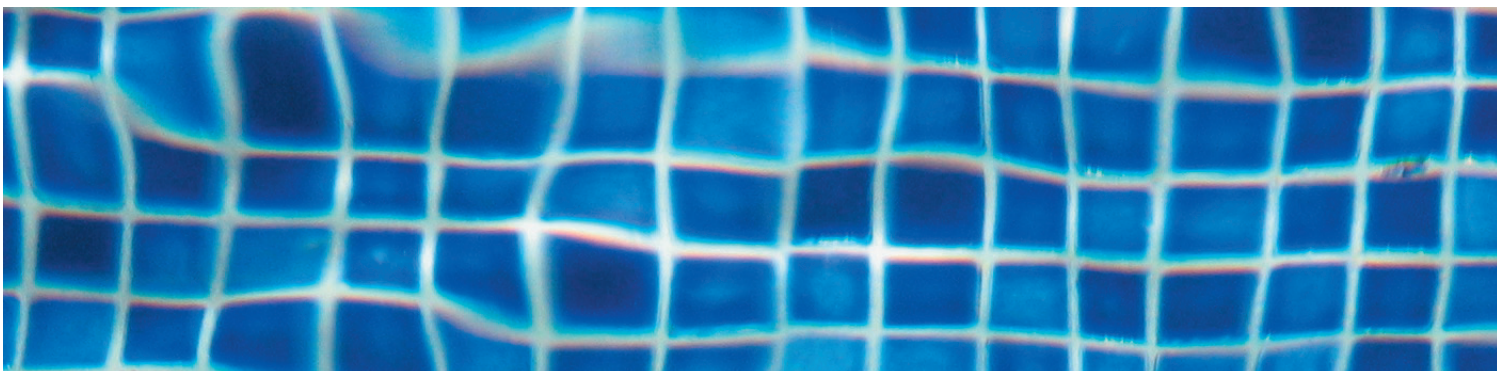
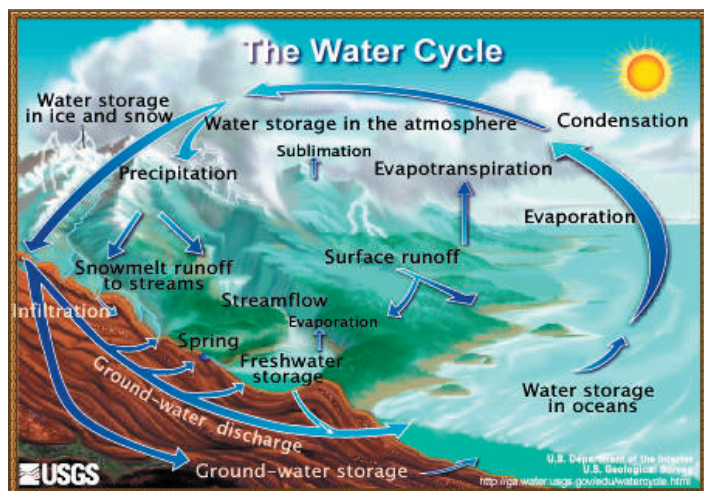


24.

Water: Water Cycle

The water cycle has no starting point. But, we'll begin in the oceans, since that is where most of Earth's water exists. The sun, which drives the water cycle, heats water in the oceans. Some of it evaporates as vapor into the air. Ice and snow can sublime directly into water vapor. Rising air currents take the vapor up into the atmosphere, along with water from evapotranspiration, which is water transpired from plants and evaporated from the soil. The vapor rises into the air where cooler temperatures cause it to condense into clouds. Air currents move clouds around the globe, cloud particles collide, grow, and fall out of the sky as precipitation. Some precipitation falls as snow and can accumulate as ice caps and glaciers, which can store frozen water for thousands of years. Snowpacks in warmer climates often thaw and melt when spring arrives, and the melted water flows overland as snowmelt. Most precipitation falls back into the oceans or onto land, where, due to gravity, the precipitation flows over the ground as surface runoff. A portion of runoff enters rivers in valleys in the landscape, with streamflow moving water towards the oceans. Runoff, and ground-water seepage, accumulate and are stored as freshwater in lakes. Not all runoff flows into rivers, though. Much of it soaks into the ground as infiltration. Some water infiltrates deep into the ground and replenishes aquifers (saturated subsurface rock), which store huge amounts of freshwater for long periods of time. Some infiltration stays close to the land surface and can seep back into surface-water bodies (and the ocean) as ground-water discharge, and some ground water finds openings in the land surface and emerges as freshwater springs.





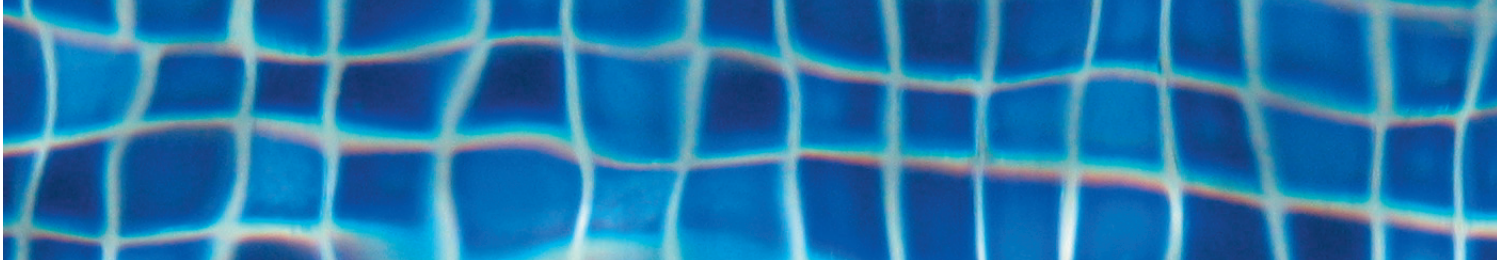
Issues:

The global community faces concerns such as water shortages, lack of safe drinking water, water contamination and groundwater depletion.

90% of Allegheny County uses the Monongahela, Allegheny, Ohio and Youghiogheny Rivers as a source of drinking water. (Three Rivers Wet Weather Demonstration Program, "Allegheny County Sewer Related Facts and Figures" Jan 2005)

Allegheny County Sanitary Authority (Alcosan, www.alcosan.org 412-734-8353) provides wastewater treatment services to the City of Pittsburgh. They charge \$2.5/thousand gallons.

Pittsburgh Water and Sewer Authority (PWSA, www.pgh2o.com, 412.255.8935) provides us with our water.



26.

Water Issues

(continued)

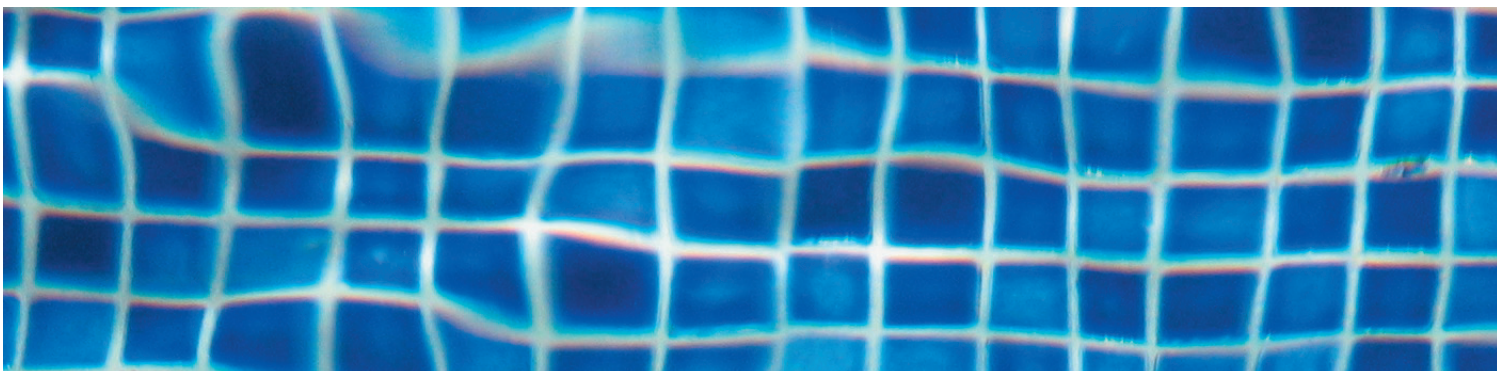
Contamination

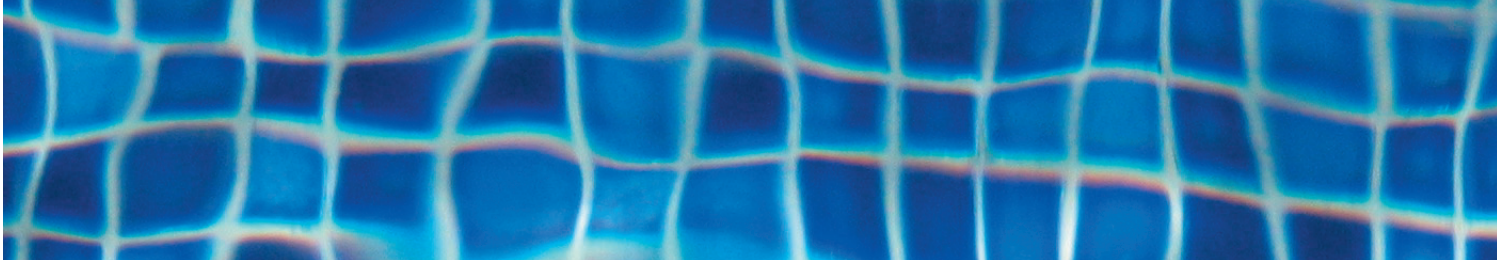
In the greater Pittsburgh area our environmental water concerns are water contamination from industry and sewage overflow. "PA ranks the 1st in the nation in toxics discharged into rivers and streams and yet _ of the state gets its drinking water from its rivers." (Keep PA Growing Greener Brochure)

The City of Pittsburgh has a combined-overflow sewer system that collects stormwater and sewage in the same pipes for treatment. When too much water is brought into the system the pipes overflow by design into streams and rivers along which the sewers run to prevent the treatment plants from being overwhelmed and sewer system backups into home and commercial buildings. This results in untreated sewage entering the stream and rivers, elevating levels of pathogenic bacteria. (Environmental Indicators for Carnegie Mellon University, Baseline Assessment, 2004 p69)

During summer 2004, 125 days out of 139 possible recreation days (May 15-Oct 1) were not healthy to swim in the rivers because of sewage overflow. (Sustainable Pittsburgh Indicators Report 2004, p29)

The most common inorganic compounds found in drinking water are chlorine, copper, fluoride and lead. The 1996 Safe Water Drinking Act, says that water suppliers have to provide a yearly report to their customers. Go to www.epa.gov/safewater/dwinfo.htm to find your community's report.





Water Issues

(continued)

Conservation

World Health Organization says good health and cleanliness require a total daily supply of about 8 gallons of water per person. (www.newdream.org)

Based on the fiscal year 2004, the following numbers represent gallons of water used by students living in these houses each day. (gallons/student/day)

- West Wing 43.8
- Doherty Apts 43.6
- Mudge 45.15
- New House 28.84

What We Have Already Done?

Conserving Water

Most of our toilets use 1.6 gallons/flush. Toilet flushing is the top water user in the home. (www.h2ouse.org)

Almost all of our washing machines are front loading, which saves about 50-70% less water than top loading machines. (Tufts ECO-Rep Training Manual p30)

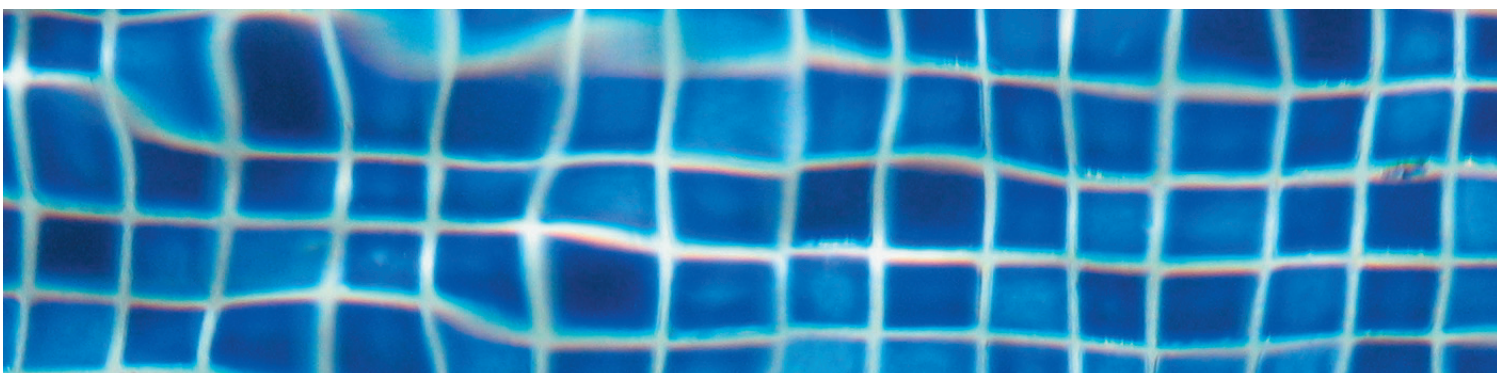
Retaining Water

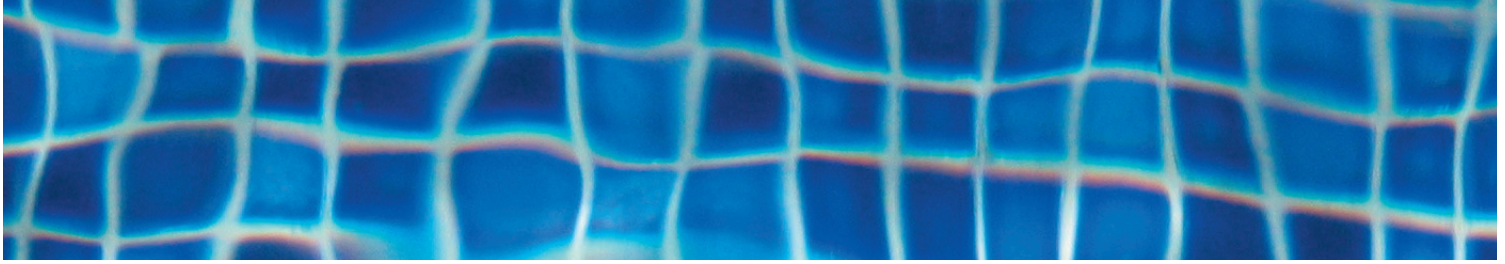
Hamerschlag Hall's Green Roof aids in stormwater management by acting like a sponge and absorbing water during heavy rains to avoid combined sewage overflow.

Faucet water use in homes in standard and conserving homes

	Non-conserving Home	Conserving Home
Typical Faucet Flow Rates (gal. per minute)	1.2	1.0
Avg. Faucet Gallons per Person Per Day	9.2	8.0
Avg. Minutes of Faucet Use per Person Per Day	8.4	8.9

(from DeOreo, et. al. 2001)





28.

Water Issues

(continued)

(aerator)



What More Can We Do?

While dishwashing in a sink, plug drain, soap up all plates and then run water until the sink is about half full and rinse soap off plates, then use drying rack.

With a dishwasher, do not pre-rinse and only run when full.

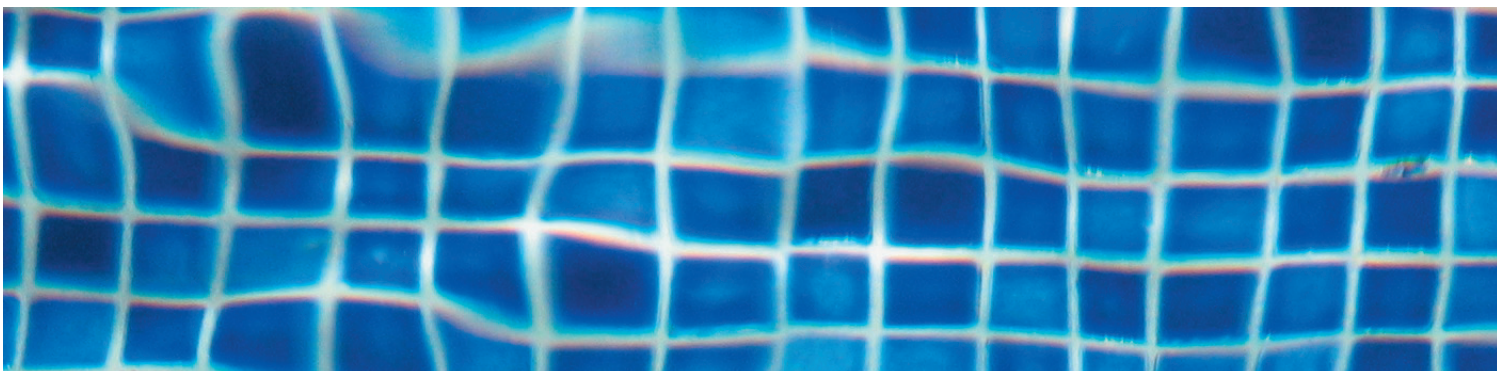
Use a vegetable brush to remove dirt instead of rinsing under a faucet.

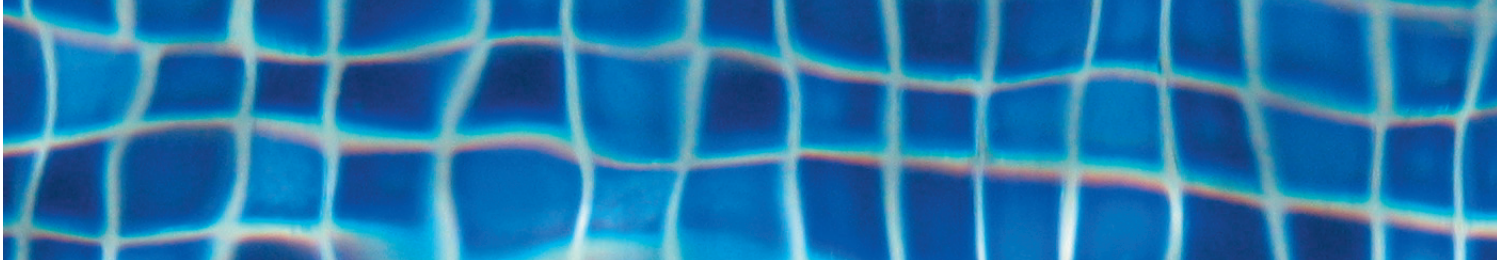
Fill up a pitcher of tap water and store in your refrigerator, so as to not have the tap running each time you want a glass.

Install low-flow showerhead and faucet aerators. Aerating mixes air into the water stream, which maintains steady pressure so the flow is even. (eartheasy.com)

Plant natives that are not water-dependent for survival. When watering plants, water the roots and not the leaves and do so in the early morning or late at night, so that the water does not evaporate.

If you see a leaky fixture, send in a maintenance request at <http://www.housing.cmu.edu/maint/MR.html>.





Action Items:

□ Toilet Leak Test

Drop some dye into the center of the toilet tank and wait about 8 minutes. If there is dye in the toilet bowl, your toilet has a leak. This can be easily fixed by replacing your flapper or flush valve.

□ Visit a Wastewater Treatment Plant

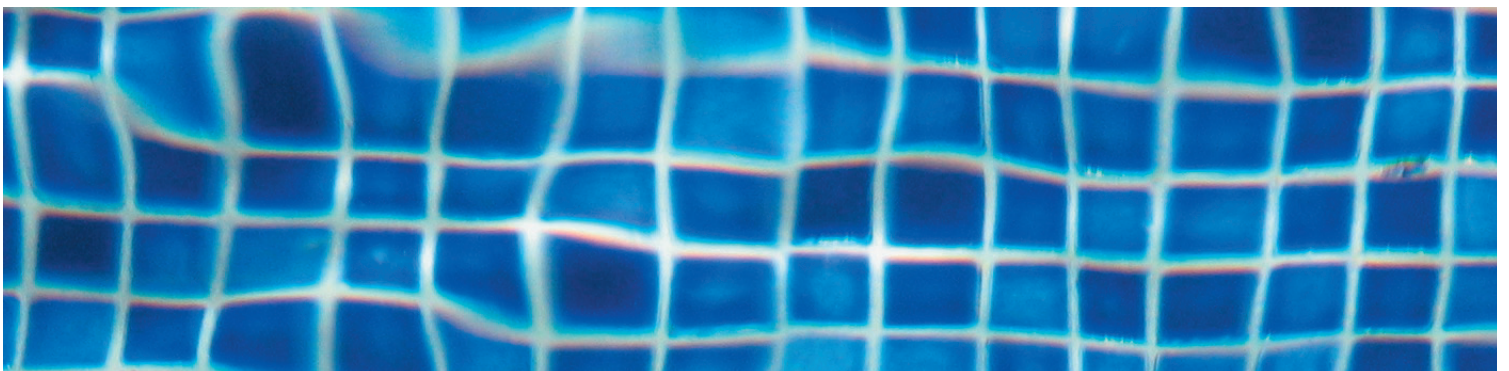
Alcosan's sewage treatment plant is on the Northside and is open for tours Mon-Fri from 9-3pm. Tours are approximately 1.5hrs. E-mail Nancy Barylak (nancy.barylak@alcosan.org) to set up an appointment.

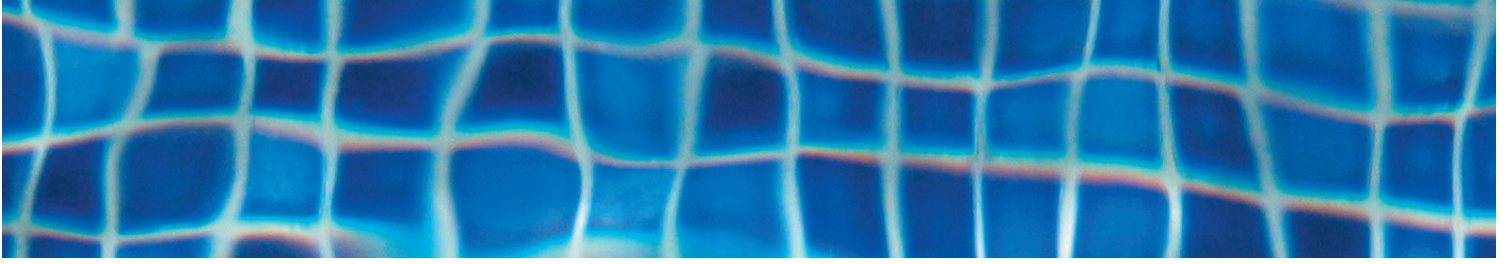
□ Bag Your Toilet

Fill up your toilet tank bag with water and place in the tank of your toilet. This device allows your tank to fill up with less water after each flush but it does not disturb the water pressure. Call South Side's Conservation Consultants Inc 412-431-4449 to get one for free.

□ Advertise the Facts

Hold a floor meeting or make posters to educate your peers about all the water saving aspects your house is already practicing! (Use the facts in this chapter and the information you gathered from your inventory).





30.

Action Items:

(continued)

□ Greywater Demonstration

Contact Architecture Professor, Christine Mondor (cmondor@cmu.edu) about possibly giving a short talk explaining greywater catchment systems designed or built for the Pittsburgh area including the CIC building on the west end of campus and the future rainwater garden near the tennis courts. (We can probably even order in food).

□ How Much Water Do We Use?

In the entrance of your house, demonstrate with plastic bottles (or something else that is tangible) how much water is used when taking a shower, flushing a toilet, running the dishwasher, washing your hands, watering your plants.

□ Host a Debate

Is bottled water healthier than Pittsburgh's tap water? Invite a water specialist from the City and have a public health professor from the Heinz School entertain this highly debated question over snacks in your house's lounge. Or read up on this controversy and team up with another Eco-Rep to debate in front of your housemates or even just your roommates.

(www.nrdc.gov/water/drinking/nbw.asp)

□ Test Your Tap Water

Invite Civil and Environmental Engineering Professor, Dave Dzombak (dzombak@) to test your house's water fountain or sink water for chlorine, copper and fluoride.

