

# What is a Watershed?

The following lessons introduce students to the concept of a watershed (in the Bronx River's case also a *sewershed*) and how they relate this to the conditions of the Bronx River. Part of assessing the quality of water in the Bronx River includes considering where the water comes from and what it picks up along the way before it drains into the river corridor. Students should begin to think about their own effect on the quality of water in the Bronx River and to the larger basin that the River drains into the East River—and eventually the Long Island Sound.

Below we have included some information on watersheds to augment these lessons.

## TERMS OF INTEREST:

Watershed, sewershed, aquifers, river corridor, springs, impervious, topography, filtration, point source pollution, non-point source pollution, estuary, headwaters, groundwater.

## BACKGROUND INFORMATION:

### *What is a watershed?*

A watershed is an area of land that water flows over or through on its way to a river, bay, or ocean. The ridgelines, or highest points in the basin define it. The Bronx River watershed drains an area of 56.4 square miles into its 21.4 miles of river corridor.



### *Where does the water in the Bronx River Watershed come from?*

The Kensico Reservoir in Westchester County now impounds the Bronx River's original source, or headwaters. The current headwaters is Davis Brook, formed by underground springs northwest of the Kensico Reservoir. The last three miles of the Bronx River are tidal, which means that this water receives salt (ocean) water from the incoming tides, causing the water level to fluctuate and forming an ecologically rich zone called an estuary.

### *The Bronx River is part of the water cycle.*

The water, or hydrologic cycle, is powered by energy from the sun and gravity. Incoming solar energy evaporates water from waterbodies, soil and vegetation. As water vapor in the air accumulates and cools, water droplets form and fall to the land as precipitation.

Precipitation may be in the form of normal rainfall up to 60 inches each year or excessive rainfall events. Other forms of precipitation include sleet, freezing rain, and snow. Much of this precipitation sinks into soils and will hydrate plants and/or become ground water.

Ground water is rainwater that infiltrates from surface waters, surrounds sediment particles, and filters through the soil. Trapped groundwater may collect in spaces called aquifers, or it may move to the surface by way of wells drilled into aquifers or by seeping from springs.

*How does groundwater affect the Bronx River Watershed?*

Surface water that becomes contaminated or polluted may seep into underground aquifers and into the river, deteriorating the quality of the water in the watershed.

In urban areas, soil is often compacted or covered by pavement and buildings. The water that moves across these surfaces is called runoff. This surface runoff drains to lower areas from the streets, into storm drains, and eventually empties into the lowest area, the Bronx River.



*How does surface runoff affect the Bronx River Watershed?*

Surface runoff, either from the "first flush," the first inch of a heavy rainfall, or from water draining for a longer time (e.g., a garden hose) can carry pollutants, such as motor oil or pesticides to the bodies of water in the watershed.

*Other water sources affect the Bronx River.*

- Combined Sewer Overflows (CSO): Sewer systems, like the one used throughout most of New York City, uses the same set of pipes to collect both sanitary and storm waste water and direct it to a waste water treatment facility. In the case of a heavy storm when the system cannot handle an excess volume of sewage and storm water to the treatment facility, the excess outflows into the local streams and rivers. There are five CSO pipe structures in-use on the Bronx River in the Bronx (managed by the NYC Department of Environmental Protection).
- Human use: Each person in New York City uses approximately 100 gallons of water each day. This fresh water comes from watersheds located as far as 135 miles north of the city. Careless action by people often allows this water to be wasted. Conservation measures to reduce this waste include repairing leaking faucets, turning off water when it is not needed, and installing low-flow plumbing fixtures.

Action on the part of citizens can prevent contamination in the watershed. For example, each of us can recycle used motor oil, pick up pet wastes, and properly use pesticides, fertilizers, and herbicides, shut off water when it is not being used, and dispose of trash properly. See *Speak Up for a Clean Bronx River!* in the ISSUES AND ACTION section of the guide to learn more about issues and solutions related to storm water and water quality in New York City's waterways.