US Army Corps of Engineers®
Philadelphia District

Philadelphia Water Department

Wissahickon Creek Feasibility Study
Public Meeting
Jan. 14, 2010 at Founders Hall, New Covenant Church

General Questions and Answers

Q: Does this project have an impact on the upper trail of the woods?
A: No, the study focuses on the mainstem of the creek, some of the tributaries, and the floodplain area.

Q: What is the funding source for this project?
A: The feasibility study is cost-shared on a 50/50 basis by the US Army Corps of Engineers and the non-Federal sponsor, the Philadelphia Water Department. Construction costs are typically shared on a 65% federal and 35% non-federal ratio. Federal funds are appropriated by Congress.

Q: Why does your evaluation process take three fish species under consideration and not other birds or mammals?
A: We're looking specifically at the floodplain/channel and we wanted to study species that are resident in that area. Birds and mammals can go into upland areas and escape stressful factors in the creek while the fish cannot.

Q: Several of the dams have heavy sediment built up. If you decide to remove a dam, will you dredge that material out so it doesn't flow downstream?
A: Yes, this will take place if the project plans include dam removal or partial dam removal.

Q: How do you plan to choose between the 10 sites?
A: There are several factors that will be considered when evaluating the different sites, including for example, cost, construction access, impact and public input.

Q: Will all 10 sites be funded?
A: The total cost of restoring all 10 sites would be significant and projects will need to be implemented as funding becomes available. The public is encouraged to state their preferences.

Q: Each site has influence on another site, so if only certain sites are funded, it may cause problems.
A: The evaluation process will consider the impact a site may have on other locations.

Q: Why are you looking at the problem from downstream to upstream and not the other way around?
A: The Philadelphia portion of the watershed is being looked at as a whole. Montgomery County is not participating in the study, but impacts on Philadelphia are being taken into account. Earlier in the study key areas of concern in the Philadelphia part of the watershed were identified and we are currently focusing on those sites, but relevant information will still be considered on a watershed basis. The order of presentation of information does not imply prioritization or order of examination of the sites.

Q: The cost-benefit analysis seems focused on financial and environmental impact. How are social and archaeological considerations taken into account?
A: The Cost Effectiveness/Incremental Cost Analysis models a certain set of criteria for evaluating alternatives and deciding how a project may move forward. However, the decision making process will also take into consideration other factors, such as social and archeological information.

Q: What is the best guess for the timeline of this project?
A: A project timeline is always dependent on provision of funding, as well as design considerations. If fully funded, the feasibility study could be finished two years from now. Once the feasibility study is complete and evaluated, it can take up to a couple years to design a project and obtain approval and funding for construction.

Q: How heavily does the NEPA process weigh things like public health? Could this study weigh improvements to public health with things like drinking water?
A: Yes, there are opportunities to document and consider improvements to public health, including water quality.

Q: What kind of observations and data are used as the basis for planning?
A: The planning process takes into consideration the physical, chemical and biological attributes of the ecosystem, as well as real estate, cost, social, historical, archeological, and public opinion information.

Q: If you remove the dams, what will be the post-storm impact?
A: Any dam removal or partial dam removal alternative will have the impact of a storm event considered during the project design phase. However, because of sedimentation buildup, the dam pools do not currently retain much water.

Q: How did the Wissahickon project originate?
A: The Philadelphia Water Department initiated the process based on their need to provide Philadelphians with clean drinking water, which is promoted by a healthy ecosystem.

Q: Will more trees be planted along the creek and tributaries? Lots of research shows that trees stabilize banks, slow water rates and provide food and habitat for beneficial benthic organisms.
A: We concur with you about the benefits of trees, especially native species. What trees are planted will be dependent upon each site design and the opportunity for trees to enhance the stream restoration.

Site Specific Questions and Answers

Big and Little Ridge Avenue Dam Comments

Big Ridge Avenue Dam – Is there any impact relationship between the proposed Gustane Lake interchange revisions and any of the alternatives proposed for Big Ridge Avenue Dam? I think alternative #3 has the best options for all concerned on Big Ridge.

Big Ridge Avenue Dam – I'd like to see this dam removed. I don't think the aesthetics of the dam are great. Redoing the sewer line would be terrific. Let the creek go natural to the Schuylkill. As for the second alternative, the rock ramp is aesthetic and good for the fish. And for the 3rd alternative, ramp – no; too convoluted. I think this project is a big priority, given the size of the dam and sewer line.

Big Ridge Avenue Dam (Site 1) – Has the canoe club been notified of potential changes? Will the people fishing here be able to continue to fish? Can the public get to the creek at this location since the water level will be lower?

Big and Little Ridge Avenue Dams - What is the impact of removing the dams at the base of the steams? There is a canoe club nearby.

Big and Little Ridge Avenue Dams, Monoshone Creek (Sites 1, 2, 3) – If any trails are impacted during construction and are resurfaced, I hope it would be suitable for equestrians. I can be reached to consult on appropriate footing. I went through training with Penn. Equine Council.

Big and Little Ridge Avenue Dam Response

There will be no related impacts between the Big Ridge Avenue Dam project and the Gustine Lake project. The Gustine Lake project is located downstream of the dam on the south side of Ridge Avenue. The Gustine Lake project will be required to meet the new stormwater regulations enforced by the Philadelphia Water Department. The design for the Gustine Lake project will include infiltration as well as other best management practices for stormwater.

Impact of alternative designs on the canoe club and anglers will be considered as we move forward with the feasibility and design phases of the project. Restoration of trails impacted during construction will be coordinated with Fairmount Park staff and will follow their requirements with regard to equestrians.

Monoshone Creek Comments

Monoshone Creek – The biggest opportunity is to fix sewers in Pelham that drain into this creek. Biggest benefit is better public health through reduced need for chlorination at Queen Lane.

Monoshone Creek – Habitat restoration on Monoshone Creek prior to addressing sewage overflows into the stream is putting the cart before the horse. There will not be an improvement in aquatic life without addressing water quality issues. This should be last priority.

Monoshone Creek – It seems foolish to worry about sediment and stream flow in the Monoshone as long as sewage flows from Outfall 5, 24 hours a day, 365 days per year. Perhaps it would be more reasonable to fix the sewage problem first.

Monoshone Creek – Most serious problem/opportunity within the scope of this planning process is the wall along Lincoln Drive between Wissahickon and RittenhouseTown – stream bed is down to bedrock and wall is undermined and collapsing. This will require civil engineering attention within 20 years. You could help.

Monoshone Creek– Why is no economics associated with the alternatives?

Monoshone Creek – It would be helpful if the maps were accurate. They are seriously outdated. There has been work done at some of these sites which has not been addressed.

Monoshone Creek (Site 3) – This is wonderful but you must get the sewage out first. No ifs, ands, or buts. This must be done.

Monoshone Creek (Site 3) – We want the sewage out of the Monoshone.

Monoshone Creek (Site 3) – What are the water quality levels coming out of Saylor's Grove? Will the Monoshone be diverted to flow through the new wetland? That might mitigate the high bacteria levels appearing periodically in the Monoshone? Also, there is a large patch of knotweed at Wissahickon and Lincoln.

Monoshone Creek (Site 3) –How will your plans affect the high pollution levels in Monoshone Creek? We are concerned about the extreme readings of fecal coloform. Can you help address this problem which the city has promised to rectify for years?

Monoshone Creek - Construction of channel next to Monoshone Creek (= Lincoln Drive Foundation). This has archaeological remains in it – it's the 1st paper mill in North America.

Monoshone Creek Response

PWD's response to the sewage comments is included in a separate attachment.

The feasibility study process includes identification of documented archeological remains and coordination with appropriate agencies regarding any impact a project might have on the historic resource. We are aware of the presence of the paper mill site and will take it into consideration during project design.

With regard to economics, the feasibility report will include estimated costs for each alternative design at each project site. The costs will be used while identifying the recommended plan. The report will also include general documentation of the economics in the study area.

The maps currently being used are for preliminary concept level information only. If Monoshone Creek is selected as a restoration project then more detailed field surveys will be conducted to

produce a more accurate, updated map and any previous work on Monoshone Creek will be taken into consideration during project design.

Carpenter's Woods Comment

Carpenter's Woods Tributary – I prefer alternative #3.

Carpenter's Woods Response
Thank you for your input.

Livezy Dam Comments

Livezy Dam - The current breach in the Livezey Dam has caused a drop in the upper sections of the dam pool. The area near the Valley Green Restaurant is no longer the upper end of the pool but has reverted back to a stream profile. Excessive sedimentation in this area has caused the stream to be directed against the rock retaining wall supporting the parking lot. Excessive erosion and wall failure have resulted. Request that if dam removal or breaching is done, the project reach and stabilization of the stream above the dam be extended into this area.

Livezy Dam - I am currently pursuing funding for the repair of the Livezey Dam raceway and mill house. I hope to re-construct the area as a historic education area and would prefer the dam be repaired. In any case, I hope the future use of this site as an education center would be considered in project development for the site.

Livezy Dam Response

Alternatives 2 and 3 will address the existing problems with wall by Valley Green Inn. Alternatives 2 and 3 will both reduce the impoundment that is currently caused by the dam. Alternative 2 will completely remove the dam and Alternative 3 will lower the dam in the location of the existing breach. This will partially or completely remove the extent of the backwater, thereby improving aquatic habitat conditions in a newly free-flowing area. This will change the profile of the stream in this location and should pull the thalweg of the channel away from the wall by Valley Green Inn.

In our dam removal concepts we have taken into consideration bank stabilization upstream of the dams.

Cresheim Dam and Creek Comments

Cresheim Dam and Creek- This project is high on list. I tried to cross this creek a day after a storm (near Devil's Pool). It was a raging, white water creek. I've hiked trails back here – the landscape is degraded and trails are hard to locate. My order of preference – 1) (Option 2) remove dam and deal with entire stream.

Cresheim Dam and Creek – Integrity of the dam? Enormous work needed downstream of McCallum street.

Cresheim Dam and Creek- Does the plan for Cresheim Creek specify any course of action for the partially collapsed bridges along the reach? If you invert the stream to a new level how can you be sure that the channel won't re-erode away under flood flows?

Cresheim Dam and Creek Response

One benefit of raising the channel invert is that it spreads flood flows out onto the floodplain. This keeps the depth of the flow very shallow and thus reduces the ability of the water to erode. Also the boulder/cobble structures installed in the channel to raise the invert function as grade control structures so that the channel won't erode back down.

We currently do not know the integrity of Cresheim Dam. If an option to retain the dam is selected then the integrity of the dam will have to be studied. Our rapid assessment of the creek indicated that most of the bank erosion is taking place upstream of McCallum Street. We did note some isolated areas of erosion downstream but the majority of this reach was stable with large boulders and bedrock stabilizing the channel.

Cathedral Run Comment

Cathedral Run – I'm concerned about the long-term stability of step pool boulders in Cathedral Run in the case of extreme floods, given mobilization of boulders in Wissahickon tributaries during recent floods. Alternatively, is it possible that the stream channel might just erode around any constructed step-pool structures?

Cathedral Run Response

Boulders are currently mobilized in the tributaries because of extremely high energy created by water flowing down a steep channel. The main function of the step/pool structures is to reduce this energy by creating pools that slow down the water. The boulders of the step/pools will be stable under the lower energy condition. Also the step/pool structures will be designed based on large flood flows such that the flood flows will not erode around them.

Thomas Mill Dam Comments

Thomas Mill Dam - Please consider keeping the Thomas Mill Dam for historic reasons. Alternatives #3 and #4 are great.

Thomas Mill Dam - I have the feeling most of the work will be for the sole benefit of fishermen, yet they are some of the most destructive of stream banks and habitat. Unless there are plans to educate and enforce regulations and laws, all of the work will be for nothing.

Thomas Mill Dam and Cathedral Run – Catch more storm water from the street (surface water). Start repair at the top of the creek, from urban areas.

Thomas Mill Dam – Chestnut Hill College expansion at Sugarloaf Hill. Expansion site borders Wissahickon Creek at Germantown Avenue Bridge. Project to include a 600 car parking garage, dormatories, performance venue, classrooms, etc. Construction will require clear cutting of 80% of timber growth on historic/environmentally protected site.

Thomas Mill Dam - I like alternative #4. However, I'm concerned about the effect in flood conditions on road bed if a great deal of water follows the old mill race rather than the main stem.

Thomas Mill Dam Response

The Chestnut Hill College (CHC) expansion at Sugarloaf Hill will not affect the Thomas Mill Dam project. The CHC project is located over three quarters of a mile north of the Thomas Mill Dam project location. The CHC expansion project will be required to meet numerous regulations on the Local and State level to manage their stormwater.

PWD has hired an engineering consultant, AKRF, to design a stormwater treatment wetland just west of the current location of outfall W-076-01 at the headwaters of Cathedral Run. The wetland will be located in a natural depression area, approximately one acre in size that is owned by the City of Philadelphia and managed by the Fairmount Park Commission (FPC). The project will provide more than 94,445 cubic feet of storage and will substantially reduce flows to an impaired reach of Cathedral Run. During dry weather, the facility will provide one acre of valuable wet meadow habitat.

At Thomas Mill Dam, most of the storm flows will remain in the mainstem of Wissahickon Creek. Flows into the old mill race will be controlled to allow fish to pass around the dam.

Wissahickon Creek Feasibility Study
PWD Response to Public Meeting Comments of January 14, 2010
Re the Monoshone Creek
February 23, 2010

Background of Sewage Problem

In many of Philadelphia's homes, sanitary sewage and stormwater travel together through a combined sanitary/storm sewer system for treatment at one of the City's three sewage treatment plants, where it is cleaned before it is discharged to the Delaware River. In some areas of Philadelphia, such as the Wissahickon Creek Watershed, stormwater from downspouts, yards and streets is piped to separate storm sewers and released into local streams. This stormwater runoff is not treated before it is released. Homes that are serviced by separate storm sewers also have a separate drainage system for their sanitary sewage, which is collected in the sanitary sewer and sent to a treatment plant. In some homes, the pipes (called laterals) leading to these two systems may be leaking or improperly connected. In this situation, sanitary sewage may enter stormwater sewers and may be released untreated into local waterways. Laterals that are improperly connected (also known as crossed laterals or cross connections) and laterals that are leaking due to deterioration are known as defective laterals. PWD funds the correction of the crossed laterals in its effort to improve stream water quality with minimal public impact.

Challenges of Separate Sewer Systems

Separate storm sewers can be beneficial to our rivers and streams as they often contain underground streams, providing essential base flow to our waterways. But urban environments also present some challenges, as the quality of stormwater runoff can be tainted by litter, gasoline, oils, fertilizers, animal wastes and other pollutants that are washed from our lawns and streets into storm drains. In addition, high volumes of stormwater runoff are delivered to streams during intense rain storms, which impacts stream habitats. The programs that PWD has instituted in the Monoshone Creek Watershed are programs focused on the inherent problems of separate sewer systems in urban areas. PWD's efforts to address the maintenance and operation of its sewer infrastructure and stormwater management in the Monoshone Creek Watershed include the inspection and repair of defective sewer lateral pipes, the relining of the sanitary sewer under Lincoln Drive, stream channel restoration, the creation of the Saylor Grove Treatment Wetland demonstration project, and the initiation of the Wissahickon Watershed Partnership

Since the Philadelphia Water Department (PWD) initiated a number of pollution prevention programs in the Monoshone Watershed in 1999, we have seen a significant reduction in the levels of bacteria that indicate the presence of sewage at the seven stormwater outfalls that drain into the Monoshone Creek. Much of this ongoing work is encouraged and supported by local environmental organizations including the Friends of the Monoshone, the Senior Environment Corps and the Friends of the Wissahickon, enabling us to make the Monoshone Creek a priority.

Pilot Monitoring Program

However, we too felt that additional samples were needed at Outfall 5 to gain a better picture of typical water quality at this outfall, in addition to determining if a more timely response could be made by PWD crews if sampling showed that a pollution causing event was happening somewhere in the Outfall 5 drainage area.

To address these issues, we initiated a pilot sampling program beginning in May 2009, geared to collected samples at Outfall 5 and a location downstream of RittenhouseTown, above the confluence of the Monoshone and Wissahickon creeks. Samples were to be collected on a weekly basis, three times a month, during dry weather (no rainfall within a 72 hour period) as the sampling goal was to determine the quality of the stream flow within Outfall 5 untainted by polluted stormwater runoff.

The good news, fecal coliform results, beginning in May 2009, are fairly good for an urban stream like the Monoshone, and sampling results are even better in the creek itself by the time the stream travels past RittenhouseTown. These results are comparable to fecal counts found in all of the streams in the built out, Southeast PA Region. However, we recognize that there is still much work to be done on resolving defective laterals which continue to pollute the Monoshone. PWD is continuing to refine its program and plans to have an update to its protection program by this summer.

Attached is the most recent Monoshone Water Quality Update, which provides some additional information and up to date sampling results as of this writing.

Philadelphia Water Department

The Monoshone Watershed

Quarterly Water Quality Update

Issue No. 3 February 2010

Introduction

Welcome to the Philadelphia Water Department's (PWD) Third Quarterly Water Quality Update for the Monoshone Creek. This issue provides updates on our Saylor Grove Treatment Wetland, and more detailed sampling information.

Saylor Grove Site Facts

- Saylor Grove Park is approximately 3.2 acres. The Saylor Grove Wetland makes up about one-third of the one-acre park.
- Saylor Grove Wetland drains approximately 156 acres of stormwater runoff from Germantown. The wetland is designed to drain the stormwater within 24 hours.
- Saylor Grove Wetland will filter a significant portion of the estimated 70 million gallons of stormwater per year.
- The wetland will remove approximately 13 tons of total suspended solids from the Monoshone Creek per year.
- The first 0.7 inches of every rainfall event will be sent to and treated at the wetland. According to the long-term historical record of the airport's rainfall data, 70% of all storms make up 0.7 inches or less of rainfall.
- The wetland will improve flow variability of the Monoshone Creek.
- The wetland will increase biodiversity (vegetation and animals).
- Approximately 3,000 trees, shrubs, and herbaceous plugs have been planted.

Saylor Grove Treatment Wetland: What has been happening there?

The Saylor Grove Treatment Wetland had been treating stormwater runoff from a drainage area of approximately 156 acres for over three years now. During this time, the wetland bottom has seen an accumulation of a large amount of sediment and some organic matter that settled as the water was retained in the basin. This sediment buildup has reduced the volume of water that the wetland can hold and treat, which created the need for the dredging operation of the pond. We expected this to happen, as both detention basins and man-made treatment wetlands require periodic dredging in order to allow them to continue to operate in an optimal manner. (The sediment collected in the treatment wetland is sediment that does not make its way to the Monoshone Creek).

(continued on page 2)

Separate and Combined Sewer Systems

In many of Philadelphia's homes, sanitary sewage and stormwater travel together through a combined sanitary/ storm sewer system for treatment at one of the City's three sewage treatment plants, where it is cleaned before it is discharged to the Delaware River.

In some areas of Philadelphia, such as the Wissahickon Creek Watershed, stormwater from downspouts, yards and streets is piped to separate storm sewers and released into local streams. This stormwater runoff is not treated before it is released.

Homes that are serviced by separate storm sewers also have a separate drainage system for their sanitary sewage, which is collected in the sanitary sewer and sent to a treatment plant.

In some homes, the pipes (called laterals) leading to these two systems may be leaking or improperly connected. In this situation, sanitary sewage may enter stormwater sewers and may be released untreated into local waterways.

Laterals that are improperly connected (also known as crossed laterals or cross connections) and laterals that are leaking due to deterioration are known as defective laterals.

PWD funds the correction of the crossed laterals in its effort to improve stream water quality with minimal public impact.

(Saylor Grove *from page 1)*

PWD has done a topographic survey of the wetland, using the as-built elevations versus the survey gathered prior to the dredging to determine the amount of sediment that had built-up throughout the wetland and that would have to be removed to get the wetland back to the as-built elevations and volume. This information will give us the sense as to how often the wetland should be dredged as a component of its long-term operation and maintenance.

In order to effectively dredge the site, the wetland was drained so that the material removed would have a larger solid content. During the work, a survey was done to confirm that the appropriate elevations were achieved in a particular area prior to moving on. The forebay pond area was dug to about three feet in the deepest part and graded, while the channel areas around the left and right sides of the island were excavated up to two feet. The northeast area of the wetland was left undisturbed due to the existence of vegetation that we wanted to preserve and the 48-inch stormwater pipe that runs beneath the wetland. Currently, PWD is testing the removed material to determine its characteristics and content, including moisture content, organic vs. inorganic composition, nutrients such as nitrogen and phosphorus, and chemical constituents. With this knowledge, we will gain a better understanding of just how effective the wetland has been in treating stormwater runoff, as this wetland is serving as a model for similar projects in the Wissahickon Creek Watershed.

Why we use Fecal Coliform as an Indicator

Fecal coliform bacteria indicate fecal contamination and the potential presence of human pathogens (microorganisms that can make people sick). The fecal coliform test is used because it is reliable, relatively simple to perform, and provides results quickly and inexpensively compared to tests for specific pathogens. One of the disadvantages of the fecal coliform test is that these bacteria are found in feces of many different kinds of warm-blooded animals, not just in sanitary flow. Although not ideal, fecal coliform is presently regulated by PADEP water quality standards and used by PWD for screening sources of potential pollution in streams and dry weather flow from stormwater outfalls.

When performing a fecal coliform test, lab scientists do not actually count individual bacteria themselves, but count the colonies that grow from a single bacterium. A sample of water is passed through a very fine filter which is then placed in a petri dish containing a food source and a selective indicator chemical. If bacteria are able to consume the food source and multiply, the chemical indicator changes color. Each color spot on the petri dish is considered one "colony forming unit" (CFU).

PWD lab scientists need to be able to test for bacteria in samples that range from very pure (drinking water) to polluted (stormwater), so they may use a much smaller subsample of water when testing stormwater and multiply the number of colonies counted by the amount that the sample was diluted. This is why the precision of the results decreases as bacteria concentration increases. With the large dilution factors applied for testing a stormwater sample, each spot on the plate can represent 1000 bacteria (or more) in the final sample result.

Summary of Fecal Coliform Results

Stormwater Outfall Monitoring Program

Data from project initiation (May '09) to present.

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

MONOSHONE CREEK -- Downstream Site (MON0250) RITTENHOUSE TOWN 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

*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.

Water is considered safe for recreation (immersing oneself in the water) when it tests below 200 colonies per 100 milliliters of sample. The Monoshone, as is true with other urban streams, rarely consistently meets that target as bacteria sources include sewage leaks, wildlife and stormwater runoff. That is why it is important to wash your hands or other parts of your body that come into contact with waterways when fishing or hiking just as you would do when gardening in your backyard.

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

Indicator bacteria generally grow best under conditions similar to the gut of warm-blooded animals. Once exposed to the environment, these bacteria may die or become otherwise injured such that they do not produce colonies in laboratory tests. 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.

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 MON0250 Rittenhouse Town monitoring site.

Bacteria, and particles to which bacteria are attached, settle out of the water column. Indicator bacteria in sediments generally die and are consumed by decomposers. However, some bacteria may be re-suspended during subsequent storm events, or rarely, even multiply within sediments under favorable conditions.

Additional Stormwater Treatment Wetlands to be Constructed in the Wissahickon Creek Watershed

The Saylor Grove Stormwater Treatment Wetland served as a working model for two new treatment wetlands planned to begin construction this spring - the Cathedral Road and Wises Mill Stormwater Treatment Wetlands. PWD and its partners are very excited about the opportunity to treat polluted stormwater runoff before it flows into these important tributaries of the Wissahickon Creek.

PWD and the Fairmount Park Commission are working together to design a stormwater treatment wetland at the headwaters of Cathedral Run. Cathedral Run is a small first order tributary to the Wissahickon Creek. The stream originates from springs downstream of Courtesy Stables and then travels approximately 2,500 ft through a wooded section of Fairmount Park before entering Wissahickon Creek. The stream is relatively steep with an average gradient of 8.5%; however, the downstream half of the tributary is visibly steeper than the upstream reach.

The watershed is highly developed with 31% impervious cover and 361 homes. The natural drainage area is 116 acres; however two outfalls collect stormwater from an additional 40 acres. Base flow is low and was measured to be 0.06 cfs during August 2005. One outfall (W-076-01) located at the headwaters of the tributary drains approximately 91 acres of residential and commercial property.

The stormwater wetland will be designed to achieve the following goals:

- Reduce downstream sediment loading
- Improve the flow variability of storm related flows on Cathedral Run
- Increase base flow
- Improve diversity of in-stream biological community
- Maintain and enhance recreational use/aesthetics
- Reduce shear stress in channel
- Ensure wetland drains within 72 hours

Schuylkill Soundings Presents:

Freshwater Mussel Restoration Program
A Project of the Partnership for the Delaware Estuary

Wednesday, February 17, 2010 • 6:00 pm to 8:00 pm
Fairmount Water Works Interpretive Center

Please RSVP by February 15. For reservations or information, please call 215-685-0723. Visit us at 640 Water Works Drive, Phila PA 19130 or online at www.fairmountwaterworks.org.

Next Issue:

PWD will be reaching out to its environmental and citizen partners to initiate a Stormwater Troopers program –- an event in which PWD and community partners saturate the neighborhood that drains into Outfall 5 to raise awareness of defective laterals and other problems that can contribute to the pollution of the Monoshone Creek.

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.

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.