Philadelphia Water Department

The Monoshone Watershed

Quarterly Water Quality Update

Issue No. 5 December 2010

Introduction

Welcome to PWD's Fifth Quarterly Water Quality Update for the Monoshone Creek.

This issue provides a year-in-review of our pilot sampling program that began in May 2009. The sampling is done at Outfall 5 and a location downstream of RittenhouseTown, above the confluence of the Monoshone and Wissahickon creeks.

Samples are collected on a weekly basis, three times a month, during dry weather (no rainfall within a 72-hour period) as the sampling goal is to determine the quality of the stream flow within Outfall 5 untainted by polluted stormwater runoff.

During some months, we did not collect as many samples as we had hoped due to lots of rain. However, in this report, we have a full year of data to share, which reflects the water quality of the Monoshone Creek during all four seasons.

Sampling The Monoshone Creek:

A One-Year Review of Water Quality Monitoring and Infrastructure Inspections

Between the spring of 2009 and summer of 2010, Philadelphia Water Department (PWD) scientists and engineers embarked on an aggressive monitoring and inspection program to further strengthen our understanding of the effects of defective lateral connections on water quality in the Monoshone Creek Watershed.

Figure 1. PWD scientist collecting water samples at Outfall 5.

The goal of this program was to develop a uniform and robust data set that quantified differences in water quality from the upstream "headwater" outfall to downstream Historic RittenhouseTown (figure 1). In total, PWD field staff collected 26 discrete samples at Outfall 5 and Historic RittenhouseTown between 2009 and 2010 (n=52 total sample events).

In tandem with water quality assessments, engineers and field inspectors investigated privately-owned sewers on a variety of blocks in an attempt to identify and abate improperly connected households. These blocks included:

- 100 block of Carpenter Lane
- 6700 and 6800 blocks of Cresheim Road
- 300 and 500 blocks of Pelham Road
- 6600 to 6800 blocks of Quincy Street
- 100 block of W. Upsal Street
- 300 block of W. Cliveden Street
- 6600 block of Emlen Street
- 6700 block of Sherman Street
- 73300 block of Rural Lane
- 200 block of W. Mt. Airy Avenue

To date, only one property on the 300 block of Pelham Road was found to have a defective (cross) connection, which has since been corrected.

During this aggressive inspection period, PWD expended approximately 360 man-hours in water quality investigations, totaling approximately $39,000.

Similarly, field investigations in privately-owned sewered areas by PWD's Collector Systems staff amounted to $29,500 in staff hours. In total, monitoring and inspections, laboratory services and equipment, and associated administrative costs were $83,898 between 2009 and 2010 (Figure 2).

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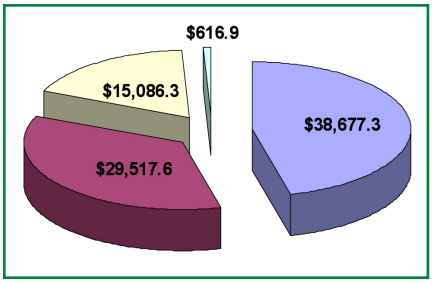
The Monoshone Watershed

(Sampling continued from page 1)



LEGEND

- Field Water Quality Sampling & Laboratory Analysis
- Infrastructure Inspection
- Administrative
- Vehicle/Equipment

Why does fecal coliform bacteria concentration decrease in the Monoshone from Outfall 5 to RittenhouseTown?

Fecal coliform bacteria concentration consistently decreases in the Monoshone from Outfall 5 to RittenhouseTown. This is a result of a number of factors, including: bacteria may die from natural causes, such as being eaten by other organisms, or changes in water chemistry, temperature and sunlight exposure.

Urban stormwater may also contain pollutants that are toxic or injurious to bacteria. In addition, dilution by other sources of water with smaller concentrations of indicator bacteria causes the overall bacteria concentration to decrease. There are several sources of flow to the Monoshone Creek between Outfall 5 and the RittenhouseTown monitoring site.

The good news is, despite sometimes higher levels of bacteria found in water samples from Outall 5, the creek, with nature's assistance, cleans itself to achieve better levels where the public may be enjoying the stream.

MONOSHONE CREEK -- Downstream Site (MON0250) RITTENHOUSETOWN SITE

Sample Date	Fecal Coliform (# per 100 milliliters)
05/12/09	400
05/19/09	300
05/26/09	1,000
06/02/09	180
07/06/09	900
07/15/09	200
08/17/09	700
08/26/09	540
09/02/09	500
09/08/09	800
09/21/09	1,100
10/06/09	800
10/14/09	200
11/09/09	100
11/18/09	100
11/30/09	300
12/30/09	150
01/05/10	10
01/12/10	45
03/10/10	209
04/06/10	100
04/20/10	10
05/11/10	60
06/08/10	200
06/23/10	100
07/06/10	260
09/20/10	1,460

*As the sampling above illustrates, fecal coliform numbers are often in the low thousands, which means we all still have work to do. But, at the same time, we have witnessed a marked improvement from sampling results taken a decade ago. Often, a high result – such as the one obtained on 8/26/09 – is an indicator that there is a problem within the City's sewer or a property lateral(s), resulting in sewage entering the creek. PWD inspects the sewers in this area to track down and repair potential problems. We did not find a problem in our system and therefore believe it was related to a private property problem.

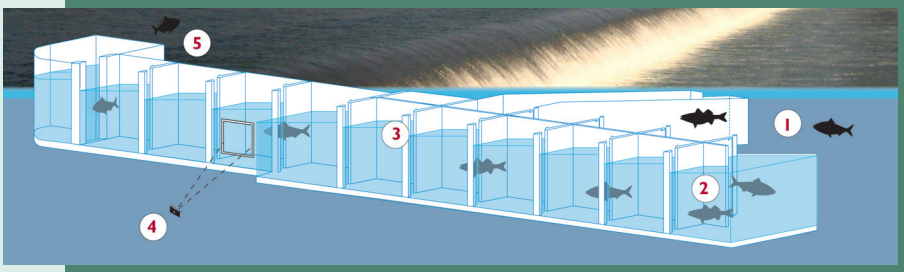
MONOSHONE CREEK Outfall #5 (ST068050)

Sample Date	Fecal Coliform (# per 100 milliliters)
05/12/09	720
05/19/09	4,000
05/26/09	1,700
05/26/09	4,900
06/02/09	3,000
06/22/09	3,000
06/24/09	4,800
07/06/09	11,000
07/15/09	1,100
07/27/09	78,000
08/17/09	26,000
08/26/09	560,000 *
09/02/09	9,400
09/08/09	5,100
09/21/09	7,600
09/21/09	1,100
10/06/09	4,900
10/14/09	7,270
10/27/09	12,300
11/09/09	5,000
11/18/09	7,545
11/30/09	45,000 *
12/29/09	200
12/29/09	210
12/30/09	280
01/05/10	964
01/12/10	4,600
01/26/10	5,500
03/02/10	13,500
03/10/10	11,000
04/06/10	3,600
04/20/10	2,200
05/11/10	2,400
06/08/10	2,000
06/23/10	11,000
07/06/10	5,900
09/20/10	4,400
09/20/10	4,800
09/21/10	52,000 *

Other Projects That Are Revitalizing Our Waterways: Fairmount Dam Fishway Facility

1. A fish following its instinct to swim upstream in the Schuylkill River encounters the turbulent water of the Fairmount Dam's spillway. A current of water, produced by the fishway, flows into the river from the fishway entrance, serving as a guide for the fish, and attracting them to swim through the entrance into the first chamber.

How the Fishway Works



2. The water, pouring through the slots connecting each chamber, guides the fish through the fishway. The water levels, in each chamber, are slightly higher than the chamber before it, allowing the fish to gradually bypass the dam. Additional chambers were added to the fishway, decreasing the effort required by the fish to swim from one chamber to the next.

3. The slots between adjacent chambers maintain the varied water levels throughout the fishway. The slots were widened to ease the passage of fish through the fishway.

4. Live images are captured by a camera through a window in one chamber of the fishway, which are then transmitted to the web and to the Fairmount Water Works Interpretive Center across the river. The live camera feed can be accessed at www.fairmountwaterworks.org.

5. Fish exit the fishway through the gate and swim into the waters beyond the Fairmount Dam.

The Fairmount Dam, a municipally-owned facility, was built in 1820 to help provide safe and potable drinking water to the City of Philadelphia. However, in its over 150-year history, the dam has decreased the population of American shad, as well as other fish of the Schuylkill River that migrate upriver from the sea to breed in fresh water.

In 1979, with funding from the City of Philadelphia, United States Fish and Wildlife Service (USFWS) and the Pennsylvania Fish and Boat Commission, a vertical slot fish passage on the west side of the dam was constructed to aid in revitalizing the underwater ecology of that stretch of the Schuylkill, specifically for American shad and river herring. Even with this new construction, the populations of these fish did not rise as expected. Because of this failure, the fishway began to deteriorate due to lack of active maintenance or monitoring by 1984.

Between 1984 and 2004, there were no fish counts performed at the Fairmount Dam, as the efforts for fishways had moved on to the Lehigh River, another tributary to the Delaware River. In 2004, the Philadelphia Water Department took over responsibility for the monitoring, maintenance and operation of the fishway, having developed a digital video system to observe the species and volume of fish using the passage.

Improvements

The renovation project, led by the U.S. Army Corps of Engineers and PWD, was completed in the spring of 2009 and has brought many improvements to the overall condition of the fishway as well as to its performance. Before the project, security fences surrounding the fishway had been damaged, which was not only unsightly but allowed trespassers access to the fishway. Finally, stormwater and regular erosion had flooded an underground storage and viewing room. The electrical power in the room was inoperable, making the real-time camera of the fish passing through the fishway useless.

When the project was finished, the fishway itself was completely renovated, with new chambers, entrances and exits and an attraction flow that steers migrating fish towards the fishway. The fences and surrounding area of the fishway have been cleared, cleaned and made more aesthetically pleasing for visitors.

The underground viewing room has also been renovated, with waterproofing to avoid flooding, and with a direct video feed to the Fairmount Water

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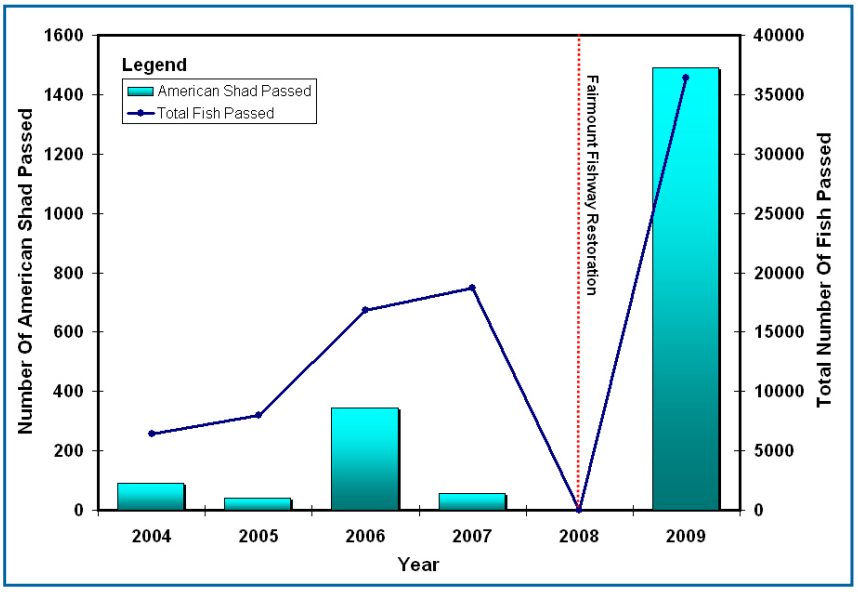
(Fishway continued from page 3)

Works Interpretive Center and the Philadelphia Zoo. The feed will show all of the fish species travelling upstream during peak season. Finally, the Philadelphia Water Department and other agencies and organizations will use the fishway for a greater amount of educational and community outreach opportunities. Included in the renovation is an outdoor amphitheater, where additional PWD educational programs will take place including instruction by trained fishery biologists.

Benefits

The restoration of the Fairmount Dam fishway is important because it is the furthest downstream passage of the Delaware River Basin. This means that the water of this passageway flows most directly into the ocean, allowing any fish that travel upstream to spawn a direct passage to their spawning areas. American shad, the main target of the fishway, are a fish that spawn genetically, meaning that a population of shad will spawn at the same area for numerous generations. Eliminating any impediments to the Schuylkill drainage will benefit the population growth of American shad and any other fish that inhabit the Schuylkill.



Schuylkill Soundings at the Fairmount Water Works Interpretive Center Presents:

December 15 at 5:30 p.m.: "Marcellus Shale and Gas Drilling in Pennsylvania: A Watershed Perspective"

To reserve, contact emilie.hickerson@phila.gov. Visit us at 640 Water Works Drive, Phila PA 19130 or online at www.fairmountwaterworks.org or on Facebook. On Twitter: @FWWIC.

Next Issue:

Our next issue will provide more updates on investigations into the stormwater sewer system of the Monoshone Creek Watershed.

For More Information:

PWD's Annual Stormwater and Combined Sewer Overflow (CSO) Annual Report and other watershed management and comprehensive characterization reports can be found at: www.phillywatersheds.org.

For up-to-date information on the recreational water quality of the Schuylkill River, go to http://www.phillyrivercast.org/.

Here's What You Can Do:

Join a watershed partnership. For information, go to: www.phillyriverinfo.org.

Visit the Fairmount Water Works Interpretive Center, both online at www.fairmountwaterworks.org, or in person at 640 Water Works Drive in Philadelphia. You may also find us on Facebook and on Twitter (@FWWIC).

What is a WATERSHED?

A watershed is the land surrounding a system of rivers (or streams or creeks), or a particular river, that, when it rains, sheds the runoff into that waterway. Everything you do impacts your watershed. Runoff from garden fertilizers, hazardous substances like used motor oil and trash dumped into one area of a river bank can pollute water many miles downstream. Protecting and preserving our watersheds helps protect our water resources.