

*Annual*

**Drinking**

**Water**

**Quality**

**Report**

**2008**



This report is being mailed to you as a requirement of the federal Safe Drinking Water Act.  
**NOTE: Industrial and commercial customers, including hospitals, medical centers, and health clinics, please forward this report to your Environmental Compliance Manager.**

**Philadelphia's water is safe and healthy to drink for most people. For people with special health concerns, please see the information on page two.**



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National Association of Clean Water Agencies  
Water Environment Federation  
Water Environment Research Foundation  
Water Research Foundation**

PWD's Public Water System Identification #PA1510001

This report is available online at <http://www.phila.gov/water>

# The Philadelphia Water Department



**T**he Philadelphia Water Department (PWD) is pleased to present our annual Water Quality Report. This report, published in April 2009, includes water quality information for the 2008 calendar year.



The good news is – your tap water is top quality. Our Water Quality Report provides our customers with a summary of where Philadelphia’s drinking water comes from, how it is treated and the results of water quality monitoring performed by us on a daily basis.

The U.S. Environmental Protection Agency (EPA) requires all water utilities to produce and distribute water quality reports on an annual basis.

We have consistently performed better than all drinking water standards developed by the EPA to protect public health.

How do we do this? We use proven treatment practices at our water treatment plants and we participate in groundbreaking research while keeping water rates among the lowest in the region.



Para obtener una copia del informe en Español sobre los resultados más recientes de la calidad del agua publicado por el Departamento de Agua de Philadelphia, llame al 215-685-6300.

## People With Special Health Concerns

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS and other immune system disorders, some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.

Environmental Protection Agency/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline: 800-426-4791.

**Our standards are the highest: our drinking water consistently performs better than all drinking water standards developed by the EPA to protect public health.**

## Where does Philadelphia's drinking water come from?

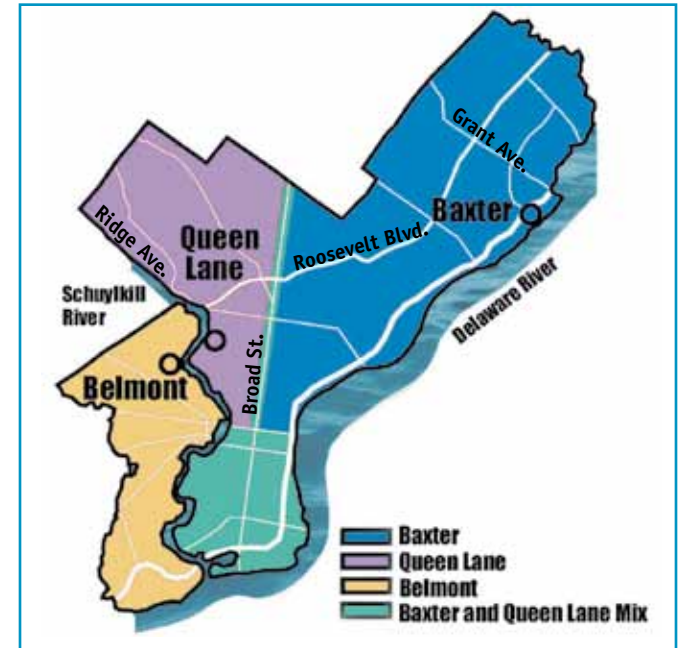
Philadelphia is located in the Delaware River Watershed, which begins in New York State and extends 330 miles south to the mouth of the Delaware Bay. The Schuylkill River is part of the Delaware River Watershed.



Map Courtesy of the Delaware River Basin Commission. Delaware River Basin Commission Map Collection.

The water that we treat comes from the Schuylkill and Delaware rivers. Rivers are surface water supplies. Philadelphia does not use groundwater. Each river contributes approximately one-half of the City's overall supply. We produce approximately 256 million gallons of high-quality drinking water for our customers on a daily basis.

PWD has three water treatment plants that process untreated river water. Depending on where you live, you receive drinking water from one of these three plants. The Queen Lane Plant is located in East Falls and its water comes from the Schuylkill River. Its intake is located along Kelly Drive. The Belmont Plant is located in Wynnefield and its water also comes from the Schuylkill River. Its intake is located along Martin Luther King, Jr. Drive. The Baxter Plant is located in Torresdale and its water comes from the Delaware River. Its intake is located at the plant on the Delaware River.



## Safeguarding the water you drink

At their sources, the Delaware and Schuylkill Rivers are generally clean. But as the rivers flow downstream, they pick up contaminants from many sources – stormwater runoff washes pollutants on the land into the rivers, and communities and industries discharge used water back into the rivers. Today, the City enjoys watersheds that are cleaner and healthier than they have been in well over a century. Although we have seen a dramatic improvement in the water quality of the City's two major rivers since the passage of the federal Clean Water Act in the early 1970s, there is still more work that needs to be done to protect our drinking water sources from pollution.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (EPA) has regulations that limit the amount of certain contaminants in water provided by water suppliers. The Food and Drug Administration establishes limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791) or from their website (<http://www.epa.gov/safewater>).

## How do drinking water sources become polluted?

Across the nation, sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water (such as rain and melting snow) travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production. They can also come from gas stations, urban stormwater runoff (from streets and parking lots) and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

## Why is chlorine used to disinfect the drinking water?

State and federal laws require the disinfection of all public water supplies. EPA and health agencies recognize that using chlorine is the most effective way to protect public health from disease-causing organisms that can be found in rivers and streams. However, chlorine can chemically react with natural materials in rivers to form disinfection byproducts, such as trihalomethanes and haloacetic acids.

We have been adjusting our treatment process over the years to reduce this chemical reaction. But we also ensure that the treated water that is distributed through the City's water mains to your homes has a "chlorine residual." This residual continues to protect your water against bacteria and other organisms on its journey to your home tap.

We now use sodium hypochlorite, a safer form of chlorine similar to household bleach, to disinfect the water at our treatment plants.

## What do we look for?

Under Primary and Secondary Safe Drinking Water Regulations, EPA and Pennsylvania DEP require drinking water utilities to monitor about 100 regulatory parameters. These regulatory parameters are defined with their maximum contaminant level (MCL) and maximum contaminant level goal (MCLG) under federal rules such as: Total Coliform Rule, Surface Water Treatment Rule, Disinfectants and Disinfection Byproducts Rule, Lead and Copper Rule, and Radionuclides Rule. We monitored for the regulatory parameters listed below. Tables on page 8 and page 9 summarize monitoring results for parameters found at detectable levels. Please see a glossary of terms and abbreviations on page 9.

### Inorganic Chemicals:

Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cyanide free, fluoride, lead, mercury, nitrate, nitrite, selenium, and thallium.

### Synthetic Organic Chemicals:

Alachlor, atrazine, benzo(a)pyrene, carbofuran, chlordane, dibromochloropropane, di(2-ethylhexyl) adipate, di(2 ethylhexyl) phthalate, endothall, ethylene dibromide, hexachlorocyclopentadiene, lindane, methoxychlor, oxamyl, pentachlorophenol, picloram, and simazine.

### Volatile Organic Chemicals:

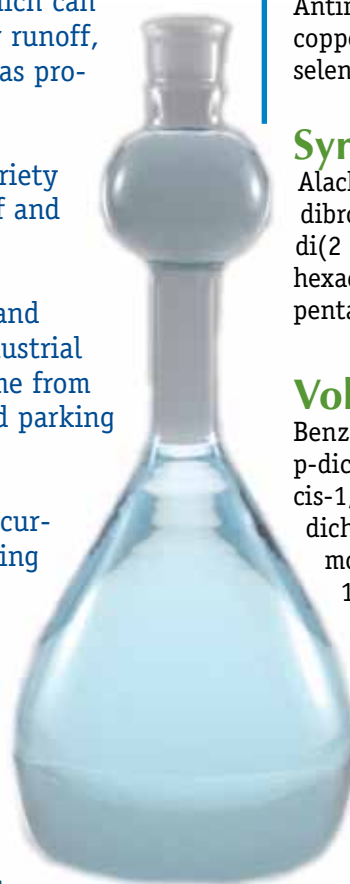
Benzene, carbon tetrachloride, o-dichlorobenzene, p-dichlorobenzene, 1,2-dichloroethane, 1-1-dichloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, dichloromethane, 1,2-dichloropropane, ethylbenzene, monochlorobenzene, styrene, tetrachloroethylene, toluene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, and total xylenes.

## Appealing to Your Senses

We also test for aluminum, chloride, color, iron, manganese, pH, silver, sulfate, total dissolved solids, and zinc to ensure that tap water meets all water quality taste and odor guidelines so that your water looks, tastes, and smells the way it should.

## Additional Testing

We periodically test for the following contaminants, even though the Pennsylvania Department of Environmental Protection (PADEP) does not require us to do so: asbestos, dalapon, dinoseb, dioxin, diquat, endrin, glyphosate, hexachlorobenzene, 2,4-D, PCBs, toxaphene, 2,4,5-TP, heptachlor, heptachlor epoxide, nickel, and vinyl chloride. No significant levels of any of the above contaminants have been found in Philadelphia's drinking water.





## Partnership for Safe Water

Employees of the Philadelphia Water Department's three water treatment plants have earned 10 consecutive Director's Awards for maintaining an elite status in the Partnership for Safe Water. This award is presented to utilities across the country which meet or go beyond the water quality goals established by the Partnership for Safe Water.

Dating back to 1996, the Philadelphia Water Department was one of the first utilities to join this unique partnership between the drinking water industry and the EPA to make voluntary improvements in the nation's drinking water quality. This program was designed to be much more rigorous than the requirements of State and federal laws.

***The turbidity of Philadelphia's water is 80 percent less than the maximum amount allowed by State and federal regulations, and our average results are 40 percent less than the Partnership's voluntary goal of 0.1 ntu.***

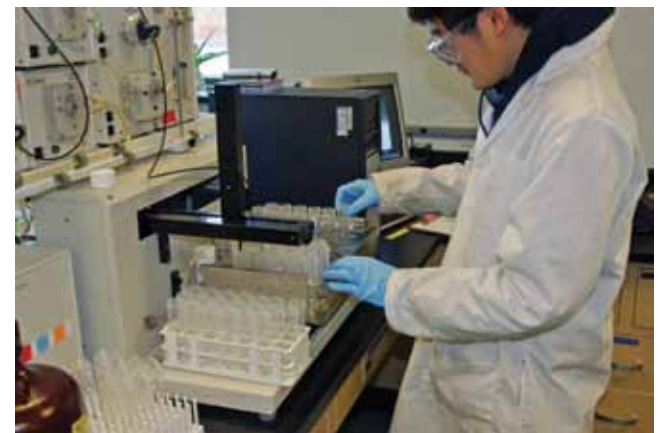
The Partnership for Safe Water established a turbidity goal of less than 0.10 ntu. Today, all three of our water treatment plants continue to lower their ntu levels, achieving a total annual average of 0.06 ntu.

Through our participation in this program, we have surveyed our treatment plants, treatment processes, operating and maintenance procedures, and management oversight practices to learn how we can improve our water system. We have already made many of the improvements, and we will continue to apply others. These improvements have helped to enhance our water system's ability to prevent *Cryptosporidium*, *Giardia*, and other microbial contaminants from entering the water we treat.

## Lead in drinking water

It is important to minimize the intake of lead from dust inhalation, food, and water. Children are particularly susceptible to the health effects of lead poisoning. Lead is most commonly found in dust, paint and contaminated soil. To a lesser extent, lead can also occur in tap water. Components of plumbing may have lead in them. You may be surprised to learn that brass fixtures, valves and faucets contain lead. Many homes still have leaded solder that was once used to join copper pipe together. Some homes in Philadelphia still have lead service lines and, when disturbed, these lines can contribute to lead in tap water. It is the homeowner's responsibility to maintain, repair and replace the service lines.

Our primary role in helping you minimize your intake of lead is to reduce the corrosive effects of tap water on materials that contain lead. Water is corrosive and encourages the dissolving of lead from these materials. The Philadelphia Water Department has a permit with PADEP for operating under optimized corrosion control. Under this permit, we maintain the pH of water between 6.8 and 7.8. We also maintain the amount of the corrosion inhibitor, zinc orthophosphate, at greater than 0.12 mg/L (0.12 ppm) as phosphorus. These conditions minimize lead leaching from plumbing materials.



Currently, every three years the Philadelphia Water Department tests for tap water lead at more than 50 representative taps of vulnerable homes in the city. We do this according to the requirement of the EPA's Lead and Copper Rule. The testing results are used to determine if our corrosion control treatment technique is working, so that water has minimum potential for lead to leach from plumbing materials. So far, our test results show that our treatment techniques keep lead levels to a minimum. For the 2008 results, please see the chart on page 8.

However, this could change in any year because Philadelphia is required to meet other regulations for tap water quality. Sometimes these water quality changes can affect the corrosion potential of the water. If such a change were to occur, the Philadelphia Water Department would notify its customers of the change while it works to return to minimum corrosion conditions again. Water utilities all over the country are in the same position as Philadelphia, trying to balance all of the regulatory requirements and changes at one time so that their customers receive the best quality water possible. We are committed to reducing the corrosive effects of plumbing and lead levels in water. Additional information is available from the EPA's Safe Drinking Water Hotline at 800-426-4791 or from their website at <http://www.epa.gov/safewater/hotline/>.

# Research and Monitoring:

## *Cryptosporidium and Giardia*

*Cryptosporidium* and *Giardia* are microscopic organisms found in surface water throughout the U.S. In 2008, we conducted 36 tests on our treated drinking water. None of the samples were positive for *Cryptosporidium* or *Giardia*.

When ingested, *Cryptosporidium* and *Giardia* can result in diarrhea, fever, nausea and abdominal cramps. However, these are also symptoms of many intestinal diseases caused by bacteria, viruses or parasites. Most healthy individuals can overcome such illnesses within a few weeks. However, immuno-compromised people are at a greater risk of developing a life-threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. *Cryptosporidium* and *Giardia* must be ingested to cause disease, and it may be spread through means other than drinking water.

The Philadelphia Water Department is one of the nation's leaders in *Cryptosporidium* research and was one of the first utilities in the U.S. to monitor for the organism. We are also working closely with the Philadelphia Department of Public Health to ensure that our tap water is free of pathogens that can be found in rivers. In addition to routinely monitoring for *Cryptosporidium*, we are involved in an innovative project with Lehigh University to identify the sources of *Cryptosporidium* in our watersheds. As part of the project, we collect water samples upstream of our drinking water intakes. We isolate the *Cryptosporidium* oocysts, and conduct DNA analyses to determine whether the oocysts originate from human sources or from other species such as dogs, cats, deer, geese, cows, horses, etc. By identifying the sources of *Cryptosporidium* in the watershed, we are taking a proactive approach in improving the river water quality.

## *Pharmaceuticals in Drinking Water*

The Philadelphia Water Department has been conducting research on pharmaceuticals in drinking water since 2004. Attention to this issue has increased greatly, along with recent advances in technology to detect very low concentrations of trace contaminants in water. However, these advanced detection capabilities are still limited to specialized research laboratories. The Philadelphia Water Department has stayed at the forefront of this issue by participating voluntarily in national research studies and establishing analysis capabilities with advanced laboratories.

This issue exists throughout the United States, and even worldwide, wherever pharmaceuticals are utilized. Pharmaceuticals get into drinking water because people now take more medications than ever, both prescription and over the counter. Only a small portion of these substances is absorbed in the body. The rest passes through the body, eventually making its way into the rivers and streams that serve as our nation's drinking water sources. The pharmaceuticals detected in Philadelphia are in extremely low concentrations. For example, a person would need to drink eight glasses of water a day for more than 40,000 years to obtain the equivalent of a single child's dose (80 mg) of Tylenol. There is currently no indication that such trace concentrations pose any public health risk. The Philadelphia Water Department will continue to stay abreast of this issue to ensure the safety of our drinking water and the protection of our watersheds.

You can help keep unused pharmaceuticals out of the water supply by paying attention to how you dispose of unused medications. Look for take-back programs that may be established near you, either through pharmacies, or through household hazardous waste collection programs. For more information, please visit: [www.phila.gov/water/Pharmaceuticals\\_in\\_D.html](http://www.phila.gov/water/Pharmaceuticals_in_D.html).



# Drinking Water Treatment

## How Do We Treat the Water So That You May Drink It?

Like the majority of water utilities in the U.S., we use a multi-step treatment process at all three of our drinking water treatment plants. This Water Treatment Process diagram provides a brief description of drinking water treatment in Philadelphia.

### 1. The River

The source of the water is from either the Delaware or Schuylkill River.

### 2. Natural Settling

After it has been pumped from the river, water is stored in reservoirs or basins for about 24 hours, to allow sediments to settle.

### 3. Disinfection

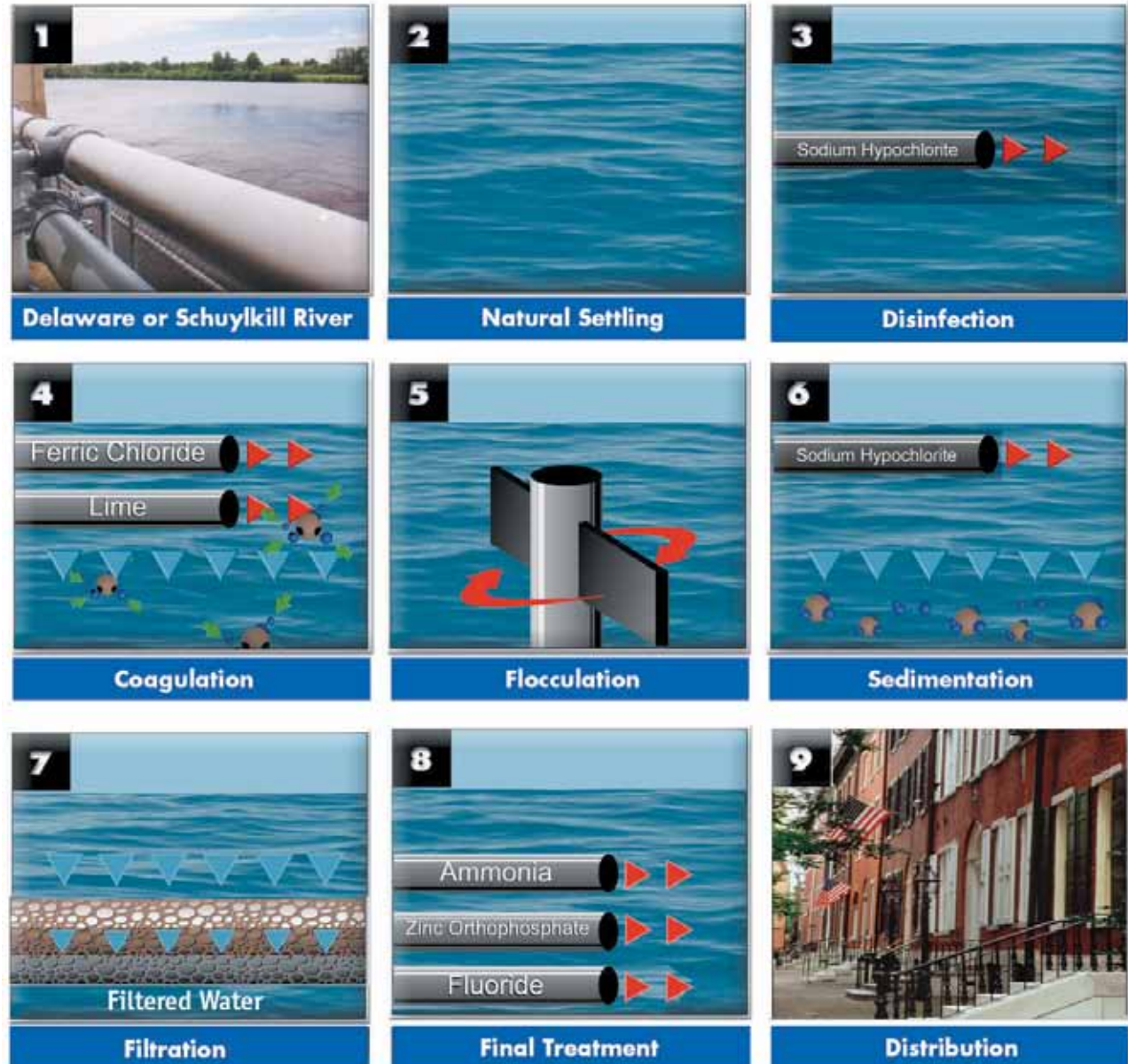
Sodium hypochlorite, a chemical compound containing chlorine, is added to kill disease-causing organisms.

### 4. Coagulation

The river water is coagulated. Chemicals are added to the water to cause smaller particles in the water to join together, and the pH is adjusted to aid in coagulation. This process makes the particles heavier so that they will settle to the bottom of the basin.

### 5. Flocculation

The water is mixed gently to make sure the added chemicals are well blended and react with all of the smaller particles. The particles combine to form "floc" which settle to the bottom of the basin.



### 6. Sedimentation

The newly joined particles or "floc" settle by gravity and are removed from the bottom of the mixing tanks. More sodium hypochlorite is added for disinfection.

### 7. Filtration

The water flows by gravity through filters of sand and crushed coal, which remove very small particles that might never settle by gravity.

### 8. Final Treatment

Fluoride is added to help prevent tooth decay. Zinc orthophosphate is added to minimize rusting of metal pipes by the water. Ammonia is added to reduce the flavor of chlorine and to help the sodium hypochlorite to persist in the water while it travels through the water main system, or to remain active in the water all the way to our customers' faucets.

### 9. Distribution

The treated water is distributed through nearly 3,300 miles of water mains to 480,000 households in Philadelphia.

# 2008 DRINKING WATER QUALITY

## METALS - Tested at Customers' Taps - Testing is done every 3 years. Most recent tests were done in 2008.

	EPA's Action Level for representative sampling of customer homes	Ideal Goal (EPA's MCLG)	90% of PWD customers' homes were less than	No. of homes considered to have elevated levels	Source
<b>Lead</b>	90% of homes must test less than 15 ppb	0	6 ppb	3 out of 97	Corrosion of household plumbing
<b>Copper</b>	90% of homes must test less than 1.3 ppm	1.3 ppm	0.3 ppm	0 out of 97	Corrosion of household plumbing

## DISINFECTION BYPRODUCTS IN TAP WATER

	Highest Level Allowed (EPA MCL) One Year Average	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average	Source
<b>Total Trihalomethanes (TTHMs)</b>	80 ppb	36 ppb Range of individual test results: 15 - 98 ppb	56 ppb Range of individual test results: 14 - 118 ppb	52 ppb Range of individual test results: 21 - 99 ppb	Byproduct of drinking water chlorination
<b>Total Haloacetic Acids (THAAs)</b>	60 ppb	35 ppb Range of individual test results: 17 - 64 ppb	32 ppb Range of individual test results: 9 - 59 ppb	28 ppb Range of individual test results: 15 - 52 ppb	Byproduct of drinking water chlorination

In 2008, PWD completed an Initial Distribution System Evaluation (IDSE), as required by the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR). We conducted this one-time study in October 2007 through September 2008 to identify distribution system locations where higher concentrations of trihalomethanes (THMs) and haloacetic acids (HAAs) may be found. Average THMs concentration during IDSE monitoring was 45.5 ppb, with results ranging from 14.5 to 112.5 ppb. Average HAAs concentration was 31.5 ppb, with results ranging from 2.1 to 66.1 ppb. PWD used results from IDSE monitoring, in conjunction with current Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) compliance monitoring data, to select compliance monitoring locations for the Stage 2 DBPR. Monitoring at the sites selected through the IDSE process will begin in 2012.

## TOTAL ORGANIC CARBON (Ratio of Removal Achieved Divided by Removal Required)

Treatment Technique One Year Average	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average	Source
Must be greater than or equal to 1	1.45	1.79	1.55	Naturally present in the environment.

## BACTERIA IN TAP WATER

*NOTE: None of the samples with Total Coliforms tested positive for E. coli.*

	Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Highest Monthly Results	Source
<b>Total Coliform (360+ monthly samples)</b>	Presence of coliform bacteria in 5% or fewer of monthly samples	0	Highest % of positive samples: 0.42%	Naturally present in the environment.

## INORGANIC CHEMICALS (IOC) - PWD monitors for IOC more often than required by EPA.

	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Highest Result	Range of Test Results for the Year	Source
<b>Nitrate</b>	10 ppm	10 ppm	3.66 ppm	0.60 - 3.66 ppm	Fertilizer runoff, sewage
<b>Barium</b>	2 ppm	2 ppm	0.04 ppm	0.03 - 0.04 ppm	Metal refineries or natural deposits
<b>Cyanide</b>	0.2 ppm	0.2 ppm	0.05 ppm	0.03 - 0.05 ppm	Discharge from steel/metals, plastics and fertilizer factories

## CLARITY CHARACTERISTICS - Tested at Water Treatment Plants

Turbidity (measure of clarity)	Baxter WTP	Belmont WTP	Queen Lane WTP	Source
<b>Treatment Technique Requirement</b>	95% of samples must be at or below 0.30 ntu	95% of samples must be at or below 0.30 ntu	95% of samples must be at or below 0.30 ntu	Soil runoff, river sediment
<b>Highest Single Value for the year</b>	0.081 ntu	0.183 ntu	0.10 ntu	Soil runoff, river sediment

*NOTE: PWD achieved turbidity limits 100% at all times tested.*

Listed on pages eight and nine are our Drinking Water Quality Results for 2008. All results are better than the recommended federal levels designed to protect public health. We are pleased to report that we did not have any drinking water violations for 2008. In keeping with our long-standing unblemished record, we continue to be free of violations since the Safe Drinking Water Act was implemented in 1974.

By reporting these results in the tables above, we are meeting a requirement of the EPA. Please see the glossary on page nine for definitions of abbreviations used in the tables. Some contaminants may pose a health risk at certain levels. Others, such as turbidity, are used as indicators for treatment plant performance. For information about potential risks, please visit our website (<http://www.phila.gov/water>), or call us at 215-685-6300. We will be happy to mail them to you.



## TOTAL CHLORINE RESIDUAL – over 400 samples collected throughout the city every month

Total Chlorine in Tap Water	EPA Maximum Residual Disinfectant Level	One Year Average	Range of Highest Levels Detected at Taps
Chloramine	4.0 ppm	1.57 ppm	1.25 - 3.35 ppm

## VOLATILE AND SYNTHETIC ORGANIC CHEMICALS (VOC and SOC)

Chemical	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Highest Result	Range of Test Results	Source
Atrazine	3 ppb	3 ppb	0.7 ppb	0.0 - 0.7 ppb	Runoff from herbicide used on row crops.
Lindane	0.2 ppb	0.2 ppb	0.007 ppb	0.0 - 0.007 ppb	Runoff from insecticide used on cattle, lumber, and gardens.
Simazine	4 ppb	4 ppb	0.13 ppb	0.0 - 0.13 ppb	Runoff from herbicide used on row crops.

## SODIUM IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
<b>Average</b>	19 ppm or 4 mg per 8 oz. glass of water	40 ppm or 9 mg per 8 oz. glass of water	35 ppm or 9 mg per 8 oz. glass of water
<b>Range</b>	15 - 24 ppm 4 - 6 mg per 8 oz. glass of water	30 - 61 ppm 7 - 14 mg per 8 oz. glass of water	22 - 53 ppm 5 - 13 mg per 8 oz. glass of water

NOTE: We conducted monitoring for sodium throughout the year, although federal regulations do not require it.

## HARDNESS IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
<b>Average</b>	80 ppm or 5 gpg	149 ppm or 9 gpg	157 ppm or 9 gpg
<b>Range</b>	60 - 100 ppm 4 - 6 gpg	121 - 208 ppm 7 - 12 gpg	93 - 215 ppm 5 - 13 gpg

Hardness defines the quantity of minerals such as calcium and magnesium in water. These minerals react with soap to form insoluble precipitates and can affect common household chores such as cooking and washing. Philadelphia's water is considered "medium" hard.

## ALKALINITY IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
<b>Average</b>	36 ppm	67 ppm	65 ppm
<b>Range</b>	21 - 49 ppm	36 - 92 ppm	40 - 89 ppm

**Temperature and Cloudiness:** The temperatures of both the Schuylkill and Delaware rivers vary seasonally from approximately 32 degrees to 88 degrees Fahrenheit. PWD does not treat the water for temperature. Cloudiness most commonly happens in the winter, when the cold water in the mains is warmed up quickly by household plumbing. Cloudiness is visible during aeration, when the water flowing from your tap into a glass appears cloudy. This temporary condition is a result of dissolved air being released from the water and being suspended in the water in the glass. This encourages the dissolved air to come out of the water.

## GLOSSARY

**Action Level:** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. The action level is not based on one sample; instead, it is based on many samples.

**Alkalinity:** A measure of the water's ability to resist changes in the pH level and a good indicator of overall water quality. Although there is no health risk from alkalinity, we monitor it to check our treatment process.

**E. coli (Escherichia coli):** A type of coliform bacteria that are associated with human and animal fecal waste.

**GPG – Grains Per Gallon:** A unit of water hardness. One grain per gallon is equal to 17.1 parts per million.

**MCL - Maximum Contaminant Level:** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

**MCLG - Maximum Contaminant Level Goal:** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**mg/L - Milligrams per liter:** One milligram per liter is equal to one part per million.

**ntu - nephelometric turbidity units:** Turbidity is measured with an instrument called a nephelometer. Measurements are given in nephelometric turbidity units.

**pCi/L - Picocuries per liter (a measure of radioactivity).**

**ppb - part per billion:** One part per billion is equivalent to one green apple in a barrel with 999,999,999 red apples.

**ppm - part per million:** One part per million is equivalent to one green apple in a barrel with 999,999 red apples.

**SOC – Synthetic Organic Chemical:** Organic compounds, such as pesticides and herbicides, that are commercially made.

**Total Coliform:** Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present.

**THAAs -Total Haloacetic Acids:** A group of chemicals called disinfection byproducts, which form during chlorination.

**TOC - Total Organic Carbons:** A measure of the carbon content of organic matter. The measure provides an indication of how much organic material in the water could potentially react with chlorine to form THAAs and TTHMs.

**TTHMs - Total Trihalomethanes:** A group of chemicals called disinfection byproducts, which form during chlorination. TTHMs form when natural organic matter in the rivers, such as leaves and algae, decompose and combine chemically with the chlorine added for disinfection. Levels of TTHMs vary seasonally.

**Treatment Technique:** A required process intended to reduce the level of a contaminant in drinking water.

**Turbidity:** A measure of the clarity of water related to its particle content. Turbidity serves as an indicator for the effectiveness of the water treatment process. Low turbidity measurements, such as ours, show how we remove particles that cannot be seen by the human eye.

**VOC – Volatile Organic Chemical:** Organic compounds that include gases and volatile liquids.

**WTP:** Water Treatment Plant



## SAN FACTS & FIGURES

### SAN Mission:

Protecting and restoring the Schuylkill River as a premiere regional:

- Drinking water source
- Recreational resource
- Natural habitat for fish and wildlife

**122:** Number of SAN organizations in 2008

### SAN Members

- Citizens
- Universities
- Water suppliers
- Federal, state and local governments
- Non-profits
- Funders
- Corporations

### Major Pollution Threats to Schuylkill River

- Agriculture
- Abandoned mine drainage
- Urban and suburban stormwater runoff
- Faulty sewer systems

### The SAN provides:

- Central coordination of restoration and protection efforts for the entire Schuylkill River
- Consensus-based plans for the watershed built on sound science, data, and stakeholder input

### \$3 million: Funds awarded to Schuylkill Action Network (2004 - 2008) from federal, state, local and private sources

- Over 40 projects reducing the impact of agriculture, abandoned mine drainage (AMD), and stormwater on the quality of the Schuylkill River.

**Agriculture:** SAN Agriculture Projects are designed to treat excessive loadings of nutrients and contaminated stormwater runoff. As of 2008:

- 40,000 feet of streambank fencing has been installed
- 6,600 feet of streambank plantings have been completed
- 15 Conservation Plans accomplished

**Abandoned Mine Drainage:** The upper watershed is impacted by polluted water seeping from abandoned coal mines that discharge iron, manganese, and aluminum to the Schuylkill River. To date:

- 5 AMD projects have been implemented, treating 21 million gallons per day of contaminated flow

### Stormwater:

- Three priority detention basins have been redesigned to enhance groundwater recharge and improve quality of rain runoff.

## Schuylkill Action Network (SAN)

In 2004, the Schuylkill Action Network received a grant from the U.S. Environmental Protection Agency to fund priority projects which were identified during the Schuylkill River Source Water Assessment. This grant was one of only 13 awarded nationally that year. As of December 2008, the Schuylkill Action Network and its partners completed all projects planned under the grant and continue to raise funds for priority projects.

## Schuylkill and Delaware River Source Water Protection Plans

The Schuylkill and Delaware River Source Water Protection Plans provide a comprehensive framework for implementing a watershed-wide effort to improve source water quality. The Plans prioritize real and potential sources of contamination to Philadelphia's raw water supply, and outline several approaches to reducing them.

One major component of the Schuylkill Plan, completed in 2005, is a build-out scenario of the Schuylkill River Watershed that looks at the possible impacts of significant development in the watershed on source water quality. Under current zoning, low-density housing could increase drastically as agricultural and forested lands are developed. This scenario helped us to see the importance of land preservation for source water protection, and has led to the development of a tool which prioritized land for protection based on its importance for preserving or improving water quality.

The Delaware River Plan, completed in 2007, brought to the forefront the need for the ongoing protection of our Baxter drinking water intake from salt intrusion from the Delaware Bay. To date, we have had ample protection from salt intrusion due to the large quantity of fresh water coming down the Delaware River. We will closely examine new policies and projected changes from global warming, climate change, sea level rise and population growth in order to ensure protection of Baxter's intake from salt intrusion well into the future.

For information about the quality of our region's rivers and streams, call the Pennsylvania Department of Environmental Protection at 484-250-5900 or check their website (<http://www.dep.state.pa.us>).

## How Do We Protect Our Water Supply?



**W**e carefully safeguard our urban water supply through a variety of initiatives focused on protecting and improving the quality of our rivers and streams. We conduct research into new and emerging issues in water quality science, implement projects to directly enhance and improve water quality, and operate and maintain an early warning system.

Since 2004, we have led the development and implementation of the Early Warning System for the Schuylkill and lower Delaware Rivers. This is a web-based system that supports notification and analysis of source water quality events such as chemical spills and other potential hazards.

The system's goal is to provide advance warning of potential source water contamination to water suppliers and industry. Funded in part by a \$775,000 grant from the Pennsylvania Department of Environmental Protection, the system provides water suppliers and industries on both rivers with essential information to make critical treatment and pumping decisions in response to spills and accidents that can have a detrimental impact on the rivers. The system is comprised of a partnership of water suppliers, industries with water intakes, and government agencies. The system also includes a web-based, centralized database for water quality and event information, a telephone and e-mail notification system, and a network of real-time water quality monitors located throughout the two watersheds.

Delaware Valley Early Warning System serves

- Over 3 million people
- Philadelphia, Camden and Trenton Metro areas
- 12 water utilities, 23 water treatment plants in Pennsylvania
- 5 water utilities, 5 water treatment plants in New Jersey

Since the system was fully deployed in January of 2005, 100 events have been entered into the system, ranging from a 100-million-gallon fly-ash spill on the Delaware, to a cyanide discharge in the Wissahickon Creek, to flood warnings and sewage discharges. In each of these cases, the improved awareness, communication and coordination provided by the system was valuable to our response.

## RiverCast

More than 100,000 people use the Schuylkill River at Fairmount Dam ("boathouse row") for recreational activities every year. The amount and scope of river use seem to increase annually. As recreation increases, so does public concern about river water quality. In response to this concern, we developed RiverCast: the first and only bacteria forecasting system created for recreational activities in the United States. Similar to a weather forecast, RiverCast is an internet-based system that provides the public with hourly updates of expected concentrations of fecal coliform bacteria in the Schuylkill River.

RiverCast uses a color rating system to indicate bacteria levels. Each color rating is linked with guidelines for recreational activity (see below). The bacteria ranges used to determine the color ratings, along with the below activity guidelines, are based on draft EPA regulations for recreational waters.

GREEN		
Bacteria	Types of Activities	RiverCast
Level low	jet skiing, kayaking, swimming, sculling	recommendation: suitable

YELLOW		
Bacteria	Types of Activities	RiverCast
Level elevated	jet skiing, kayaking, swimming, sculling	recommendation: may not be suitable

RED		
Bacteria	Types of Activities	RiverCast
Level high	jet skiing, kayaking, swimming, sculling	recommendation: not suitable

The website has been visited over 150,000 times and has been used for the planning of major water recreational events such as triathlons and regattas. Visit RiverCast at [www.phillyrivercast.org](http://www.phillyrivercast.org).

## Source Water Assessments

The Pennsylvania Department of Environmental Protection has been conducting assessments of all potentially significant sources of contamination to all public drinking water sources. The Philadelphia Water Department has prepared assessments to support local and State efforts to protect the quality of Philadelphia's drinking water sources.



*Baxter Water Treatment Plant*

Funded in part by a grant from the Pennsylvania Department of Environmental Protection, we partnered with Aqua America (formerly Philadelphia Suburban Water Company) and the Pennsylvania American Water Company to perform a source water assessment of water intakes along the Schuylkill River and its tributaries.



*Belmont Water Treatment Plant*

In addition, the Philadelphia Water Department conducted an assessment for seven surface water intakes along the tidal section of the Delaware River.



*Queen Lane Water Treatment Plant*

This summary is for water supply areas for the Philadelphia Water Department's Baxter, Belmont, and Queen Lane water treatment plants. It assesses the raw (untreated river) water only.

For water quality information on our treated "tap" water, please see the charts on pages 8 and 9 of this report.

If you would like to receive a copy of the source water assessment summaries, or would like to know how to get involved in protecting your water supply or watershed, please call the Philadelphia Water Department at 215-685-6300, visit our website at [www.phila.gov/water](http://www.phila.gov/water), or see Table 2 on page 14.

## Baxter Water Treatment Plant

This plant, located in the Torresdale section of Philadelphia, provides treated water that comes from the Delaware River. Through the Delaware River Protection Plan, we revisited the findings of our source water assessment report. The plan identified population growth, land cover change, impact of sea level rise, global warming, and changes in flow management on the vulnerability of our Baxter intake to salt intrusion, as the activities of greatest concern for our water supply on the Delaware.

Historically, we have developed and maintained emergency response plans to address transportation accidents and spills along the Delaware River that could potentially impact the water supply, since it is a working river with barges, railroads, and many other transportation activities on or adjacent to it. We now have an automated early warning system which has greatly enhanced our emergency preparedness and response. Through our award-winning Source Water Protection Program, we also work with upstream partners such as watershed organizations, regulatory agencies, planning commissions, municipalities, and water suppliers to prevent declines in water quality throughout the entire 13,000 square-mile watershed to keep our water supply as clean as possible. Our Delaware River Protection Plan outlines our many strategies for protecting and enhancing the quality of the Delaware River as a source of drinking water for future generations.

## Belmont and Queen Lane Water Treatment Plants

These plants provide treated water that comes from the Schuylkill River in Fairmount Park. Through a source water assessment report, the State drinking water program has found that our water supply is potentially most susceptible to challenges caused by discharges of treated and untreated sewage upstream, polluted runoff from urban areas and agricultural lands, transportation accidents and spills, and abandoned mine drainage. Most of these potential sources are located watershed-wide, but abandoned mine drainage originates over 100 miles upriver near the source of the Schuylkill River in Schuylkill County. Much closer to Philadelphia, the Wissahickon Creek requires special protection from potential sources of pollution due to its impact on source water quality at the Queen Lane intake.

Historically, we have developed and maintained emergency response plans to address accidents and spills that could potentially impact the water supply. We now have an automated early warning system which has greatly enhanced our emergency preparedness and response. Through our award-winning Source Water Protection Program, we also work with upstream partners such as watershed organizations, regulatory agencies, planning commissions, municipalities, and water suppliers to prevent declines in water quality throughout the entire 2,000 square-mile watershed to keep our water supply as clean as possible. Our Schuylkill River Protection Plan outlines our many strategies for protecting and enhancing the quality of the Schuylkill River as a source of drinking water for future generations.

## We welcome your ideas and opinions

We participate in nearly 200 public and community events a year, including presentations made at schools, on-going educational programs and other environmental celebrations.

**We offer ways for individuals, families, students, seniors, community groups and others to participate in learning about protecting water.**

We greatly benefit from our citizens advisory council, which has been working with us over the last few years to improve our communications with our customers. Citizens representing business and industry, education, environmental advocacy, senior citizens, regulatory agencies, and civic and community groups have assisted us in developing public information about a variety of topics, including drinking water quality and stormwater pollution prevention.

Interested citizens are welcome to attend our Water Quality Education Citizens Advisory Council meetings. Call our Hotline at 215-685-6300 to confirm the meeting dates, times and locations.

## Getting Involved

If you would like to help protect your water supply or watershed, please call the Philadelphia Water Department at 215-685-6300, visit our website at [www.phila.gov/water](http://www.phila.gov/water), or see Table 2 on page 14.

## How to contact us

You can write to us at:  
Philadelphia Water Department  
ARAMark Tower  
1101 Market Street, 3rd Floor  
Philadelphia, PA 19107-2994

You can call our Customer Information Hotline at 215-685-6300.

## Explore Water in Our World at the Fairmount Water Works Interpretive Center!

Our Fairmount Water Works Interpretive Center is where the water environment comes alive! The Fairmount Water Works stopped pumping water in 1909, but it now has an exciting new life housing the Interpretive Center's exhibits and theater. Activity abounds in the galleries, on the deck, and by the river as school children, families and other visitors explore the water right outside our window.

Our exhibits and programs serve the entire Philadelphia region; the Interpretive Center has been recognized by the Pennsylvania Department of Environmental Protection as the Delaware River Basin's official Watershed Education Center.

Did you know that you can drink the same water that dinosaurs drank? Come to our Interpretive Center where you can pilot a helicopter up the Delaware River, make it rain, peak inside a 48-inch water main, visit Pollutionopolis, and more!

### Hands-on Learning

We offer a number of school programs, ideal for all grades. Our programs are interdisciplinary and include:

**Water in Our World -** An orientation to the Interpretive Center that is the perfect overview for teachers focusing on water issues.

**From Street to Stream: Slow the Flow -** Our indoor and outdoor lesson focuses on stormwater runoff, watersheds and the different kinds of land pollution that affect water quality.

**Land and Water: A Delicate Balance -** In this introduction to stewardship, students come to understand the relationship of land use and water quality. Students use maps to understand the development of land over time, and plan fictional communities that would protect water quality.

**Building as Machine: Water for the City -** In this hands-on lesson, students become waterpower engineers as they build simple machines and explore the Water Works' original drawings and turbine.

**New School programs include:**  
**History of the Manayunk Canal: Industrial Revolution, Environmental Devolution -** This full-day class is designed for grades 4 through 8, with walking tours and examination of 100-year-old documents. Students will understand the devastating impact of industrialization in Manayunk on the drinking water supply in Philadelphia.



### Seeing is Believing: A Drop in the Bucket

Through this new career-based science education program, high school students will explore the microscopic world of water in a laboratory environment through freshwater sampling. And with the use of state-of-the-art videoconferencing equipment, students will communicate directly with PWD's Lab scientists and engineers.

### Lifelong Learning

Our adult programs include lectures and seminars from nationally and internationally known scientists and writers. Guided group tours for adults of both the historic Fairmount Water Works and the Interpretive Center's exhibits are available. The Schuylkill Soundings speakers' series presents writers, artists and lecturers who share our passion for protecting our water environment

-- including topics such as climate change and sustainable communities.

### Visit Us Soon!

The Interpretive Center is located at 640 Water Works Drive, below the Art Museum. Our hours are Tuesday through Saturday, 10:00 am to 5:00 pm, and Sunday from 1:00 pm to 5:00 pm. We are closed on Mondays and city holidays. Admission is free. The Center is ADA accessible. To schedule classroom tours or to check out the Center's Saturday Family Programs and other environmental education events at the Center, visit our website: [www.fairmountwaterworks.org](http://www.fairmountwaterworks.org).



# Clean water begins and ends with you

Always recycle or dispose of unwanted household hazardous wastes properly. Don't pour motor oil, antifreeze or other toxic materials down storm drains. Water that enters our storm drains often flows directly to our local streams and rivers. So, don't pollute! Recycle these household hazardous materials safely and help protect our waterways. Also, don't flush paint thinners, insect sprays, herbicides and other harmful chemicals down the sink. Contact the Streets Department to get a schedule of their Household Hazardous Materials Drop-off Events where you can dispose of these materials safely without polluting your drinking water supply.

**TABLE 1: Who to Call to Report Various Situations**

Situation	Who To Call	Phone
Dead Fish	Fish & Boat Commission	717-626-0228
	Fish & Boat Waterways Officer	717-587-0414
	PADEP	484-250-5900
Illegal Dumping & Related Pollution Activities	PADEP	484-250-5900
	Phila. Environmental Police Unit	215-686-3082
Sewage Spills	PADEP	484-250-5900
	PWD	215-685-6300
Oil & Gas Spills/Accidents	PADEP	484-250-5900
	PWD	215-685-6300

## Important telephone numbers and Internet addresses

Philadelphia Water Department  
215-685-6300  
<http://www.phila.gov/water>

Philadelphia Streets Department  
215-686-5560  
<http://www.phila.gov/streets>

U.S. Environmental Protection Agency  
(Safe Drinking Water Hotline)  
800-426-4791  
<http://www.epa.gov/safewater>

Schuylkill River Source Water Assessment  
<http://www.phillyriverinfo.org>

Schuylkill Action Network  
<http://www.schuylkillactionnetwork.org>

Philadelphia river and watershed information  
<http://www.phillyriverinfo.org>

RiverCast  
<http://www.phillyrivercast.org>

Fairmount Water Works Interpretive Center  
215-685-0723  
<http://www.fairmountwaterworks.org>



**TABLE 2 – Places To Go To Get Involved In Protecting Your Local Streams, Rivers and Water Supply**

Organization	Activity Types	Phone Number	Website Address
Friends of the Pennypack	A, C, E, P, T	215-934-PARK	<a href="http://balford.com/fopp">http://balford.com/fopp</a>
Friends of the Wissahickon	A, C, E, P, T	215-247-0417	<a href="http://www.fow.org">http://www.fow.org</a>
Friends of Fox Chase Farms	A, C, E, P	215-728-7900	<a href="http://www.foxchasefarm.org">http://www.foxchasefarm.org</a>
Friends of the Manayunk Canal	A, C, E, P, T	215-483-9238	<a href="http://www.manayunkcanal.org">http://www.manayunkcanal.org</a>
Schuylkill Environmental Education Center	A, B, C, E, P, T	215-482-7300	<a href="http://www.schuylkillcenter.org">http://www.schuylkillcenter.org</a>
Partnership for the Delaware Estuary	A, B, C, E, P, S,T	1-800-445-4935	<a href="http://www.delawareestuary.org">http://www.delawareestuary.org</a>
Philadelphia Canoe Club	R, F, T	215-487-9674	<a href="http://www.philacanoec.org">http://www.philacanoec.org</a>
Friends of Fairmount Fish Ladder	F	215-683-0217	email: <a href="mailto:epac99@aol.com">epac99@aol.com</a>
Cobbs Creek Environmental Education Center	A, C, E, P, T	215-685-1900	<a href="http://www.cobbscreekcenter.org">http://www.cobbscreekcenter.org</a>
Wissahickon Restoration Volunteers	A, C, E, P, T	215-951-0330 x2101	<a href="http://wissahickon.patrails.org">http://wissahickon.patrails.org</a>
Wissahickon Valley Watershed Association	A, C, E, P, T	215-646-8866	<a href="http://www.wvwa.org">http://www.wvwa.org</a>
Lower Merion Conservancy	A, C, E, P, T	610-645-9030	<a href="http://www.lmconservancy.org">http://www.lmconservancy.org</a>
Philadelphia Water Department Water Quality Education Citizens Advisory Committee	A, E	215-685-6300	<a href="http://www.phila.gov/water">http://www.phila.gov/water</a>
Schuylkill Banks	B,E,L	215-222-6030 x103	<a href="http://www.schuylkillbanks.org">http://www.schuylkillbanks.org</a>
Senior Environment Corps	A, C, E, P, T	215-848-4072	<a href="http://www.centerinthepark.org/progsec.html">http://www.centerinthepark.org/progsec.html</a>

### ACTIVITY TYPES

- A:** Environmental activism
- B:** Business related protection and education activities
- C:** Clean-up of trash and litter
- E:** Environmental education
- F:** Fishing or fish recreation activities
- L:** Land conservation and management
- P:** Planting trees and streambank repair/protection
- R:** Rowing, canoeing, and related boating activities
- S:** Storm drain marking
- T:** Water quality testing

# WATER Wheel

## Clean Waters — Green Streets: Neighborhood-Friendly Solutions

A Sustainable Approach/2009

### WHAT IS STORMWATER RUNOFF AND WHY IS IT A POLLUTION PROBLEM?

In many of Philadelphia's homes, sanitary and stormwater waste travel together through a combined sewer system. We bring this waste to one of our water pollution control plants, treat the water, and return the cleaned water to the Schuylkill and Delaware rivers. This treated water is actually cleaner than the river water. But when there is too much stormwater runoff for our systems to contain and treat, all of this polluted stormwater goes into our waterways without being treated.

In some areas of Philadelphia, stormwater from gutters, yards and streets is collected in storm sewers. It is then released -- untreated -- into local creeks and rivers that flow into the Schuylkill and Delaware rivers. Homes that use this system have a separate system for their sanitary sewage. The sewage is collected in the sanitary sewer and sent to a water pollution control plant for treatment.

In either system, it is important that we reduce the amount of stormwater runoff as much as possible, to make sure we can clean this polluted water before it reaches our waterways.



*A street in Philadelphia as it looks today. Please go to the next page to see how our Green Streets Program would transform this street.*

In the past, a major source of pollution in our waterways came from industries. Now, stormwater runoff is the number one reason for this pollution.

#### **Stormwater runoff:**

- picks up chemicals, bacteria and trash (oil, grease, dog wastes, etc.) as it flows through our streets and over our properties into storm drains;
- fills our combined sewer systems (in those areas of the City with a single pipe that collects wastewater and stormwater runoff), resulting in overflows into our rivers and streams when the sewer system reaches capacity;
- drains through our separate storm sewer system (in those portions of the City with separate wastewater and stormwater collection pipes) and goes directly, often at high volumes, into our rivers and streams.

At PWD, we are designing stormwater management systems that capture rain where it falls to the ground. These systems do what Mother Nature does best -- lets rainwater soak into the soil. This refills our groundwater table while making our streets and lawns greener.

### A Sustainable and Neighborhood-Friendly Approach to Stormwater Management

Making our neighborhoods clean and safe is both a priority and a challenge for Philadelphia. One way we are achieving this is through our stormwater runoff program.

*(continued on next page)*

## Clean Waters — Green Streets: Neighborhood-Friendly Solutions

A Sustainable Approach/2009

(continued from previous page)



*How the same street shown on the previous page looks as we add some of the Green Streets improvements, such as porous concrete in the sidewalks, trees and sidewalk planters and planted curb bumpouts. The result is a street that not only helps control stormwater runoff, but adds beauty and shade to the neighborhood.*



### Bringing Our Clean Waters — Green Streets Program to Our Neighborhoods

Our Green Streets program has many benefits, including:

- reducing the amount of water that has to go through our city sewers
- making our neighborhoods more beautiful
- reducing urban heat
- improving air quality
- helping traffic flow

### A New Look For City Streets

A major goal of our Green Streets Program is to reduce the amount of asphalt and concrete in our neighborhoods. When our city has a large amount of this impervious cover, rain has nowhere to go but into our drains. When our streets have more green areas, rain will be able to soak into the soil.

Some of our solutions are small and simple, and others are large projects. They all will help us achieve our goal. Some of these projects include:

- porous pavers in street parking lanes
- porous concrete in large sidewalk blocks
- trees and sidewalk planters
- planted curb bumpouts

We are working with our many city, state, and federal partners and, most importantly, our residents, to transform Philadelphia into a city famous for its clean, beautiful rivers and streams. Our Green Streets Program is an important part of achieving this goal. For more information about this program and PWD's Combined Sewer Overflow (CSO) Long Term Control Plan, please visit [www.phillyriverinfo.org](http://www.phillyriverinfo.org).