

# the **AQUIFER**

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## A Formula For Success

### Community-based Groundwater Protection

By Jennifer Wernhoff, The Groundwater Foundation

“Regardless of what state or federal policies are in place, the responsibility for protecting a community’s groundwater supply ultimately rests with the community itself,” says Andy Belanger.

Belanger is the Director of Public Services for the Southern Nevada Water Authority in Las Vegas, Nevada, active on the Las Vegas Valley Groundwater Guardian team, and a member of The Groundwater Foundation’s Board of Directors. He’s involved in groundwater protection in a number of ways and roles, and knows firsthand that communities need to play an active role in protecting groundwater supplies.

“Nearly a billion people on the planet are plagued by

inadequate access to safe water, and much of that is due to inadequate management of local water supplies,” Belanger continues. “As water scarcity becomes an increasing concern—even here within the United States, where we have a tendency to take it for granted—community-based groundwater protection is going to play an increasingly important role in sustaining a safe, reliable water supply.”

The Groundwater Foundation’s nearly 30 year history has included countless projects and programs aimed at involving communities in groundwater protection and conservation. Some of its most successful efforts were and are those that unite a community toward the

common goal of protecting groundwater.

“When working towards change and lasting success in a community, the only way to achieve true progress is to get the whole community involved,” said Community Outreach Specialist for The Groundwater Foundation, Heather Voorman. “The best results occur when the entire community invests in a goal or idea. When the entire community is invested, there is no limit to what they can accomplish.”

The Foundation’s long-running Groundwater Guardian program is an example of this community investment, and is a tool to help communities

▲ Desert Springs Preserve in Las Vegas, Nevada is the site of the “Community-based Groundwater Protection; A Formula for Success” forum on October 7, 2014.

## INSIDE

2

Groundwater Shorts

4

Peeking at the Past

6

DEA’s Drug Take-Back Program

7

When It Rains, It Pours

9

News from the Foundation

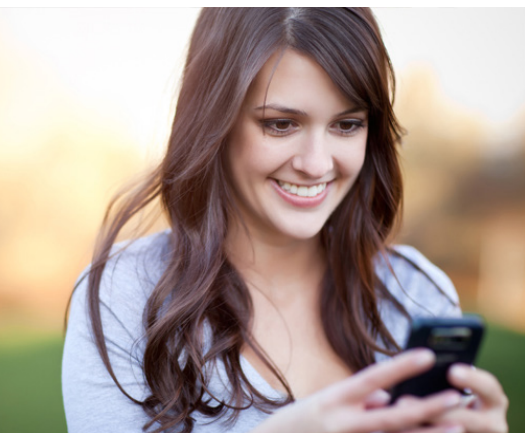


### Mission of The Groundwater Foundation:

To educate people and inspire action to ensure sustainable, clean groundwater for future generations.

Formula, continued on page 3 ►

# Groundwater Shorts



## There's An App For That

The U.S. Environmental Protection Agency (EPA) released an enhanced version of “How’s My Waterway,” an app and website to help people find information on the condition of thousands of lakes, rivers and streams across the continental United States from their smart phone, tablet or desktop computer.

The How’s My Waterway app and website, <http://www.epa.gov/mywaterway>, uses GPS technology or a user-entered zip code or city name to provide information about the quality of local water bodies. The new version of the site includes data on local drinking water sources, watersheds and efforts to protect waterways, as well as a map-oriented version of “How’s My Waterway” designed for museum kiosks, displays and touch screens, available at: <http://watersgeo.epa.gov/mywaterway/kiosk/>.

“Communities and neighborhoods across the U.S. want to know that their local lakes, rivers and streams are healthy and safe to enjoy with their families, and providing that information is a priority for EPA,” said acting assistant administrator for EPA’s Office

of Water Nancy Stoner. “The enhanced version of ‘How’s My Waterway’ provides easy, user-friendly access to the health of the places we swim, fish and boat, where we get our drinking water, and what is being done to curb water pollution. People can get this information whether researching at

a desktop or standing streamside looking at a smart phone.”

The enhanced version includes new data and improvements based on user feedback to the original site, including localized information on:

- The waterways that supply drinking water to communities.
- The health of watersheds and organizations working to protect watersheds.
- Permits that limit pollutant discharge into waterways.
- Efforts to restore waterways to protect and improve fish habitats by the National Fish Habitat Partnerships.

To use How’s My Waterway, go to <http://www.epa.gov/mywaterway> and allow GPS technology to identify the nearest streams, rivers or lakes or enter a zip code or city name. You’ll instantly receive a list of waterways within five miles of the search location. Each waterway is identified as unpolluted, polluted or unassessed. A map option offers the user a view of the search area with the results color-coded by assessment status.

Once a specific lake, river or stream is selected, the app and website provides information on the type of pollution reported for

that waterway and what has been done by EPA and the states to reduce it. Additional reports and technical information is available for many waterways. Read simple descriptions of each type of water pollutant, including pollutant type, likely sources and potential health risks. A related links page connects users to popular water information on beaches, drinking water and fish and wildlife habitat based on a user’s search criteria. ♦

## NOAA, Partners Predict an Average ‘Dead Zone’ for Gulf of Mexico

Scientists are expecting an average, but still large, hypoxic or “dead zone” in the Gulf of Mexico this year.

NOAA-supported modeling is forecasting this year’s Gulf of Mexico hypoxic zone to cover an area ranging from about 4,633 to 5,708 square miles (12,000 to 14,785 square kilometers) or about the size of the state of Connecticut.

While close to averages since the late 1990s, these hypoxic zones are many times larger than what research has shown them to be prior to the significant human influences that greatly expanded their sizes and effects.

The Gulf of Mexico prediction is based on models developed by NOAA-sponsored modeling teams and individual researchers at the University of Michigan, Louisiana State University, Louisiana Universities Marine Consortium, Virginia Institute of Marine Sciences/ College of William and Mary, Texas A&M University, and the U.S. Geological Survey, and relies on nutrient loading estimates from the USGS. The

models also account for the influence of variable weather and oceanographic conditions, and predict that these can affect the dead zone area by as much as 38 percent.

The dead zone in the Gulf of Mexico affects nationally important commercial and recreational fisheries and threatens the region’s economy.

Hypoxic (very low oxygen) and anoxic (no oxygen) zones are caused by excessive nutrient pollution, primarily from human activities such as agriculture and wastewater, which results in insufficient oxygen to support most marine life and habitats in near-bottom waters. Aspects of weather, including wind speed, wind direction, precipitation and temperature, also affect the size of dead zones.

“We are making progress at reducing the pollution in our nation’s waters that leads to ‘dead zones,’ but there is more work to be done,” said Kathryn D. Sullivan, Ph.D., undersecretary of commerce for oceans and atmosphere and NOAA administrator.

Later this year, researchers will measure oxygen levels in both bodies of water. The confirmed size of the 2014 Gulf hypoxic zone will be released in late July or early August, following a mid-July monitoring survey led by the Louisiana Universities Marine Consortium.

USGS nutrient-loading estimates for the Mississippi River are used in the hypoxia forecasts for the Gulf. USGS estimates that 101,000 metric tons of nitrate flowed down the Mississippi River into the northern gulf in May 2014, which is less than the 182,000 metric tons in last May when stream flows were above average. ♦



### Formula, continued from page 1

achieve success. The 20 year-old program provides a framework for local action, recognition for accomplishments, and motivation to continue activities year after year. Communities across North America have participated, and united for local activities from festivals to wellhead protection, to community awareness projects and pollution prevention.

The common denominator across Groundwater Guardian Communities? A community-based approach works.

## October Forum to Share Successes and Ideas

The Groundwater Foundation, in partnership with the Southern Nevada Water Authority, will host a forum on October 7, 2014 at the Springs Preserve Desert Living Center in Las Vegas to discuss "Community-based Groundwater Protection: A Formula for Success." The forum will be held the day before the start of the Water Smart Innovations conference in Las Vegas.

The forum is slated to feature veterans of successful groundwater protection and conservation efforts who will share their experiences and keys to their success. A number of these will represent Groundwater Guardian Communities from across the nation, sharing how the program was a tool for their community's approach to groundwater protection.

In addition, the forum will welcome Pat Mulroy, former general manager of the Southern Nevada Water Authority and Las Vegas Valley Water District. Mulroy helped guide the area's water management during periods of growth and drought, and will share her unique perspective

on the role of community in protecting and conserving water supplies.

"The Southern Nevada Water Authority is grateful for the opportunity to partner with the Groundwater Foundation for the upcoming groundwater protection forum in Las Vegas because it provides us access to the kind of innovative, forward-leaning ideas we need to protect our community's groundwater resources," said Belanger.

The forum will include an opportunity for idea sharing and collaboration among participants. "Peer-to-peer networking and idea sharing has always been one of the hallmarks of our Groundwater Guardian program," said Jane Griffin, Groundwater Foundation President. "Forum participants will hear from others facing similar challenges, and have the chance to discuss how they addressed them and had success."

"Any agencies or community leaders who rely upon groundwater should strongly consider participating in this event. To have this level of knowledge and commitment assembled in one place is rare, and it is an opportunity that shouldn't be missed," said Belanger.

For more information about the forum, including a draft agenda, and to register or become a sponsor, visit [www.groundwater.org/action/formulaforsuccess.html](http://www.groundwater.org/action/formulaforsuccess.html).

Special thanks to Southern Nevada Water Authority and Marshfield Utilities, Wisconsin for their support of the forum. 💧



▲ Community-based groundwater protection has proven successful in communities of all types. Groundwater Guardian Communities like Casper Aquifer Protection (CAP) Network in Laramie, Wyoming (top); Grand Island, Nebraska (middle), and Meadville Area, Pennsylvania (bottom) implement activities locally that help protect groundwater supplies. The October 7 forum in Las Vegas will discuss various elements of successful community-based groundwater protection.





# Special Feature: Peeking at the Past

As The Groundwater Foundation prepares to celebrate its 30th anniversary in 2015, we'll take a look back at headlines and articles in issues from the past.



## 20 YEARS AGO

Summer 1994, Volume 9, Number 1

### New Look at Cleanup: Report from The National Research Council Underscores Need for Protection

While current technology can restore portions of the nation's contaminated groundwater sites to meet drinking water standards, total cleanup at many sites is not feasible even though such decontamination is required by federal and state laws, concludes a new report from a committee of the National Research Council. To take this into account, the federal government should revise cleanup plans based on the severity of contamination at each site and consider levying an annual fee on polluters responsible for contaminating groundwater sites where cleanup is not technically feasible. Fees collected would be used to fund research on improved cleanup methods or

to encourage polluters to test innovative cleanup techniques.

"The tools are available to protect human health and the environment by containing contaminants or restoring some polluted sites," said committee chair Michael Kavanaugh of Enviro Corp. in Emeryville, CA. "But at many of these sites, existing technologies are not enough for treating all of the contaminated groundwater to meet current regulatory standards."

When Congress enacted and later amended laws such as the Resources Conservation Recovery Act (RCRA) and Superfund, policy-makers assumed that technology could reverse contamination problems. However, there are limits to what technology can accomplish given the diversity of contaminated sites and the technical complexity of groundwater cleanup.

According to the committee, the U.S. Environmental Protection Agency (U.S. EPA) and other regulatory agencies should establish consistent mechanisms for deciding the restoration potential of contaminated sites. These mechanisms would allow officials to set realistic priorities and cleanup goals for each site. U.S. EPA should develop strategies for preventing public exposure to contaminated water over the long-term at sites where complete cleanup is infeasible.

Underground environments vary widely, and many common contaminants have characteristics

that make decontamination difficult. Because fluids move through the irregular spaces between grains of sand and gravel, or through fractures in solid rock, contaminants often seep away from their sources in unpredictable ways. In some cases, contaminants are trapped in clay or microscopic pores in rocks too small for water to flush them out. These contaminants can become long-term sources of pollution as they slowly diffuse into nearby groundwater.

Insufficient or inaccurate characterization of a contaminated site can hamper cleanup and lead to flawed design of the cleanup system. In some cases, systems have failed to clean up or even contain pollutants because not enough was known about the extent or sources of contamination. This often happens even after huge sums have been spent and considerable time has elapsed in characterizing the site. Expert panels should be established to assist technically trained agency staff in addressing the often difficult technical choices at contaminated sites.

"Pump-and-treat" systems, which involve installing wells at strategic locations to pump contaminated water to the surface for treatment, are the most common technology for groundwater cleanup in the U.S. But remediation using these systems is a slow process which can take up to hundreds or even thousands of years.

Properly designed pump-and-treat systems still provide important benefits, even at sites where restoring all of the groundwater to meet the drinking water standard is not feasible.

Such systems can partially remove some underground contaminants and keep them from migrating away from their source through nearby water and soil. They also can shrink the size of the contaminated area. However, this technology alone will be ineffective for cleaning up locations with large-scale problems or contaminants that adhere strongly to soils.

Innovative technologies could improve the efficiency of groundwater cleanup efforts such as "enhanced" pump-and-treat systems — incorporating techniques such as air sparging (circulating air through the subsurface), and in-situ bioremediation (pumping substances underground to stimulate growth of contaminant-eating organisms). These methods can increase the quantity of contamination removed and decrease costs. While enhanced pump-and-treat systems offer improvements over conventional systems, they also have some of the same limitations and will not be able to fully restore sites with severe contamination.

Alternative technologies that do not require pumping fluids — such as cutoff walls and barriers containing reactive materials to contain or filter out waste — can also significantly decrease treatment costs. However, these technologies remain largely untested, and some simply contain the contamination instead of cleaning it up. However, many innovative cleanup technologies show promise and should be used more widely, despite the technical, institutional, and economic constraints that have limited their use in the past.



## 15 YEARS AGO

Summer 1999, Volume 14, Number 1

# What an Awesome Aquifer Adventure! The 1999 Children's Groundwater Festival

The theme for the 1999 Children's Groundwater Festival was "Awesome Aquifer Adventure." It began on Tuesday, March 23 when buses of students began arriving in Grand Island, Nebraska at Central Community College and College Park. There were so many activities and entertainers that the children were able to experience one awesome adventure!

More than 300 presenters and volunteers made it possible for 2,000 4th-6th grade students from across Nebraska to participate in a variety of educational, hands-on activities that taught them about groundwater and other related natural resources. The key to reaching and educating the students is to let them have fun while they learn. They may not realize they're learning, but later, when someone asks them how a well works, they may be surprised when they know the answer!

The Groundwater Foundation implemented a new program last fall called Awesome Aquifer Club (AAC). It is geared to provide students with yearlong learning about groundwater. As members of the AAC, students are encouraged to be environmental stewards and sponsor a groundwater project in their community. These projects could range from conducting littler cleanups to hosting their own mini water festival.

As part of AAC, students were also given the opportunity to present what they had learned through AAC at the Festival in Grand Island. "Having student-led presentations meant the presenting students really had to know their stuff well in order to teach it to their peers," said Susan Seacrest, Foundation President.

"This proves to all of us that children can be leaders as well as learners."

Students may have been surprised when they spotted Nebraska's Lieutenant Governor, David Maurstad, joining in on the fun! Many students watched

the fun adventure in Water Drop Bangles. The students discovering the importance of wetlands in Wetland Metaphors could hardly believe their eyes when they met a striped skunk, owl, and salamander. The Snail Circus was filled with mini lessons under the

increasing need for water, we have been able to maintain our consumption at fairly stable levels for the past 15 years," said USGS Chief Hydrologist Robert Hirsch. "It shows that advances in technology in irrigation and power generation allow us to do more with less water."

Electric power generation, irrigation and public supply account for the bulk of water usage. Power generators make up 48 percent, irrigation 34 percent, and public supply (that delivers water to homes, businesses, and industries) 11 percent of daily water usage. Self-supplied industrial users, livestock, mining, aquaculture and domestic wells, taken together, account for about seven percent of the Nation's daily water usage.

"Sound planning for water depends on a sound understanding of the Nation's water resources and a sound understanding of how people will use water in the future," Hirsch said. "This study will help the public, decision makers, engineers and scientists better understand water use, aid in the development of long-term national water policy and ensure that information is available to take proper steps now to ensure water availability for future generations of Americans."

The full report is available online at <http://pubs.water.usgs.gov/circ1268/>.



in awe as a giant bubble was pulled up over the Lieutenant Governor's head with a hula hoop! "I've heard so much positive about the Festival," said Maurstad. "This is a good example of what Nebraska is all about."

Percolating Pulp. Groundwater Picture. The Incredible Journey, Soils Alive. Water Drop Bangles. Wetland Metaphors. Snail Circus. What do all these names have in common? They were all new activities presented at the 1999 festival. Many children enjoyed making paper out of recycled materials in Percolating Pulp. Groundwater Picture allowed students to identify parts of the groundwater system while the Incredible Journey transformed students into water molecules traveling through the water cycle. "Good soil means good water quality," was the message of Soils Alive, where students learned about worms and their important role in soil and maintaining groundwater quality.

Learning about water in some Native American cultures and creating bead necklaces was

big top and reminded students that big or small, all creatures rely on water for survival.

## 10 YEARS AGO

Summer 2004, Volume 19, Number 1

# America's Thirst Remains Stable

Despite growing population and increasing electricity production, water use in the U.S. remains fairly stable, according to a new report released recently by the U.S. Geological Survey.

The USGS report shows that in 2000, Americans used 408 billion gallons of water per day, a number that has remained fairly stable since 1985 and a sign that conservation is working. In the report, "Estimated Use of Water in the United States in 2000," USGS researchers found that the chief water users for the Nation are power generation, agriculture, and public water supply. The report also finds that the personal use of water is rising, but not faster than population change.

"It's pretty good news for the nation despite the

## American's Thirst Remains Stable

USGS Report: Water Use in 2000 Virtually Unchanged Despite Growth

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## President Signs Bill Providing \$1 Million for Low-Interest Loans

New Loan Program to Assist Low to Moderate Income Persons

President George W. Bush has signed a bill providing \$1 million for low-interest loans to assist low to moderate income persons for the construction of a home. The bill is part of the President's effort to help low-income families. The bill is part of the President's effort to help low-income families. The bill is part of the President's effort to help low-income families.





# Prescription Drug Take-Back Days

## DEA's Take-Back Program Meets A Growing Need for Americans

Americans nationwide showed their support for the United States Drug Enforcement Administration's (DEA's) National Prescription Drug Take-Back Day program in 2014 by dropping off more prescription pills than ever.

After seven previous Take Back Days spread over almost four years, 780,158 pounds (390 tons) of pills were brought to the 6,072 collection sites that DEA and its 4,423 state, local, and tribal law enforcement partners set up on April 26, 2014 so the public could discard unwanted, unused and expired prescription drugs from medicine cabinets, bedside tables, and kitchen drawers. When added to that collected at previous DEA-coordinated Take-Back events, 4.1 million pounds (2,123 tons) of prescription medications have been removed from circulation.

"DEA's National Prescription Drug Take-Back events provide an obviously needed and valued service to the public, while also reducing prescription drug abuse and trafficking," said DEA Administrator Michele Leonhart. "By taking these medications off their hands, our citizens know they have made their own families and communities safer. We continue to work toward making the process for disposing of controlled substance medications by users and their caregivers even easier by creating regulations that will enable the public to regularly, safely,

and conveniently dispose of such medicines when they are no longer needed or wanted."

The National Prescription Drug Take-Back Day aims to provide a safe, secure, and environmentally responsible means of disposing of prescription drugs, while also educating the general public about the potential for abuse and trafficking of medications. This is important because the non-medical use of controlled substance (CS) medications is at an all-time high, with 6.8 million Americans reporting having abused prescription drugs in 2012, according to the Substance Abuse and Mental Health Services Administration's National Survey on Drug Use and Health (NSDUH) released in 2013. That same study revealed more than 54 percent of people who abuse prescription pain relievers got them through friends or relatives, a statistic that includes raiding the family medicine cabinet.

The DEA's Take-Back events are a significant piece of an overall strategy for preventing prescription drug abuse and trafficking, which also includes education of health care providers, patients, parents and youth; enhancing and encouraging the establishment of prescription drug monitoring programs in all the states; and increased enforcement to address doctor shopping and pill mills.

Take-Back Days are presently needed because the Controlled

Substances Act (CSA) as originally written did not provide a way for patients, caregivers, and pet owners to dispose of such CS medications as painkillers, sedatives, and stimulants like ADHD drugs. People were flushing their old meds down the toilet or throwing them in the trash.

DEA launched its first Take-Back event in September 2010, after which the President signed the Secure and Responsible Drug Disposal Act of 2010, which amended the CSA to allow people to regularly, conveniently, and safely dispose of their CS medications by delivering them to entities authorized by the Attorney General to accept them. DEA is in the process of finalizing regulations to implement the Act, publishing on December 21, 2012, a Notice of Proposed Rulemaking on the Disposal of Controlled Substances that presented possible disposal options.

In addition to the DEA take-backs twice a year, many communities around the

country are being proactive about pharmaceuticals in their communities, holding take-back events or establishing permanent take-back options for non-controlled substances.

The Marshfield, Wisconsin Groundwater Guardian team began holding community-wide take-back events in 2005. The events' success prompted the team to work with local law enforcement to set up a permanent take-back drop box at the police station in 2008 to collect unwanted/unused medications and properly dispose of them. Find out more about Marshfield's work at <https://www.marshfieldutilities.org/index.php/environment/groundwater-guardians>.

In Lincoln, Nebraska, the Medication Education for Disposal Strategies (MEDS) Coalition is working with local pharmacies to collect medications for proper disposal. Learn more about the Nebraska take-back initiative at <http://www.nebraskameds.org>. 💧

Take-Back Event	Pounds Collected
September 25, 2010	242,000
April 30, 2011	376,593
October 29, 2011	377,086
April 28, 2012	552,161
September 29, 2012	488,395
April 27, 2013	742,497
October 26, 2013	647,211
April 26, 2014	780,158



# When It Rains, It Pours

By Kathy Jespersen, On Tap Assistant Editor

**T**hat old saying usually refers to a string of bad luck. In this instance, however, it can bring to mind overflowing storm sewers, stormwater runoff, and the pollution that gets swept into streams and rivers. Unmanaged or poorly managed stormwater runoff is becoming an increasing concern across the U.S.

## What is stormwater?

Stormwater is precipitation, such as rainwater and melted snow that runs off streets, lawns, and other sites.

## Why is stormwater a problem?

Typically, stormwater is absorbed into the ground where it is filtered and replenishes aquifers or flows into streams and rivers. But in developed or urban areas, where impervious surfaces—such as parking lots and roofs—don't allow precipitation to be absorbed into the earth, problems can arise, such as contaminated streams, rivers, and coastal waters.

This pollution happens as water is washed over impervious surfaces, where it can pick up pollutants, such as sediment, nitrogen, phosphorus, bacteria, oil and grease, trash, pesticides, and

metals. Not surprisingly, studies have shown that stormwater pollution equals that of sewage plants and large industries.

The U.S. Environmental Protection Agency (EPA) lists the following three issues as major concerns:

1. **Pollution.** As stormwater passes over developed land, it picks up pollutants and transports them to the nearest storm drain and eventually to rivers and bays. This contamination can harm or kill fish and other wildlife—and possibly close local businesses.
2. **Flooding.** Unable to soak into the ground, stormwater quickly flows or floods downstream from developed land, which can damage homes and businesses, flood septic system drainfields and overwhelm streams, wetlands, and wildlife habitat.
3. **Water shortages.** Impervious surfaces, such as roads, parking lots and rooftops, keep rainfall from soaking into the ground and replenishing groundwater and streams used for drinking water or fish habitat.

## Are there any rules that apply to stormwater?

EPA continues to update its rules related to stormwater. Currently, wastewater treatment plant operators must obtain a National Pollutant Discharge Elimination System (NPDES) permit and develop a stormwater management program to prevent harmful pollutants from being washed or dumped into a Municipal Separate Storm Sewer Systems (MS4s). EPA stormwater regulations were launched in two phases.

- Phase I, issued in 1990, requires medium and large cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. There are approximately 750 Phase I MS4s.
- Phase II, issued in 1999, requires regulated small MS4s in urbanized areas as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. There are approximately 6,700 Phase II MS4s.

According to EPA, Phase I MS4s are covered by individual permits and Phase II MS4s are covered by a general permit. Each regulated MS4 is required to develop and implement a stormwater management program (SWMP) to reduce the contamination of stormwater runoff and prohibit illicit discharges.

## What is the NPDES Stormwater Program?

The NPDES Stormwater Program regulates stormwater discharges from three potential sources: MS4s, construction activities, and industrial activities. Most stormwater discharges are considered point sources, and operators of these sources may be required to receive an NPDES permit before they can discharge. This permitting mechanism is designed to prevent stormwater runoff from washing harmful pollutants into local surface waters such as streams, rivers, lakes or coastal waters.

Most states are authorized to implement the NPDES Stormwater Program and administer their own stormwater permitting programs. EPA remains the permitting authority

*It Pours, continued on page 8 ►*





## It Pours, *continued from page 7*

in a few states, territories and on most tribal lands. For these areas, EPA provides oversight and issues stormwater permits.

### What is an MS4?

MS4 is shorthand for municipal separate storm sewer systems. EPA defines an MS4 as a conveyance—a way of moving or transporting—or system of conveyances that is:

- Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;
- Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.);
- Not a combined sewer; and
- Not part of a Publicly Owned Treatment Works (sewage treatment plant).

### Who is covered under the NPDES Stormwater Program?

The NPDES Stormwater Program covers the following types of stormwater discharges:

- MS4s. Operators of large, medium and regulated small MS4s may be required to obtain authorization to discharge stormwater.
- Construction activities. Operators of construction sites that are one acre or larger (including smaller sites that are part of a larger common plan of development) may be required to obtain authorization to discharge stormwater under an NPDES construction stormwater permit. Where EPA is the permitting authority, operators must meet the requirements of EPA's Construction General Permit.
- Industrial activities. Industrial sectors may require authorization under an NPDES industrial stormwater permit for stormwater discharge. Where EPA is the permitting authority, operators must meet the requirements of EPA's Multi-Sector General Permit.

### What's a TMDL?

Throughout the U.S. there are thousands of waters listed for impairments from stormwater sources. The most common pollutants coming from stormwater sources include sediment, pathogens, nutrients, and metals. These impaired waters need a Total Maximum Daily Load (TMDL), which identifies the total pollutant loading that a waterbody can receive and still meet water quality standards, and specifies a pollutant allocation to specific point and nonpoint sources. The TMDL is implemented via the National Pollutant Discharge Elimination System (NPDES) stormwater permitting system. States and EPA Regions have used a variety of methods to develop stormwater-source TMDLs during the past decade. With the expansion of NPDES Stormwater regulations to smaller municipalities and smaller construction activities, there has been increasing demand for more detailed quantification of stormwater allocations in TMDLs that are more useful for implementation in NPDES permits.

### What is section 404 of the Clean Water Act?

Section 404 requires prior authorization from the U.S. Army Corps of Engineers for the discharge of dredged or fill material into waters of the U. S., including wetlands. The term "discharge of dredged material" means any addition of dredged material into, including redeposit of dredged material other than incidental fall back within, the waters of the U.S. The term "discharge of fill material" means the addition of fill material into waters of the U.S. These regulations are designed to improve the effectiveness of compensatory mitigation to replace lost aquatic resource functions and area, expand public participation in compensatory mitigation decision making, and increase the efficiency and predictability of the mitigation project review process.

### How can stormwater be managed?

While the challenges to stormwater management are many, solutions are available. Communities have an important role to play in protecting water resources and public health by implementing appropriate stormwater management practices. For example, best management practices (BMPs) that include technologies and management systems reduce the impact that stormwater has on public health and the environment.

Solutions may include more traditional systems including conveyance systems, such as pipes, drains, and ditches, to transport stormwater. But BMP strategies are flexible, making site-specific solutions possible for many different circumstances. For example, solutions that are suitable for newly developed land can be retrofitted for existing areas. BMP strategies most commonly being used in urban areas involve rainwater capture and control practices. Commonly referred to as green infrastructure, these BMPs include green roofs, rain barrels and cisterns, rain gardens, pocket wetlands, and permeable pavements. These solutions can work on individual sites, at the neighborhood level, or can be incorporated into a more widespread municipal stormwater management program. And they have added benefits—they beautify neighborhoods, cleanse the air, reduce energy costs, improve economies, and support American jobs.

### Where can I find more information?

For more information about stormwater, including regulations and permitting, visit EPA's site at: <http://cfpub.epa.gov/npdes/stormwater/swbasicinfo.cfm>. 💧

*Reprinted from On Tap, Volume 13, Issue 2, Fall/Winter 2013.*





## Get Water Wise with Frannie the Fish

As part of The Groundwater Foundation's Let's Keep It Clean project with Girl Scouts, a blog was created to provide activity ideas, resources, and fun information for Girl Scouts, leaders, parents, and the public.

The Let's Keep It Clean blog, found online at [www.groundh2o.blogspot.com](http://www.groundh2o.blogspot.com), provides fun and educational activities to develop an understanding about the importance of groundwater in each of our lives, and to inspire action to protect water resources.

A regular feature on the blog is Water Wise Wednesday with Frannie the Fish! Frannie is the lovable fish mascot of the Let's Keep It Clean patch booklets created by The Groundwater Foundation. Every Wednesday, Frannie shares information about water conservation, upcycling, recycling, the water cycle, environmentally-friendly cleaning products, and much more!

Check Frannie out at [www.groundh2o.blogspot.com](http://www.groundh2o.blogspot.com) or like The Groundwater Foundation's Facebook page at [www.facebook.com/groundwaterfoundation](http://www.facebook.com/groundwaterfoundation). You can also find out more about

the Let's Keep it Clean patch project at [www.groundwater.org/girlscouts.html](http://www.groundwater.org/girlscouts.html). ♦

## Survey Says...We Want to Hear From You!

The Groundwater Foundation is working with the U.S. Geological Survey (USGS) to collect feedback about the use and presentation of their scientific information.

Water is one of six science mission areas of USGS. Water's mission is to collect and disseminate reliable, impartial, and timely information that is needed to understand the Nation's water resources.

Go to [http://www.groundwater.org/action/usgs\\_feedback.html](http://www.groundwater.org/action/usgs_feedback.html) and take a short survey about various products available from USGS.

Completing the survey gives you a chance to win one of two \$50 pre-paid Visa cards.

The survey closes August 15 so don't wait - provide your input today!

Questions? Contact us at 1-800-858-4844 or email [info@groundwater.org](mailto:info@groundwater.org). ♦

## Groundwater Foundation Shows Off New Space at Open House

The Groundwater Foundation hosted an open house for partners, the public, and guests at its new office space on May 19, 2014.

Visitors had the chance to check out the Foundation's new space, talk with Groundwater Foundation staff about current projects and programs, meet members of the Board of

Directors and others interested in groundwater, while enjoying food and drink.

The new offices provide increased visibility for The Groundwater Foundation with prominent signage, as well as space and technology for hosting meetings, trainings, and workshops.

Special thanks to food and drink sponsors Premier Catering and Trader Joe's. ♦

▼ *Visitors mix and mingle at the open house at The Groundwater Foundation's new offices at 3201 Pioneers Boulevard in Lincoln, Nebraska.*







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The Groundwater Foundation is a nonprofit educational foundation dedicated to educating the public about the conservation and protection of groundwater.

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