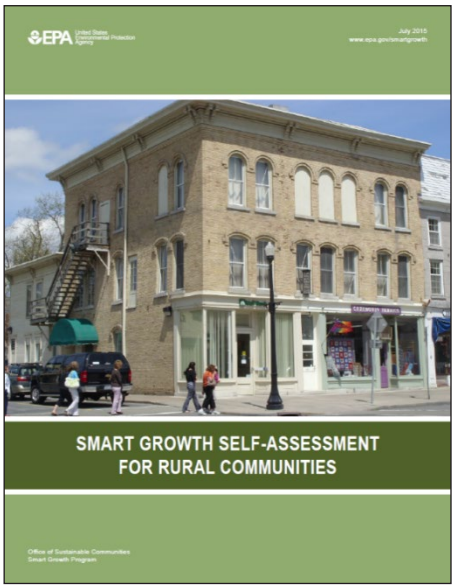


Figure 1. EPA's *Smart Growth Self-Assessment for Rural Communities* guide helps highlight goals and opportunities for change.

Users are guided through a simple self-assessment process designed to help communities establish a baseline understanding of their current policies and plans by answering a series of "Yes" or "No" questions centered around 11 key topic areas:

(1) Revitalize Village and Town Centers
(2) Strengthen the Local Economy
(3) Engage and Connect Community Members
(4) Improve Health and Promote Active Living
(5) Protect Natural Habitats and Ecosystems
(6) Support Productive Agriculture for a Variety of Markets
(7) Meet Housing Needs for Different Ages and Incomes
(8) Preserve Historic and Cultural Resources
(9) Provide Transportation Choices
(10) Invest in Efficient Public Infrastructure Systems and Operations
(11) Use Energy Efficiently and Provide Renewable Energy

Each section of the assessment tool focuses on a specific set of issues and requires review of available policy and planning documents, as well as input from multiple parts of the local government, community residents and other stakeholders (Figure 2). The self-assessment tool was designed so communities can focus on the sections of the self-assessment that are most relevant to their needs.

Goal: Protect Natural Habitats and Ecosystems	Adopted?	Add or Improve?	Context [219]
Using Water More Efficiently			
Do codes require water efficiency and stormwater runoff reduction in new development and redevelopment?			
Strategy 1: Codes require new homes to meet at least the minimum requirements of a program designed to use water more efficiently and improve water quality.[220]	☐	☐	1,2,3
Strategy 2: Codes encourage re-use of gray water where some or all water used in a building is captured, treated, and used or reused on site.[221]	☐	☐	1,2,3
Strategy 3: Codes include incentives or requirements for green infrastructure including permeable pavement, vegetated swales near roadways, green roofs, and rain gardens.[222,223,224,225,226,227]	☐	☐	1,2,3

This snapshot of the checklist tool shows a portion of one section included under the Natural Habitats and Ecosystems goal area. If a community has already adopted a given strategy, they check the "Adopted?" box. If the community wants a particular strategy to be an area of focus for a community, they check the "Add or Improve?" column. The rightmost column ("Context") helps a community find strategies that are most likely to apply to them: 1 = large town/small city (> 10,000 people), 2 = small town/village (<10,000 people), and 3 =rural areas/open space (low-density areas). The completed checklist will help identify what is important to the community and where gaps exist in their policies, plans, codes and zoning regulations. The numbers next to each strategy description refer to footnotes that provide more information or link to examples and other resources.

Figure 2. An example snapshot of the Smart Growth Self-Assessment checklist tool, with brief instructions.

"Many communities find it easier to do a few of the checklist sections that are most critical, rather than the entire suite at the same time," notes Dr. John Thomas, Acting Associate Director in EPA's Office of Sustainable Communities. To simplify communities' efforts to perform the assessment, EPA is developing a PDF version of the tool that can be filled in electronically.

The tool was specifically designed to avoid prescriptive solutions, with the understanding that communities are diverse and have different needs and circumstances. It was designed to help communities identify actions they could pursue based on local needs, cultural factors and available resources. The document also contains follow-up actions that the community can undertake to implement programs and policies based on the results of the self-assessment. Such actions could include developing an action plan that details how to advance each high-priority strategy, identifying leaders who will champion and be responsible for the various efforts, establishing timelines for actions, and hosting community engagement events such as workshops and charrettes.

Join the Smart Growth Listserve

To receive the latest news on the smart growth self-assessment tool and other resources, subscribe to EPA's smart growth email list.

Self-Assessment in Action

Road tested in communities from Maine to Arkansas to Colorado, this self-assessment has already helped rural areas find new opportunities to spur economic development, improve quality of life for residents and protect the natural environment.

- In Damariscotta, Maine, a community with significant seasonal tourism, the self-assessment helped community members identify a key underutilized strength—local nonprofits and nonprofit collaborations—that could help them better capitalize on downtown economic development for the benefit of year-round residents.
- In Osceola, Arkansas, the self-assessment revealed how re-writing local land use plans could be an effective strategy to remove blight and underutilized properties by helping prioritize areas for infill development.
- In Steamboat Springs, Colorado, the self-assessment helped local officials create a plan to further incentivize green building as a way to support local sustainability goals; this strategy was also seen as a way to lower housing prices by decreasing energy costs and other monthly expenses for renters, and by helping builders reduce costs through tax credits and other programs.

[Excerpted from "New Tool Helps Rural Communities Assess Opportunities for Smart Growth and Development," an EPA Connect blog post by Matthew Dalbey and Doug O'Brien.]

[For more information, contact the U.S. Environmental Protection Agency, Office of Sustainable Communities (MC 1807T), 1200 Pennsylvania Avenue NW, Washington, DC 20460. Phone: 202-566-2878; Email: smartgrowth@epa.gov]

Tool Helps Rural Communities Assess Opportunities for Smart Growth (continued)

Webcasts Highlight Green Infrastructure Topics

Want to add green infrastructure elements into your community or establish a green infrastructure program? The U.S. Environmental Protection Agency's (EPA's) free Green Infrastructure Webcast Series can help. Designed for public officials and practitioners nationwide, the series features leading academics and professionals sharing their expertise on a range of topics related to green infrastructure.

You may register for upcoming webcasts and watch them live online. To receive updates on upcoming webcasts and registration availability, sign up for EPA's GreenStream listserv by sending a blank email to join-greenstream@lists.epa.gov.

Did you miss the one you wanted to see? More than a dozen past webcasts are available either as YouTube videos or as downloadable slides and transcripts.

- Greening Your Backyard: Water Efficiency and Stormwater Solutions for Homeowners and Communities
- Greening Vacant Lots
- Ahead of the Curve – Implementing Green Infrastructure in Rural and Growing Communities
- Winter Weather Operation and Maintenance (O&M) for Green Infrastructure
- Paying for Stormwater - The Benefits of a Utility
- Getting More Green from your Stormwater Infrastructure
- Green Infrastructure for Arid Communities
- Green Infrastructure for Localized Flood Management
- Innovative Financing for Green Infrastructure
- Green Infrastructure and Smart Growth
- Building Climate Resiliency with Green Infrastructure .
- More Bang for the Buck: Integrating Green Infrastructure into Existing Public Works Projects
- Case Studies: Implementing Green Infrastructure under Enforcement Orders
- O&M and Green: Best Practices for Green Infrastructure Operations and Maintenance

Greening America's Capitals Program Expands

Sometimes people need to see something to truly understand and imagine its possibilities. The U.S. Environmental Protection Agency (EPA)'s Greening America's Communities (GAC) program, originally known as Greening America's Capitals, is helping cities develop an implementable vision of environmentally friendly neighborhoods that incorporates innovative green infrastructure and other sustainable design strategies. Launched in 2010, the program helps city stakeholders see how their neighborhoods could look with green elements and then guides them as they craft a plan for making that vision a reality. EPA hopes to not only help communities increase their sustainability and environmental and economic health, but also to inspire local and state leaders to expand this type of work elsewhere.

How Does the GAC Program Work?

After selecting program participants—about five per year—through a competitive process, EPA funds a team of designers to visit each community to produce diagrams and illustrations intended to initiate or complement a larger planning process for the pilot neighborhood.

"Many cities want to incorporate green elements, but don't know where to start," explained Clark Wilson, with EPA's Office of Sustainable Communities. "Other cities have a green infrastructure program underway, but are looking for guidance and suggestions. Our visualization tool allows people to see what the changes would look like, which helps get them interested and excited about the prospects. Then we can work backward from there to help the city determine what they can do, in terms of policy and code changes, to make it happen."

The GAC project areas often serve as the testing ground for citywide actions, such as changes to local codes and ordinances that would better support environmentally sustainable growth and

green infrastructure. The design team and EPA, along with partners from other federal agencies, also help city staff develop specific implementation strategies and identify possible funding sources.

GAC in Action

From 2010 to 2014, EPA's GAC program helped 23 capital cities and the District of Columbia with sustainable design strategies. EPA developed reports for these projects that offer detailed designs and ideas for environmentally friendly ways to revitalize neighborhoods, spur economic development, offer transportation options, improve public health and protect natural resources.

In 2014 the GAC program worked with the city of Columbus, Ohio, to create several design options for the western portion of the Milo-Grogan neighborhood—a low-income neighborhood one mile north of downtown Columbus. The process, along with the results of the effort, are described in the *Greening America's Capitals: Columbus, Ohio* report, released in April 2016. The city sought to revitalize the neighborhood, expand economic development opportunities, and explore the use of green infrastructure—using plants and trees to manage and treat stormwater—as a way to reduce localized flooding and improve neighborhood aesthetics. EPA brought together a team of federal agency staff and consultants to help the city create a plan for the area, which was developed with input from community stakeholders and residents. The final design options offered an array of green infrastructure approaches to sustainable stormwater management, including bioretention cells, porous pavement, street trees, and vegetated curb bulb-outs (Figure 1). Additional design strategies include streetscape improvements, lighting, and public/civic art expressions. Using the plan as a starting point, Columbus has just begun to take steps to bring their ideas to life.

Proposed design elements improve transportation and sustainability. Sharrows, which are low-traffic automobile lanes that have been marked with common symbols (arrows and bicycle graphic), clearly indicate shared roadway use for vehicles and bicycles. On-street parking along the southern side is better defined by curb bulb-outs at intersection corners as well as a permeable pavement surface. Bioretention cells along the northern street side allow for improved stormwater runoff infiltration and diversion from the municipal stormwater system. Equally spaced street trees along both sides of the street provide much needed shade on new sidewalks and help increase overall urban tree canopy cover.

Figure 1. East 2nd Avenue in the Milo-Grogan neighborhood in Columbus, Ohio, before (lower right) and after (top) proposed design elements were overlaid on the photo.

Seeing Results

For other cities, the vision has already become a reality. For example, Little Rock, Arkansas, was one of the first group of cities that participated in the program in 2010. When applying for the program, the mayor of Little Rock had asked EPA to help catalyze the redevelopment potential of the city's ailing Main Street. In response, EPA funded a team of designers to visit Little Rock and produce illustrations showing streetscape improvements that could enhance the pedestrian experience along Main Street, improve the aesthetics, and incorporate green

infrastructure elements to collect and treat stormwater runoff that would otherwise flow directly into the Arkansas River (Figure 2). To wrap up the project, stakeholders participated in a 3-day charrette, which included a review of the analytical and design work completed, as well as five focus sessions that addressed topics such as potential funding and implementation resources.

During the 2010 GAC project, designers took a picture of the existing Main Street in Little Rock, Arkansas (left) and overlaid it with illustrations of vegetated bioretention areas and additional street trees (right) to help the city and the public envision how these types of improvements could revitalize the city's street.

Figure 2. A photo of Main Street in Little Rock, Arkansas, used as part of the 2010 GAC visioning process.

Little Rock implemented many of the streetscape improvements suggested during the 2010 GAC visioning process. As seen in this 2015 photo, the addition of street trees, bioretention planters, and pedestrian-friendly permeable pavements has created a vibrant space.

Figure 3. Main Street in Little Rock, Arkansas, 2015.

The 2010 GAC program helped Little Rock lay the foundation for Main Street's redevelopment. Since that time, with a vision and plan in hand, the city was able to leverage $900,000 through the Arkansas Natural Resources Commission for green infrastructure improvements, and $1.2 million from the Pulaski County Brownfields for cleanup of properties on Main Street. The city also received a $150,000 grant from the National Endowment for the Arts through the Our Town grant program that enabled the city to continue envisioning improvements to Main Street, and successfully brand the entire package of efforts as the Main Street "Creative Corridor." After 5 years of dedicated action, Little Rock held an official opening for the Main Street Creative Corridor on September 15, 2015 (Figure 3).

The Program's Reach is Expanding

Initially the program was only available to state capitals, but in 2016 EPA expanded the program to include communities that participated either in EPA's Making a Visible Difference in Communities initiative or in the Obama Administration's Strong Cities, Strong Communities initiative. The eligibility parameters for the 2017 program will depend on place-based initiatives put forth by the next Administration.

In June EPA announced that six cities had been selected for the 2016 round of technical assistance under its GAC program: Columbia, SC; Brownsville, TX; Oklahoma City, OK; Muscatine, IA; Honolulu, HI; and Multnomah County, OR. Many of these projects will focus on incorporating green infrastructure elements to control stormwater and flooding, reduce heat island effects, and improve community life. More information about each 2016 project is available on the GAC website.

Greening America's Capitals Program Expands (continued)

"EPA is excited to roll up our sleeves and start working with the next round of cities through Greening America's Communities," said EPA Administrator Gina McCarthy in a press release announcing this year's recipients. "This program is another example of EPA making a visible difference in communities—helping build healthy, vibrant neighborhoods and stronger local economies centered on environmental sustainability."

[For more information, contact Clark Wilson, U.S. Environmental Protection Agency, Office of Sustainable Communities, 1200 Pennsylvania Ave., NW [MC 1807T], Washington, DC 20460. Phone: 202-566-2880; Email: wilson.clark@epa.gov]

Deepwater Horizon Oil Spill: Settlement Will Fund Restoration

On April 20, 2010, the BP *Deepwater Horizon* mobile drilling unit exploded, caught fire and sank in the Gulf of Mexico, resulting in the death of 11 workers and injury of 17 others. The damaged oil well discharged oil and natural gas for 87 days after the explosion, resulting in the release of approximately 3.19 million barrels (134 million gallons) of oil into the Gulf—the largest offshore oil spill in U.S. history. Six years later, on April 4, 2016, a federal court in New Orleans entered a consent decree resolving civil claims against BP. This historic settlement resolves the U.S. government's civil penalty claims under the Clean Water Act (CWA), the governments' claims for natural resources damage claims under the Oil Pollution Act (OPA) of 1990, and also implements a related settlement of economic damage claims of the Gulf States and local governments. Taken together, this resolution of civil claims is worth more than $20 billion and is the largest settlement with a single entity in the history of federal law enforcement.

Impacts of the Deepwater Horizon Spill

- 134 million gallons of oil released into the ocean
- A 15,300-square-mile oil slick created
- 1,300 miles of shoreline fouled by oil
- 1.8 million gallons of chemical dispersant applied to oil in the Gulf

Under the consent decree BP will pay a CWA civil penalty of $5.5 billion (plus interest), $8.1 billion in natural resource damages (this includes $1 billion BP already committed to pay for early restoration) under OPA, up to an additional $700 million (some of which is in the form of accrued interest) for adaptive management or to address injuries to natural resources that are currently unknown but could come to light in the future, and $600 million for other claims. Under the economic damages settlement noted above, BP will pay $4.9 billion to the Gulf States (Alabama, Florida, Louisiana, Mississippi and Texas) to resolve their economic damage claims. In other, related agreements, BP will pay up to another $1 billion to resolve similar claims the company faces from various local governments in the Gulf region. This settlement includes both the largest civil penalty ever paid by any defendant under any environmental statute, and the largest recovery of damages for injuries to natural resources.

During the natural resources damage assessment a consultant uses a pole to check for oil in the marsh island's sediment.
Photo credit: NOAA

Restoring Affected Ecosystems

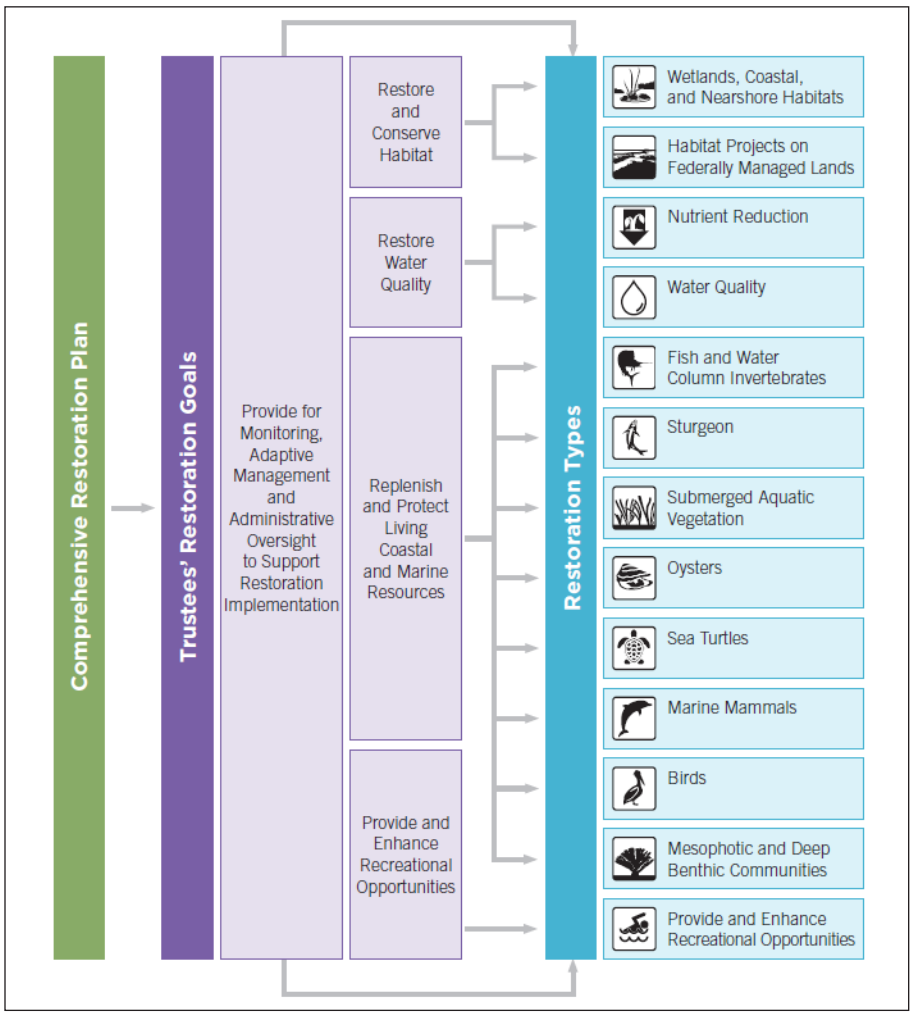
Under the 2012 RESTORE Act (Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act), which Congress enacted in 2012 in response to the spill, 80 percent of the $5.5 billion CWA penalty is allocated for environmental restoration, economic recovery projects, and tourism and seafood promotion in the five Gulf states. As noted in the RESTORE Act, the state-federal Gulf Coast Ecosystem Restoration Council (Council) administers a portion of these funds known as the Council-Selected Restoration Component to "undertake projects and programs, using the best available science, which would restore and protect the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, coastal

Deepwater Horizon Oil Spill: Settlement Will Fund Restoration (continued)

wetlands, and economy of the Gulf Coast." The Council is focusing on 10 key watersheds across the Gulf to concentrate and leverage available funds to address critical ecological needs in high-priority locations. The Council developed a public-reviewed Funded Priorities List (FPL) that will direct the use of funds under the RESTORE Act. Some of the items on the initial FPL include restoring over 200,000 acres of valuable forest and wetland habitat through hydrologic restoration activities (e.g., backfilling 16.5 miles of abandoned oil and gas canals) and protecting existing coastal ecosystems by plugging 11 abandoned oil and gas wells. For more information, including fact sheets and interactive project area maps, refer to the Gulf Coast Ecosystem Restoration Council website.

Addressing Natural Resources Damages

The *Deepwater Horizon* spill is also subject to the provisions of the OPA, which addresses preventing, responding to, and paying for oil pollution incidents in navigable waters, adjoining shorelines and the exclusive economic zone of the United States. Under the authority of OPA, a group of federal and state trustees—composed of representatives from four federal agencies and all five Gulf states—was established on behalf of the public. As required under OPA, the trustees conducted a natural resource damage assessment and, in February 2016, released the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement* (PDARP/PEIS), which describes the trustees' assessment and proposed restoration plan. The trustees also released a supplementary document, the *Plan for Deepwater Horizon Oil Spill Natural Resource Injury Restoration: An Overview*, which provides an easy-to-read overview of key components of the PDARP/PEIS.



The BP natural resource damages settlement will help achieve five restoration goals by funding Gulf restoration projects in 13 categories. Rather than identifying and analyzing specific restoration projects, the Gulf ecosystem restoration plan provides higher level guidance for identifying, evaluating and selecting projects.

As outlined in the April 2016 consent decree, BP will make 15 annual payments to the *Deepwater Horizon* Oil Spill Natural Resource Damage (NRD) Fund beginning in April 2017 and continuing through 2031. According to the restoration plan, the NRD funding will support Gulf restoration projects within 13 categories selected by the federal and state trustees to meet five restoration goals (see flow chart). The final plan proposes a distributed governance structure that assigns an implementation group for each of the restoration areas. Each implementation group will develop project-specific restoration plans for their respective restoration area, consistent with the restoration funding allocations. As NRD funds are received from BP, a series of payments will be distributed to each implementation group over the course of 15 years. Each implementation group can determine a project-specific restoration plan development schedule that most appropriately benefits the restoration type. (Note: all project-specific restoration plans will be subject to a public comment and review period.)

Public involvement was an integral part of the development of the comprehensive restoration plan. The trustees engaged the public soon after the spill, including a formal scoping process in early 2011. These

Deepwater Horizon Oil Spill: Settlement Will Fund Restoration (continued)

initial efforts helped inform the trustees about the types of restoration and environmental impacts important to consider in the final plan. The trustees have kept the public informed about the progress of restoration and sought continued input on restoration projects by holding public meetings and communicating by email and through the Gulf Spill Restoration website.

[For more information contact Nanciann Regalado, U.S. Fish and Wildlife Service, Deepwater Horizon Natural Resource Damage Assessment Office, 1875 Century Blvd., Atlanta, GA 30345. Phone: 678-296-6805 Email: nanciann_regalado@fws.gov]

Notes from the States, Tribes and Localities

New Healthy Watersheds Grant Program Supports Protection Projects

In June 2016 the U.S. Environmental Protection Agency (EPA) and the U.S. Endowment for Forestry and Communities (Endowment) awarded $1.4 million in grants for nine watershed protection projects in seven states under the new Healthy Watershed Consortium Grant Program. The grants are supporting a variety of efforts by providing short-term funding to leverage larger financing for targeted watershed protection; providing funds to help build the capacity of local organizations for sustainable, long-term watershed protection; and providing funds to support new techniques or approaches that advance the state of practice for watershed protection.

Webinar Offers More Details

In January 2016 the U.S. Endowment for Forestry and Communities hosted an informational webinar about the new grant program. Both the video and the presentation slides are available on the Healthy Watershed Consortium Grant Program website.

EPA launched the Healthy Watershed Consortium Grant Program in 2015 to accelerate and expand the protection of healthy, freshwater ecosystems and their watersheds. EPA co-funds the program with the Endowment, which manages the partnership. "The Healthy Watershed Consortium Grant Program is a unique public-private partnership that brings together businesses, local governments, universities and not-for-profit organizations to work collaboratively on watershed protection—which is key to long-lasting environmental protection," said Joel Beauvais, deputy assistant administrator for EPA's Office of Water, in a press release. The grants "will protect waterways from pollution while maintaining healthy habitats and ensuring clean and safe drinking water that will safeguard local economies that depend on watersheds."

The selected projects—from California, Colorado, Florida, Maine, Oregon, Washington, and West Virginia—represent a broad array of innovative and diverse approaches to healthy watershed protection currently embraced by organizations across the nation:

- **Healthy Watersheds California:** $225,000 to Pacific Forest Trust to develop the policies, technical assessments, and financing instruments needed to leverage private and public capital for restoration and conservation of an estimated 7 million acres of watersheds that serve California's primary reservoirs.
- **Protecting Forests to Protect Watersheds, California:** $200,000 to The Trust for Public Land and the Save the Redwoods League. These organizations are working collaboratively to seek California Clean Water State Revolving Fund loans for large-scale protection of forested watersheds.
- **Protecting Blue Creek and the Klamath River for Salmon, Wildlife and People, California:** $100,000 to Western Rivers Conservancy to implement long-term watershed protection plans, sell carbon offsets and create new jobs in rural northern California. Partners, including the Yurok Tribe, will protect 47,000 acres of temperate rainforest.
- **Colorado Conservation Exchange: Accelerating Investment in Watershed Health:** $150,000 to accelerate investment in watershed health to reduce wildfire threats in the Big Thompson and Cache La Poudre watersheds and beyond through a Watershed Investment Fund linking investors with land stewards.
- **Myakka Island Conservation Corridor, Florida:** $156,000 to the Conservation Foundation of the Gulf Coast to conserve more than 10,000 acres over the next 6 years within the

New Healthy Watersheds Grants Program Supports Protection Projects (continued)

Myakka River watershed, in rapidly growing Sarasota and Manatee counties. These properties will link and buffer already-protected lands and help keep waterways drinkable, fishable and swimmable.

- **Permanently Protecting the Largest Rivers in Eastern Maine:** $150,000 to Downeast Salmon Federation, which wants to conserve 80 percent of the habitat corridors along the remaining three unprotected rivers in Washington County, Maine, by 2025. Funds will support a full-time director for 3 years at the Federation's Downeast Rivers Land Trust.
- **Framework for Acquiring and Sustainably Managing Agricultural Land, Oregon:** $200,000 to Freshwater Trust to build a replicable framework to acquire and sustainably manage agricultural land in the John Day Basin, Oregon. The model will address the increasing conversion of farmland nationally. As farmers retire over the next 20 years, nearly half of all U.S. farmland—400 million acres—will change hands. Sustainable management of these farmlands will enhance watershed protection.
- **Accelerating Watershed Protection in the Central Puget Sound Region, Washington:** $200,000 to Puget Sound Regional Council, a metropolitan planning organization that includes 86 jurisdictions. Their project will develop a regional open space plan focused on protecting high-priority, threatened ecosystems; prepare a watershed protection report that informs the upcoming update of the Region's growth plan, VISION 2040, to integrate growth management with ecosystem protection; and promote use of a new online ecosystem service valuation tool for regional watershed benefits, decision making and local actions.
- **Healing Waters Regional Landscape Initiative Cacapon River Watershed, West Virginia:** $100,000 to Cacapon and Lost Rivers Land Trust to develop the Healing Waters Regional Landscape Initiative, build capacity for large-scale protection efforts throughout the watershed, and create a strategic local and regional collaboration model.

[For more information about the grant program, see the U.S. Endowment for Forestry and Communities' Healthy Watershed Consortium Grant Program website. For healthy watersheds information, see EPA's Healthy Watershed Program website.]

EPA's Healthy Watershed Program Focuses on Protection

Streams, lakes, rivers and other waters are interconnected with the landscape and all its activities through their watersheds. The dynamics between the land and the water largely determine the health of the waterways and the types of aquatic life found in a particular area. After decades of focusing almost exclusively on restoring impaired waters, in 2009 EPA created the Healthy Watersheds Program to help address the "maintain" component of the "restore and maintain" goal intended by Congress in the 1972 Federal Water Pollution Control Act amendments. Healthy watersheds protection is a systems approach; this approach sees that waters and their watersheds, as well as our collective efforts to protect and maintain their qualities and benefits, are each the sum of many interacting parts. A holistic protection approach as provided by the Healthy Watersheds Program is essential for addressing threats to healthy watersheds, including loss and fragmentation of habitat, hydrologic alteration, invasive species and climate change.

Software Spotlight

New Tool Helps States Develop Wetland Water Quality Standards

The U.S. Environmental Protection Agency (EPA) and state water quality and wetland associations have partnered to develop an online tool, *Templates for Developing Wetland Water Quality Standards* (Templates). The tool will help states, territories and authorized tribes (hereafter collectively referred to as "states") develop protective and comprehensive narrative water quality standards (WQS) for their wetlands. Once developed, the state may submit the wetland WQS to EPA for review and approval.

Loss of wetland acreage and functionality remains an important issue in the United States, affecting water quality, hydrology and wildlife. Healthy wetlands support diverse fish and wildlife, improve water quality by filtering and absorbing pollution, protect against storms by storing floodwaters, act as buffers against shoreline erosion, and provide recreation opportunities. "Healthy wetlands can also improve the nation's resiliency to climate change," explained Jennifer Brundage, a biologist with EPA's Office of Science and Technology. "The online tool is a powerful new resource to help states protect and restore their wetlands."

Why develop WQS for wetlands?

Developing wetland-specific WQS can help states maintain the spatial and functional components of wetlands and help ensure that provisions of the Clean Water Act (CWA) and state permitting and certification programs are fully applied to wetlands. For example, having wetland WQS in place provides a clear basis for making water quality-based permitting decisions under CWA section 402, which pertains to National Pollutant Discharge Elimination System permitting; CWA section 404, which addresses the regulation of the discharge of dredged or fill material into U.S. waters, including wetlands; and other state and tribal programs. Similarly, WQS are the basis for states to approve, condition or deny certifications under CWA section 401 programs, which applies to federal license or permit applications for activities possibly affecting U.S. waters. Finally, WQS provide a benchmark against which pre- and post-restoration monitoring data can be used to assess and report on wetlands function and condition over time.

Core Elements of Water Quality Standards

Consistent with EPA's WQS regulations at 40 CFR Part 131, WQS include three core components:

- **Designated uses** (also known as beneficial uses), which specify functions/activities (e.g., recreation, aquatic life) supported by a specific level of water quality.
- **Criteria** to ensure protection of those uses (i.e., numeric, narrative, biocriteria).
- **Antidegradation policy and implementation procedures** protect higher quality waters and protect existing uses.

Maryann McGraw launched the New Mexico Environment Department's Wetlands Program 10 years ago and is currently leading an effort to develop narrative wetland WQS. At the beginning the Wetlands Program had little wetland data, and McGraw wanted to develop a comprehensive program in a coordinated manner. "Not only were we looking to monitor and assess wetlands, we also wanted to track restoration and protection. That was the incentive for us to begin collecting data and start pursuing development of standards for wetlands. We also hope that having wetlands water quality standards will strengthen and improve our CWA section 401 certification program."

What is the purpose of the Templates?

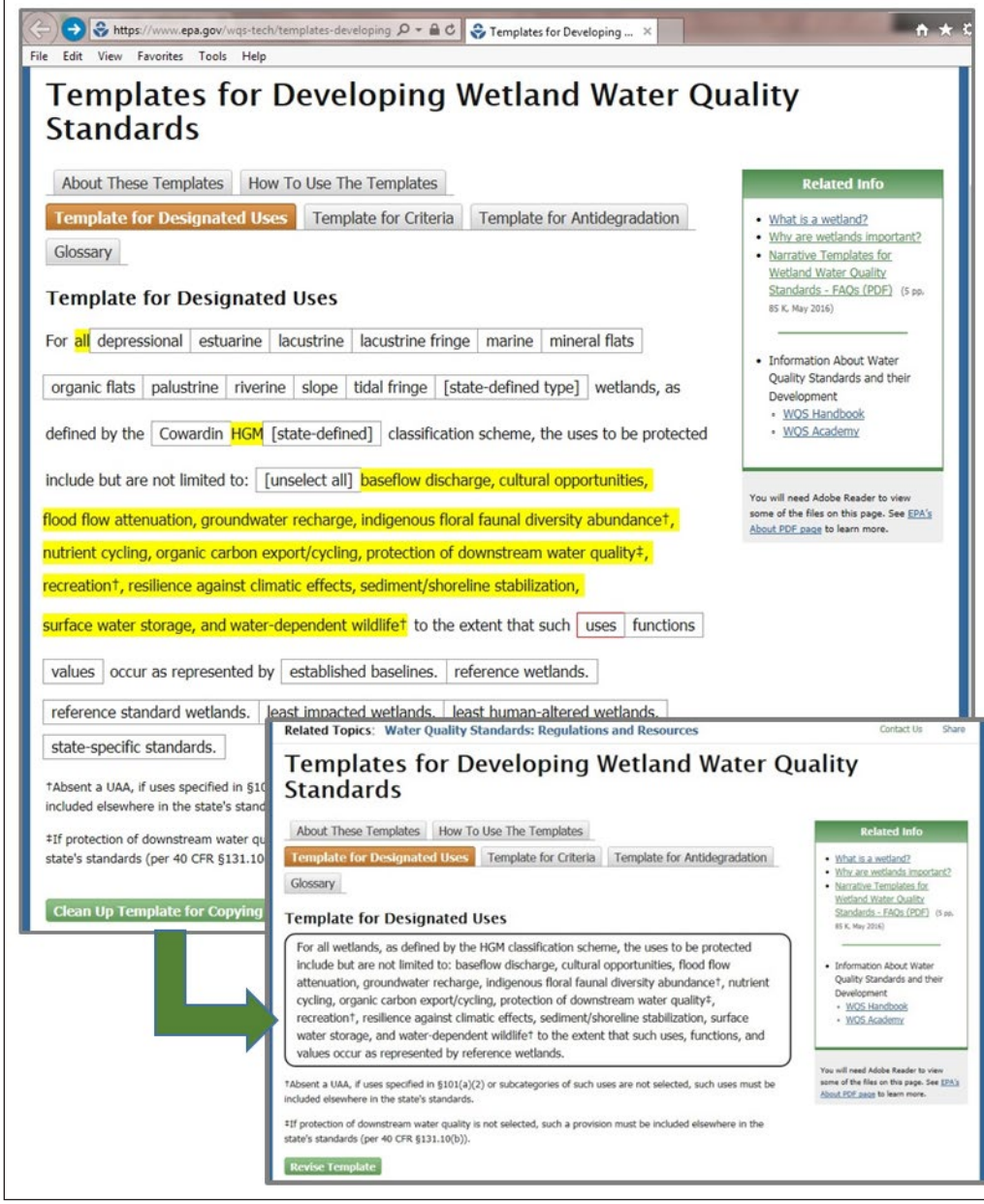
States can use the customizable Templates to simplify and streamline the development of wetland WQS. The Templates provide options for multiple wetland-specific terms so regulators can develop WQS that best suit the needs of and conditions in a given wetland, wetland type or state.

"Only a handful of states currently have established comprehensive wetland water quality standards," noted Jennifer Linn with EPA's Office of Wetlands, Oceans, and Watersheds. "A larger subset of states have one or two wetland-specific components in their standards. The Templates are a stride forward in our effort to help more states build robust wetland water quality standards."

The Templates are separated into the three WQS components: designated uses, criteria and antidegradation policy. The user can customize all three components to generate a complete wetland-specific narrative statement according to the needs of the state and its wetland resources. Once customized, each new narrative component of the WQS can be copied and pasted into a single document for submittal to EPA. If a desired term or element is not included in the Templates, a state need only add it to the version submitted to EPA.

Why do the Templates focus on narrative wetland water quality standards?

Wetlands exist as ecosystems along the land margins (e.g., land–sea, land–lake, land–river) and in depressional landscapes such as prairie potholes in the northern plains. Depending on the season and location, wetlands experience variable water depth and velocity, soil type and saturation levels, vegetation, nutrient levels, sediment type, and oxygen demand. Because wetlands are spatially and



This combined image shows an example in-progress template for the designated use portion of the three-part narrative water quality standard. As seen in the top left image, the text enclosed by boxes represents potential elements for inclusion. A user may select some or all, depending on preference. Selected items are anchored into the narrative statement and denoted with yellow highlight. To remove a previously selected term, the user simply clicks on the term again. Once all elements are chosen, the user clicks on the "Clean Up Template for Copying" button at the bottom left. As seen in the bottom right image, the system will generate a new webpage showing the user's chosen designated use-based standard in a paragraph form, which can be copied and pasted into another document for EPA submittal. The templates for criteria and antidegradation function similarly. All three WQS components can be completed and combined to create a robust narrative wetland WQS.

temporally complex ecosystems, narrative—rather than numeric—statements are often the best choice for states when first developing WQS for wetlands.

When would states opt for numeric wetland WQS?

Numeric water quality criteria are specific numeric values for chemical constituents (e.g., nitrates), physical parameters (e.g., temperature) or biological conditions (e.g., Index of Biological Integrity) that are adopted into state WQS. Numeric criteria are more straightforward than narratives when implementing permits and total maximum daily loads. EPA maintains a list of recommended criteria for surface waters under section 304(a) of the CWA. Many numeric criteria

that are currently applied to other surface waters can (and should be) applied to wetlands, such as the numeric criteria for the protection of human health and numeric criteria for toxics (e.g., selenium). Other existing numeric criteria, such as those for pH and dissolved oxygen, might not be appropriate for wetlands. In addition, because of wetlands' complexity, key aspects of wetland function such as hydrology and biological integrity are typically not protected by WQS developed for other surface waters—yet these are critical to wetland protection.

For parameters that are typically unique and highly variable spatially and temporally in wetlands, establishing accurate wetland-specific numeric WQS requires developing criteria that reflect the natural background conditions in a specific wetland or wetland type; this can involve extensive data collection, research, field testing and calibration.

Webinar: Wetland Water Quality Standards Templates in the Spotlight

On July 26, 2016, EPA partnered with the Association of State Wetland Managers and the Association of Clean Water Administrators to host "Developing Water Quality Standards for Wetlands," a webinar focused on how states can use the new templates to develop protective and comprehensive narrative water quality standards for wetlands. It highlighted the efforts of two states that are currently working to develop WQS to protect their wetlands: New Mexico and New Hampshire. The free webcast is available for viewing on EPA's Templates for Wetland Water Quality Standards website.

"Many states are doing quite a bit of work with their wetland monitoring and assessment programs, and some already have numeric criteria in place, or are thinking about developing them," added Linn. "We're aware that this is an area where there will be a need in the future. As a first step we focused on the narrative water quality standards as a good point of entry for states."

Regardless of whether a state chooses narrative or numeric criteria, or a combination of the two, adopting water quality standards for wetlands—in both coastal and inland areas—allows states to protect existing wetlands while also providing a descriptive target to help guide efforts to restore degraded or lost wetlands. This topic is discussed in more detail on the *Narrative Templates for Wetland Water Quality Standards: Frequently Asked Questions* fact sheet.

What's your state's approach to wetland water quality standards?

In 2015 the Association of State Wetland Managers (ASWM) completed a study of wetland programs across the nation. ASWM compiled information on four core elements: (1) wetland regulation, (2) wetland monitoring and assessment, (3) wetland water quality standards and (4) voluntary wetland restoration, and assessed how advanced every state's wetland program was for each core element. The study's results showed the majority of states apply some form of WQS to wetlands. As of 2014, six states had wetland-specific WQS, 10 states were in the process of developing them, and 31 states reported applying existing (not wetland-specific) WQS to wetlands. Only three states reported not applying any WQS to wetlands. More information is available in the ASWM's summary document, *Status and Trends Report on State Wetland Programs in the United States*. Comprehensive, state-specific results are available on ASWM's State Wetland Programs website.

[For more information contact (1) Jennifer Brundage, U.S. Environmental Protection Agency, Office of Science and Technology, 1200 Pennsylvania Avenue, N.W., Mail Code 4305T, Washington, DC 20460. Phone: 202-566-1265, Email: brundage.jennifer@epa.gov; or (2) Jennifer Linn, U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds, 1200 Pennsylvania Avenue, N.W., Mail Code 4502T, Washington, DC 20460. Phone: 202-566-1258, Email: linn.jennifer@epa.gov]

Online Mapping Tool Encourages Drinking Water Source Protection

Do you know where your drinking water comes from? Do you want to see what pollution sources might affect the quality of your water? The U.S. Environmental Protection Agency (EPA) recently released an online mapping tool—the Drinking Water Mapping Application to Protect Source Waters (DWMAPS)—to make this type of information available to everyone. Developed in consultation with EPA regional drinking water program staff, state drinking water regulators and public water system staff, DWMAPS is designed to help you learn about your watershed and understand more about your water supplies and suppliers.

Online Mapping Tool Encourages Drinking Water Source Protection (continued)

"A key part of having safe drinking water is protecting the sources—the streams, rivers, and lakes where utilities withdraw water," EPA Administrator Gina McCarthy said in a recent press release. "DWMAPS is the latest example of how EPA is using technology and digital tools to better protect public health and the environment."

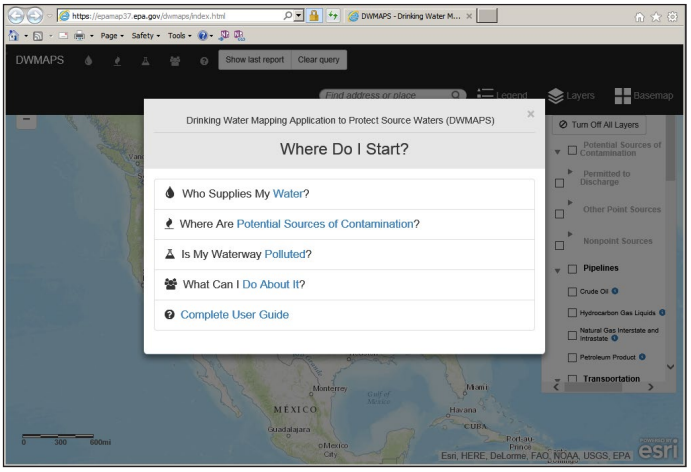
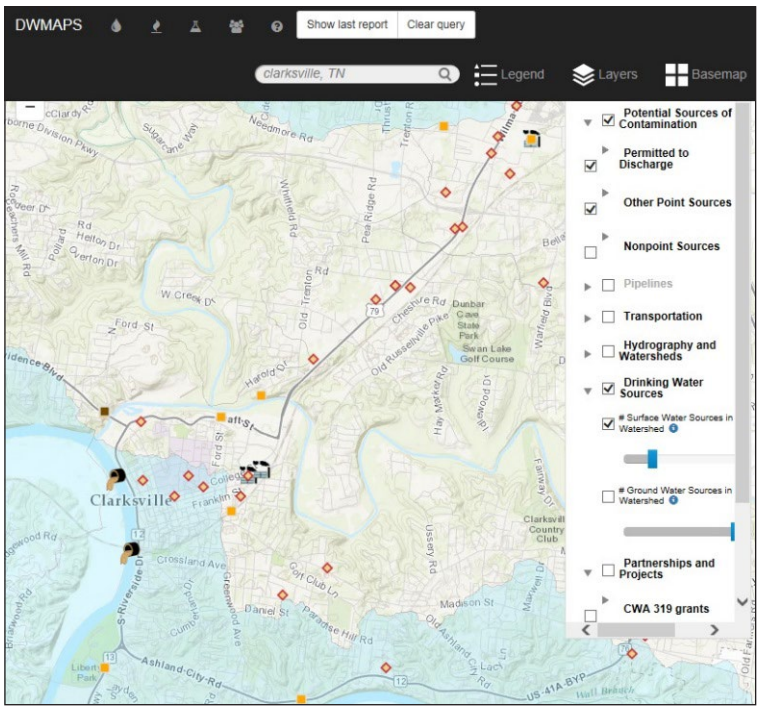


Figure 1. A navigational menu guides the tool's users.

How does it work?

Upon opening the tool, DWMAPS offers a menu of questions citizens are likely to ask about their local water supplies; these questions are always accessible on the top left DWMAPS toolbar as well (Figure 1). The layout is designed to provide answers to questions such as:



A search on the Clarksville, Tennessee, area shows the location of permitted and other nearby point source pollution sources (squares and icons) as well as the areas that serve as a surface water drinking water source (light blue shading). Nonpoint sources of pollution register as a solid and continuous pollutant layer across the map, so they were not included for the purposes of this search.

Figure 2. DWMAPS information for Clarksville, Tennessee.

- **Who supplies my water?** Here you can discover if any of your local drinking water systems violated health-based standards for contaminants under the Safe Drinking Water Act. You can also identify local watersheds where restoration activities can help safeguard your drinking water.
- **Where are potential sources of contamination?** Here you can see contamination sources in the watershed, such as nonpoint sources of pollution, Superfund sites and wastewater treatment plants. You can also find which industries are discharging pollutants within 24 hours travel time of a municipal water supply.
- **Is my waterway polluted?** Here you can identify whether your local waters are considered impaired under the Clean Water Act and for what pollutants, whether they have a total maximum daily load in place, and whether these waters are used for public water supply (Figure 2). The tool will help you locate permitted facilities that discharge pollutants (and how much) into water bodies under the National Pollutant Discharge Elimination System.
- **What can I do about it?** Here you can find information about nearby watershed groups and projects that are working to protect source water.

[For more details on how to navigate the tool, refer to the DWMAPS User Guide. For additional assistance, contact the DWMAPS help desk.]

Reviews and Announcements

Agricultural Nonpoint Source Pollution

EPA Announces Winners of Nutrient Recycling Challenge

On March 03, 2016, EPA announced the winners of Phase I of the Nutrient Recycling Challenge—a competition to develop affordable technologies to recycle nutrients from livestock manure. The goal of the challenge is to help farmers manage nutrients, create valuable products and protect the environment. EPA received 75 concept papers from around the world and selected submissions by 34 teams to continue on to Phase II of the challenge, which will run from October 2016 through March 2017. In Phase II, the 34 selected teams are invited to develop technology designs based on the concept papers they submitted. EPA and its partners will support the innovators with informational webinars and workshops, individualized feedback and other resources to maximize their ability to develop designs for effective and affordable technologies. Innovators will be required to submit their designs and finalize their teams by March 2017 for entry into Phase III of the challenge, which is expected to be a prize competition for building prototypes.

Study Analyzes U.S. Conservation Practice Adoption Rates

In December 2015 the U.S. Department of Agriculture (USDA) Economic Research Service released *Conservation Practice Adoption Rates Vary Widely by Crop and Region*, an information bulletin that describes research analyzing national and regional adoption of no-till and strip-till planting systems; cover-crop use; and nitrogen-fertilizer application rates, timing and methods. Results show that U.S. farmers' adoption of these practices varies widely by crop and region, with many farmers adopting conservation practices on some but not all acres. In general, southern and eastern regions use no-till/strip-till and cover crops more intensely than other regions.

Climate Change

Climate Resources Publication List Developed

The National Agricultural Library and the Natural Resources Conservation Service Conservation Effects Assessment Project (CEAP) have developed climate change publication lists that offer links to peer-reviewed publications addressing climate change and selected agricultural conservation practices. These online publication lists are automatically generated from the AGRICOLA and Scopus databases and are drawn from the broad scientific literature. The lists provide a baseline of the scientific literature on climate change and conservation practices to inform conservation effects assessment activities and related efforts, such as tailoring strategies for addressing climate related conservation concerns.

EPA Releases New Online Training Module Featuring Climate Change and Water Resources

EPA has released a new online training module, Understanding Climate Change Impacts on Water Resources. This training module is intended to increase water resource professionals' understanding of the causes of climate change and the challenges that water resource professionals face as climate change affects their local waters. The module also describes how federal, state, tribal and local governments and communities are working to make the United States more resilient. The 45-minute training is part of the EPA Watershed Academy Web certificate program at www.epa.gov/watershedacademy.

Nationwide Online Gaming Event Highlights Climate

From April 15–24, 2016, the National Oceanic and Atmospheric Administration (NOAA) hosted the *National Climate Game Jam—Water!*, bringing together youth, climate scientists and educators at sites around the country to create new virtual and physical game prototypes that allowed players to learn about climate change and water through science-based, interactive experiences. Details about the Jam-winning games are posted on the website.

Multiagency Web Dashboard Supports Climate Issues

NOAA and several outside organizations are launching a shared U.S. Climate Resilience Toolkit: Water Resources Dashboard. This dashboard will serve as a common resource for water resource managers, urban planners and local officials to easily access many of the flood and drought data sets needed to support climate-adaptation planning. To connect users around the dashboard, NOAA will run a series of Web-based sessions to explain the data on the dashboard and demonstrate how these data can be incorporated into decision making.

Report Highlights Management of Stormwater in Response to Climate Change

EPA's Air, Climate, and Energy research program, located within the Office of Research and Development, released *Stormwater Management in Response to Climate Change Impacts: Lessons from the Chesapeake Bay and Great Lakes Regions,* a report providing insights gleaned from workshops that EPA and NOAA held with local planners on ways to further the adoption of climate change adaptation practices in stormwater management. Documentation from the workshops formed the basis for assessing common challenges and opportunities across the Chesapeake Bay and Great Lakes regions and for providing specific examples of tools, data, methods and actions that can be used to address climate change impacts. The intended audiences for this report are local and state planners and managers engaged in developing and implementing stormwater management policies and practices, local climate change or sustainability coordinators, or anyone charged with implementing climate change adaptation plans, and scientists working on climate change adaptation specific to stormwater control.

Report Reviews Climate Change Effects on U.S. Water Supplies

As mandated by the SECURE Water Act of 2009, the U.S. Bureau of Reclamation (USBR) recently released its *SECURE Water Act Report to Congress.* The report provides a basin-by-basin overview of impacts to U.S. water supplies from climate change, and includes numerous potential adaptation strategies relevant to each basin. USBR also released an interactive SECURE Water Act Visualization Tool—a Web-based companion product to the report to Congress that allows the public to interact with the data presented in the report, and to better understand the risks that the data indicate.

Roadmap for Climate-Smart Agriculture and Forestry Released

USDA has released *Building Blocks for Climate Smart Agriculture and Forestry*, the Department's roadmap for helping farmers, ranchers and forestland owners respond to climate change. The effort relies on voluntary, incentive-based conservation, forestry, and energy programs to reduce greenhouse gas emissions, increase carbon sequestration, and expand renewable energy production in the agricultural and forestry sectors.

Study Shows a Delay in Climate-Related Temperature Change in Mountain Streams

A study by the U.S. Forest Service and U.S. Geological Survey (USGS) shows that cold-water mountain streams are warming at a much slower rate than previously forecasted by models, providing hope for cold-dependent species such as salmon and trout. The results of this research, published in the *Proceedings of the National Academy of Sciences* ("Slow climate velocities of mountain streams portend their role as refugia for cold-water biodiversity"), indicate that many cold-water species will continue to persist in mountain streams this century, giving resource managers time to survey these populations and develop conservation strategies.

Coastal Concerns

Report Shows U.S. Coastal Waters are a Mix of Good and Fair Health

In February 2016 EPA released the *2010 National Coastal Condition Assessment* report, which shows that more than half of the nation's coastal and Great Lakes nearshore waters are rated good for biological and sediment quality, while about one-third are rated good for water quality. In almost all coastal waters, however, contaminants in fish tissue pose a threat to sensitive predator

fish, birds and wildlife. The National Coastal Condition Assessment is part of a series of National Aquatic Resource Surveys (NARS) designed to advance the science of coastal monitoring and answer critical questions about the condition of U.S. waters. EPA conducted the National Coastal Condition Assessment in partnership with state water quality agencies and other federal agencies. One in a series of five surveys conducted under the NARS program, it is based on sampling conducted in 2010 at 1,104 sites in coastal waters and nearshore waters of the Great Lakes aimed at assessing the condition of U.S. coastal waters. National surveys have been completed for wadeable streams (2004), lakes (2007), rivers and streams (2008–2009), coastal waters (2010) and wetlands (2011). EPA and its partners plan to continue to assess each of these waterbody types on a 5-year rotating basis.

Data Resources

National Water Model Released

In June 2016 NOAA released experimental output from a new National Water Model that will dramatically enhance the nation's river-forecasting capabilities. The model, which was developed by the National Center for Atmospheric Research with funding from NOAA and the National Science Foundation, relies on data from EPA and USGS. The National Water Model will deliver forecasts for approximately 2.7 million locations, up from 4,000 locations today—a 700-fold increase in forecast density.

Northeast Habitat Map Viewer and Dataset Developed

The Nature Conservancy developed the Northeast Habitat dataset and map viewer as a practical tool for conservation professionals and as an educational resource for nature enthusiasts. The interactive map depicts the 140 common and unique terrestrial habitats of the U.S. Northeast and provides information on each habitat's ecology, plants and animals, regional population abundance and predicted loss to development.

Online Tool Reports Estimated Pesticide Levels in U.S. Streams

A new interactive mapping tool from USGS provides predicted concentrations for 108 pesticides in streams and rivers across the United States and identifies which are most likely to exceed water quality guidelines for human health or aquatic life. The online mapping tool is based on a USGS statistical model—referred to as Watershed Regression for Pesticides (or "WARP")—which provides key statistics for thousands of streams, including the probability that a pesticide might exceed a water-quality benchmark and the reliability of each prediction. The WARP model estimates concentrations using information on the physical and chemical properties of pesticides, agricultural pesticide use, soil characteristics, hydrology and climate, and is based on data from USGS monitoring of pesticides in streams nationwide since 1992 as part of the National Water Quality Assessment program.

Education

Video Series to Increase Public Awareness of Water

In a new video series produced by NBC Learn, the educational arm of NBC Universal News Group, the National Science Foundation will explore ways that cutting-edge science and engineering research can transform how the country understands, designs, and uses water resources and technologies. The four-part series, which will be made freely available for public and classroom use across a variety of platforms in fall 2016, will promote public awareness of water infrastructure designs and needs, water conservation in rural and urban settings, water treatment techniques, and water quality issues. The new series will build on the 2013 NBC Learn video series, Sustainability: Water.

Water Resources Extension Webinars Available

Penn State Water Resources Extension is offering its new and archived webinars online for free. Recent webinars have featured title such as First Investigation of Stream Health (FISH): A New Citizen Science Activity; Buying a Home with a Private Well and Septic System; Feed

Management Effects on Watersheds; The Importance of Forests to Clean Water; Unveiling Penn State Extension's New 4-H Stormwater Experiment: Rain to Drain, Slow the Flow; and Strategies to Protect Groundwater and Drinking Water.

Green Stormwater Infrastructure

Case Studies Highlight Communities Overcoming Infill Challenges

EPA's Smart Growth Program just published *City Green: Innovative Green Infrastructure Solutions for Downtowns and Infill Locations*, a collection of 12 case studies of projects across the country that showcase how cities overcame challenges to implementing green infrastructure in dense urban areas. In these case studies, space on which to place stormwater management practices was limited and soil conditions were unsuitable for infiltration practices. Each of the featured 12 communities demonstrated how these obstacles could be overcome and how stormwater could be managed onsite in a sustainable manner that enhanced or preserved the character of the community.

Design Toolkit Released

The nonprofit Delta Institute released *Green Infrastructure Designs: Scalable Solutions to Local Challenges,* which is a decision support tool to help communities identify and prioritize which green infrastructure practices are most appropriate for their community. The document contains descriptions of the green infrastructure practices most commonly used in the public right-of-way, and includes design templates for bioswales, stormwater planters, permeable pavements and underground storage practices. The target audience for this toolkit includes public sector managers, planners and decision makers—particularly those at the municipal level. This toolkit aims to provide users with a clearer understanding of how to identify opportunities for green infrastructure implementation and to determine which green infrastructure practices are most suitable for a specific site or purpose based on cost and maintenance requirements.

Document Presents Green Infrastructure Lessons Learned

EPA's new report, *Tools, Strategies and Lessons Learned from EPA Green Infrastructure Technical Assistance Projects*, summarizes results from EPA's green infrastructure technical assistance program. This report was designed to provide the reader with a set of real-world examples detailing how communities with unique challenges identified appropriate green infrastructure solutions to meet their individual circumstances. The report also includes a handy guide to green infrastructure technologies and a table of benefits that can be shared with potential collaborators and stakeholders when communicating how green infrastructure can enhance the project or community.

EPA Study Shows Long-term Benefits of Green Stormwater Infrastructure

EPA collaborated with other federal agencies—U.S. Army Corps of Engineers, NOAA and the Federal Emergency Management Agency [FEMA]—to conduct a modeling study estimating the flood loss avoidance benefits that could be achieved from applying small storm, site-level retention practices for new development and redevelopment projects nationwide. Using the FEMA Hazus model and national-scale datasets, 20 eight-digit hydrologic unit code (HUC8) watersheds (between 500 and 3,000 square miles in size) were modeled in areas where significant growth is expected between 2020 and 2040. The results of the modelling effort showed that the use of green stormwater infrastructure can save hundreds of millions of dollars in avoided flood losses over the 20-year implementation period if stormwater retention practices were integrated into both new and redevelopment practices in the 20 watersheds that were studied. The analysis also modelled the potential benefits that could be realized if existing areas of development were retrofitted with retention practices. Study results were highlighted in a 195-page report, *Flood Loss Avoidance Benefits of Green Infrastructure for Stormwater Management*, published in December 2015.

Green Infrastructure Effectiveness Compendium Released

In late 2015 EPA released *Green Infrastructure for Stormwater Control: Gauging its Effectiveness with Community Partners*. This document summarizes the EPA Office of Research and Development's

(ORD's) green infrastructure reports, journal articles and conference proceedings published to date. ORD has a 5-year green infrastructure research program that will generate additional results in the future; EPA will publicly disseminate these new results and findings on an ongoing basis. This report contains synopses of significant findings, lessons learned and guidance to communities for projects implemented across eight EPA regions. The following green infrastructure practices were evaluated in the studies: one roof downspout disconnection project, three green roofs plus one conventional roof project, two rain garden and bioretention projects, and two permeable pavement projects.

Green Streets Video Online

EPA recently released a new online video, Green Streets: The Road to Clean Water, which highlights green streets as a technique for managing stormwater and providing other economic and community benefits. The video, designed for municipal officials and decision makers, shows examples of localities that are using green street features such as porous pavement, rain gardens, vegetative curb areas and sidewalk trees as part of their stormwater management plans and right-of-way stormwater practice palette.

Report Highlights Green Infrastructure in Parks

In March 2016 the nonprofit Trust for Public Land released *City Parks, Clean Water: Making Great Places Using Green Infrastructure*. This report contains information describing how parks, and the communities they are located in, can be enhanced by designing the parks to serve as green infrastructure. The report documents how communities around the United States are redesigning their parks to enhance park aesthetics, revitalize adjacent neighborhoods, provide access to unserved community members, stimulate economic development, provide wildlife habitat, restore streams, create jobs and manage runoff. The report features case studies and includes interviews with national experts.

Stormwater Control

EPA Releases Template for Small Residential Lot Stormwater Pollution Prevention Plans

In December 2015 EPA released a voluntary Construction General Permit (CGP) compliance template (Small Residential Lot Stormwater Pollution Prevention Plan Template) for residential construction projects of less than 1 acre. This project was undertaken in direct response to a request by the National Association of Home Builders to simplify the stormwater compliance process for small builders. To be covered under EPA's 2012 CGP, all construction operators are required to develop a stormwater pollution prevention plan (SWPPP). The requirement to develop a SWPPP applies equally to small-scale construction projects as it does to large-scale construction projects, but the level of detail might vary depending on the nature of a given project. A SWPPP for the construction of a single residential lot could require less detail because such projects are often easily managed with basic best management practices. Moreover, these projects are relatively small and are usually completed relatively quickly. Where documentation is required, it can be done in a relatively concise manner. With that in mind, EPA has developed the Small Residential Lot SWPPP Template as a tool to help operators of small residential lot projects develop SWPPP documents that are consistent with requirements in EPA's 2012 CGP. Although the new template is only available in states where EPA is the direct permitting authority (New Mexico, Idaho, Massachusetts, New Hampshire and the District of Columbia), home builders' associations and water quality officials can use the template as a guide when launching compliance guides in their own jurisdictions. More information is available in EPA's *Stormwater Pollution Prevention for Small Residential Construction Sites* fact sheet and on EPA's National Pollutant Discharge Elimination System Stormwater Discharges from Construction Activities website.

New Issue Brief Helps Communities Understand Stormwater Credit Trading

In February 2016 the Natural Resources Defense Council released *How To: Stormwater Credit Trading Programs*, a seven-page issue paper designed to inform communities about the benefits and challenges of adopting a stormwater credit trading program as part of a water quality improvement plan.

Report Highlights Use of Graywater and Stormwater to Enhance Water Supplies

The National Academies of Sciences, Engineering and Medicine released a new report, *Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits*. In a time when chronic and episodic water shortages are becoming common in many regions of the United States, the report considers the feasibility of using alternative water sources such as graywater (e.g., water from bathroom sinks, showers, bathtubs, clothes washers) and stormwater to supplement scarce water supplies. The study found that the capture and use of graywater and stormwater can enhance and diversify local water supplies while providing additional financial, environmental and social benefits such as a reduction in water pollution and combined sewer overflow discharges. At present, broader implementation is hindered by the absence of risk-based guidelines for stormwater and graywater use across a range of applications, as well as a lack of water quality data—particularly for human pathogens—that are necessary to assess these risks. The report recommends clear objectives and provides a decision framework that can be used when considering the use of graywater or stormwater.

Stormwater Credit Trading Key to Protecting Waterways in the Nation's Capital

In an effort to reduce the polluting effects of stormwater on regional waterways, Prudential Financial is investing $1.7 million towards a new pilot collaboration—District Stormwater, LLC—between The Nature Conservancy and Encourage Capital. Funds will support development of green infrastructure on properties in the District of Columbia that measurably reduce stormwater runoff through nature-based solutions. These projects, such as permeable pavement and rain gardens will generate stormwater retention credits under the District's new Stormwater Credit Trading Program. Developers may purchase the credits to help them meet their runoff reduction requirements.

USDA Partners with EPA on Resources Supporting Water Quality Trading

In September 2015 USDA and EPA committed to collaboration on a series of new tools and resources supporting water quality trading:

- EPA-USDA Water Quality Trading Roadmap: This decision-support tool is a searchable database that consolidates water quality trading policy guidance from EPA, information from state programs, and examples and supporting materials from across the United States.
- EnviroAtlas partnership to support environmental markets: USDA and EPA will incorporate environmental markets data layers into the federal ecosystem service decision support tool, EnviroAtlas. The data layers will show where markets for water, carbon, wetlands and habitats occur on the U.S. landscape, provide information about these markets, and allow this information to be displayed in the context of existing environmental data.
- Nutrient Tracking Tool (NTT): USDA will soon release the next version of NTT, ready for use in the Pacific Northwest and Ohio River Basin. The tool estimates losses from fields managed under a variety of cropping patters and management practices through the Agricultural Policy Environmental Extender (APEX) model. The new version of NTT is a USDA-hosted, user-friendly, Web-based tool that calculates edge-of-field nutrient and sediment loads for use in conservation planning and environmental market credit calculation.
- USDA Environmental Markets Website: USDA released a website that integrates information, tools and resources on environmental markets from across USDA, allowing users to easily gain a snapshot of the agency's environmental market activities.

Targeting Pollutants

Aquatic Trash Prevention Great Practices Compendium Released

In October 2015 EPA released *Aquatic Trash Prevention Great Practices Compendium – Mid-Atlantic States Trash Free Waters Program*, a compendium identifying policies, programs and initiatives that help reduce or prevent aquatic trash. The compendium highlights practices that have shown real results, enabling civic leaders and others to make informed decisions about their future trash prevention program investments based on the experiences of others.

Countries Adopt New Phosphorus Reduction Targets for Lake Erie

Through the Great Lakes Water Quality Agreement, the United States and Canada adopted new targets to reduce phosphorus entering affected areas of Lake Erie by 40 percent. Achieving the targets will minimize the extent of low oxygen "dead zones" in the central basin of Lake Erie, maintain algae growth at a level consistent with healthy aquatic ecosystems, and keep algae biomass at levels that do not produce toxins posing a threat to human or ecosystem health. The 40 percent reduction targets are based on 2008 loading levels. Canada and the United States have committed to develop domestic action plans by February 2018 to help meet the new targets.

Harmful Algal Blooms and Hypoxia Strategy Report Available

The Interagency Working Group on the Harmful Algal Bloom and Hypoxia Research and Control Act recently released a report to Congress, *Harmful Algal Blooms and Hypoxia: A Comprehensive Research Plan and Action Strategy*. This report was written in response to the legislative requirements of the Harmful Algal Bloom (HAB) and Hypoxia Research and Control Act. The report outlines federal agencies' roles and responsibilities for evaluating and managing HABs and hypoxia, highlights agency management and response actions since 2008, identifies remaining challenges, and recommends actions.

Harmful Algal Bloom Field and Laboratory Guide Released

USGS developed a new resource, *Field and Laboratory Guide to Freshwater Cyanobacteria Harmful Algal Blooms for Native American and Alaska Native Communities*, which offers valuable information for indigenous peoples that depend on water bodies for their livelihood. This guide provides field images showing cyanobacteria blooms, some of which can be toxin producers, as well as other nontoxic algae blooms and floating plants that could be confused with algae. After a potential toxin-producing cyanobacterial bloom is recognized in the field, the type of cyanobacteria present needs to be identified. Species identification, which requires microscopic examination, could help distinguish a toxin-producer from a nontoxin producer. This guide also provides microscopic images of the common cyanobacteria that are known to produce toxins, as well as images of algae that form blooms but do not produce toxins.

National Microbead Ban Signed into Law

On December 28, 2015, President Obama signed into law the Microbead-Free Waters Act of 2015. This bill amends the Federal Food, Drug, and Cosmetic Act to ban rinse-off cosmetics that contain intentionally added plastic microbeads beginning on January 1, 2018, and to ban manufacturing of these cosmetics beginning on July 1, 2017.

USGS Provides Fact Sheet Summarizing 10 Years of Coal-Tar Sealant Findings

In April 2016 the USGS released *Coal-tar-based pavement sealcoat—Potential concerns for human health and aquatic life*, a six-page fact sheet summarizing the information known about the possible effects of coal-tar asphalt sealant. Key findings include human health concerns, because as coal-tar-based sealcoat ages, it wears into small particles with high levels of polycyclic aromatic hydrocarbons (PAHs) that can be tracked into homes and incorporated into house dust. For people who live adjacent to coal-tar-sealcoated pavement, ingestion of PAH-contaminated house dust and soil results in an elevated potential cancer risk, particularly for young children. Runoff from coal-tar-sealcoated pavement is acutely toxic to fathead minnows and water fleas, two species commonly used to assess toxicity to aquatic life, even 3 months after application. The report notes that exposure to even highly diluted runoff from coal-tar-sealcoated pavement can cause DNA damage and impair DNA repair.

Watershed Management

Delaware Basin Initiative Moves Forward

An ambitious effort is underway to protect and restore the Delaware River Basin's water quality and overall ecological health. Kick-started by a $35 million commitment by the William Penn Foundation, the Delaware River Watershed Initiative (DRWI) is targeting eight "clusters" within

the basin for conservation investment. More than 50 leading nonprofits have joined together, aligning priorities for land protection and restoration projects and assessing water quality impacts using standardized methods. Partners are focusing on reducing agricultural runoff and urban stormwater in areas with poor water quality, and they are protecting headwaters, forests and groundwater reserves where water quality is high. Coordination among the many partners will allow the first-ever collection, synthesis and analysis of data from sites across the basin, generating critical information on what works in river protection and restoration. An interactive mapping tool (DRWI Mapper) allows online exploration of subwatershed regions of the Delaware River Watershed directly affected by DRWI restoration and conservation efforts.

USDA Adds 17 New Watersheds to National Water Quality Initiative

In February 2016 the USDA announced an investment of $25 million targeted to help agriculture producers improve water quality in 187 high-priority streams and rivers across the country, including 17 new watersheds. Through the National Water Quality Initiative (NWQI), USDA's Natural Resources Conservation Service (NRCS) will help agricultural producers apply conservation measures that contribute to cleaner water downstream. USDA's targeted approach to improve water quality is working across the country. In Arkansas, USDA reports that conservation efforts improved the water quality to the point that portions of the St. Francis River and the Illinois River are no longer considered impaired streams by EPA. In coastal Mississippi, focused efforts led to Orphan Creek's removal from the list of impaired streams, and in Louisiana, two watersheds, Big Creek and East Fork Big Creek, are on track for delisting. This year, NRCS added 17 new watersheds to NWQI, and because of marked progress in some watersheds, "graduated" 13 watersheds from the initiative. (See page 17 of *News-Notes* Issue 92 for more information on the NWQI.)

Wetlands

EPA Releases Report on Condition of Nation's Wetlands

EPA has released *National Wetland Condition Assessment (NWCA): A Collaborative Survey of the Nation's Wetlands*. The report finds that of the wetland areas surveyed, 48 percent are in good condition based on plant community. Of the stressors examined, physical alterations to wetland habitat such as compacting the soil surface, digging ditches, or removing plants are the most widespread. This is the first national monitoring study of the overall condition of wetlands conducted with a statistically valid random sample approach. A webcast held on Thursday, June 16, 2016, provided a brief overview of the National Aquatic Resource Surveys and highlighted key findings from the NWCA.

Public-Private Investment Will Improve Critical Wetlands in 12 States

In July 2016 USDA announced an award of $44.6 million through its Wetland Reserve Enhancement Partnership (WREP) to support 10 wetland enhancement projects on private and tribal agricultural lands in 12 states: Arkansas, Indiana, Iowa, Kentucky, Louisiana, Mississippi, Missouri, Nebraska, New Hampshire, Tennessee, Washington and Wisconsin. Project recipients are providing more than $4.3 million in matching funds, bringing the total investment to approximately $49 million. In total, the projects will help to protect, restore or enhance 15,000 acres of wetlands in critical watersheds across the United States. Projects will bring together partners leveraging technical and financial resources to address local concerns, such as water quality and flooding. A full list of projects funded is available on the WREP website.

Other

Compendium Highlights Customer Assistance Programs

In early 2016 EPA released *Drinking Water and Wastewater Utility Customer Assistance Programs,* a document outlining the benefits, implementation and examples of programs designed to help financially constrained customers pay utility bills, including those for stormwater management. Assistance typically includes short-term or long-term cost reductions through programs including bill discount, flexible terms, lifeline rates, temporary assistance and water efficiency.

Recent and Relevant Periodical Articles

These Two Scientists Just Raised $4 Million To Test Soil Health For Farmers (in Forbes Online*, July 13, 2016).*

This article describes the effort of a start-up firm to provide genetic services to farmers for their soil. The firm will use genetic sequencing to identify microbes in the soil, helping farmers know more about which crops and techniques are best to use in a given field.

Help wanted: Seniors sought to monitor waterways, improve environment (in Pittsburgh Post-Gazette*, July 11, 2016).*

This article describes the efforts in Pennsylvania to expand the Senior Environment Corps, a national organization of people 55 years old or older who volunteer for environmental tasks such as tree planting and trail cleanup. The Beaver County Conservation District wants to create a local chapter and recruit volunteers to collect water quality samples on a regular basis.

Websites Worth a Bookmark

Challenge.gov

This website is the hub for federal incentive prize and challenge competitions. It lists competitions run by more than 80 federal government agencies seeking solutions from the public to solve mission-centric problems. More than $220 million in prize money has been offered since 2010, along with valuable and unique incentive prizes. Recent EPA-sponsored challenges have included "Visualize Your Water," in which high school students were challenged to use open government data sources to create visualizations to inform communities about nutrient pollution and inspire them to reduce nutrient levels that cause algal blooms and hypoxia.

EPA Calendar of Climate Change and Water Events

This calendar webpage, maintained by the EPA Office of Water, provides updated links to conferences, meetings, webinars, workshops and training opportunities related to climate change and water. Readers are invited to submit information for the calendar to water_climate_change@epa.gov.

Soak Up the Rain

Soak Up the Rain is a stormwater public outreach campaign designed to raise awareness about the problem of polluted stormwater runoff and encourage action by citizens, municipalities and others. The site offers educational information and tools to assist in outreach efforts.

The Conservation Fund's Google Trekker

The Conservation Fund (CF) collaborated with Google Street View Trekker to create Google Maps-based virtual tours of places CF protects. By using 360-degree mapping technology carried in a backpack, CF recorded step-by-step visits to many of its special sites, including Georgia's Arabia Mountain National Heritage Area, Virginia's Roanoke River Partners Paddle Trail, the Captain John Smith Chesapeake National Historic Water Trail and many more.

WikiWatershed

Hosted by the Stroud Water Research Center, WikiWatershed is a Web toolkit that helps watershed stakeholders collaboratively advance knowledge and stewardship of fresh water. WikiWatershed Web tools offer rapid visualization of watershed data, advanced geospatial analysis capabilities, and science-based predictions of human impacts on stormwater runoff and water quality.

Calendar

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

October 2016

10/15–16	International Conference on Climate Change Adaptation, Toronto, Canada
10/17–20	Association for Environmental Health and Sciences Foundation: 32nd Annual International Conference on Soils, Sediments, Water, and Energy, Amherst, MA
10/19–21	Southeast Stormwater Association's 11th Annual Regional Stormwater Conference, Birmingham, AL
10/20–21	Living on the Edge Conference: Taking Action, Galveston, TX
10/28–30	Land Trust Alliance Rally 2016: National Land Conservation Conference, Minneapolis, MN
10/30–11/2	American Water Works Association (AWWA) Water Infrastructure Conference & Exposition, Phoenix, AZ

November 2016

11/1–4	North American Lake Management Society (NALMS), Banff, Canada
11/1–4	Cities Alive: Annual Green Roof & Wall Conference, Washington, DC
11/13–17	American Water Resources Association Annual Water Resources Conference, Orlando, FL
11/16–17	Arbor Day Foundation's Partners in Community Forestry Conference, Indianapolis, IN

December 2016

12/5–9	A Community on Ecosystem Services (ACES) Conference: Linking Science, Practice, and Decision Making, Jacksonville, FL
12/10–15	2016 Summit: Our Coasts, Our Future, Our Choice, New Orleans, LA
12/13–15	Association of Climate Change Officers: Rising Seas Summit, New Orleans, LA

January 2017

1/25–26	Climate Impacts to Water Conference: Managing the Uncertainties of Water Supply and Quality in the Pacific Northwest, Stevenson, WA
1/22–25	New England Water Environment Association 2017 Annual Conference Environmental Stewardship in the 21st Century, Boston, MA
1/28–2/1	National Association of Conservation Districts' 2017 Annual Meeting, Denver, CO

February 2017

2/7–9	ESRI Water Conference, Orlando, FL
2/21–24	International Erosion Control Association's Environmental Connection Conference, Atlanta, GA

March 2017

3/19–22	American Water Works Association: Sustainable Water Management Conference, New Orleans, LA

April 2017

4/30–5/2	2017 Spring AWRA Conference: Connecting the Dots: The Emerging Science of Aquatic System Connectivity, Snowbird, UT

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