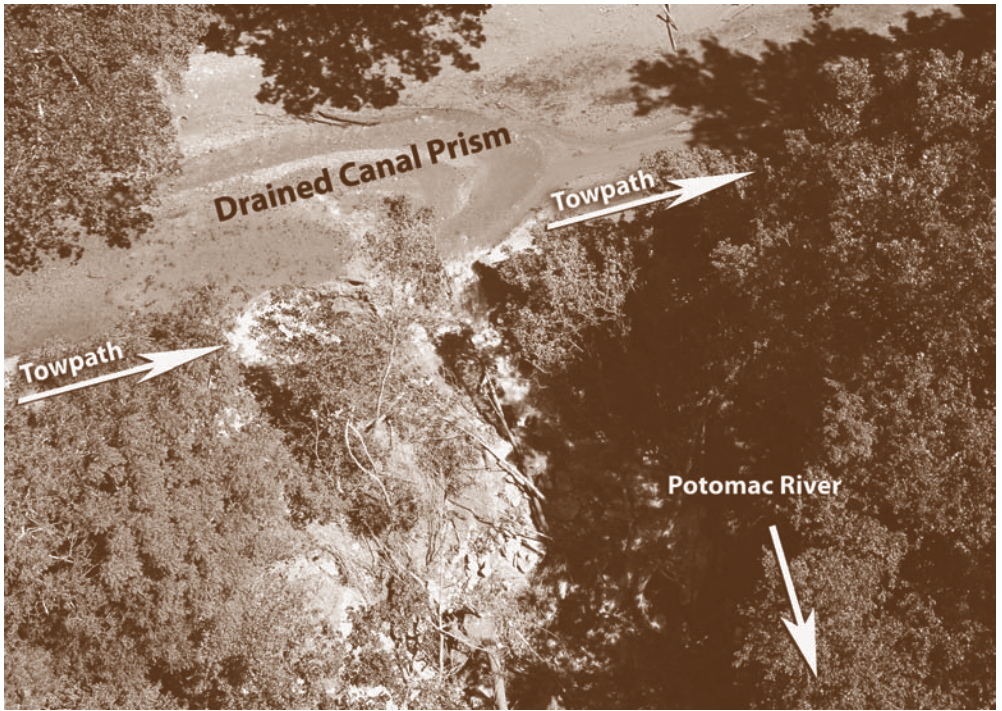


# REPORTER



C&O Canal Trust

A major breach of the C&O Canal and towpath occurred near the Old Angler's Inn in Montgomery County, Maryland, on September 6. A seven-mile stretch of a popular part of the towpath is closed. See story inside.

## Where Does My \$30 Go?

## How About a Free Home Septic Upgrade

For the cost of a septic repair permit and county recording fee and a little time, some Maryland homeowners can get a free upgrade to their septic system. Yes, free. The \$30 fee that homeowners send to the state each year for the Bay Restoration Fund is covering the cost of the upgrades. The fund is really working for you and showing it with tangible benefits.

Maryland's Bay Restoration Fund, signed into law in May 2004, has provided money to help improve water quality in the Chesapeake Bay watershed. Funds collected from those whose wastewater is sent into a sewer system helps wastewater treatment plants upgrade with enhanced nutrient removal (ENR) technology. According to the Maryland Department of Environment's (MDE) website, "Effluent from wastewater treatment plants is one of the top three major contributors of nutrients entering

the Bay," (urban and agricultural runoffs are the other two). Septic users, who also pay the fee, may qualify to get an upgrade for their onsite sewage disposal system (OSDS) through their county's health department. The state estimates that approximately 420,000 systems are in use in the state.

Upgrades to the OSDS helps reduce the amount of nitrogen that is leached out into the septic field. "In upgraded systems, nitrogen is broken down into the normal components of the air we breathe. When we take care of nitrogen, some of the other things, like fecal coliform and *E. coli*, are reduced," said Frederick County's Program Manager for Well and Septic, Dave Gatrell. The upgrades make the septic systems aerobic, meaning they bring oxygen into the system. Instead of ammonia and nitrates, waste is broken down into basic nitrogen and the oxygenated system essentially poisons the *E. coli* and other

***Our mission is to enhance, protect and conserve the water and associated land resources of the Potomac River and its tributaries through regional and interstate cooperation.***

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harmful bacteria that are another common type of stream pollution. In general, upgraded systems are much more efficient at breaking things down. "The effluent is cleaner going into the field and that means the field will work for a longer time," said Gatrell.

Phosphorus, another nutrient that contributes to algae blooms in the rivers and Bay, is not removed in the process. Rather, phosphorus binds to solids and settles in the septic tank. The solids are pumped out of the tank every few years during routine maintenance. If tanks are not regularly pumped, "sediments build up and will go into the leach field. These sediments cannot percolate into the ground," said Gatrell, noting that the field's underground piping could become clogged. Along with the septic upgrades comes a five year maintenance plan, in which the homeowner is responsible for getting the tank pumped, but the installer checks the system to be sure it's working properly. The MDE also takes samples to determine how well the upgrades are actually working.

The upgrade makes systems more efficient and trouble-free while helping to protect the aquifers that provide the groundwater drinking source for residents that use wells. Gatrell noted that in unconfined aquifers, such as karst (porous limestone), everything will get into the ground and can contaminate the groundwater. Upgraded OSDS can help reduce the amount of nutrients and bacterial contamination.

Though the upgrade process takes a little longer than if a homeowner simply called a septic repair company to take care of the issue, it is worth it. After initiating the process with the county, the system is assessed to be sure the leach field is in working order. The program cannot cover the costs of repairing the leach field, only replacement or upgrades to the tank, which really is the heart of the system. Once the system upgrade is approved, homeowners will need to obtain three contractor bids, a bit tougher than it sounds. It may mean phone calls to eight or ten companies to get those three bids.

Canaan Valley Institute, in partnership with Frederick County, Md., has secured funds to upgrade 60 failing or underperforming OSDS systems. In 2004, the Frederick County Division of Public Works, Watershed Management Section, collaborated with the Maryland Department of Natural Resources and representatives of various local, state, and regional government agencies and non-government organizations to complete the Monocacy Watershed Restoration Action Strategies (WRAS). The Monocacy WRAS identified failing septic systems and systems located on small lots as probable sources of nutrient impairment in the watershed.



J. Willoughby

A square is cut from the top of the septic tank to accommodate a component that helps aerate the tank and breaks down nitrogen wastes.

The approved OSDS upgrades must all provide aeration in the tank to help break down nitrogen and coliform bacteria. “The requirement is to reduce nitrogen by 90 percent in each system. We’ll know what our true reduction is in a few months, when MDE will begin testing,” said Gatrell. There are about 43,000 septic systems in Frederick County and a 90 percent reduction on some of those systems would make a significant impact on water quality.

Individual counties that have been awarded grants from the state are responsible for prioritizing applications according to certain factors, including sites with failing systems, sites concentrated on lots smaller than one acre, proximity to surface water, sites located within proposed source water protection areas, sites with restrictive soil conditions, and other conditions. Sites in the Monocacy watershed may also be prioritized based on the Monocacy WRAS, which identified sites in communities that are, based on collected data, probable contributors to nitrogen impairments and sites located in subwatersheds known to contain native brook trout populations. Thus far, only 16 systems have been upgraded this year, although there is funding for many more.

Charles County, another Maryland jurisdiction that abuts the Potomac River, also is offering septic upgrades. Thus far, 30 systems have been installed, five are underway, and the county has nearly 80 more applicants. Because of the significant response, Charles County Registered Sanitarian Rosie Lewis indicated that the county will be applying for more funds next year to help meet demand. When asked about the significant response, Lewis credited the Port Tobacco River Conservancy with helping to get the word out and educate residents about the program. Incidentally, most of the applications are in the Port Tobacco watershed, a priority area for the county to address nutrient reduction.

Other basin states are considering ways to help fund septic and treatment plant upgrades, although none have passed a

fee similar to Maryland’s. “I wish we had this program in Jefferson County, W.Va.,” said ICPRB’s Jim Cummins, who lives in the county. Even with the fund, few people have made use of the free septic upgrade. During the past two years of the program, less than 400 systems have been upgraded. About nine percent of the nitrogen polluting the Chesapeake Bay is attributed to septic systems. Septics along shorelines can pose the greatest problems. And while the fund is making the new technology available, none of the Maryland counties in the Potomac watershed have mandated the enhanced systems for new development or replacement of failed systems.

While the finished systems have more above ground parts that are a bit of an eyesore, knowing that the upgrades are helping to improve water quality far outweigh the system’s appearance. A simple lattice fence with a native climbing vine or potted plants will help blend the system into the yard. And, the septic upgrade is free. You can’t beat free.

These on-the-ground upgrades, which taxpayers fund with their \$30 per year, will hopefully make measurable improvements in the local watersheds and the Chesapeake

## Tips for Maintaining Your Septic System

**\*Get your septic tank pumped out** and inspected every one to four years. It will help keep the leach field working properly.

**\*Don’t use a garbage grinder** in the sink. Garbage grinders will make the tank fill faster.

**\*Don’t put oils or harsh chemicals** down the sink. These chemicals can upset the balance in the tank and prevent effluent from breaking down properly.

**\*Bleach is okay, in moderation.** A little bleach will not upset the system, but be aware that too much can prevent the proper breakdown of nutrients and harmful bacteria.

**\*Apply for an upgrade.** If you live in Maryland, you could be eligible for a septic upgrade. Check the Maryland Department of Environment website for more information about the program.

*These tips were provided by Frederick County’s Program Manager for Well and Septic, Dave Gatrell.*



Bay. The MDE will be monitoring the improvements in the next year to determine the true accomplishments of the upgrades. Though not all counties have been granted funds to help upgrade septic systems, homeowners can directly apply to the Maryland Department of Environment for funding. Despite the recent downturn in the economy, Bay Restoration fund money can keep working toward better water quality.

To learn more about the program, visit [www.mde.state.md.us/water/cbwrf/osds/](http://www.mde.state.md.us/water/cbwrf/osds/), or call (410) 539-4195.

Reporter *co-editor Jennifer Willoughby recently had her septic system upgraded with a Bay Restoration Fund grant from Frederick County. Her septic system is older and was in good working order, but she lives on a small lot at the headwaters of Ballenger Creek.*

## Murky Waters of River, Bay Restoration

Restoration of the Chesapeake Bay and the Potomac River, its second-largest tributary, depends in part on the successful reduction of stormwater that washes the landscape of whatever can be loosened and carried by the flow. The list is impressive: sediment, fertilizers, pesticides, and other industrial and agricultural chemicals, cattle and pet waste, automobile oil and other chemicals, road and runway de-icers, contaminants from failed septic fields, and lots of litter can send a slew of chemicals and contaminants into our streams, rivers, and tidal waters.

Perhaps the most visible component is sediment. High sediment loads turn the water muddy for some time after a storm. The sediment comes with nutrients attached, adding to the nutrient load. The muddy waters block sunlight and hinder the growth of submerged aquatic plants, which provide habitat for river creatures and oxygenate the water. Excessive sediment eventually settles to the bottom, creating a mucky layer that can smother bottom habitat and the shellfish and other creatures that live there. Tides and storm-related currents can resuspend the sediments over and over again.

While many programs to address sediment have been created, and much money spent, a growing amount of data suggest that water quality is sliding backward in some tidal waters. After a storm, it is not difficult to see muddy water coming off urban, suburban, or agricultural lands.

Heavy influxes of sediments to the estuary have been a problem since colonial times, and their accumulation has permanently changed the Potomac River in ways that now hinder restoration. Europeans colonizing the Potomac watershed found a wide, deep river with firm shorelines surrounded by forests that kept sedimentation to a minimum. Extensive oyster reefs lined the shores. Deep water ports for ocean-going vessels were established as far up the Potomac River as Rock Creek in Washington, D.C.

Land clearing for agriculture and industry followed, and the practice was carried westward. Erosion and sedimentation began to cause navigational problems in the mid 1700s. Ports began to be abandoned in the 1800s. Increasing turbidity and aggressive harvesting eventually destroyed oyster bars that protected the river's shores from tides and storms. Tropical Storm Agnes' flooding in 1972, along with persistent oyster diseases, have left only a remnant of the huge oyster population that once filtered estuary water.

The shape of the tidal Potomac changed as soft, organic-rich muds and clays filled in the shorelines and accumulated along the river's flanks. The volume of the river is smaller now, forcing incoming fresh water to travel more quickly through the estuary. Saltier water that once reached up along the river bottom to the District of Columbia is pushed miles downstream. Diminished oyster reefs no longer buffer river banks in the lower estuary from the erosive power of tides and waves.

These profound changes were accompanied by increasingly poor water clarity. The percent, or frequency, of water clarity measurements achieving levels adequate for healthy growth of both underwater grasses and free-floating algae has been erratic or trending down since at least the 1960s. Researchers suspect that the introduction of the Asiatic clam, *Corbicula fluminea*, temporarily reduced water-borne sediments and algae in fresh and brackish waters, and helped underwater grasses to return to the middle and upper Potomac River in the early 1980s. Water clarity has begun to decline again, rejoining the longer, steeper, decline occurring in the saltier lower estuary. In 2007, only 1 in about 17 measurements met the water clarity requirements of both plant types in the upper and middle estuary. One in about 30 measurements met the requirements of both plant types in the lower estuary.

While it is tempting to simply link the Potomac's degrading water clarity to

stormwater runoff, the facts don't fully support this. Management practices have successfully reduced sediment loads from many large free-flowing rivers in the Chesapeake Bay watershed, and the steepest declines in clarity occur in saltier waters, miles away from freshwater sources.

Claire Buchanan, ICPRB Associate Director of Aquatic Habitats, is one of several scientists studying the declining water clarity. She highlighted the problem in several presentations this year, noting that more research is needed to identify the cause of the decline and locate its sources. Buchanan warns that sediment's effects on

monitoring the correct factors to fully understand the issue," Buchanan said. "Method-related differences in our water clarity measurements are hinting at the possible culprit."

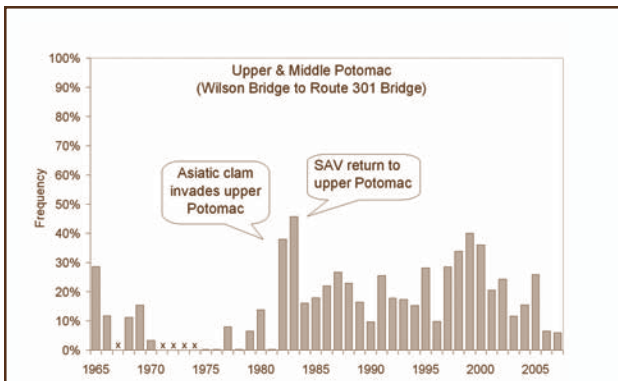
Scientists grappling with the unexplained clouding of the waters use two common methods to measure underwater light. Light sensors, or radiometers, lowered to several depths in the water sense light energy coming from above. They are thus able to detect oblique (scattered) light rays. These sensors have shown little change over time in light attenuation. Meanwhile, the Secchi disc method has documented steady declines in the same saltwater areas. The Secchi disc (a white and black disk lowered into the water until it is obscured) relies on vertical light rays reflecting off the disc to return, unabsorbed and unscattered, to the observer at the surface.

The different method results suggest a major factor responsible for the water clarity declines may be very small particles that tend to scatter rather than absorb light. A variety of these very small particles in Chesapeake Bay and the Potomac River, from fine clays to small organic particles, are not currently monitored. Better knowledge about the nature and movement of these particulates in the system could help address the decreasing water clarity.

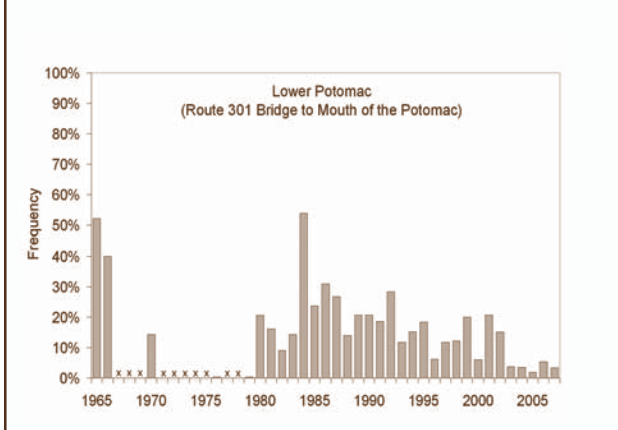
The source of the particulates is also in question. Sea level rise is submerging coastal wetlands and exposing new layers of geologic material to the river environment. The continental shelf of the Atlantic Ocean, which is increasingly impacted by pollution from coastal bays, is an important source of nutrients and sediments to the lower bay. Dredging and strong storms resuspend sediments in shallow waters that are no longer protected by oysters or

underwater grasses. New research suggests clumps formed from suspended particulates are generated internally in bay waters through processes enhanced by nutrient pollution.

"While water clarity is improving in some fresh and brackish waters of the Chesapeake system, we really don't know why water clarity is declining in saltier waters," Buchanan said. "I wonder if the current nutrient and sediment reduction strategies, which focus heavily on the watershed, can actually reverse these declines in open waters."



The yearly frequency of water clarity measurements meeting levels adequate for growth of healthy plants (underwater grasses and free-floating algae). Adequate water clarity levels are greater than about 0.9 m or 35 inches in the upper and middle Potomac, which has fresh and brackish waters (top graph), and greater than about 2 meters or 73 inches in the lower Potomac, which has saltier waters (bottom graph). "X" indicates little or no data.



the river and bay are increasingly severe and "Management's plans to restore the estuary may now be overestimating its restoration potential."

Water clarity is the distance—usually the depth—to which light penetrates water before it is entirely scattered or absorbed. Several factors have the potential to reduce water clarity but the likely ones—chlorophyll, which is an indicator of algal biomass, and total suspended solids, which includes sand, silt, clay, and living and dead microorganisms—do not appear responsible for the current declines. "We may not be

# Chesapeake Watershed Forum: New Watershed Community Launched

More than 225 watershed workers attended the third annual Chesapeake Watershed Forum for four days of interactive and educational workshops, critical networking, and hands-on activities. Held October 2-5 at the National

Conservation Training Center in Shepherdstown, W.Va., the Forum attracted representatives of local government, state and federal resource agencies, and staff and volunteers of numerous non-profit watershed organizations. Whether it's leadership development, fund-raising, or stream restoration, the forum has become the premier watershed-based resource for learning new innovative practices and meeting people with expertise to share.

The National Conservation Training Center is a facility of the US Fish and Wildlife Service. The technologically advanced center is equipped with lecture rooms, a modern laboratory complex, and computer labs that leave it well-prepared to handle the training of more than 15,000 conservation professionals per year. Additionally, a picturesque setting on the Potomac River affords numerous opportunities for field experiences and demonstrations.

The Chesapeake Watershed Forum is a project of the Alliance for the Chesapeake Bay and collaboratively planned by representatives of numerous Chesapeake organizations including ICPRB. Funding for this year's forum was provided by the Chesapeake Bay Funder's Network, the Chesapeake Bay Trust, the U.S. Environmental Protection Agency Chesapeake Bay Program, and the National Fish and Wildlife Foundation.

This year's Forum included pre-conference workshops on financing green initiatives, regional networking sessions, six two-day workshops tracks, a keynote address, and an evening bonfire social. Penny Gross, a member of the Fairfax County, Va., Board of Supervisors, remarked: "I was so impressed with the workshop at the watershed forum that I really want to be sure that we get next year's Forum dates on the calendar ASAP. The quality of the presentations was first-rate, and the audience was a bit different from what I am used to, and that was a plus."

This year's keynote address was given by Mary Anne Hitt, Executive Director of Appalachian Voices, an organization that brings people together to solve the environmental problems having the greatest impact on the Central and Southern Appalachian Mountains. Her address detailed a grassroots success story of online activism that uses Google Earth to shed light on the visible effects of mountaintop removal coal mining.

Besides the empowerment and education of over 225 watershed activists, perhaps the largest thing to come out of this year's forum was the creation of the



## Watching the River Flow

Flow of the Potomac River measured near Washington, D.C. was well below normal in August and September, according to provisional data from the U.S. Geological Survey. Storms in October have brought flows back to normal or above.

The August average flow of the Potomac was about 1.6 billion gallons per day (bgd), about 53.8 percent less than the long-term average of 3.4 bgd. Daily extremes during the month ranged from a high of about 2.2 bgd on August 7, falling to a low of about 1.1 bgd on June 30. Water taken from the river for metropolitan water supply averaged about 400 million gallons per day (mgd).

September flows were again below average, with a flow for the month of about 2.7 bgd, or about 23.6 percent less than the September long-term average of about 3.6 bgd. The river's flow ranged from a high of about 10 bgd on September 7, and falling to a low of about 1.4 bgd on September 23. Water taken for municipal supply averaged about 200 mgd.

Showers in the first part of October have increased Potomac flows, and more frequent monitoring of river levels for drought management purposes by the ICPRB Section for Cooperative Water Supply on the Potomac River (CO-OP) was discontinued. The probability that releases of stored water to augment water supply needs this year is minimal. For more information, visit <http://www.potomacriver.org/cms/drinkingwaterdocs/WSO.Oct.08.pdf>.



Chesapeake Watershed Network. The network is an online community of colleagues working to protect and restore the land and waters of the Chesapeake. The network provides the space for each individual to create a personal page that describes their background, the type of work they perform, the strengths and insight they have to offer and areas where they could use some help. Established networking groups can pull individuals together to share ideas to address stormwater or protect forests, to collaborate on regional or other issues. In addition, a shared calendar lists events and happenings around the watershed. Users also can post documents and resources on various topics, and participate in on-line discussion forums.

The network can be found at



[www.chesapeakenetwork.org](http://www.chesapeakenetwork.org) and should prove to be an invaluable tool for facilitating collaboration among the diverse community of watershed workers. More than 275 people have joined the network and are becoming familiar with all it has to offer.

—Adam Griggs, ICPRB Watershed Coordinator, wrote this article and was one of the forum organizers.

## Hanna's Rains Breach C&O Canal



The Potomac is just visible in this photo showing the breach.

C&O Canal Trust

Rains from Tropical Storm Hanna helped to create a massive breach of the C&O Canal near the Old Angler's Inn in Montgomery County, Md., in early September, closing the towpath. A well marked detour has been established.

The breach occurred when heavy rains from the storm crumbled what may have been an already weakened part of the canal prism. Cracks in the surface of the adjacent towpath were found the day before the storm on September 5<sup>th</sup>, and that section of the towpath was closed. The following day, six inches of rain fell, and a 125-foot gap sent canal water to the river. Currently, the towpath is closed from Old Angler's Inn to Great Falls, and the canal has been drained of water for a seven-mile stretch from Widewater to Lock 5.

A preliminary assessment revealed the presence of gabions, large metal baskets filled with rocks, that may have been used to shore up the area after the devastation caused by Tropical Storm Agnes in 1972, noted Matthew Logan, president of the C&O

Canal Trust, formed last year to assist in protecting and enhancing the C&O Canal National Historic Park.

After a more detailed assessment of the damage, work will begin to restore the canal and towpath, which could take two years or more and cost as much as \$2 million. "The breach at Angler's is the most serious in the park since the two major floods of 1996," said Park

Superintendent Kevin Brandt. That section of the park hosts about 1.5-million visitors per year.

For the time being, a dike will be installed on both sides of the breach to contain the damage and create a shorter bypass for hikers. Staffs of the national park and the C&O Canal Trust are working together to devise a strategy to raise funds and other resources for repairs. The C&O Canal Trust will hold fundraisers and solicit donations from the public, Logan noted.

As in past C&O Canal Park restoration efforts, the park will need volunteers as well as funds. The park's large local user base has made volunteer efforts a saving grace for the park in the past. Logan is compiling a list of complementary projects, such as removing downed trees and other debris from the drained section of the canal while repairs are underway. To make a contribution or to check volunteer opportunities, and get overall status on restoration, visit the C&O Canal Trust website at [www.canaltrust.org](http://www.canaltrust.org).

# Water Monitored Around the World

Students, nonprofit groups, and governments around the world have joined together again this year to provide a snapshot of the planet's water quality and draw attention to the need to heal its waters.

The kick-off for World Water Monitoring Day, sponsored by the Water Environment Federation and the International Water Association, was held in East Potomac Park in Washington, D.C. Some two dozen organizations, including ICPRB, partnered in the event, in which 150 students from District schools monitored the Potomac River and reported the results of the simple chemical tests.

ICPRB Living Resources staff brought live macroinvertebrates (bottom-dwelling stream critters) for the students to see and touch. "It always attracts a lot of attention and questions from the kids," said ICPRB Living Resources Director Jim Cummins.

Ben Grumbles, U.S. Environmental Protection Agency Assistant Administrator for the Office of Water, thanked the students. "World Water Monitoring day is about



C. Dalpra

**ICPRB Watershed Coordinator Adam Griggs shows live insects captured in a stream to World Water Monitoring Day attendees.**

reconnecting people to their watersheds. Think globally, monitor locally," he said.

The event is held annually from September 18 to October 18 to accommodate the collection of data from around the world. About 50,000 people from 50 countries participated. For more information, visit [www.worldwatermonitoringday.org](http://www.worldwatermonitoringday.org).



Potomac Basin

# REPORTER

**Editors: Curtis M. Dalpra  
Jennifer D. Willoughby**

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