



Your Water, Your Future

by Dauphin County Conservation District

Dauphin County's Stormwater Publication for Municipalities
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Your Water, Your Future is a newsletter produced as part of Dauphin County Conservation District's Municipal Stormwater Outreach Initiative. This issue, the second in the series, introduces the water cycle and watershed concepts as they relate to managing stormwater runoff in your municipality.

Please contact Gil Hirschel at 921-8100 regarding questions, comments, and requests for additional information.

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The Water Cycle

The water cycle, or hydrologic cycle, describes the continuous movement of water on, above, and below the surface of the Earth as rainfall, runoff, streams and groundwater. This cycle has no beginning or end - some of the water you drink today may have been floating in the Gulf of Mexico last week! Water also changes states (liquid, vapor, solid) at various places in the cycle. The components of the cycle include ocean storage, evaporation, sublimation, transpiration, atmospheric water, condensation, precipitation, runoff, streamflow, freshwater storage, infiltration, and groundwater.

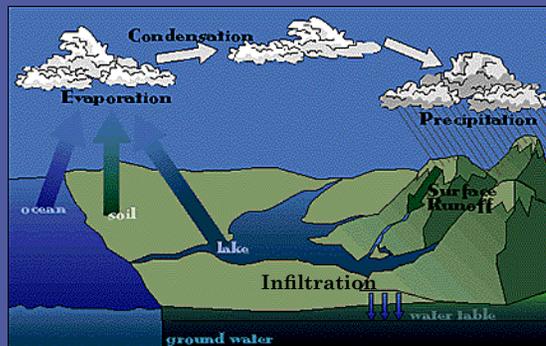


Diagram of the water cycle

It is our impact on this cycle that is important! We are especially concerned with precipitation, runoff, streamflow, infiltration, and groundwater.

Municipal land use and stormwater management decisions have a profound impact on many aspects of the water cycle. To avoid serious problems, municipal decision makers must deal with the hydrological changes caused by new and existing development.

Quick Facts about Water

- 97% of the water on Earth is salt water
- 3% of the Earth's total water supply is fresh water
- 2% of the total water supply is fresh water frozen in glaciers and ice caps; only 1% of water on Earth is fresh water available for human use
- Water is unique in that it can exist as a solid, liquid or gas on the earth's surface

Quiz - True or False

1. The functions of the water cycle interact only within regional boundaries.
2. Municipal land use and stormwater management decisions have a profound impact on many aspects of the water cycle.
3. Planning for development can reduce the cause of threats to watershed quality and health.
4. Stormwater runoff is not a problem in Dauphin County's watersheds.
5. Watersheds with only 10% of their land covered with impervious surfaces have impacted streamflows and water quality.

Answers on reverse side, bottom of the page.

Watersheds

A watershed is an area of land that water flows across on its way to a stream, river or lake. It is essentially a large basin that drains water from the land surface to a larger body of water. The watershed also includes the groundwater and aquifers located below the surface (Figure 1).

Watersheds provide critical natural resources that sustain and enrich our lives; they supply our drinking water, critical plant and animal habitat, areas of natural beauty, and outdoor recreation.

All the major elements of a watershed – its land, streams, groundwater, biological resources, and people – are interdependent. The quality of water resources in a watershed is directly dependent on the condition of that watershed and, most importantly, how well its land and water resources are managed.

Municipal Role

How and to what extent the land in your local watershed is managed has a direct effect on the quality and quantity of your water resources and streams. As you are aware, increasing impervious land cover for development decreases the amount of land available to absorb rain and runoff. This causes changes to characteristics of runoff, such as its volume and speed. Without adequate stormwater management, a greater volume of runoff is delivered to local waterways and groundwater levels decrease.

Planning for development is a factor in the quality of water resources in your local watershed. A study done by the Center for Watershed Protection determined that it takes only 10% of impervious cover in a watershed to create negative impacts on streams.

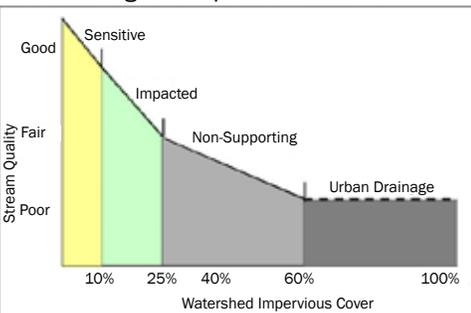


Figure 2. Impervious cover model

Courtesy of the Center for Watershed Protection

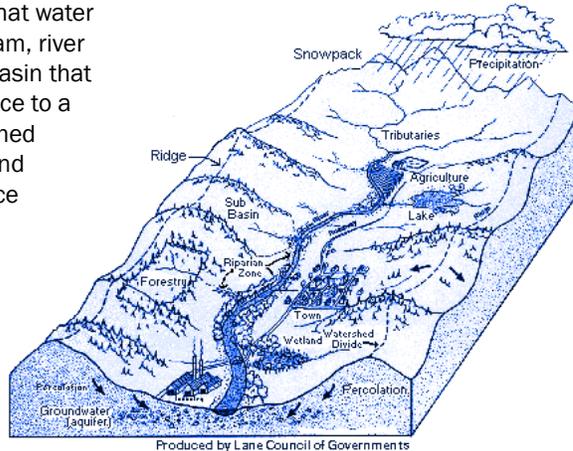


Figure 1. Watershed diagram

These impacts include lower stream depth and reduced water quality. Studies also show that at about 25% impervious cover, stream quality shifts to a poor condition (Figure 2), and can no longer support a diverse stream community - the stream essentially becomes a conduit for conveying stormwater flows. Additionally, depending on the degree of impervious cover, the annual volume of stormwater runoff can increase by two to 16 times its predevelopment rate, with proportional reduction in groundwater recharge.

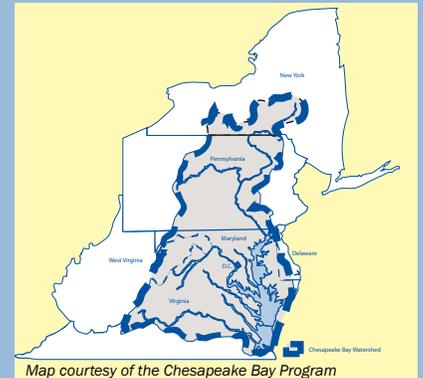
Inadequately managed stormwater runoff is the most pervasive problem in Dauphin County's watersheds. It results in:

- water pollution
- greater in-stream erosion
- increased and more severe flooding
- loss of groundwater recharge
- declines in dry weather streamflows
- degraded stream habitat
- reduced aquatic diversity
- increased resident complaints
- increased cost to infrastructure.

Adequate stormwater management practices will delay, capture, store, treat, and infiltrate stormwater. Dauphin County municipalities have the authority through land use ordinances and stormwater ordinances to adequately manage their stormwater runoff and reduce or prevent water resources problems. □

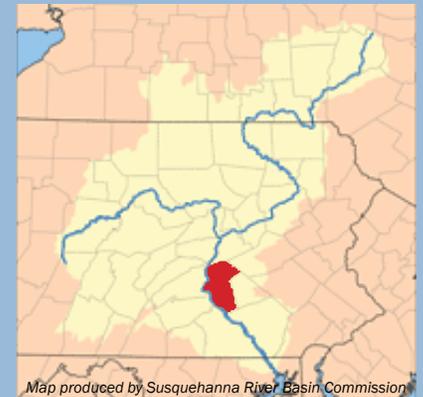
Next Issue: Groundwater

How Watersheds Overlap



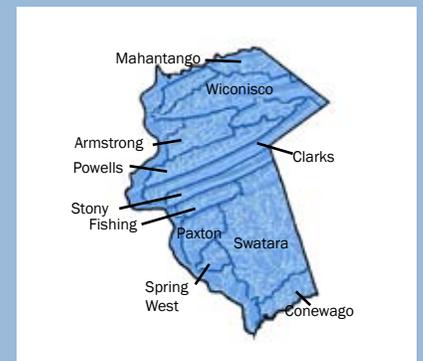
Map courtesy of the Chesapeake Bay Program

The Chesapeake Bay watershed (above) drains 64,000 square miles of land across the mid-Atlantic region.



Map produced by Susquehanna River Basin Commission

The Susquehanna River watershed (above) covers 27,500 square miles, which make up 43% of the land in the Chesapeake Bay watershed.



All Dauphin County watersheds (dark blue outline, above) drain to the Susquehanna River, and are part of the larger Susquehanna River and Chesapeake Bay watersheds.

Quiz Answers

1-False; 2-True; 3-True; 4-False; 5-True