



Fairmount Water Works Interpretive Center Newsletter

SPECIAL EVENTS AND PROGRAMS

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Through historical imagery along with an animated presentation, the “dynamic duo” of Adam Levine and C. Drew Brown will present the topic of how we came to filter our drinking water in Philadelphia.

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Newsletter for the Fairmount Water Works Interpretive Center



Focus on Microbes!



Vibrio fischeri, bioluminescent bacteria, on agar plate. Photos by Aurora MacRae-Crerar.

Article by Meg Malloy

One of the most popular 2011 Science Saturdays at the Fairmount Water Works Interpretive Center (FWWIC) was our November focus on microbes. To best explain this expansive group of organisms, we teamed up with Aurora MacRae-Crerar and Maddie Stone from the University of Pennsylvania. They are both graduate students and highly enthused about their fields of study.

Aurora, a native of Princeton, New Jersey, studies the consequences of global climate change and land use pressures in the grasslands of northern Mongolia by using pyrosequencing techniques to genetically characterize thousands of microbial species and to determine the effects of microbial community shifts on carbon and nitrogen cycling. Maddie also studies microbes. Her area of focus is the role of soil microbes in cycling nutrients in the tropical forests of Puerto Rico.

Microbes are everywhere! Hopefully, that news doesn't send the reader into a fit of scratching, scrubbing or soaking in antibacterial soaps. These tiny organisms can have big affects.

(continued on next page)

FAIRMOUNT WATER WORKS INTERPRETIVE CENTER

640 Water Works Drive • Philadelphia, PA 19130 • 215-685-0723 • www.fairmountwaterworks.org

Hours

Tuesdays – Saturdays: 10:00 AM to 5:00 PM

Sundays: 1:00 PM to 5:00 PM

Closed on Mondays and City Holidays

The Interpretive Center is ADA accessible.

We invite you to Friend us on Facebook at "Fairmount Water Works" and follow us on Twitter at @FWWIC!

Donations to the FWWIC can be made on line at our website, or with a check to "The Fund for the Waterworks – IC."

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(continued from page 2)



Our yeast experiment at the Water Lab taught families about the properties of microbes. Here's an experiment one of our families did during a November Science Saturday.

The test tubes contain yeast pellets. The tube marked "W" contained yeast and water. The middle vial contained yeast and sugar, and the tube with the green balloon contains yeast, water, and sugar. The experiment proved that yeast needs both water and food to survive – note the inflated balloon.

Photo by Meg Malloy.

Microbes can be protozoa (single-celled animal like an Amoeba), fungi (single or multi-cellular spore producing, for example, mushrooms and yeast), and bacteria (single-celled with cell wall but lacking organized organelles, like *E. coli* and *Vibrio fischeri*).

Unfortunately, most of the human species look down on these little guys. They hear/read "microbes" and they think – D I S E A S E. It is true that some microbes can wreak havoc on the human body and cause us to suffer the unpleasantness of diarrhea, pain from infection, or, worse – death! This dark cloud of potential illness has cast a shadow over all the positives of most microbes.

Thanks to the local home brew revolution more than a few people have been reintroduced to the positive nature of microbes such as yeast. We, as humans, need microbes. They help digest our food, fight pathogens, are critical for crop production and are a key component of the aquatic food web.

In our Water Lab, children and adults got a great introduction on the basics of microbes. They conducted a yeast experiment, and got to plate *Vibrio fischeri*, bioluminescent bacteria. Maddie noted that there are, "few outlets as a grad student to talk about what you study to an audience that gets as excited

as you do. Kids are still receptive to everything, and I really think that they see the world differently." Aurora added, "It felt really good to teach about something I love and to learn about how kids see the world."

They both enjoyed their experience and we received positive feedback from those who participated. We were thrilled to have Maddie and Aurora volunteer their time and energy.

I love the idea of peeking into the labs of our local academic institutions and getting a first hand account of what they are researching. Maddie and Aurora brought their love of science right into the Water Lab and I do believe changed some peoples' opinions of microbes.

To learn more, please visit us at the FWWIC, and talk to me. I welcome your questions!

Next month, our Science Saturdays will be focusing on damselfly and dragonflies (see page 7).

Meg Malloy is our Environmental Scientist. Read more about her on page 4.



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Meet Meg Malloy!

If you are a regular visitor to the FWWIC, you probably know Meg Malloy. She can usually be found in our Water Lab -- unless she's out on the river.

Meg started working with the FWWIC in January, 2007, as an environmental Education Consultant. Before then, she was a scientific academic researcher at the University of Pennsylvania.

Her involvement with the IC began when, as a graduate student, Meg volunteered at the IC as part of her Master's thesis project at the University of Pennsylvania. Her thesis, titled "Watersheds: Our Drinking Source, Our Dumping Ground. Initiating an Environmental Education Program on Watershed Monitoring and Stewardship," focussed on educational programming related to the Tookany-Tacony-Frankford Watershed Plan.

In December of 2011, Meg was hired as a full-time Philadelphia Water Department (PWD) Environmental Scientist. She'll continue to take lead on programs such as *Seeing is Believing*, a water sampling lab based lesson, and Green Infrastructure tours.

"I am thrilled to be part of the PWD. I was impressed by the PWD in graduate school when I learned about the history of water in Philadelphia and how proactive our water department is." Meg said. "I am proud to be an official member of the team! I am looking forward to taking on more responsibilities, and bringing much more of the science behind water and wastewater to the IC. It's so critical that the public understands the important role each of us plays in the water use cycle and our relationship to the river that flows past the Water Works."



The Buzz About Bees: Learn Beekeeping at Awbury Arboretum

Green Sanctuary Earth Institute of Pennsylvania is creating a community apiary on the Awbury Arboretum grounds. The Arboretum's public green space is pesticide free, making it an ideal site for educational honeybee hives.

There are two courses: youth can join the 4-H Beekeeping Club, which meets Tuesdays beginning January 10, 2012. The course is six weeks long and costs \$25.00.

Adults and youth can enroll in the Comprehensive Beginner's Course, where classes will include "swarm control" and "honey harvesting." This 10-week course begins Thursday, February 2, 2012, and costs \$120.00. Receive a discount when more than one member of a household enrolls.

The Awbury is located at One Awbury Road Philadelphia, PA 19138.

Register by contacting Anais Salles, Green Sanctuary Community Apiary, at 267-325-6869; or at gseipa@gmail.com.



Philadelphia is Named an “Emerald City” for its Green Projects



Philadelphia’s “Green City, Clean Waters” program is both visionary and practical. The program combines traditional and sustainable methods to control stormwater runoff.

Governments and agencies around the country are taking notice, and Philadelphia was just rated as an Emerald City by the Natural Resources Defense Council (NRDC). Philly received a perfect score for its green infrastructure programs – the only city in the US to receive this level.

The cities were judged on the following criteria:

- Long-term planning for green infrastructure
- Stormwater retention standards
- Use of green infrastructure in comprehensive land planning
- Private sector incentives to install green infrastructure
- Guidance and assistance
- Long-term funding to support green infrastructure investment

Here’s how NRDC’s new report, *Rooftops to Rivers II*, describes Philly’s projects and programs:

Over the next 25 years, Philadelphia is committed to deploying the most comprehensive urban network of green infrastructure in the United States.

Philadelphia’s Green City, Clean Waters plan, recently approved by state regulators, requires the retrofit of nearly 10,000 acres (at least one-third of the impervious area served by a combined sewer system) to manage runoff on-

site; relies on green infrastructure for a majority of the required CSO reductions; calls for the investment of more public funds in green infrastructure (at least \$1.67 billion) than in traditional gray approaches; and leverages substantial investments from the private sector, primarily through application of a one-inch retention [one inch of rainfall] standard for new development and redevelopment projects citywide.

The city will fund its share of the costs with a stormwater fee based on impervious area, supplemented by state and federal grants as available. To encourage retrofits on private property beyond that required by the retention standard, the city offers incentives such as reduced stormwater fees, free design assistance and low-interest loans to owners of large impervious properties, a green roof tax credit, rain barrel giveaways, and expedited permit reviews.

Philadelphia also has installed dozens of green infrastructure demonstration projects, has published a technical design manual, and is developing a maintenance manual.

To read more, please go to: <http://planphilly.com/eyesonthestreet/2011/11/17/emerald-city-philly-ranked-best-in-the-nation-for-green-infrastructure>.

The full article about the NRDC’s evaluation process can be found at: <http://www.theatlanticcities.com/technology/2011/11/americas-best-clean-water-cities/515/>



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Venice Island: An Underground Tank and Aboveground Green



sanitary sewage during heavy rains, avoiding overflows directly into the Schuylkill River. This stored flow will be pumped to a treatment facility when the sewer system has available capacity.

In addition to the storage tank and upgraded facilities, PWD and Philadelphia Parks and Recreation will also be making improvements to the Manayunk Canal to restore flow, which will include dredging and modification to the spillway at Flat Rock Dam.

Venice Island is located in the Philadelphia neighborhood of Manayunk which became part of Philadelphia in the mid-1800s. Once an active paper and textile mill town, Manayunk boomed with industry. As the area grew so did the need for water and sewer infrastructure. Eventually, the demands on the existing system exceeded the available infrastructure, causing sewer backups and neighborhood flooding.

Around the turn of the 20th century, the sanitary and stormwater pipes near Shurs Lane were modified to alleviate the flooding situation, allowing a mix of sanitary sewage and stormwater to overflow into the Schuylkill River. While this seemed like a good idea

100 years ago, we now understand the negative impacts this has on the Schuylkill River, a source of drinking water for many Philadelphians.

Analysis in the early 2000s looked at different ways to meet the demands on the infrastructure and protect the health of the River. PWD looked at different locations, multiple tank options, even running a new sanitary sewer down Main Street. Ultimately, it was determined that a tank on Venice Island was the best solution.

The project includes constructing an underground storage tank and PWD head house facilities to protect and improve the health of the Schuylkill River. A new performing arts center and children's play area are planned to replace the recreation facilities demolished to accommodate the project. A new parking lot that includes green stormwater management practices will further aid in controlling stormwater runoff.

The storage tank will be approximately 400 feet long, 75 feet wide and 25 feet deep. This size will allow for temporary storage of nearly four million gallons of water and

The Venice Island Underground Storage Tank project will benefit the area in multiple ways. The biggest benefit will be the improvement in water quality. The Storage Tank will provide an area for stormwater to be held so that sewers do not become overburdened, overflowing into the Schuylkill River.

The complementary canal improvements, led by Philadelphia Parks and Recreation, will also greatly benefit the area by creating more flow through the canal and thus improving water quality. The improvements to the recreation facilities will provide a modern performing arts facility and innovative play areas for the residents of Manayunk as well as the visitors to the area.

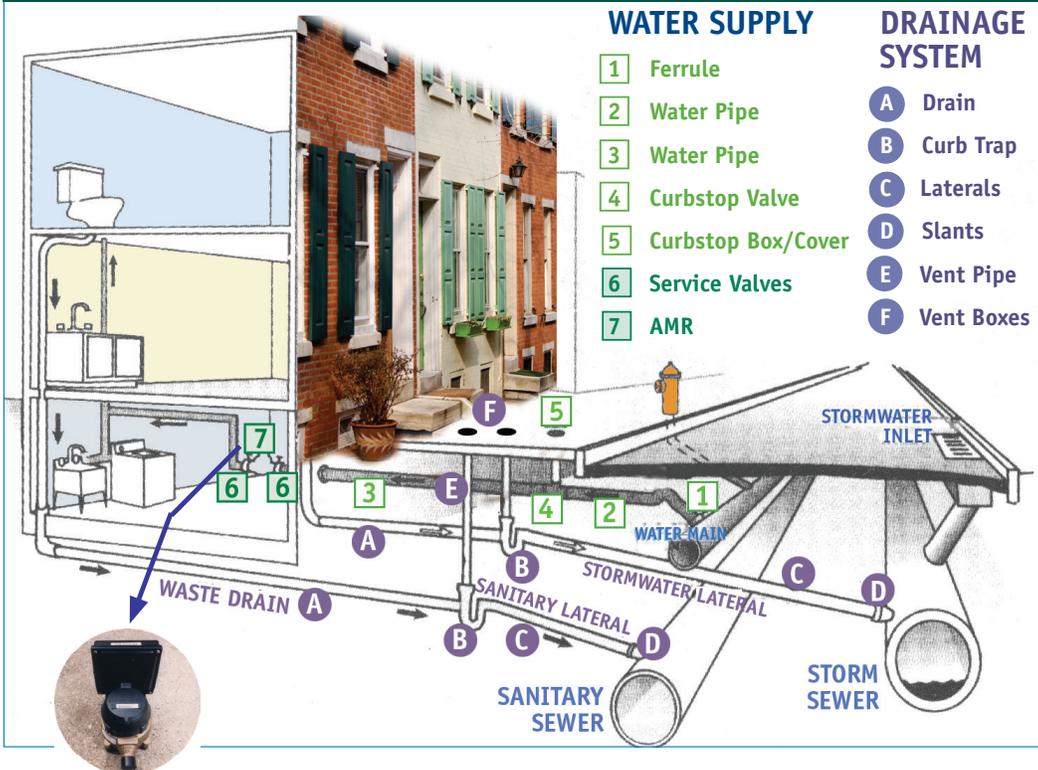


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It's YOUR Turn! Your Plumbing From Sidewalk to Sink

EXAMPLE OF A SEPARATE SEWER SYSTEM



Your Drainage System

The homeowner must maintain household waste pipes as well as pipes leading from the home to PWD's sewers underground. Once the sanitary sewage enters the sewers, PWD takes responsibility.

The sewer system includes your drain (A), curb trap (B), stormwater and sanitary laterals (C), slant (D), vent pipe (E) and vent boxes (F). The homeowner is responsible for this part of the system.

Once drinking water leaves the PWD water main in the street, it becomes your responsibility. This means you must repair plumbing that connects our water main to you, as well as the plumbing in your home. We have several programs to help; see the list at the end of the brochure.

The illustration to the right shows the water supply and drainage system.

The **Ferrule (1)** connects the water main to your underground water service line. Water passes through the ferrule, and into your **water service pipe (2 & 3)**.

In addition to your water service pipe, you are also responsible for:

Outside your home:

The **curbstop valve (4)**, its **box and cover (5)**, usually located near the curbside in front of your home. If you are repairing your sidewalk, be sure that the curbstop box is not covered with cement. (Damaged curbstop boxes and covers can be replaced at a local hardware or plumbing supply store.)

Inside your home:

The **service valves (6)** on either side of your **automated meter reader (AMR) (7)**. PWD is responsible for the AMR. The valves and AMR should be in good condition and accessible at all times.

The Philadelphia Water Department Hotline is 215-685-6300. Open 24 hours/daily, the hotline for reporting water and sewer emergencies, such as water main breaks, water and sewer and other inquiries, water quality information, taste and odor complaints, open hydrants, inlet cleaning, water conservation programs (CAP), automatic meter reading installations and inquiries. This hotline takes calls and dispatches crews to investigate and/or fix problems.

Visit our website at: www.phila.gov/water



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Schuylkill Sounding: Thursday, January 19, 5:30-7:00pm

Through historical imagery along with an animated presentation, the “dynamic duo” of Adam Levine and C. Drew Brown will present the topic of how we came to filter our drinking water in Philadelphia.

Accustomed to utilizing the Schuylkill and Delaware Rivers as the city’s water supply, the Philadelphia Water Department undertook a building project of previously unknown proportions to create filtration plants that would make the rivers, which had become polluted, safe to drink. In 2009, Philadelphia celebrated 100 years of delivering filtered drinking water to all residents of the city.

Schuylkill Soundings will take place on the third Thursday of the month from 5:30 to 7:00 pm (presentations begin at 6:00).

Science Saturday: January 7, 14, 21, 28 from 2:00pm to 4:00pm, starting every half hour.

Mixing Art and Science – Origami Dragonflies and Damsels

Where’s the dragon in a dragonfly? We will look at the life cycle and behaviors of dragonflies. We will then fold a dragonfly in origami tradition and use various artistic media to capture the patterns of your most common local species. Keep your dragonfly and try to find the real thing next summer.

Save the Dates!

Coming in February:
(events subject to change)

Exhibition: Project Flow (For Love Of Water) student artwork

Schuylkill Soundings, February 16th: “The Life, Death and Rebirth of the Schuylkill River” presented by Ed Grusheski.

Science Saturdays: Digging in the Banks of the Schuylkill

Film Series: FLOW: How did a Handful of Corporations Steal Our Water?

Partnership Events

Darby-Cobbs Watershed Partnership Public Education & Outreach Committee presents:

• **Thursday, January 12th from 10am to 12pm** [PlanPhilly, S Horticultural Dr, Philadelphia PA]. Join us for the Master Gardeners: Green Homes 101 workshop where Stephanie Alarcon, a Penn State Extension Philadelphia Master Gardener, is back to continue her discussion on green roofs. This workshop will introduce beginners to fundamental issues in planning a green roof, register now at HCPHila@gmail.com.

• **2012 Philadelphia Green City, Clean Waters Art Contest.** Teachers!! Along with the Partnership for the Delaware Estuary, we present this year’s contest. The deadline is Friday, February 24th, 2012. For more information, please go to: http://www.delawareestuary.org/acivities_teachers_art_contests.asp



Movie: “Liquid Assets: The Story of Our Water Infrastructure”

90 minutes. Not Rated.

Water infrastructure plays a critical role in protecting public health, promoting economic prosperity, and ensuring quality of life across the United States. Though largely out of sight and out of mind, many of these complex systems are aging, neglected, and in need of immediate national and local attention. Previously broadcast on PBS, this award-winning documentary film seeks to facilitate local discourse about the urgent challenges facing our water infrastructure. Locations featured in the documentary include Atlanta, Boston, Herminie (Pennsylvania), Las Vegas, Los Angeles, Milwaukee, New York City, Philadelphia, Pittsburgh, and Washington, D.C.