

HEADWATERS

PUBLICATION OF MARYLAND SEA GRANT EXTENSION WATERSHED EDUCATORS

Inside this Issue

- + From Gray to Green
- + UMD Senate - What's it all About?
- + 'Tis the season...to put your best foot forward on your Trust Fund application
- + Stormwater Permit Requirements
- + Need Help Educating This or the Next Generation?
- + Got Septic - Do You Know What Type?

GREETINGS LOYAL HEADWATERS READERS,

Winter is here and our thoughts turn to spending time with family and friends over the holidays. So if you want to be the life of the office or departmental party or family gathering, take a few minutes and check out the articles in this issue of Headwaters. What better way than to captivate them with some of your witty repartee about what Milwaukee and Maryland have in common, sharing with them what you know about the U of MD Senate and how they can get involved, the do's and don'ts of applying for a bay restoration grant, or your knowledge of the new municipal stormwater requirements to help clean up the Chesapeake. You can even tell them about some great information on resources for educators looking to up their game or the difference between certain types of septic systems and how they work.

As we close out 2018, we hope you had a great year and have a wonderful holiday season. And as always, if you would like more information about an article or our program, our email addresses are on the last page of Headwaters.

Happy holidays,
The Maryland Sea Grant Extension Watershed Educators Team



[Happy Holidays! Source: Chad Geran at www.dribbble.com](http://www.dribbble.com)





From Gray to Green

+ ERIC BUEHL



On July 22, 2010, the City of Milwaukee was hit with more than 8 inches of rain that resulted in widespread flooding and damage to properties. In response to this, the Milwaukee Metropolitan Sewer District (MMSD) undertook a number of projects to address localized stormwater flooding. At the same time, the City also began working to address a total maximum daily load (TMDL) to decrease phosphorus and bacteria discharges into Lake Michigan. So why am I suddenly interested in what's happening in Milwaukee? Several of us had an opportunity to participate in a Green Infrastructure and Stormwater Management workshop in November and this is some of what we learned while there, all of which has relevance to us here in Maryland.



Due in part to the City of Milwaukee's industrial past, treating stormwater runoff in certain areas has required creative solutions, such as these two 1,200 gallon cisterns that collect runoff from a bridge. Source: Eric Buehl

One of the techniques MMSD is employing to address stormwater problems is Green Infrastructure, or GI for short.





“GI is a cost-effective approach to managing stormwater runoff using vegetation, soils, and other practices to mimic natural processes and treat runoff close to its source.”

GI is a cost-effective approach to managing stormwater runoff using vegetation, soils, and other practices to mimic natural processes and treat runoff close to its source. The opposite of green infrastructure is gray infrastructure, which are piped drainage and wastewater treatment systems designed to transport stormwater runoff to another location. Unfortunately, if the storm drain and sewer systems are connected, large volumes of runoff can overload treatment plants and result in discharges of untreated sewage directly into rivers and streams.

In one neighborhood alone, MMSD is well on its way to reaching its goal of being able to store more than 40 million gallons of stormwater in three large stormwater basins. To reduce the amount of stormwater runoff they have to hold and treat in these basins, they are also utilizing a host of GI practices including street-side bioretention, downspout disconnection, rain gardens, and increasing green space wherever practical.

So where’s the connection to our area? It turns out that GI is an approach that is taking place right under our very noses! Consider what Washington DC is doing to address stormwater runoff and the Chesapeake Bay clean-up. Like Milwaukee, DC is using a combination of green and gray practices to treat runoff from impervious areas such as roads, parking lots, sidewalks, and rooftops. Many of us have heard about the Anacostia River Tunnel that was constructed to store untreated stormwater and wastewater during storms so it doesn’t discharge directly





“Very rarely is there ever a downside to GI, once people understand it, they really appreciate it.”

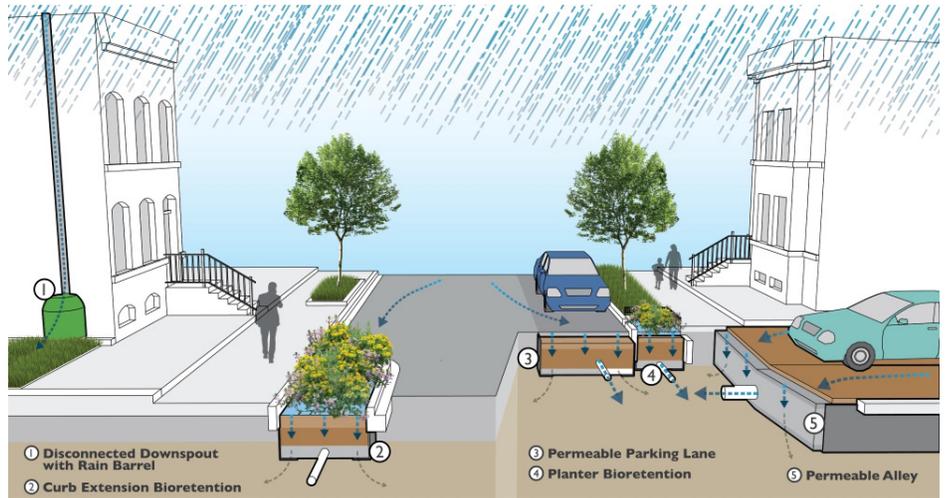


Along with the installation of several large stormwater management basins in the 30th Street Corridor in north central Milwaukee, MMSD is using dispersed green infrastructure practices such as this street-side bioretention facility which will help to decrease the volume of stormwater runoff they need to capture and treat. Source: Eric Buehl

into local rivers. Once a storm passes, the water in the tunnels can then be pumped to the wastewater treatment plant to be treated before being discharged. Like Milwaukee, DC is also using GI in targeted areas to reduce the amount of runoff entering these systems. City officials have identified several problem areas in DC and are implementing practices such as bioretention, permeable parking and alleys, and downspout disconnection with rain barrels.

Along with the practices already listed, GI can also include the use of stormwater planters, green roofs, tree plantings, and open space protection and enhancement. With a list of options like that, you can see that not only do certain GI practices help decrease water quantity and improve water quality, they can improve air quality, decrease energy costs, improve





Part of the District's Clean Rivers Project involves the use of GI techniques to decrease the volume of stormwater runoff they need to treat, similar to what is being implemented in the Brightwood Park and Manor Park neighborhoods in Northwest DC. Source: DC Water

aesthetics, and in some instances, augment local recreational opportunities. As MMSD's Director of Planning Research and Sustainability Karen Sands told workshop participants, "Very rarely is there ever a downside to GI, once people understand it, they really appreciate it."

For more information about GI, check out the U.S. Environmental Protection Agency's Green Infrastructure website at <https://www.epa.gov/green-infrastructure/what-green-infrastructure>. To learn about how MMSD utilizes GI, visit <https://www.mmsd.com/what-we-do/green-infrastructure/resources>. Be sure to check out DC Water's Clean Rivers Project at <https://www.dewater.com/clean-rivers-project>.





UMD Senate - What's it all About?

+ AMANDA ROCKLER

Have you ever wondered what the University of Maryland Senate does? Do you want to get engaged in shared governance at the University? Do you want to learn more about how the University works? If the answer is yes to any of these questions, read on.

The UMD Senate is comprised of faculty, staff, students, and administrators that are peer-elected, volunteer, or appointed. The primary function of the Senate is to advise the University President on virtually all campus policy matters and concerns, including but not limited to: education, budget, personnel, campus-community, long range plans, facilities, and faculty, staff and student affairs. The senate enables the various constituencies to share in the governance of the University which supports the democratic process and the fundamental base of our society.

During my tenure as Senator a number of important issues have been brought to the Senate floor including most recently crafting a Resolution to Improve the Status of Shared



The Senate is an opportunity for faculty, staff, and students to actively participate in shared governance. Source: John T. Consoli/University of Maryland





“The Senate enables the various constituencies to share in the governance of the University which supports the democratic process and the fundamental base of our society.”

Governance in the University System of Maryland (Senate Document #18-19-17) and a Resolution Condemning the Actions of the Board of Regents.

I want to encourage anyone interested to get involved in shared governance. There are several ways in which you can get involved:

1. Run for Senate.
2. Join a Committee. I served on the Programs, Courses, & Curricula (PCC) Committee. The PCC evaluates and reviews policies and proposals concerning modifications to academic programs, curricula, and courses.
3. Suggest improvements to policies or procedures.
4. Get updates on Senate activities (<https://senate.umd.edu>). Subscribe to the general Senate listserv by sending an email to listserv@listserv.umd.edu with the body of the email containing: subscribe senate-public name-of-subscriber (i.e. subscribe senate-public Joe Smith). Subscribe to the monthly newsletter, by sending an email to listserv@listserv.umd.edu with the body of the email containing: subscribe senate-eneews name-of-subscriber (i.e. subscribe senate-eneews Joe Smith).

Senate meetings are open to the public so plan to attend the next Senate meeting on February 5, 2019 from 3:15 to 5:00 pm in the Stamp Student Union Atrium. I encourage anyone interested to attend. And as one of your UME Faculty Senators, my door is always open and I would love to hear from you.





‘Tis the season... to put your best foot forward on your Trust Fund application

+ JENNIFER DINDINGER

It’s that time of year again - time to think about annual budgets, restoration projects, and applications to the [Chesapeake and Atlantic Coastal Bays Trust Fund](#).

The Trust Fund is Maryland’s dedicated source of funding to help counties, towns, and organizations install restoration projects that meet local and state water quality improvement goals, including the Chesapeake Bay Total Maximum Daily Load (TMDL). Below are five “pro tips” to help you assemble a succinct and competitive package. You can always contact your local watershed restoration specialist as well. Good luck!

Pro tips

1. Read, then re-read, the RFP: Geographic targeting and priorities for projects can change from year to year.
2. Know your 2 Year Milestones: What local priorities can you highlight in your application that align with Trust Fund priorities?



The Horsebridge wetland enhancement project funded by the DNR Trust.
Source: DNR Chesapeake & Coastal Services





“Look for emails in early 2019 with more information about exact dates and priorities.”

3. Identify Multiple Benefits: Do you have an idea for a restoration project that will also help improve a roadway, fix a wet spot at a local park, enhance a schoolyard with educational opportunities, etc.? In what ways can you identify and highlight the benefits your proposed project can provide the community in addition to improving local water quality?

4. Build Relationships Now: Who else can you partner with (other agencies, NGOs, nearby towns or counties?) to accomplish similar goals? Can matching funding from other partners be used for administrative costs so your dollar spent per pound reduced ratio stays competitive? Do you need permission from landowners for the project? Who will provide letters of support for your proposal?

5. Ask for Guidance: Trust Fund project managers are available to conduct site visits and answer questions about suitable projects. Asking for help now gives you more time to make changes and edit the proposal to be more competitive.

Administered by the Maryland Department of Natural Resources (DNR), the Trust Fund application process usually includes a Letter of Intent due in January and a full proposal due in March. Look for emails in early 2019 with more information about exact due dates and priorities.

COST-EFFECTIVE NON-POINT SOURCE POLLUTION REDUCTION GRANTS
CHESAPEAKE & ATLANTIC COASTAL BAYS TRUST FUND



Grant Summary
Maryland's Chesapeake & Atlantic Coastal Bays Trust Fund (Trust Fund) is seeking to fund the most cost-effective, efficient non-point nutrient and sediment reduction project proposals in geographic targeted areas of the State. The Trust Fund encourages multi-year, multi-partner projects that will achieve the greatest reduction per dollar invested.

Funding is available to local governments and non-governmental organizations, including bi-county agencies, counties, municipalities, forest conservancy district boards, soil/water conservation districts, resource conservation and development councils, academic institutions and nonprofit organizations having a demonstrated ability to implement non-point source pollution control projects.

Individual private or commercial landowners, consultants, contractors, and other for-profit entities with demonstrated restoration experience are encouraged to apply in partnership with an entity identified above.

Awards will be made by an Inter-Agency review panel based on:

- geographic location
- cost-effectiveness, and
- ability and readiness to proceed

Please refer to full solicitation for detailed description of proposal requirements and submission guidelines.
http://dnr.maryland.gov/ccs/Pages/funding/trust-fund_grants.aspx

WHAT?
The solicitation will identify the most cost-effective non-point source pollution reduction projects for funding in state fiscal year 2019 in targeted areas of the state.

HOW MUCH?
There is no maximum request.
The minimum request is \$500,000.

WHEN?
Letter of Intent due January 19, 2018
Full proposal due by March 30, 2018
Awardees will be announced no later than July 1, 2018

HOW?
Submit letters of intent and proposals online through CCS's grants management service, at: <http://mccgs.com/GrantsOnline/>

CONTACT
Gabe Cohen
Maryland Department of Natural Resources
Chesapeake & Coastal Service
gabe.cohen@maryland.gov
410.260.8753





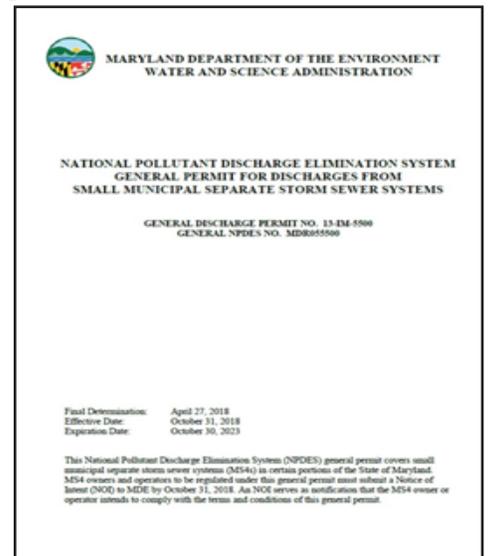


New MS4 Permit, New Restoration Requirements

+ KELSEY BROOKS

On October 31, 2018 Maryland’s new Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4) went into effect. This permit regulates the stormwater discharges of “small” public entities that operate an MS4 and meet certain other criteria (more on that in a couple of paragraphs). The new permit supersedes the 2003 Phase II MS4 General Permit, which had been administratively continued since its initial expiration in 2008. Since 2008 the Maryland Department of the Environment (MDE) has faced a number of legal challenges over the state’s approach to meeting water quality requirements and goals. For a number of both new and existing permittees, MDE’s approach to permit determination has been of specific concern.

The new Phase II permit designates 13 new municipal permittees (in addition to a number of newly designated state and federal facilities). That includes four new county permittees: Calvert County, Queen Anne’s County, St. Mary’s County, and Wicomico County. It also includes eight newly designated towns: North East, Perryville, and Rising



The recently issued Phase II General MS4 Permit requires small MS4s to meet the Chesapeake Bay TMDL restoration requirements. Source: MDE





“The new Phase II MS4 General Permit designates 13 new municipal permittees (in addition to a number of newly designated state and federal facilities).”

Sun in Cecil County; Indian Head and La Plata in Charles County; Easton in Talbot County; Boonsboro and Williamsport in Washington County; as well as the city of Fruitland in Wicomico County.

In other states some of these permittees would not be considered regulated MS4s. Under the federal regulations (40 CFR § 122.32) small MS4s require permits if they are “located in an urbanized area as determined by the latest Decennial Census by the Bureau of the Census” or if they are “designated by the NPDES permitting authority.” In this case, the “NPDES permitting authority” is MDE, which, according to another federal regulation (40 CFR § 122.26(a)(9)(i)), can designate additional permittees if they determine “that storm water controls are needed for the discharge based on wasteload allocations that are part of ‘total maximum daily loads’ (TMDLs) that address the pollutant(s) of concern” or “that the discharge, or category of discharges within a geographic area, contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.”

In short, that means states have some discretion to permit MS4s that are not located within a census urbanized area if the state has reason to believe those entities are having a substantial impact on water





quality. Not all states utilize this component of the federal regulation to bring additional cities, towns, and counties into the program. Another significant difference between the 2003 and 2018 permits has likely been at the heart of driving these challenges. In 2010 the Chesapeake Bay TMDL was released and, as a result, the cost of being an MS4 in this region increased substantially. The new Phase II permit incorporates Maryland's approach to addressing the reduction requirements for total nitrogen (TN), total phosphorus (TP), and total sediments (TSS). For these permittees it means implementing restoration practices that treat 20% of their existing impervious cover that has little to no existing stormwater management.

While it is not evident from the permit how MDE made these determinations, their process is explained in a separate document called "[Basis for Final Determination to Issue the General Permit for Discharges from Small Municipal Separate Storm Sewer Systems](#)," which is available on their website.





Need Help Educating This or the Next Generation?

+ JACKIE TAKACS

Regardless of our organization, program or title, those of us that work in the environmental field often find ourselves in the role of educator. Whether it's explaining an upcoming restoration project to a group of community members, exhibiting our programming at local fairs or festivals, or, should you be lucky enough, formally teaching your expertise to a local group of youth or volunteers, then having a toolbox of educational support and resources is a must! If you are looking for a new way to teach an old topic or starting from scratch and looking for someplace to start, then I have two recommendations to assist you in taking your program to the next level or to help you get out of that rut you've been stuck in. Take a few minutes and check out my go-to's for yourself.



2018 MAMEA annual conference participants actively engaged in learning new ways to teach content. Source: Jackie Takacs





“Don’t let the word ‘Marine’ throw you, MAMEA is an organization of people whose common goal is to improve education about all aspects of marine and aquatic environments.”



Let me introduce you to one of my favorite groups, the Mid-Atlantic Marine Education Association (MAMEA). Don’t let the word “Marine” throw you, MAMEA is an organization of people whose common goal is to improve education about all aspects of marine and aquatic environments. Having served as the organization’s treasurer for over a decade I may be biased, but tell me where else can you join a professional association for less than the cost of lunch. For a mere \$10 you become part of an active network of primary, secondary and college-level educators; informal educators from numerous museums, aquariums, zoos, science centers and research facilities; scientists working on basic and applied scientific research on marine and aquatic topics; and local, state and federal government staff with responsibilities in education, environment and science issues. You also gain access to relevant, unique and hands-on professional development opportunities throughout the year, scholarship opportunities and have access to \$1000 a year in grant money. Did I mention that you get all this for \$10?





If hanging out with great and amazing people isn't your thing, let me introduce you to one of my favorite resources - the Bridge. The Bridge is a growing collection of the best marine education resources available online. It provides educators with a convenient source of content-correct and content-current information on global, national, and regional marine science topics, and gives researchers a contact point for educational outreach. You can go online to find the latest research and resources in the areas of biology, chemistry, physics, geology, the atmosphere, habitats and human activities as they pertain to the aquatic environment. Interested in using real-time data? Check out the Bridge's research and data collections and their bank of data-driven lesson plans that have been reviewed and tested by researchers and classroom teachers.

So if you need help educating this or the next generation and don't want to spend the next 25 years looking for contacts, resources or ideas, then be sure to check out MAMEA and the Bridge. You'll be happy you did. To visit MAMEA check out www.mamea.org or the Bridge at <http://web.vims.edu/bridge>.





Got Septic - Do You Know What Type?

+ ANDY LAZUR



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Do you know if you have a septic system to treat your home's wastewater? If so, do you know what type of system you have? Fact is many homeowners really do not know that much about their system - where it is located or what type tank or drainfield they have. This information is critical to understand how to care for it and prolong its life. Last issue we presented information about the importance and function of septic systems and in this article we will discuss the types of systems.

Historically, most septic systems were simple in design including a tank, distribution box and drainfield with perforated pipe inside gravel filled trenches. Referred to as conventional systems, they can be an effective means to treat wastewater and are widely used and installed today. Some older systems have the tank buried and may be difficult to locate while newer systems will have access/service ports that are visible at the ground surface. This is where a service provider will access the tank for periodic pumping or provide other maintenance. Septic tank design and construction though has evolved over the years to provide for more watertight storage and improved management of wastewater. Concrete and plastic with two chambers are the two most common materials and design used in tank construction today. The two chambers serve to provide separation of solids from liquid and needed storage volume. A filter is included in the second chamber to prevent solids from leaving the tank, and entering and clogging the drainfield.





“Fact is many homeowners really do not know that much about their system - where it is located or what type tank or drainfield they have.”

The drainfield serves to distribute and treat the wastewater. Drainfield size is based on a design (typically by county health department) incorporating key factors including number of bedrooms, a comprehensive soil analysis to determine ability for wastewater to infiltrate into soil layers, and depth to water table. Choices for wastewater dispersal/treatment in drainfields has also evolved and includes: gravity fed trenches with gravel, plastic chambers or domes, or packaged tubes with synthetic aggregate; at-grade and sand mounds (used in areas with marginal soil types and high water tables), and drip dispersal or irrigation. Mounds and drip dispersal systems include a pumping system to lift wastewater to the elevated dispersal area.

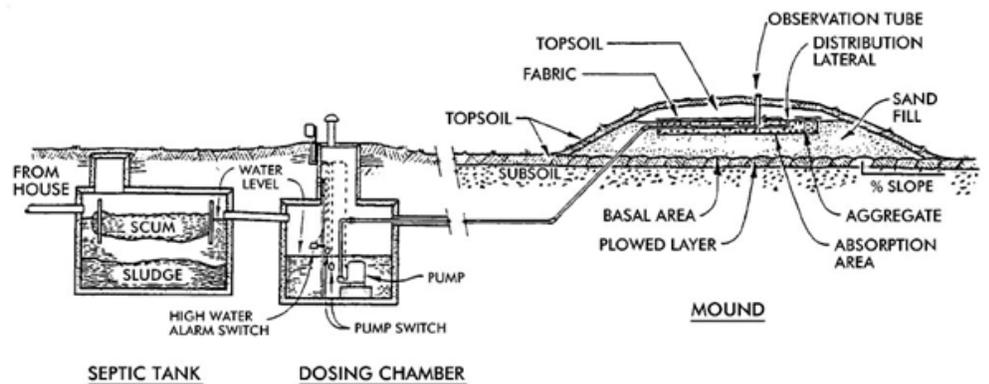


Diagram of a mound system. Source: EPA - ASAE and Converse and Taylor, 1998





“Septic tank design and construction though has evolved over the years to provide for more watertight storage and improved management of wastewater.”

Advanced treatment, enhanced nutrient removal or best available technology (BAT) systems are relatively new (last 15 years) technologies that, as the terms suggest, provide for improved treatment of wastewater and reduction of nitrogen and other water quality parameters that can negatively impact surface and ground waters. BAT units are comprised of several chambers, each with a specific function including solids settling, aeration, clarification and pumping (some units include recycling to enhance treatment). The advanced design and mechanical mixing features of BATs help to reduce nitrogen by 50-85%. The Maryland Department of Environment has evaluated and approved nine BAT units for use in Maryland. The systems vary in design, wastewater flow process, and efficiencies and MDE has extensive information on the nine systems including cost, nitrogen removal and electrical costs. For BAT and other information on onsite systems see <https://go.umd.edu/Uh9>.

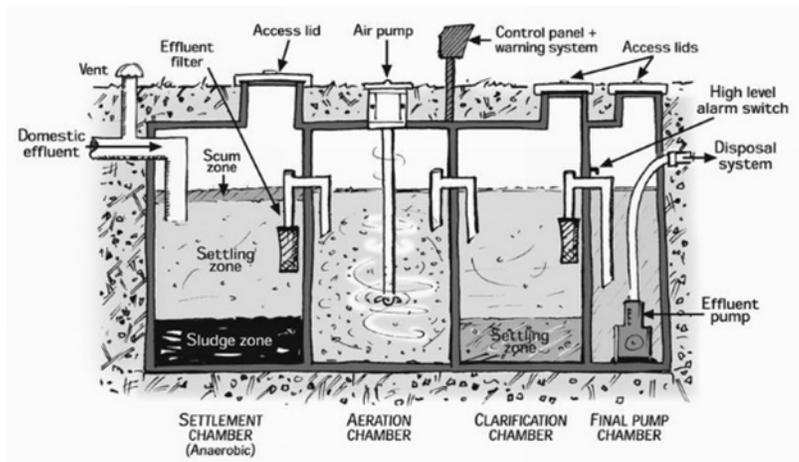


Diagram of a generic BAT system. Source: Frederick County Health Dept.





“It is important to appreciate the important service and value it (septic system) provides to you and your home.”

In 2004, Maryland established the Bay Restoration Fund (BRF) to help fund upgrades for wastewater treatment plants and onsite wastewater treatment, or septic systems. The fund provides 50-100% of the cost of an approved BAT system depending on homeowner income level or type of business. Funding priority is based on proximity to the Critical Area and whether a system is failing or non-conforming. Since its conception, there have been over 14,000 BATs installed and can provide a significant cost savings to homeowners and businesses. Local county health departments implement the program, so to find out more about the BRF, county contact information is available at <https://go.umd.edu/UhC>.

Still unsure about the details of your system? Your county health department may have a record of your system installation, or your service provider or pumper can help also. Whatever system you have, it is important to appreciate the important service and value it provides to you and your home. The next issue will cover helpful care and maintenance tips to keep your system operating efficiently for years to come while reducing environmental impacts to ground and surface waters.



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Headwaters is a publication providing information and resources for Extension and watershed protection professionals. It is a joint production of the University of Maryland Extension and Maryland Sea Grant Program. If you have any comments, questions, or ideas for Headwaters, please contact the Editor: Eric Buehl ebuehl@umd.edu

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