What Is A Watershed?

No matter where you are, you're in a watershed! All lands on the surface of the Earth are in a watershed. Chester County's land area consists of portions of 21 watersheds that ultimately drain to the Delaware Bay or Chesapeake Bay.

A *watershed* is the area of land (catchment area) that captures rain and snow, and then stores, filters, seeps or drains this water into a common water body (marsh, stream, river, or lake). A watershed includes the network of streams that drains that surface land area, and the groundwater and aquifers located underground that contribute water to those streams.

Watersheds are separated from adjacent ones by a continuous ridgeline that forms the watershed's boundary. Watersheds come in all shapes and sizes and can be broken down into *subwatersheds* (or *subbasins*). Each water body has its own watershed; some are millions of square miles in size; others are just a few acres. Watersheds often cross municipal, county, state, and even international borders. The watershed area and the volume of water that drains from it relates directly to the size and flow of the primary stream or water body. Other factors that make each watershed distinctive include its mosaic of land uses, soil types, geology, topography, and climate.

What are the 6 key components of a watershed?

Every watershed has six key components.

- **Precipitation** - the ultimate source of water to the watershed.
- **Continuous Ridgeline** - determines the boundary line between adjacent watersheds.
- **Catchment Area** - includes all of the land surface area within the surrounding ridgeline.
- **Stream Network** - the primary water body and its tributaries serve as the drainage system to collect and drain water from the watershed.
- **Groundwater Aquifer** - water stored in underlying soils and rock units that contribute to stream flows throughout the year.
- **Outlet** - lowest point of the watershed, where it discharges to another water body.

Groundwater and streams are interconnected. This relationship is easy to observe during dry periods. Despite a lack of precipitation falling in the watershed, many streams continue to flow due to ample groundwater supplies.

What is a Watershed

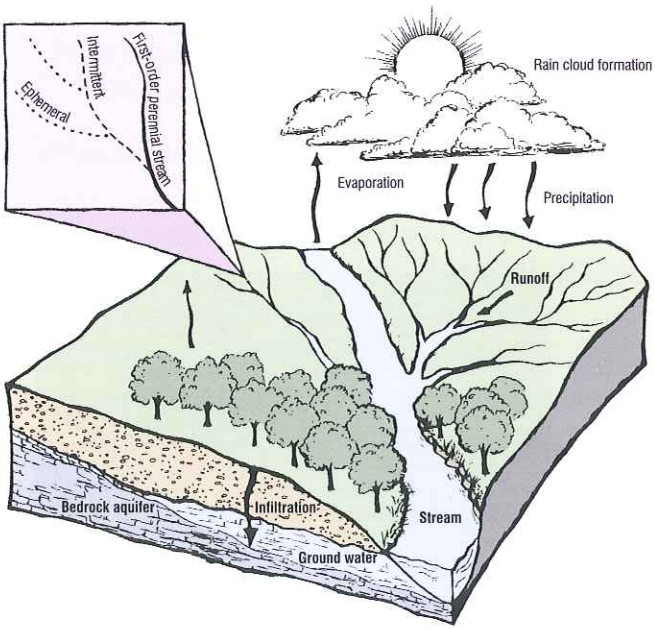
Where does the water come from?

The water that exists within our watersheds originates from rain or melted snow. Chester County receives approximately 46 inches of precipitation each year, falling fairly consistently throughout the year. Close to 90 percent of the total precipitation that falls annually occurs in small storms that consist of only one inch or less of precipitation. In fact, almost two thirds of all storms recorded in Chester County provide a quarter inch of rainfall or less. These storms – large and small – provide the water for all the streams, springs, lakes, ponds and aquifers in Chester County's watersheds.

What is groundwater?

Groundwater is the water located underground that fills the spaces between particles of soils such as sand, silt, and clay, and that fills the crevices and fractures in underlying rock. Groundwater may exist near the land surface (less than 10 feet down), or it may occur at depths of up to several hundred feet. The saturated underground rock units in which the groundwater occurs are called *aquifers*. Aquifers are major sources of water for residential, agricultural, commercial, industrial, public water supply, and other purposes in Chester County.

Groundwater and surface water are interconnected. In fact, it is often difficult to separate the two because they continuously feed one another. Groundwater aquifers interact closely with streams, often releasing water into streams, wetlands or lakes and sometimes receiving water from streams, wetlands or lakes. Groundwater supplies approximately 60% of the water that flows in streams, and provides the source of water that flows from springs.



A watershed is dynamic and three-dimensional. It includes precipitation, the network of surface streams and the groundwater stored in underground aquifers.

Groundwater aquifers are recharged by precipitation or surface water that percolates down through the soils until it reaches the underlying aquifers. In Chester County, approximately 28% of the annual precipitation recharges the groundwater. Groundwater arrives at a balance in natural areas, discharging to streams about the same volume of water that it receives from recharge. In developed areas, paved surfaces can disrupt this natural balance by restricting local recharge. As future land development and redevelopment occurs, these water balances must be protected to safeguard groundwater to ensure sustainable stream flows, water supplies and healthy watersheds.

—How Does It Work?

How do streams work?

Streams and rivers are an integral part of our landscape. Streams receive their water from the rain that falls and runs directly off of the land surface into the streams, wetlands or lakes. Stream water also comes from seeps and springs where groundwater discharges from aquifers to the land surface. As this water collects and moves downslope, it concentrates its flow in low areas and forms small stream channels. These small streams are considered the *headwaters* of a watershed. As these small streams converge, they form larger streams, ultimately flowing into rivers, estuaries, and then oceans.

During severe storms, the cumulative volume of rainfall that runs off the land surface and into the stream system may exceed the volume that can be carried within the stream channels. This results in flooding conditions, where the water flows out of its stream channel and enters the floodplain. Flooding is a natural condition that occurs in stream systems.

Another natural condition is the continuous movement of sediment in streams. Streams in forested areas contain very little sediment because vegetation protects stream banks from erosion. Where stream banks are not well vegetated, soil along the stream banks can quickly erode causing severe property and infrastructure damage and degrading aquatic habitats.

Flooding is a natural occurence, and streams with adjacent forested floodplains fair best during storms. These forested floodplains help protect downstream communities by slowing floodwaters as the stream rises out of its banks.

How does land use impact water?

How we use the land impacts watersheds. Once the land area is disturbed by farming or development, the ecological balance in a watershed is affected. Buildings, roads, parking areas, and other *impervious* features (where water cannot percolate into underlying soils) eliminate groundwater recharge and convert that volume of water into stormwater runoff. In most communities, this increase in stormwater runoff is quickly diverted through storm drains to a local stream. To worsen matters, during larger storm events this excess runoff from impervious areas also causes excessive stream channel erosion and increases the frequency and magnitude of flooding.

Nonpoint source pollutants are causing widespread impacts to the waters of our watersheds. These pollutants come from diffuse sources such as excess fertilizers, pesticides, animal waste, sediment, and other chemicals on the land surface. During a rainstorm, these nonpoint source pollutants percolate into the underlying aquifers, and are carried from the land into the streams by stormwater runoff.

How can you reduce your *watershed footprint*?

There are easy steps you can take to reduce your impact on your watershed (please see the resources listed at the bottom of the page).

- Find your *watershed address* by locating your home on a watershed map.
- Support a local watershed group that works to improve the local water resources.
- Learn about ways to reduce your water use and stormwater runoff and pollution contribution where you live and work.

What actions can your community take to protect its watershed?

Effective stormwater management has become a key strategy to protecting the waters of developing watersheds. *Best Management Practices* (BMPs) offer us the opportunity to reduce our impacts without unduly restricting sensible growth. BMPs can:

- remove nonpoint source pollutants;
- reduce flooding; and
- increase the infiltration of rainfall to protect groundwater and streams.

Our water resources require a delicate balance to meet the needs of aquatic life, provide drinking water for human consumption, and ensure treated wastewater discharges can be properly incorporated back into the watershed. Communities and homeowners can implement BMPs and other solutions (see below) to make the best use of the land resources, while protecting the quality and quantity of the water resources of our watersheds.

Where can I find more information?

Please contact our office or visit www.chesco.org/water and browse for resources such as:

- A map of the watersheds of Chester County;
- A listing of local watershed organizations;
- Watershed stewardship strategies for individuals and communities (browse for *Watersheds Plan*, go to Parts 7 and 8).

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