Introduction

Increasing populations of suburban residents enjoy many amenities in Cecil County. The County provides good schools, road systems, fire and police protection, scout camps, places of worship, shopping, and easy access to Philadelphia, Baltimore, and Wilmington. Residents also enjoy natural resources in their backyards, the vast shores of the Chesapeake Bay, State parks, and the rural/agricultural areas that constitute most of the County.

From My Backyard to Our Bay illustrates the collective impact of human activity on natural resources. The way that you care for our natural resources affects your property, your neighborhood, your watershed, and our Chesapeake Bay. This guide offers tips on many environmental issues and provides a list of resources for more information. **It is the hope of the Cecil Soil Conservation District that this booklet inspires a conservation and stewardship ethic in all residents of Cecil County.**

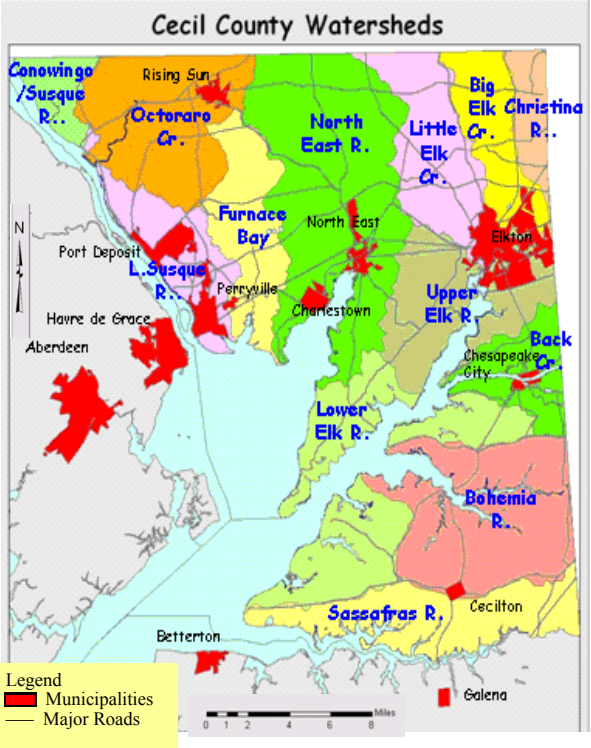
Environmental Issues In Your Community

Environmental Issues in Your Backyard

Environmental Issues In Your Community

Protecting Your Water Supply

Whether your water comes from a well drilled on your property or from the local public water system, what you do in your house and yard has an impact on water quality and quantity. This booklet includes simple actions that you can adopt in your home and yard that will help to protect both your own local groundwater supplies and regional reservoirs.



What Is A Watershed?

A watershed is all the land area that drains to a given body of water. Topography (the elevation and the contour of the land) and land use determine the velocity and direction of stormwater runoff and its eventual drainage to a surface water body. The watershed of a small stream, which may include hundreds or thousands of acres, is a sub-unit of a larger watershed of the river system that the stream flows into. Most residents of Cecil County live in a watershed that drains to a major tributary of the Chesapeake Bay or to a reservoir of the water supply system.

Where To Get Help for watershed information

- Maryland Surf Your Watershed **https://cfpub.epa.gov/surf/huc.cfm?huc_code=02060001**
- Cecil County Government Geographic Information Systems **http://cecilmaps.ccgov.org/public/**
- Cecil Soil Conservation District **http://www.cecilscd.com**; **410-398-4411 ext. 3**
- Center for Watershed Protection **http://www.cwp.org; 410-461-8323**
- Elk and Northeast River Association: **https://www.facebook.com/ENERWA**
- Friends of the Bohemia: **https://www.facebook.com/FriendsoftheBohemia/**
- Octoraro Watershed Association **http://www.theowa.org; 717-529-2132**
- Sassafras River Association **http://www.sassafrasriver.org; 717-529-2132**
- Welcome to Your Watershed **http://mda.maryland.gov/resource_conservation/Documents/watershed/index.html**
- Stroud Water Research Center: **https://www.stroudcenter.org** (610) 268-2153 Ext. 238
- Cecil County Watershed Stewards Academy: **https://extension.umd.edu/cecil-county/water-chesapeake-bay/cecil-county-watershed-stewards-academy**

Everything Flows to the Bay

The entire Chesapeake Bay Watershed encompasses 64,000 square miles, the largest watershed on the eastern seaboard. The District of Columbia and parts of including New York, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia drain to the Bay. The contribution of each source may be small, but the collective effect of millions of small contributions can create the potential for serious environmental problems for the Bay. Each of us can help minimize the potential for such problems.

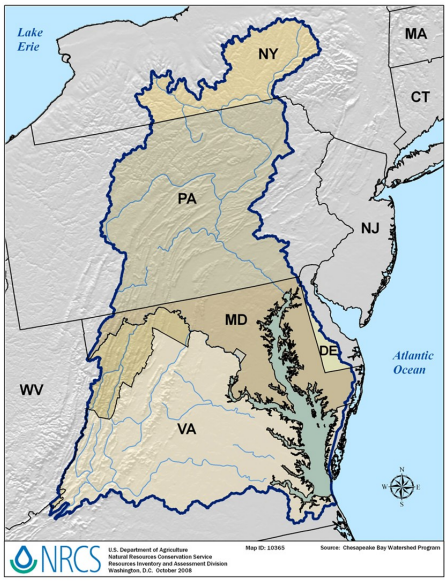


Image credit:
Chesapeake Bay Watershed
https://www.nrcs.usda.gov/Internet/FSE_MEDIA/stelprdb1046486.png

The responsibility of all landowners, large and small, is to understand the concept of living in a watershed, where **everyone's contribution has an impact**. That impact can be either positive or negative. Two common examples of attitudes that can contribute to negative impacts are: "The little bit of pollution from my property won't make a difference"; or, "Those other guys (developers, farmers, industry, etc.) are causing all the problems." In order to make a positive difference, all landowners must accept responsibility for proper and sustainable management of their land, even if it is just a small backyard.

Through the efforts of thousands of people and the expenditure of several billion dollars over the last quarter century, the condition of the Bay has begun to slowly improve from its critically degraded state. However, much more needs to be done by everyone in order to continue our progress toward a healthy, stable ecosystem. Every resident in the Chesapeake Bay watershed can do something to help.

How Do Pollutants Get In the Water?

Water bodies become polluted through two sources: point sources and non-point sources. A point source is a concentrated discharge. For example, point sources include pollution through a pipe from an industrial operation or a sewage treatment plant. A non-point source is stormwater runoff from non-specific sources such as parking lots, lawns, and agricultural fields. Over the last 30 years, many advances have been made in technology to reduce and control point source pollution. Point sources are easier to monitor because they come from identified sources. Polluted runoff, however, can result from stormwater flowing over large areas, making it substantially more difficult to locate and control the source of the pollutants picked up by runoff.

Hydrologic Cycle

Water is one of the most important natural resources on Earth. Seventy-five percent of the earth's surface is covered by water. Most of the water, however, is sea water. Sea water becomes usable, safe for drinking, and free of harmful salt and minerals through the hydrologic cycle.

The hydrologic cycle begins with the sun. Energy from the sun turns water from the oceans, rivers, and land into water vapor. Air masses move the water vapor over land, where it condenses and becomes precipitation. Rain, sleet, snow, and hail are all forms of precipitation. Some precipitation evaporates while falling toward the earth, while some is intercepted by plants, buildings, and cars and evaporates. Most of the precipitation soaks into the soil and eventually returns to rivers and oceans.

People can survive on 1 gallon of clean water per day for drinking and cooking. Each American uses approximately 1500 gallons of water per day. This number was found by dividing the total water use in the United States by the population in the United States. These numbers are based on 2000 United States Geological Survey and United States Census data, which are the most accurate and up to date available. It is important to remember that water is a natural resource. What we put into our water and how we use the water today will affect the quality and availability of water in the future. Check out NRCS, Conservation and the Water Cycle for more information on the hydrologic cycle at **http://www.wcc.nrcs.usda.gov/factpub/aib326.html.**

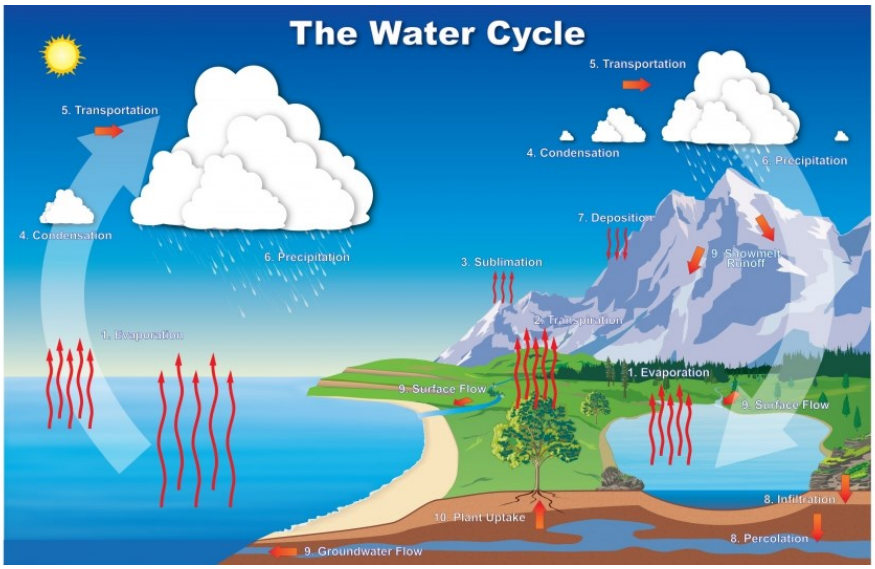


Image credit: Hydrologic Cycle
http://www.noaa.gov/resource-collections/water-cycle

U.S. Population
http://factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=01000US&-_box_head_nbr=GCT-PH1-R&-ds_name=DEC_2000_SF1_U&-format=US-9S
U.S. Water Use
http://pubs.usgs.gov/circ/2004/circ1268/htdocs/text-total.html

Living Above or Below the Fall Line

The Fall Line runs from New Jersey to Georgia. This imaginary line separates the Piedmont Plateau from the Coastal Plain. The Piedmont Plateau is a region composed of hard metamorphic rocks and forms the foot of the Appalachian Mountain chain. The Coastal Plain is made up of softer sedimentary rocks washed down from the mountains and deposited along the coast.

The Fall Line is the break in slope where the rivers flow off the plateau and down onto the plain through a series of waterfalls. The Fall Line was one of the factors in determining the location of the East Coast's major cities. The waterfalls acted both as physical barriers and logical locations for water-wheel powered industries. Cities including Baltimore, Philadelphia, Richmond, and Washington, D.C. are located along the Fall Line. Cecil County is split by the Fall Line, roughly along I-95, with the hilly woodlands of the Piedmont Plateau to the northwest and the flat farmlands and wetlands of the Coastal Plain to the southeast.

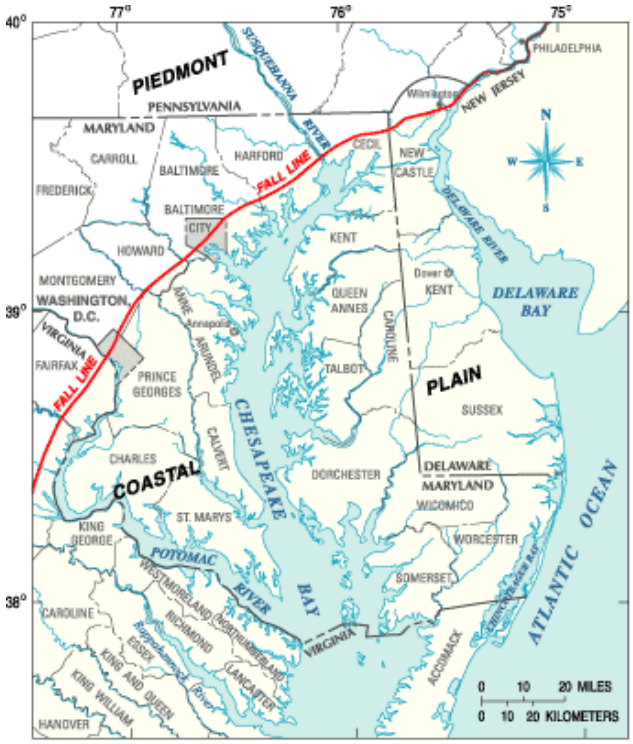


Image credit: The Fall Line https://pubs.usgs.gov/fs/2006/3009/images/

Where To Get Help for Fall Line information

- Cecil County Orthophotography, Topography, and Planimetrics Data

http://www.ccgov.org/government/land-use-development-services/gis

- Fall Line Information **http://www.mgs.md.gov/geology/**

Soil Is More Than Just Dirt

Soil is a valuable natural resource. The Cecil County Soil Survey displays maps and describes the different soil types found in the county. Each soil map unit has a unique set of characteristics relating to its structure, texture, tendency to erode, depth to bedrock and subsurface layers. This information is used to prepare charts that show each distinct soil's strengths and limitations for certain land uses such as farming, forestry, wildlife habitat, recreation, development and even home gardens.

You can make an appointment with the Cecil Soil Conservation District to find your property on an aerial photograph with the soil types superimposed. The soil descriptions list characteristics of the soil types on your property and how to use those soils to their best advantage. An online version of Cecil County's Soil Survey will soon be available for public use at **https://websoilsurvey.nrcs.usda.gov/app/**.

Soil Profile

O horizon: layers of organic matter at the surface.
A horizon: layers close to the surface, dominated by mineral particles and darkened by the accumulation of organic matter.
B horizon: accumulated materials washed down from the layers above or materials formed in place through the weathering process.
C horizon: least weathered horizon, influenced little by soil forming processes.
R horizon: bedrock

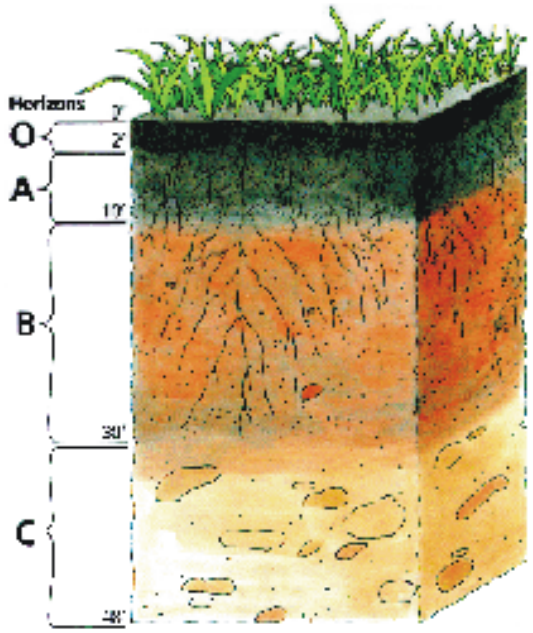


Image credit: Soil Profile
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/office/ssr7/profile/?cid=nrcs142p2_047970

Agriculture is a Major Land Use and Industry in the County

Agriculture continues to be a major land use and the primary industry in Cecil County. Cecil County's total land area is 222,284 acres. Of the total land area, eighty thousand acres are devoted to tillable production farmland. Livestock operations include beef cattle, dairy, hogs, poultry, and sheep. Common crops grown here include corn, hay, soybeans, wheat, and barley. Other agricultural operations include horse, nursery crop, mushroom, and orchard operations.

Agriculture is a preferred land use to conserve our natural resources and protect the water quality of the Bay. Farmers use many Best Management Practices to increase farm productivity, reduce soil erosion, and protect the water quality of the Bay. Best Management Practices include cover crops, buffers, diversions, grass waterways, manure storage structures, and constructed wetlands. Other agricultural methods include pest scouting, forest conservation, and the management of nutrients, crop residue, soils, and wildlife habitat.

Through state and county agricultural land preservation programs, farmers may choose to sell or donate their development rights in exchange for placing permanent restrictions on property deeds that prohibit any future residential, commercial, or industrial use of the land.

Sights, Sounds, and Smells of Farming

If you are a home owner in the rural part of the County, you will see, hear and smell things that are quite different from the more urban part of the County. Many farms have their fields near suburban neighbors. Farmers sometimes receive complaints from their new neighbors about routine agricultural operations, dust, noise, and smells. Although in some cases farmers may be willing and able to accommodate requests to modify their operations, the interface between agricultural and residential neighbors requires some cooperation on both sides in order to keep peace in the community

Most farming operations use pesticides to control weeds and insects. Farmers are required by the Maryland Department of Agriculture to have a Pesticide Applicators License, which requires them to attend training and to pass an exam before they are issued the license. After years of testing modern pesticides are approved for use by the U.S. Environmental Protection Agency (EPA). Newer generation pesticides are used in very small quantities and are more environmentally friendly.

A big part of farming involves working with conditions that people can't control, especially the weather. As soon as the soil warms up and dries out enough to plant, farmers must get their crops in the ground to take advantage of the maximum number of days in the growing season. Harvesting is also a particularly critical time, and farmers must work every available hour until the crops are harvested from the fields and processed. Part of the urgency is due to the fact that if certain crops get wet during harvest time, the crops could be completely ruined or seriously devalued. During harvest time, farmers

may be working from dawn to dusk to get their crops in. Also, during this time, harvesting equipment and wagons may need to use the highway to get from fields to barns. Patience from motorists when slow-moving farm equipment is on the road is always appreciated.

When the farm is a livestock or dairy operation, the efficient and environmentally safe disposal of manure is a major consideration. When possible, farmers use manure as organic fertilizer on crop fields, reducing their need for commercial fertilizer, which is both an economic and environmental benefit. Manure is usually stored in a facility that will protect it from runoff and therefore prevent it from being washed from the barnyard into streams. The facility provides storage, but eventually the manure is spread on the fields. Manure handling involves odors, but under normal conditions the odor from manure spreading quickly dissipates.

New homeowners may find themselves living in sight of, and perhaps downwind of, farming operations. Farming is an occupation and a tradition that is often handed down from one generation to another. Agriculture is the foundation of rural communities and farmers expect and hope to live peacefully with their neighbors.

It is critical that a process to address problems with new neighbors is conducted in a manner that allows changes on both sides for a peaceful solution. In some cases, a friendly visit to the farm to learn more about the operation can eliminate many misunderstandings.

Where To Get Help for Agricultural Information

- Cecil Soil Conservation District 105 Chesapeake Blvd. Suite B-3, Elkton, MD 21921; **http://www.cecilscd.com**; **410-398-4411, Extension 3**
- Cecil County Maryland Cooperative Extension **http://extension.umd.edu/cecil-county**; **410-996-5280**
- Cecil County Farm Bureau, 135 North Hills Drive Rising Sun, MD 21911; **410-658-2460**

http://www.mdfarmbureau.com/?s=county+sites

- USDA-Economic Research Service; **http://www.ers.usda.gov/**
- Maryland Department of Agriculture; **http://www.mda.state.md.us**; **410-841-5700**
- American Farmland Trust; **http://www.farmland.org**; **202-331-7300**

Wetlands

Wetlands cover approximately 1-2 percent of the land in Cecil County. Wetlands provide vital habitat for plants and animals, filter pollutants, control erosion, and help protect the shoreline from damaging waves. Wetland plants also act to regulate global temperature by absorbing large amounts of carbon.

America's wetlands support over 5,000 species of plant life, 190 amphibian species, and many endangered species. Some endangered species found in the wetlands of Cecil County include the Whooping Crane and the Bog Turtle. Cecil County's wetlands are also home to a Maryland Threatened Species, the Bald Eagle.

Image Credit: Bog Turtle
http://www.dnr.state.md.us/naturalresource/spring2006/turtles.asp

There are two types of wetlands, tidal wetlands (coastal) and non-tidal (inland) wetlands. Tidal wetlands are found where seawater joins freshwater along coastal areas, creating a unique ecosystem. The plants and animals found in tidal wetlands have adapted to survive in salty water and soil conditions. Non-tidal wetlands are found along the floodplains of rivers and streams and in other low-lying depressions.

The Federal Government regulates some of the activities that take place in wetlands through Section 404 of the Clean Water Act. The "Swampbusters" and the Coastal Management and Coastal Barriers Resources Act also provide protection for and further regulation of activities that take place in wetlands.

Where To Get Help for wetland information

- Cecil County Wetlands Restoration **http://www.mde.state.md.us/programs/Water/WetlandsandWaterways/Pages/index.aspx**
- Living in Harmony With Wetlands **http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/home/?cid=nrcs143_023373**
- What are Wetlands? **https://www.epa.gov/wetlands/what-wetland**
- Environmental Concern; **http://www.wetland.org**

Cecil County's Forests

More than 60 native species of trees are found in Cecil County. Cecil County's forests provide vital habitat for many of Maryland's animal species. Forests are important to the health of the Bay, acting as filters, improving water quality, reducing sedimentation, removing nutrients, and regulating stream flow during storm events. In addition, forests can be harvested sustainably for products including lumber, furniture, flooring, firewood, and pulp for paper.

There are approximately 85,000 acres of forest in Cecil County, comprising about 38 percent of the land area. Of that, about 8,000 acres of forest are located in State parks, forests, or State/Federal wildlife management areas. However, forest land is decreasing in Cecil County and Maryland.

In an effort to lessen the impact of development on forestland, the State of Maryland adopted The Forest Conservation Act in 1992. The Act regulates the cutting, clearing, or grading of forested areas that are to be developed. A Forest Conservation Plan also defines how sensitive areas will be protected during development. Since 1993, Cecil County Planning and Zoning has been implementing and enforcing the State mandated Forest Conservation Act through approved Forest Conservation Plans or exemption declarations.

Where To Get Help **for forestry information**

- Maryland Department of Natural Resources Forest Service, Cecil County Office **410-287-5777**
- Cecil County Forest Conservancy District Board; **http://www.cecilfb.sailorsite.net**
- A Citizen's Guide to the Forest Conservation Act in Maryland **http://www.cbf.org/news-media/newsroom/2017/cbf-in-the-news/maryland-should-put-actual-conservation.html**
- Maryland Department of Natural Resources Forest Service; **http://www.dnr.state.md.us/forests**; **1-877-620-8367**
- The Importance of Maryland's Forests **http://dnr.maryland.gov/forests/Documents/publications/forests_ytt.pdf**
- Cecil County Maryland Forest Conservation Regulations **http://www.ccgov.org/home/showdocument?id=1262**

Creating Living Shorelines

There are approximately 4,360 miles of shoreline within the Maryland portion of the Chesapeake Bay watershed. Thirty percent of Maryland's tidal shorelines are identified as eroding, as well as 14,063 miles of freshwater streams that lead to the Chesapeake Bay. Maryland Chesapeake Bay shorelines are eroding at an average rate of 0.6 feet per year. Although average values can be calculated, site specific conditions must be considered to design shoreline stabilization practices. Erosion along shorelines is a natural but relentless process. Many methods have been utilized to try to slow or stop the erosion process. More recently, the natural approach to shoreline stabilization has been used in many different scenarios with much success.

The natural approach is favored over the structural approach. The structural approach utilizes permanent stone or concrete structures such as bulkheads and revetments and should be used only in high energy areas with high erosion rates. In low energy erosion areas, non-structural practices can be used to slow erosion as part the natural approach. Non-structural practices include fringe marsh creation and coir log edging. Medium energy areas most commonly use hybrid projects. Natural approach hybrid projects include vegetative marsh fringes with sills, groins, or breakwaters. The goal of the natural approach is to establish or restore vegetative marsh areas. Vegetative marsh acts as a buffer that can reduce run-off pollution and act as a nutrient and sediment trap. The root system of vegetative buffers holds the shoreline sand in place, reducing the effects of erosion.

Ordinary Point during restoration (left) and after shoreline restoration (right).

Where To Get Help for shoreline information

- Cecil County Planning and Zoning should be contacted for Critical Area interpretation and permitting needs **410-996-5225**
- Chesapeake Bay Foundation; **http://www.cbf.org/document-library/cbf-publications-brochures-articles/Living_Shorelines011a.pdf**
- Cecil Soil Conservation District; **http://www.cecilscd.com**; **410-398-4411 ext. 3**
- Shore Erosion Control the Natural Approach **http://www.somdrcd.org/articles/uploads/1/Shore_Erosion_Control_1.pdf**
- Shore Erosion Control: Living Shorelines and Other Approaches **http://dnr.maryland.gov/ccs/Documents/training/lsuipa_cm.pdf**

Critical Area

The Critical Area Act was passed in 1984 in an effort to protect Maryland's most important natural resource, the Chesapeake Bay. The Bay watershed covers 64,000 square miles, where 15 million people and 2,700 species of plants and animals live and interact.

By law, the Critical Area is defined as all land within 1,000 feet of the Mean High Water Line of tidal waters or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and its tributaries. Any land-disturbing activities within the Critical Area must be carried out following specific provisions that can be found in the State-adopted Critical Area Criteria and local Critical Area Programs.

Before conducting any land-disturbing activities, be sure to contact the Cecil County Department of Public Works regarding grading permits and Cecil County Planning and Zoning concerning Critical Area questions. Critical Area violations include activities such as clearing trees, removing vegetation, and increasing impervious surfaces. These activities are violations if conducted without proper permits, variances, or management plans.

Riparian Forest Buffer within the Critical Area
along the North East River

110-foot Buffer: The Cecil County Critical Area Law requires a 110-foot Buffer along the shoreline used as a transition between upland and aquatic habitats.

Typical Critical Area Violations:

- Clearing trees and/or vegetation in the Buffer
- Construction of accessory structures (shed, pool, etc.) in the Buffer
- Disturbance of the Buffer, including; grading, stockpiling of construction materials, or dumping

Other Violations:

- Clearing or cutting trees anywhere within the Critical Area without a permit
- Building or grading without a building or grading permit

The above listed activities may not be a violation if the property owner has proper approval from the local planning and zoning office and a building and/or grading permit is displayed on the property. If you feel that the work being carried out is not in accordance with the permit, call the office that issued the permit.

Where To Get Help for Critical Area information

- Cecil County Planning and Zoning **410-996-5220**
- Cecil County Department of Public Works **410-996-5267**
- Maryland Critical Area Commission; **http://dnr.maryland.gov/criticalarea/Pages/default.aspx (410)-260-3478**
- Maryland Department of the Environment Tidal and Non-tidal Wetlands Division Call; **410-537-3837** or **410-537-3768** for violations including filling of tidal or non-tidal wetlands without a permit, pier construction without a permit, construction of structures on piers, and clearing and/or burning marsh vegetation
- Maryland Department of Natural Resources, Natural Resources Police Call **410-260-8880** for violations including exceeding the posted speed limits on waterways and abandoned boats
- Cecil County Zoning Ordinance **http://www.ccgov.org/home/showdocument?id=1172**
- Cecil County Government Geographic Information Systems (GIS) **http://cecilmaps.ccgov.org/**

Controlling Erosion

Erosion occurs when soil particles are dislodged by the force of stormwater runoff or by wind. Some soils have a tendency to erode more than others do. Any soil type that is left bare and unprotected will erode. Also, the steeper and longer the slope of the exposed land, the faster and more erosive runoff becomes. Minimizing runoff and preventing erosion reduces the movement of other pollutants from your property to the nearest stream or storm drain.

A healthy soil is porous, multi-textured and full of life. The topsoil, the upper six to eight inches, should be high in organic content. Earthworms and soil microbes help to make nutrients available to plants and keep the soil absorbent and porous, which facilitates infiltration.

Tips for Controlling Erosion

- Protect the soil with vegetation, mulch, or other materials that will intercept the force of rainfall and runoff and help prevent erosion from taking place. Such protection will also allow maximum infiltration and minimum runoff.

- In a typical suburban yard, maintaining a healthy lawn and mulching flowerbeds and gardens will not only prevent erosion, but will also more effectively retain fertilizer and pesticides as well as other potential pollutants, such as pet waste.

- Remember, vegetation is important on steep slopes, including ditches! Allow vegetation to grow in ditches to help trap eroding soil.

Where To Get Help **for runoff, erosion & soil information**

- Cecil County Government Department of Public Works Sediment and Stormwater Management Branch **410-996-5267**
- Maryland Department of the Environment, Cambridge Field Office, 410-901-4020; 407 Race Street, Cambridge, MD 21613; **http://www.mde.state.md.us**
- Cecil County Soil Conservation District, 105 Chesapeake Blvd., Suite B-3, Elkton, MD 21921; **http://www.cecilscd.com**; **410-398-4411 ext. 3**
- USDA-Natural Resources Conservation Service Soils, **410-666-1188 ext. 3**; **http://soils.usda.gov**

Storm Water Runoff Can Pollute

In a rainstorm, some rainfall will infiltrate or soak into the ground and some will become runoff. Infiltrated water will percolate through the soil and replenish the ground water that wells tap into. Runoff can cause serious pollution problems.

With every house that is built, a considerable expanse of impervious surface is added. A vacant lot can absorb rainfall over its entire surface, but when roofs, sidewalks, driveways, streets, and parking lots are installed, all of the rainfall striking these surfaces runs off and there is very little infiltration. Runoff from residential areas can quickly pick up pollutants while traveling to the nearest storm drain.

The most common pollutant is sediment, soil particles carried in suspension by the runoff, that makes "muddy" streams. When runoff slows down the sediment will drop out of suspension. Pollutants such as fertilizers or pesticides can be carried in runoff either in solution or attached to sediment particles. Other water-borne pollutants include pathogens, fecal coliform (which could come from wild animal or pet waste), gas, oil, grease, and exhaust particulates that wash off streets, and parking lots. Use caution when swimming in rivers after heavy rains.

In suburban areas, runoff eventually flows into the storm drain system, headed for drinking water reservoirs and the Bay. It is far easier and more cost-effective to solve pollution problems at the source. Once polluted runoff leaves your property, it becomes a public and much more expensive problem.

Suburban developments built since 1984 have been required to provide permanent stormwater management practices that treat runoff and slowly release it to the nearest stream. This slow release prevents the concentrated flow that results in stream bank erosion, which can cause many thousands of tons of sediment from the collapsed stream banks to be moved downstream.

Tips for Reducing Runoff

- The first and simplest rule of conservation is maximize infiltration of rainfall and minimize runoff.

- Protect soil with grasses, shrubs, trees, or mulch. This will make the soil more resistant to erosion and more likely to absorb the maximum amount of rainfall before runoff begins to occur.

Streams in Your Neighborhood Need Your Help

Streams flowing through suburban areas need special care. New expanses of impervious surfaces (roofs, parking lots, and streets) will not allow rainfall to soak into the ground. As urbanizing areas develop, natural stream channels must increase in size to handle a higher volume of stormwater runoff coming from impervious surfaces. High, turbulent waters scour stream channels and undercut the banks until the tops of the stream banks cave in and are carried away, degrading the stream with tons of sediment. Healthy stream banks should angle gently away from the stream.

Stream banks should be protected with vegetation and trees. Streamside vegetation acts as a filter for runoff flowing from upland areas towards the stream and is very effective in trapping and absorbing runoff and associated pollutants. The shade from trees and shrubs whose canopies overhang the stream keeps the water cool to protect stream-dwelling organisms. Buffers also provide excellent habitat for birds and other wildlife.

Landowners should bear in mind that any grading or significant changes within the stream channel that would affect the flow or cross-section of the channel require a State permit. This permit is granted only if the landowner can prove that the proposed change will not negatively impact the environment or the stream's ability to convey stormwater.

The best protection for streams is the establishment of a riparian buffer strip, a protected area extending beyond the stream-banks that is densely planted in grasses, shrubs, and trees. Many non-profit organizations have stream buffer planting projects. You can volunteer to help with these projects. Contact the Cecil County Soil Conservation District for more information on the available cost-share programs offered for installing buffers.

Where To Get Help for **stream information**

- Cecil Soil Conservation District **410-398-4411 ext. 3**; **http://www.cecilscd.com**
- Maryland Department of Natural Resources Streams **http://www.dnr.state.md.us/streams/**
- USDA-Natural Resources Conservation Service, Buffer Strips Common Sense Conservation; **http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/home/?cid=nrcs143_023568**

Impacts of Urbanization

In developed areas where land is covered by houses, parking lots, roads, rainwater cannot be absorbed into the ground. Instead, rainwater becomes run-off and is forced to the closest drain-pipe. The resulting run-off is discharged to the nearest body of water and is not properly treated. In areas with increased urbanization, flash-flooding is more common. The increased velocity resulting from flash-flooding erodes stream banks.

Fallen tree from the bank of the Elk Creek.

The base flow (flow not attributed to runoff of precipitation or snowmelt) of streams in more developed areas is typically lower than that in rural areas. As a result, streams in more developed areas cannot support aquatic life. There is a direct relationship between impervious cover and stream health. As the percentage of impervious cover (roads, parking lots, sidewalks, or building roofs, etc.) increases, stream health decreases.

Streams in more developed areas suffer not only from increased flash-flood velocities and low base-flow velocities, but also from increased temperatures, pollutants, and loss of buffers. Typical pollutants found in more developed areas include sediments, nitrogen, phosphorus, oil, heavy metals (zinc, copper, and lead), and pesticides. Excess nutrients (nitrogen and phosphorus) accelerate the growth of algae. The increased growth of algae reduces the oxygen available in the stream, which affects the survival rate of aquatic life dependant on dissolved oxygen.

Where To Get Help **for impacts of urbanization information**

- Chesapeake Bay Foundation; **410-269-0481**; **http://www.chesapeakebay.net/issues/development**
- Center for Watershed Protection; **410-461-8323**; **http://www.cwp.org**
- Several slideshows and other information about the impacts of urbanization are available at the Stormwater Manager's Resource Center; **http://www.stormwatercenter.net**

Sustainable Development

In an effort to reduce the impacts of urbanization the idea of sustainable development came about in the 1960s. Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The aim of sustainable development is to link the economy, the environment, and social well-being. To implement sustainable development, practices, ideologies, and policies must be changed at all levels of development from the individual to the international.

Goals of Sustainable Development

- Protect important farmland from being developed.
- Encourage the use of better stormwater management practices.
- Encourage citizens to take care of green spaces including town and state parks and neighborhood gardens.
- Help communities to set development goals for the future, keeping environmentally friendly practices in mind.

Where To Get Help **for sustainable development information**

- Cecil County Government Planning and Zoning **410-996-5220**
- Cecil County Government Development Services Division
  410-996-5265 or **410-996-5267**
- United Nations Division of Sustainable Development;
  http://sustainabledevelopment.un.org/about/dsd
- For sustainable development definitions, principles, and timelines
  visit Sustainable Development Gateway; **http://iisd.org/pdf/2011/intro_to_sd.pdf**

Recycling and Public Works

Cecil County Department of Public Works is composed of four operational branches. The four branches are the Roads, Water and Wastewater Management, Weed Division, and Solid Waste Management Divisions. The Roads Division is the largest operational division of Cecil County Public Works. The 49 member crew provides upkeep for roads, bridges, and road signs. The Roads Maintenance Division maintains county streets and drainage structures and is responsible for emergency response actions daily. The Cecil County Water and Wastewater Division is responsible for upkeep and maintenance of public water facilities and sewage treatment plants. Cecil County has four public water supply facilities and five public wastewater/sanitary sewer treatment plants. The Weed Control Division is the smallest of the four divisions of Cecil County Public Works, and is responsible for the inspection and control of noxious weeds.

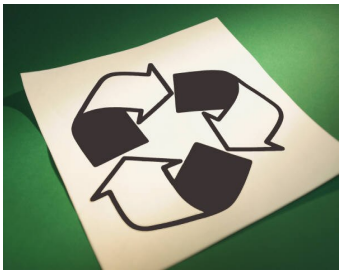
The Solid Waste Management Division in Cecil County has two satellite solid waste transfer stations and a central landfill facility. Maryland state law requires that each county up to 150,000 in population must recycle at least 15 percent of its solid waste stream. Cecil County is currently recycling 40 percent of its waste stream. As of December 1, 2006, Cecil County began Single Stream Recycling. Single Stream Recycling allows recyclables, including paper and cardboard, to be mixed into one container. All three facilities accept single stream recycling. Recyclables are shipped to Recycle America's plant in Elkridge, Maryland, where the recyclables are sorted. In May 2008, a new Homeowner's Convenience Drop-off Center is expected to open at the Central Landfill.

On April 22, 2006 the Cecil County Landfill began electronics recycling. Computers, DVD players, VCRs, printers, keyboards, and TV's under 25" are among the items that can be recycled. Electronics are picked up by Computer Donations of Baltimore, Maryland, and 100% of the donations are recycled.

Scrap metal, white goods (household appliances such as refrigerators) and Freon units can be brought to the Cecil County Central Landfill free of charge. Stemmers Run Transfer station also accepts these items on a biweekly basis. Hazardous waste can be taken to the County Landfill free of charge on designated Hazardous Waste Days, which occur once in the fall and once in the spring. **Unused medications**, paint, and cleaners are common household hazardous wastes, and these products should not be thrown away or put down the drain. Oil, antifreeze, fluorescent bulbs, and lead acid batteries can be taken to any of the three facilities Monday through Saturday during regular operating hours.

Yard waste is accepted at the Central Landfill. Yard waste is vegetative matter such as leaves, grass, brush, tree trimmings, limbs not exceeding 3" in diameter and 6' in length, Christmas trees, and certain garden and orchard materials. Contact the Central Landfill to be sure materials to be recycled meet the rules and regulations for recycling.

Recyclables Include the Following:



- Cans: all aluminum, steel, "tin", or bimetal beverage and food cans that are rinsed
- Paper: includes but is not limited to cereal boxes, frozen food boxes, shredded paper, mail, catalogs, telephone books, and magazines
- Narrow Neck Plastic Bottles and Food Containers: Look for the number inside the recycling symbol on the bottom of bottles and containers
- Glass: Rinsed unbroken glass bottles and food containers

Number and Name	Examples
1 Polyethylene Terephthalate	Water, soda, and sports drink bottles
2 High Density Polyethylene	Shampoo, dish and laundry detergent bottles
3 Polyvinyl Chloride	Milk, water jugs and soft drink bottles
4 Low Density Polyethylene	Squeezable honey and mustard bottles
5 Polypropylene	Ketchup and Medicine bottles
6 Polystyrene	Transparent aspirin and medicine bottles
7 Other Plastics	3-5 gallon reusable water and juice bottles

Where To Get Help **Public Works information**

- Cecil County Department of Public Works; **410-996-5259**; **http://www.ccgov.org/government/public-works**
- Roads Division; **410-996-6270**; **http://www.ccgov.org/government/public-works/public-works-divisions/roads-division**
- Water and Wastewater Division; **410-996-5143**; **http://www.ccgov.org/government/public-works/public-works-divisions/wastewater-division**
- Solid Waste Management Division; **410-996-6275**; **http://www.ccgov.org/government/public-works/public-works-divisions/solid-waste-management-division**
- Weed Control Division; **410-287-4638**; **http://www.ccgov.org/Home/Components/BusinessDirectory/BusinessDirectory/1089/140**

Easy Ways to Save Water

Although Cecil County is generally blessed with bountiful rainfall, it has also known severe drought periods that have had a serious impact on water supplies, both from private wells and public water systems. As the population in our county and region grows, more people vie for the same sources of water, and water conservation is evermore critical. By adopting a few simple water-saving habits, you can help extend precious water supplies and alleviate excessive burdens on septic systems and public sewer systems.

To conserve water, repair all leaks and drips around the house. A single running toilet can waste 200 gallons of water per day. Make sure there are no dripping faucets, running toilets, leaking pipes, or other unnecessary water use. Turn off the faucet while you brush your teeth, shave, lather up, etc. Installing low-flow fixtures on showerheads, sinks, and toilets will also minimize water use.

Be savvy about lawn and garden care. Adding organic matter to the soil increases water absorption, and mulching bare areas conserves moisture. Water deeply, thoroughly, and infrequently—early morning is the best time to water. Installation of drip irrigation and/or timers also reduces water use. Use nozzles on outside hoses, and wash cars with a bucket of water, using the hose only to rinse off. When washing dishes or doing laundry, maximize your water usage by running only full loads. Make your next washing machine a front loading model (they require less water).

Where To Get Help **for water conservation information**

- Maryland Cooperative Extension; http://extension.umd.edu/topics/water
- Conserve Water; http://mda.maryland.gov/resource_conservation/Documents/tip5.pdf
- USDA Natural Resources Conservation Service, Water Conservation; **410-398-4411 ext. 3**; http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?cid=nrcs143_023539
- Water Conservation Tips; **http://www.monolake.org/about/waterconservation**
- MDE Water Conservation; http://www.mde.state.md.us/programs/permits/Watermanagementpermits/Pages/waterpermits.aspx
- Listed Local Water Restrictions in Times of Drought; **http://www.mde.state.md.us/programs/Water/DroughtInformation/pages/index.aspx**

Living on Well Water

If you have a home well, you alone are responsible for maintaining the safety and quality of your drinking water supply. When your well system is suitably located, correctly installed, properly maintained, and regularly tested, you should have few problems with water quality.

Residential wells in subsurface aquifers, depending on the depth of the well, are replenished by rainwater that falls anywhere from several feet away to miles away from the location of the well. For this reason, the way you and your neighbors use the landscape can be an important factor in the quality of your water supply. Be alert to possible sources of well water contamination, such as runoff from large paved areas, faulty septic systems, leaking underground fuel tanks, landfills, industrial spills or discharges, and inappropriate use of animal wastes, fertilizers, and pesticides.

Tips for Safeguarding Well Water

- Detecting groundwater contamination requires regular testing. Test your water supply once a year for bacteria and nitrates. Consider seasonal testing if any sample shows elevated levels of contaminants. Prolonged periods of heavy rain can flush contaminants into groundwater supplies.

- At the very least, test your water any time you notice unusual odors, colors, or cloudiness or if you note an interrupted supply, such as pumping air or sediment.

Where To Get Help for well water information

- Conserve Water; **http://mda.maryland.gov/resource_conservation/Documents/tip5.pdf**
- For concerns or questions involving well water quality, or if you experience problems with your well contact the Cecil County Health Department Environmental Health Services at **410-996-5160**
- Well Maintenance Tips; **http://www.epa.state.il.us/well-water/well-maintenance-tips.html**
- Wells, Well Water, and Water Contamination; **http://extension.umd.edu/healthy-environments/healthy-and-safe-environments-home/private-wells-septic-systems**
- Wellowner; **http://www.extension.umd.edu/healthyenvironments/private-wells-septic-systems/private-well-owners-can-have-water-tested-upcoming**

Taking Care of Your Septic (Wastewater) System

In areas without public sewer service, household wastewater (from the bathroom, kitchen, and laundry) is treated in individual septic systems. A septic system has two major components: a septic tank and a drain field. Wastewater sewage flows from the house to the septic tank, which retains wastewater long enough for the heavy solids to settle to the bottom and then releases the untreated wastewater into the drain field. A solid pipe leads from the septic tank to a distribution box, where the wastewater is channeled to the drain field—one or more perforated pipes set in trenches of gravel. Here the water slowly infiltrates into the underlying soil. Dissolved or suspended wastes and bacteria in the water are trapped or absorbed by soil particles or decomposed by microorganisms.

These microorganisms perform the only treatment of the water before it percolates through the soil to the groundwater table. Under normal conditions, the microorganisms perform well, unless very toxic materials overwhelm the septic system. Microorganism performance can also be diminished if the drain field becomes saturated with stormwater.

A Best Available Technology (BAT) for septic systems is an advanced onsite sewage treatment system that will greatly reduce the amount of nitrogen emitted from a septic system. BAT units combine settling of solids, extended aeration, and recirculation to produce a greatly reduced amount of nitrogen in the effluent. The average user of a septic system produces 3.8 pounds of nitrogen per year that eventually ends up in surface waters. The anticipated load from septic systems in Maryland is estimated at 5.1 million pounds per year to the surface waters of the state.

Tips for Septic System Care

- Tanks generally need to be pumped out every two to five years, depending on use, the size of the tank and the number of people in the house. If the tank gets too full, sludge particles will flush out of the tank and clog the drain lines. The EPA recommends tanks be pumped before sludge and scum accumulations exceed 30% of the tank volume.

- Don't add "starter enzymes" or yeast to your system. Additives have not been scientifically proven to improve the performance of your system.

- Do not pour fats and oils, chlorine bleach, solvents, chemicals, pesticides, paint thinner, or auto products down the drain. These substances can kill the bacteria that make the system function.

- Do not put trash in the toilet such as paper towels, tissues, cigarette butts, disposable diapers, sanitary napkins, tampons or condoms. These items do not break down quickly and can fill the septic tank.

- Direct downspout discharges and runoff away from the septic field to avoid saturating the drain field area with excess water.

- Do not overload the system—this is the primary cause of system failures. Early morning and bedtime are peak use times in the bathroom. Run dishwashers and washing machines at other times of the day. Don't do all the family laundry in one day.

- Dense grass cover and other shallow-rooted plants are beneficial over a drain field. However, do not plant trees near a drain field because large plant roots can clog or break the pipes.

- Avoid compacting the soil over a drain field to ensure proper percolation of effluent.

- Using a garbage disposal can double the amount of solids in the tank. Instead, consider composting organic matter. See the "Composting" section for tips.

- Look into getting a BAT unit for your septic system. BAT systems are more expensive than a regular septic system but are now made more affordable to the property owner through the use of grant money collected through the Bay Restoration Fund. To find out more, contact John Boris, Project Manager at the Maryland Department of the Environment (MDE), at 410-537-3678 or by email at jboris@mde.state.md.us.

Where To Get Help **for septic system information**

- If you have a septic system problem, contact the Cecil County Health Department Environmental Heath Services at **410-996-5160**
- For Frequently Asked Questions; **http://www.cecilcountyhealth.org/ccdhxx/pdf/FAQ%20-%20Bay%20Restoration%20Fund.pdf**
- A Guide to Maintenance; **http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf**
- MDE BAT Grant; **http://textonly.mde.state.md.us/PROGRAMS/WATER/BAYRESTORATIONFUND/ONSITEDISPOSALSYSTEMS/Pages/Water/cbwrf/index.aspx**

Energy Conservation

Global warming and climate change have received an increasing amount of media coverage over the past several years, and energy conservation has become a hot topic of discussion. Over 50 percent of the United States' electricity is generated from coal. The U.S. Department of Energy, Department of Fossil Energy is researching ways to virtually eliminate sulfur, nitrogen, and mercury released during the burning of fossils fuels, ways to capture greenhouse gases, and ways to increase the efficiency of coal fueled power plants.

The use of oil and natural gas accounts for 35 percent of the energy consumed in the United States. It is likely that the use of oil, coal, and natural gas will continue to increase even with new renewable and nuclear technologies. The DOE is working to improve its many renewable energy sources. Renewable energy sources include wind, solar, geothermal, hydrogen, and biomass energies. Hydroelectric power facilities generate enough energy to supply 28 million households with electricity, which is equivalent to 500 million barrels of oil. Cecil County is home to the nation's largest privately owned hydroelectric power plant, the Conowingo Dam. The Conowingo Dam and Hydroelectric Plant is located on the Susquehanna River, bordering Cecil and Harford Counties.

Image Credit: Conowingo Dam
http://www.portdeposit.org/gallery/Scenic/Conowingo_Dam_4_9

As population and development demands increase in the United States the demand for energy increases. It is important to begin conserving energy on an individual scale. The following is a list of simple steps homeowners can take to reduce energy demand and save money.

Tips for Conserving Energy

- Turn off the lights when leaving the room.
- Keep doors, windows, and drapes closed when running the air conditioning and the drapes open when running the heat.
- If your air conditioning unit is old, consider replacing it with a new energy efficient model that could save up to 50 percent of your electricity bill.
- Air dry dishes instead of using the drying cycle on your dishwasher.
- Clean the lint filter in the clothes dryer after every load to improve circulation.
- Consider buying a laptop for your next computer upgrade, laptops use less energy than desktop computers.
- Plug appliances, like TVs and DVD players, into power strips. When the appliance is not in use turn the power strip off. Appliances still use energy when plugged in and not in use. Electricity used by appliances accounts for 20 percent of a typical American's electric bill.
- By cutting your programmable thermostat from 72 to 68 degrees for 8 hours a day (when at work), your heating bill can be cut up to 10 percent.
- Lighting accounts for 15 percent of household electricity use. Fluorescent bulbs reduce energy use by 75 percent and last ten times longer when compared to incandescent bulbs.

Where To Get Help **for energy conservation information**

- United States Department of Energy; **http://www.energy.gov**
- 53 Ways to Conserve Energy; **http://www.reupower.com/energysvc/53ways.html**
- 85 Ways to Save Money and Energy; **http://www.pepco.com/my-home/save-money-and-conserve-energy/home-energy-saving-tips/**
- Maryland Energy Administration; **http://www.energy.state.md.us/**
- For a guided tour by appointment or more information about the Conowingo Dam and Hydroelectric Plant call **410-457-5011**

Environmental Issues In Your Backyard

Backyard Stream

Healthy backyard streams need to have an established buffer zone. A buffer zone is a transition zone between the backyard and the stream. The buffer zone is vegetated to decrease the amount of pollutants that can reach a stream from a backyard. The vegetation acts as a filter.

Begin a buffer zone with a no mow area (the wider the better) that follows the stream bank. Be sure that the grass is at least three inches high. Plant shrubs and trees that need little or no fertilizers to stabilize the shoreline and reduce erosion. Use fertilizers, pesticides, and herbicides in your yard only when necessary, and be sure to follow all directions for application. To further reduce the amount of pollutants reaching the stream, store firewood, trash, and other materials away from streams.

To ensure that the quality of your backyard stream is maintained educate your neighbors on practices that will protect the stream's health. One practice could be a neighborhood trash pick-up day that will not only improve the appearance of your neighborhood, but also improve the health and water quality of your backyard stream.

Where To Get Help **for backyard stream information**

- Soil Erosion and Rainwater Runoff Harm the Chesapeake Bay; **http://mda.maryland.gov/resource_conservation/Documents/tip3.pdf**
- Cecil Soil Conservation District; **410-398-4411 ext. 3**; **http://www.cecilscd.com**
- Caring for your Backyard Stream; **http://dnr.maryland.gov/criticalarea/Documents/BackyardMakeover.pdf**
- The Backyard Stream Guide (pgs. 4-9); **http://www.conservect.org/ctrivercoastal/PDFs/BackyardStreamGuide.pdf**

Rain Barrels

By collecting rainwater from rooftops before it reaches the sewer system, the capacity of the city sewer system is increased. Rain barrels are designed to temporarily store rainwater runoff from rooftops. The runoff into rivers and streams, and eventually drinking sources can be reduced with the use of rain barrels. Less runoff results in a higher quality of water in rivers and streams.

A rain barrel is a 55 gallon drum that is connected directly to a downspout. Water is collected in the drum to be saved for later use. Water from a rain barrel can be used to water lawns and gardens and wash cars. A rain barrel must be emptied before the next storm to ensure the barrel functions properly.

Wooden Rain Barrel

Rain barrels can be wooden or plastic. This plastic, 55 gallon drum rain barrel is located at the Fair Hill Nature Center.

Where To Get Help for rain barrel information

- Building a Rain Barrel: **http://www.mde.state.md.us/programs/Water/WaterConservation/Documents/www.mde.state.md.us/assets/document/water_cons/rainbarrel.pdf**
- Maryland Department of the Environment's Building a Rain Barrel; **http://www.mde.state.md.us/programs/water/waterconservation/documents/www.mde.state.md.us/assets/document/water_cons/rainbarrel.pdf**
- Rain Barrel Construction **http://www.ecoexpress.org/video_detail.php?videoId=164&notes=1,1,1,1**

Rain Gardens

During a one-inch rainstorm, over 750 gallons of water fall on 1,200 square feet (about half the space of ground covered by the average American house). That is a larger quaintly of water rushing off into storm drains or perhaps saturated lawns.

Rain gardens are gaining popularity as a way to control stormwater runoff on residential properties. A rain garden is more than just a bed of pretty plants, properly sized and installed, a rain garden can collect and filter large quantities of water. This helps keep pollutants such as fertilizers, motor oil, and heavy metals out of streams, and it saves time and money that otherwise might have been spent watering a lawn or delicate flowers.

The difference between a traditional garden and a rain garden lies underground and in the plant selection. A rain garden is positioned slightly down-slope of a gutter in order to catch the rainwater. The ground is dug to a depth of about 6 inches and refilled about halfway with a mixture of topsoil and organic material, compost, or shredded leaves and sand. If heavy clay soils are present, other amendments such as vertical cores of gravel may be needed. For more information on the soil types in your yard, contact the Cecil Soil Conservation District at 410-398-4411, extension 3.

Image Credit :A newly installed Rain Garden at Fair Hill Nature Center
https://extension.umd.edu/sites/extension.umd.edu/files/_docs/locations/cecil_county/CecilCounty2016ImpactStatementFINAL.pdf

Rain gardens are generally best sited in sunny locations, and the plants that do best in them often prefer full to partial sun. Plants selected for rain gardens must be able to tolerate drought as well as periodic flooding. Selecting plants with large root systems is also beneficial. Luckily, many attractive native plants fit these requirements. A two to three inch layer of mulch keeps the plants moist and provides additional filtration. Before installing a rain garden can be installed, conduct an infiltration test (see page 35).

Tips for Planting a Rain Garden

- **Picking the location:** Sunny areas where the land slopes slightly away from the house are best.

- **Determining the Size**: Measure the area of roof that will drain to the downspout. The garden should be about 20% of the size of the area to be drained.

- **Keep your Distance:** Plant the rain garden at least 15 feet away from the house.

- **Don't fear the mosquitoes:** Mosquito larvae take 7 to 10 days to mature. A well-designed rain garden should drain in 3 days or less. A rain garden will also attract predators such as birds, toads, and dragonflies to keep bugs at bay.

- **Choose native plants with large root systems:** Native plants are generally best suited to the rain garden environment. Not all non-native (exotic or introduced) plants are invasive, however, many plants that have been classified as "invasive" or detrimental to the environment are still available in nurseries. Please see the "Controlling Noxious Weeds and Invasive Plants" section for more information. As in any garden, if the location is central, site tallest plants in the center and plant gradually smaller ones toward the edges. If you are only viewing one side, plant the tallest species in the back. Look for varieties that provide color throughout all seasons.

Image Credit: A simple rain garden
https://extension.umd.edu/watershed/rain-gardens

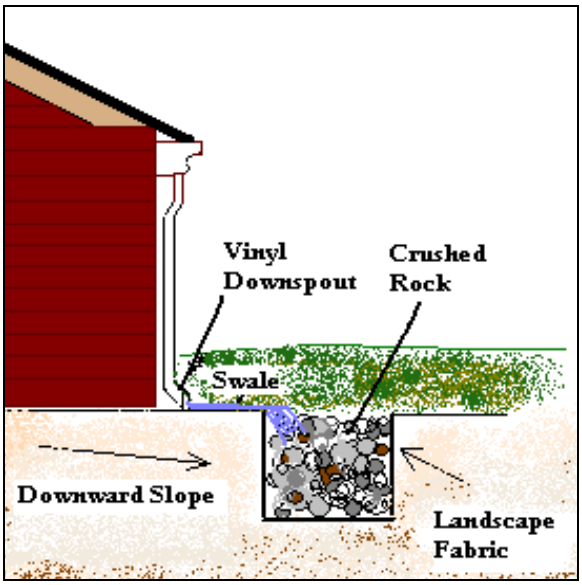
Where To Get Help **for rain garden information**

- A Rain Garden Manual for Homeowners; **http://www.greencitybluelake.org/images/land/rain-garden-manual.pdf**
- A Homeowner's Guide to Stormwater Management; **http://www.phillywatersheds.orgdocHomeowners_Guide_Stormwater_Management.pdf**
- Chesapeake Ecology Center publication, *Ecoscaping Back to the Future;* **http://www.chesapeakeecologycenter.org/**
- National Park Service publication, *Plant Invaders of the Mid-Atlantic;* **http://www.nps.gov/plants/alien/pubs/midatlantic**
- University of Maryland Extension: **https://extension.umd.edu/watershed/rain-gardens**

Dry Wells

Dry wells are designed to temporarily store rainwater until the water can infiltrate (soak into) the soil. Dry wells are designed to directly catch rainwater. The collected rainwater is allowed to soak into the soil and be filtered before entering the water system and becoming potential drinking water. Dry wells are used to store water from a downspout or in a problem area of the yard where water collects.

A dry well is a small pit filled with crushed stone. Before constructing a dry well an infiltration test must be conducted to determine if the dry well will function properly (See page 35). The dry well must be sized to ensure that the well will work correctly, see the table below for dry well sizing.



Storm Depth (in.)	Roof Area Draining to Dry Well (sq. ft.)	Depth (ft.)	Area (sq. ft.)	Example Length (ft.)	Example Width (ft.)
0.25	100	1.5	3.8	2	3
0.25	250	1.5	9.4	4	3
0.25	500	1.5	19	7	3
0.5	100	1.5	7.5	3	3
0.5	250	1.5	19	7	3
0.5	500	1.5	38	13	3
1.0	100	1.5	15.1	6	3
1.0	250	1.5	38	13	3
1.0	500	1.5	75	26	3

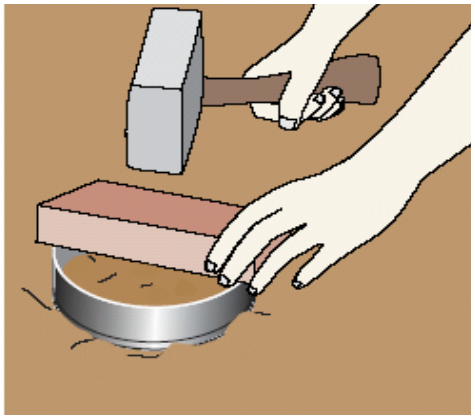
Infiltration Test

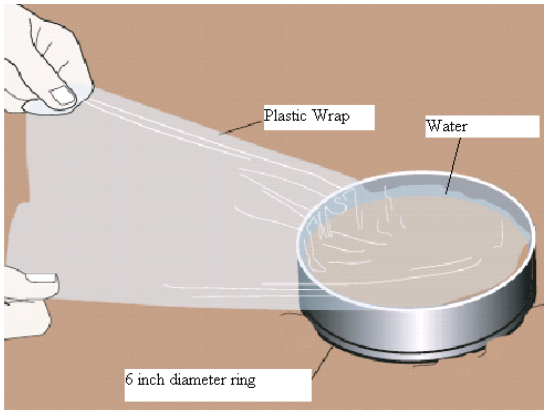
Materials:

- 6" diameter ring
- Hand sledge
- Wood block
- Plastic wrap
- 500 mL plastic bottle or graduated cylinder
- Stopwatch or timer
- Pen
- Paper

An infiltration test is used to determine how quickly water can soak in and flow through the soil. This test must be conducted before installing a rain garden or dry well. If the test is not conducted there is no way to tell if the newly installed dry well or rain garden will function properly.

1. Drive a ring 3" into the soil, where vegetation has been cleared.
2. Firm the soil around the outside edges of the ring to prevent seepage.
3. Line the soil surface inside the ring with plastic wrap.
4. Fill a bottle with 444 mL of water. Pour water over plastic wrap, remove plastic wrap, and record the time when the water has soaked into the soil and the soil surface is glistening.
5. Repeat the test 2-3 more times over the same test area. Do not move the ring. The tests should be run consecutively and last under one hour. If the test lasts more then one hour then a dry well or rain garden will not function properly.





Where To Get Help for dry wells & infiltration tests

- Step-by-Step Directions for both Dry Wells and Infiltration Testing; **http://www.mde.state.md.us/programs/Permits/WaterManagementPermits/Pages/waterpermits.aspx**
- Infiltration Test; **https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052494.pdf**

Infiltration Trench

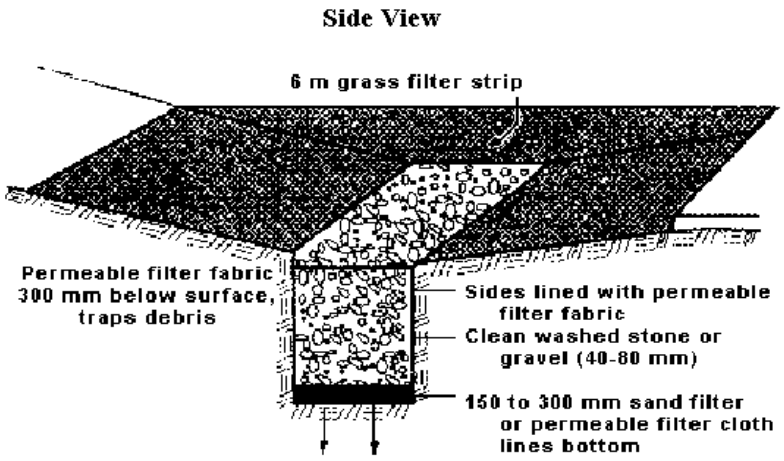


Image credit: Infiltration Trench
http://www.fhwa.dot.gov/environment/ultraurb/fig4.gif

Infiltration trenches are designed to collect and filter rainwater. When water is collected in an infiltration trench, the water is allowed to permeate into the soil rather than flowing directly into the water system. Infiltration trenches are excavated trenches that range from 3 to 12 feet deep. The trenches are backfilled with stone aggregate and lined with filter fabric. Research has shown that infiltration trenches can remove up to 90 percent of sediments, metals, coliform bacteria, and organic matter. Up to 60 percent of phosphorus and nitrogen, and 70-80 percent of biochemical oxygen demand can be removed by infiltration trenches.

Infiltration trenches function in cold weather only when surface icing is avoided. Instillation of infiltration trenches should be in areas where levels of sediments and hydrocarbons (grease and oil) in runoff are low. When sediment levels are high, infiltration trenches can become clogged and stop functioning properly. Before installing an infiltration trench, be sure that the groundwater will not become contaminated. Do not install a trench where hazardous materials or chemicals are stored.

Where To Get Help for infiltration trench information

- Environmental Protection Agency, Infiltration Trenches;

(Search **https://nepis.epa.gov** site for "Storm Water Technology Fact Sheet Infiltration Trench")

- Infiltration Trench; **http://www.michigan.gov/documents/deq/deq-wb-nps-it_250882_7.pdf**

Pervious Pavement

Impervious surfaces, such as parking lots, collect pollutants in higher concentrations than the surrounding surfaces. These pollutants include oil and anti-freeze and are easily washed into rivers and streams by rainwater. The EPA Storm Water Phase II Final Rule provides programs and practices to regulate the concentrations of pollutants that can be found in waterways.

There are two ways to reduce the pollutant levels found in waterways. The amount of runoff to the waterways can be reduced, or the amount of pollutants in the runoff can be reduced. One method to reduce the pollutants found on surfaces such as parking lots is to use pervious (porous) pavement.

Pervious pavement reduces the ability of pollutants to build up. Pervious pavement uses the same materials as conventional concrete, but the fine aggregate material found in conventional concrete is removed. Upon curing, water is allowed to flow through the porous pavement. Since water can flow through the porous pavement pollutants cannot build-up. Instead, the pollutants move from the surface through the pervious pavement and into the soil. The soil acts as a filter, ridding the water of many harmful pollutants before the water travels to streams and rivers.

Pervious pavement requires a little maintenance. The pervious pavement must be cleared of debris that can clog the pores and reduce the ability of water to infiltrate. Soil will support pervious pavement if the soil can support a septic tank. Pervious pavement can be used to construct low-volume pavements, residential roads and driveways, tennis courts, swimming pool decks, patios, and parking lots.

Where To Get Help for pervious pavement information

- EPA Storm Water Technology Fact Sheet Porous Pavement; (Search **https://nepis.epa.gov** site for "Storm Water Technology Fact Sheet Porous Pavement")
- Pervious Concrete; **http://www.perviouspavement.org**

Tree Planting

Trees can provide more than just shade. Trees are planted for a number of reasons including aesthetic purposes, increased property value, and habitat restoration. The shade from trees planted next to a house can reduce summer cooling costs by up to 40 percent.

Image credit:
https://www.arborday.org/

Many homeowners plant trees because trees are a way to beautify property. A well treed lot can be sold for 20 to 40 percent more than a bare lot. Trees are not only important aesthetically, but are also important for habitat restoration. Many species depend on trees for a place to live and feed. As part of habitat restoration, trees act as a buffer. Trees and other vegetation filter out pollutants before the pollutants can reach a nearby body of water.

Tips for Planting Trees

- Determine the location and purpose for planting the tree. This will aid you in deciding the species of tree to plant.
- If planting for aesthetic purposes, choose species that bloom throughout the year or have interesting foliage or bark.
- When restoring habitat, plant native tree species.

Where To Get Help for tree planting

- Step-by-Step Tree Planting Tips; **http://www.phillywatersheds.org/tree-planting-tips**
- Native Trees and Shrubs; **http://dnr.maryland.gov/criticalarea/Pages/default.aspx**
- Pesticide Alternatives: **http://mda.maryland.gov/resource_conservation/**

Wildflower Meadows

Wildflower meadows can be useful in storm water management, increasing infiltration, water quality treatment, flood control, and habitat creation. Wildflower meadows require less water and fertilizers than lawns, saving time and money.

Proper site selection is important. The site should have 6 hours of sunlight per day and be dry and flat. Previously cultivated land like a garden is best, but a lawn can also be transformed into a wildflower meadow. The site should be prepared by removing vegetation. The preparation is much like the preparation for a vegetable garden.

Plant selection must also be given careful consideration. The selected species must be well suited to survive in the conditions present (moisture and temperature needs, etc.). A diversity of species is important, and the species should consist of native plants currently found in the area. A mix of graminoides (grasses) and forbs (flowering meadow wildflowers) is recommended.

Planting should take place in spring, early summer, or early fall. Planting in spring will favor grasses, and planting in fall will favor forbs. The newly planted meadow should be watered like a newly planted lawn for the first 1 to 2 months. For 1 year after planting, do not allow weeds to reach more than one foot before cutting to 4-6 inches. In the second year, cut back to 1 foot since the plants will be larger. For the following years, mow close to the ground in late fall or early spring.

Tips for Planting Wildflower Meadows

- For the first two years, weeds will grow faster than wildflowers. Do not pull weeds; this may damage the wildflower seedlings. Weeds can be smothered with black plastic prior to planting.
- To ensure a heavy bloom, sow seeds at a rate higher than recommended.
- Do not use herbicides. The drift from herbicides may kill large patches of wildflowers along with weeds.

Where To Get Help for wildflower meadow information

- How to Create Your Own Wildflower Meadow;
  http://www.gardenguides.com/how-to/tipstechniques/flowers/wildflowermeadow.asp
- Creating a Wild Backyard-Wildflower Meadows;
  http://www.dnr.state.md.us/wildlife/Pages/habitat/

Planters

Consider the use of planters to reduce impervious surface. The construction of houses, driveways, sidewalks, and roads all contribute to the increase of impervious surfaces and greatly reduce the amount of rainwater that can be absorbed by the soil. The use of planters allows rainwater to be absorbed that would otherwise become unfiltered runoff.

Planters can range from large concrete planters to small plastic pots. Planters can be placed on sidewalks, in backyards, on rooftops, or along the perimeter of a home to catch rooftop runoff. Planters can contain any variety of plants ranging from flowers to small shrubs and trees. All plants chosen should be native species that are both drought resistant and tolerant of large quantities of water.

Where To Get Help for planter information

- Growing Hanging Plants; **http://www.clemson.edu/extension/hgic/plants/landscape/flowers/hgic1154.html**
- For suggestions and tips about planters visit **http://www.hgtv.com** or **http://www.diynetwork.com**

Integrated Pest Management

The goal of Integrated Pest Management (IPM) is to control pests in the most environmentally friendly, cost effective, and efficient method possible. IPM can be used in agricultural and non-agricultural settings including homes, gardens, or workplaces.

When using IPM pesticides are used in a limited capacity in conjunction with biological practices to control the pests. Biological practices include using pheromones, trapping devices, and natural predators. One of the most important steps to IPM is to identify if control of the pests (weeds, insects, etc.) is necessary, since not all pests are damaging.

For tips on controlling invasive species visit: IPM ***http://www.uky.edu/Ag/Horticulture/landipm/ipm/intro.htm***

Before using pesticides around the house:

- Remove food, water, and shelter sources used by the pest.
- Remove pet food and water over night.
- Caulk cracks and crevices around cabinets or baseboards.
- Fix leaky plumbing.

Before using pesticides in the garden:

- Remove all breeding sites (standing water, etc.) outdoors.
- Plant species that are resistant to pest invasion and disease.
- Be sure the garden has good drainage.
- Try to rotate your crop locations every year. Pests that survive the winter will be less likely to invade if the crops are in a different location.
- Mulch the garden with leaves, hay, grass clippings, or shredded bark. DO NOT use newspaper, since it could contain toxic metals including lead and mercury.

Where To Get Help for IPM information

- Maryland Cooperative Extension Cecil County Office; **410-996-5280**; **https://extension.umd.edu/cecil-county**
- Integrated Pest Management in Schools; **https://www.epa.gov/pesticides**
- EPA, Pesticides Fact Sheets; **http://www.epa.gov/pesticides/factsheets/index.htm**
- A Citizen's Guide to Pest Control and Pesticide Safety; **https://www.epa.gov/safepestcontrol/citizens-guide-pest-control-and-pesticide-safety**

Invasive Plants

Weeds are generally defined as any plants growing where they were not planted. However, some weeds are so persistent, destructive, and difficult to eradicate that they have received the designation of being noxious. Maryland has a noxious weed law that requires landowners to control Canada Thistle, Johnsongrass, Shattercane, and Bull Thistle, Plumeless Thistle, Musk Thistle on private property. Both the seed and the root system of these weeds must be managed for effective control by mowing, cultivating, or treating with approved herbicide. For information on the identification or control of these plants, contact University of Maryland Cooperative Extension, MarylandDepartment of Agriculture, or Cecil County Weed Control.

Other plants that are widely recognized to out-compete native plants and quickly take over natural areas, but have not been designated as noxious weeds are considered invasive plants. Non-native plants come from other countries or habitats and are introduced into new landscapes, where they quickly replace native species. Invasive plants are often spread by windborne seeds or by birds and other animals. These plants can overrun nearby wetlands, meadows, or forests, crowding out native plants that provide important habitat for birds and other wildlife.

Many common invasive plants are used in landscaping. Before you purchase a plant, be sure it is not a listed invasive plant. Some of these plants include Phragmites, Purple Loosestrife, Miscanthus, Winged Euonymus, Bradford or Callery Pear, English Ivy, Vinca, Periwinkle, and Japanese Stilt Grass. Assistance is available for the removal of many invasive species. For more information call Cecil County Weed Control, 410-287-4638.

Invasive Plants

Noxious Weeds

Image Credit: Global Invasive Species Database
http://www.issg.org/database/welcome

Where To Get Help for weed and invasive plant control information

- Maryland Cooperative Extension Home and Garden Information Center Phone Hotline; **1-800-342-2507; https://extension.umd.edu/hgic**
- Cecil County Weed Control; **410-287-4638**; **http://www.ccgov.org/government/public-works/public-works-divisions/roads-division**
- National Invasive Species Information Center; **http://www.invasivespeciesinfo.gov/plants/databases.shtml**
- Maryland Noxious Weed Identification; **http://www.mda.maryland.gov/plants-pests/Pages/noxious_weeds_in_md.aspx**
- Maryland Invasive Species Council; **http://www.mdinvasivesp.org/index.html**
- Center for Invasive Plant Management; **http://www.weedcenter.org**

Inviting Wildlife to Your Backyard

Even a suburban backyard can attract a surprising number of creatures including birds, butterflies and beneficial insects. Trees, shrubs, and other plants provide both food and shelter for wildlife. The types of plants used for food and cover help determine the wildlife species that will be drawn to your backyard.

There may be some wildlife you don't want to attract to your backyard such as deer. Deer populations are the largest in history and are adapting to areas heavily populated by humans. Although they are exciting to see, they can easily strip your shrubs and trees and cause other environmental damage as well. When you purchase nursery stock, check with your salesperson to make sure that the species you are interested in are not "deer candy."

Putting up birdhouses and bird feeders can invite an array of colorful birds as regular visitors. However, bird feeders, besides attracting the species you want, may also attract species you don't want, such as English Sparrows, Starlings, Grackles, Crows and squirrels. Choose a location for birdhouses that birds will find appealing and secure, usually away from areas of frequent human activity.

This birdhouse is located at the CSCD constructed wetland at North East Middle School. Birdhouses like this one can be installed in your backyard to attract your favorite bird species.

The birdhouse should be specifically designed for the bird species you wish to attract. The size of the entry hole is critical to accommodate the desired bird but keep out other larger species that might destroy eggs and young. Cats have a detrimental effect on the population of birds. Keeping cats inside instead of outside, may help attract birds to your backyard. Supply clean, fresh water nearby with a birdbath, saucer, or pond. All wildlife needs water.

Butterflies are attracted to a large variety of plants that produce nectar. Caterpillars, the larval stage of butterflies, need nourishment from different plants. Bees play a critical role in healthy wild plant communities (as well as gardens and agriculture) through pollination. About 30 percent of our diet is food produced through the pollination of fruits and vegetables. Use native plants in your garden to support pollinating insects as well as butterflies and birds. These plants provide the right food or nectar at the right time, and are generally well adapted to our local climate when planted in the right place.

Backyard ponds can be homes for fish, frogs, dragonflies, birds, butterflies, and many other creatures. A water feature is very effective in drawing wildlife to your backyard. Ponds and the landscaping around the ponds create an ecosystem of their own that is not only excellent habitat for wild creatures, but also a satisfying and relaxing place for you and your family. Research the correct location and construction of a small backyard pond and the equipment and plants that will keep it functioning properly. For a larger pond, engineered plans and permits will be required.

All wildlife is very vulnerable to the inappropriate use of many pesticides and other chemicals. Probably the single best thing a landowner can do for wildlife is to limit the use of chemicals and pesticides to an as needed basis and never exceed or ignore label instructions

Where To Get Help **for attracting wildlife and solving wildlife problems**

- Cecil Soil Conservation District; **410-398-4411 ext. 3**; **http://www.cecilscd.com**
- Maryland Department of Natural Resources Wildlife Problems; **http://dnr.maryland.gov/Wildlife/Pages/plants_wildlife/wildlifeproblems.aspx**
- National Wildlife Federation; **1-800-822-9919**; **http://www.nwf.org/backyard**
- USDA-Natural Resources Conservation Service, Backyard Conservation **https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/home/?cid=nrcs143_023574**

Composting and Yard Waste

In 2003, the EPA estimated that each person in the U.S. contributes 4.5 pounds of garbage (municipal solid waste) daily. That equals 1,642 pounds of garbage per person per year! Much of this waste is organic and could degrade naturally if composted in aerobic conditions, saving space in landfills and reducing greenhouse gasses. Composted organic material can also be used to improve soil for lawns and gardens, further reducing the need for fertilizers. Start reaping the benefits by setting up a backyard compost pile.

Tips for Composting

- There are many different ways to compost: the bin system, tumblers, trench composting, sheet composting, and even vermicomposting (using worms to break down material). Some methods are more simple than others.

- Add kitchen scraps from vegetables, fruits, and coffee to a compost pile. Yard waste such as leaves, lawn clippings, and other materials are also great for composting.

- Do not add pet waste, grease, meat, or dairy products to a compost pile. These items contain bacteria that may be very harmful.

Where To Get Help for composting information

- Composting; **http://www.mda.state.md.us/resource_conservation/Pages/environmental_education.aspx**
- How to Make a Compost, a Composting Guide; **http://www.compostguide.com**
- Tips and Techniques for Composting; **http://www.gardenguides.com/how-to/tipstechniques/planning/compost.asp**
- Composting in Your Backyard; **http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?cid=nrcs143_023537**

Pet Waste

Animal waste can easily be carried untreated by rainwater, untreated to the nearest stream or drainpipe. Pet waste contains many harmful bacteria. It is important to keep these bacteria out of drinking water sources and off the lawn. Disease causing bacteria can be harmful to your pet and your family. Pet waste can act as a fertilizer in the water system and promote the unhealthy growth of aquatic plants, including algae. The increased abundance of aquatic plant life can rob other aquatic life of much needed oxygen.

When walking the dog, take a plastic bag along. Pick up the pet waste and flush it down the toilet, where it will be properly treated. If flushing is not an option, dig a small trench in the yard, layer pet waste with leaves, grass clippings, and dirt. Do not put pet waste down the storm drain!

Where To Get Help for pet waste information

- Pet Waste and Water Quality;
  http://extension.umd.edu/sites/default/files/_docs/programs/bay-wise/FS703-PetWasteAndWaterQuality.pdf
- Are You Polluting? Pet Waste and Water Quality;

http://clean-water.uwex.edu/pubs/pdf/pet.pdf

- Five Important Reasons to Clean Up Pet Waste;
  http://www.drsfostersmith.com/Articles/clean_up_waste.cfm

Keeping a Healthy Lawn

In the pursuit of maintaining green, weed-free lawns, some homeowners may over-apply fertilizer to encourage vigorous growth and pesticides to control weeds, insects, and diseases. According to the Maryland Department of Agriculture, there are over 685,000 acres of residential lawns statewide. Of that, 675,000 acres surround single-family homes and the remaining 10,000 acres are townhouse yards. If everyone over-fertilizes their lawn by just one pound, a huge amount of excess nutrients ends up in groundwater, streams, rivers, reservoirs and the Chesapeake Bay. Excessive nutrients cause serious water quality problems.

Soil fertility should be tested before seeding a new lawn and every 3 years for an established lawn to determine the amount of fertilizer and lime needed. Do-It-Yourself kits can be used, or for more accurate results contact a local soil testing laboratory.

Before establishing a lawn, consider whether turf grass is suitable. Heavily shaded or severely sloped areas may not provide the conditions needed for turf, leading to erosion, pest, and nutritional problems. Cecil County is located in planting zone 7. Fescue and zoysia are drought resistant grasses that are recommended for Cecil County. Warm-season grasses turn brown when temperatures get cold and will turn green again when temperatures reach 70 degrees. Cool-season grasses tend to turn brown in drought conditions, but turn green again when water is available.

Fertilizer-free and pesticide-free lawns are the best choice for the environment. Both time and money can be saved by reducing the frequency of fertilizing and applying pesticides. When fertilizers and pesticides are needed, experts recommend application for cool season lawns in early fall. Slow release fertilizers and low or no phosphorus fertilizers are optimal to promote a healthy environment. New lawns may require large amounts of phosphorus, but once established, require much less. Be sure not to over fertilize the lawn.

Lawn Care Tips

- Ground covers or planting islands (areas with groupings of trees, shrubs and flowers) may be better suited for problem areas than turf.

- It is better to spread two or three smaller applications of fertilizers spaced a month apart (early September, October, and November), than one larger application.

- Do not apply fertilizer to frozen ground or dormant turf (especially when cool season grasses turn brown during summer droughts).

- Apply only the recommended amounts of fertilizer. Use no more than one pound of nitrogen per 1,000 square feet of lawn per application. Keep fertilizer off of paved areas by sweeping it back onto the grass.

- Mow at an appropriate height to maintain a healthy lawn. Mowing too short may reduce root and stem development and encourage weed problems. The proper mowing height helps to reduce weeds by as much as 50-80%. Maintaining the grass height at 2 ½ inches, or taller, helps keep the soil cool and provides drought protection.

- Using a mulching blade on the lawn mower will keep the grass clippings on the lawn, which helps naturally fertilize the lawn.

- If you must water your lawn, water slowly in order to wet the soil to a depth of 4"-6". Prevent runoff from leaving your property. Early morning is the best time for watering. Light, frequent watering or watering in the evening can actually damage your lawn.

Where To Get Help for lawn care information

- Maryland Cooperative Extension Lawn and Landscaping; **http://extension.umd.edu/sites/default/files/_docs/programs/bay-wise/FS702-LawnsAndChesapeakeBay.pdf**
- Use Fertilizers Wisely; **http://www.mda.maryland.gov/resource_conservation/Documents/Tip2.pdf**
- Maryland Cooperative Extension Cecil County Office; **410-996-5280**; **https://extension.umd.edu/cecil-county**
- USDA Planting Zones for Maryland; **http://www.usna.usda.gov/Hardzone/hzm-ne1.html**
- Chesapeake Bay Foundation: Bay Friendly Lawn Care; **http://chesapeakestormwater.net/be-bay-friendly/bay-friendly-lawn-care/**
- Choosing a Lawn Care Service That's Right for You and the Chesapeake Bay; **http://www.mda.maryland.gov/resource_conservation/Documents/LawnCareService.pdf**

Keeping Water Away From Your House and Basement

Drainage of surface and subsurface water is an important concern for every homeowner. One key factor in proper drainage is the permeability of the soil on your property— the ability of the soil to transmit water or air. For example, soils that are high in clay content usually have low permeability. Another factor in good drainage is proper grading, so that gentle slopes convey runoff away from the house and basement, and water is not left standing against walls or causing water pressure to build up under the basement floor.

Wet basements can be the result of water passing through cracks in the basement walls, through the joint between the basement wall and the floor, or through the basement window well. Flowerbeds and foundation plantings may hold water against the walls.

Check the exterior grading to make sure that rainwater will flow away from the house. When re-grading, avoid placing soil against wood or siding. Grading in excess of 5,000 square feet requires a County permit. For more information, contact the Cecil County Government Department of Planning and Zoning at 410-996-5220 or **http://www.ccgov.org/government/land-use-development-services/planning-zoning-division**

Image Credit: Downspout Products
http://www.gutterworks.com/downspoutproducts.html

Inspect all areas where the downspouts from the gutters around the house discharge onto the ground. Twice a year, clean out all gutters and down spouts to prevent overflows that will drip water too near the foundation. Because the flow from a downspout will be forceful in a storm, make sure that the area where flow drains across the ground is adequately protected with either sturdy vegetation or even stone or gravel in extreme situations.

Usually, a splash block of concrete or plastic placed directly under the downspout outfall will absorb the initial force of the water gushing from the downspout. This will help disperse the water's erosive energy and move it away from the foundation.

In some situations, due to poorly drained soils in low-lying areas or difficult terrain, the only solution may be an underground drainage system. Such a system involves digging a ditch about 2-3 feet deep from the wet area to an adequate outfall down the slope (where the drainage pipe emerges from the ground). The ditch is first lined with "landscape fabric" (material available at garden centers that will allow water but not soil particles to pass through). Then a layer of 3 to 4 inches of gravel is installed, followed by a length of perforated, corrugated plastic drainage pipe that is covered with more gravel. After covering the gravel with landscape fabric, the top 6 inches or so is filled with soil and sod.

The new drainage system will draw water from the surface down to the level of the drainage pipe. The landscape fabric prevents sediment from filling in the void spaces in the gravel core and retarding water flow. Place mesh or screen across the end of the drainage pipe at the outfall to prevent animals from entering. Make sure that the area below the outfall of the system is adequately protected with vegetation or gravel to prevent the formation of a gully.

To help prevent surface water from standing in your yard, maintain a slight slope that drains toward a swale (an earthen channel) or storm drain. When you concentrate runoff erosive potential increases, so maintaining a stand of sturdy vegetation in the swale to prevent formation of a gully is important.

Where To Get Help **for drainage information**

- USDA Natural Resources Conservation Service, Drainage Around Your Home; **http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_034353.pdf**
  410-398-4411 ext. 3
- Landscapes that Help the Chesapeake Bay; **http://extension.umd.edu/sites/default/files/_docs/programs/bay-wise/FS701-LandscapesThatHelpChesapeakeBay.pdf**
- New York Times, Home and Garden; **http://landscaping.about.com/b/2004/03/18/drainage-problems-and-soil-grading.htm**

Disposing of Household Hazardous Waste

The average household contains between three and ten gallons of materials that are hazardous to human health or to the environment. The improper disposal of household hazardous wastes can cause problems for the entire community. Wastes can be explosive or highly flammable. Sewers have exploded and garbage trucks have burned because people have carelessly discarded flammable or reactive wastes.

Household hazardous wastes can leak from landfills and contaminate groundwater and surface water or can enter the air we breathe through emissions from landfills and incinerators. Some wastes are poisonous to humans or wildlife, while others can cause cancer, birth defects, or other serious medical problems. Any water that flows into storm drains flows untreated into the Chesapeake Bay or one of its tributaries. Used oil, antifreeze, or other chemicals should not be dumped into storm drains.

It is important to learn about the products you use in your home, garden, and workshop and how to dispose of these products when they are no longer needed. Hazardous wastes are any materials that are flammable, explosive, toxic, corrosive, or irritating. Unused medication is a form of hazardous waste and should not be thrown in the trash. Other common household hazardous wastes include, paint, cleaning supplies, and automobile fluids. Use the County's hazardous waste recycling and disposal facilities to dispose of hazardous waste.

To reduce the amount of hazardous materials you use, find less hazardous substitutes, do not buy more than you need, and follow all directions on the packaging. Store your waste materials in their original containers until the waste can be disposed of properly to prevent leaking.

Where To Get Help **for hazardous waste information**

- Be sure to check out the next Cecil County Hazardous Waste Disposal Day; **http://www.ccgov.org/Home/Components/Calendar/Event/2460/20**
- Waste Reduction; **http://mgaleg.maryland.gov/Pubs/LegisLegal/2017-Waste-Management.pdf**
- Household Hazardous Waste; **http://www.epa.gov/epawaste/index.htm**
- Hazardous Waste; **https://nerc.org/state-information/delaware/overview**

Winter Deicing

When snow and ice pile up, salt is commonly used to speed up the melting process. However, salt can be harmful to the environment in high concentrations. Excess salt can destroy the structure of soil, causing it to erode more easily. High concentrations of salt can kill species of plants and aquatic life that are not tolerant of high concentrations. Salt can also leech through the soil, contaminating groundwater that becomes drinking water.

There are several alternatives to reduce that amount of salt needed for deicing. Alternatives include potassium chloride, calcium chloride, magnesium chloride, corn processing by-products, and calcium magnesium acetate (CMA). These afore mentioned alternatives can be found under several brand names, so be sure to read the labels.

Any alternative can be harmful when over applied. All of the alternatives are most effective when used in combination with salt. CMA is the most environmentally friendly alternative to salt. However, it is the most expensive, and effectiveness decreases when temperatures drop below 26 degrees Fahrenheit.

To reduce salting needs:

- Shovel sidewalks and driveways to reduce the ability of ice to build up.
- Take the temperature into consideration when determining which deicer will be most effective.
- Only apply deicers where necessary—on the most high traffic areas.
- Use sand for traction to reduce the amount of salt needed.

Where To Get Help for winter de-icing information

- Melting Ice Safely; **http://extension.umd.edu/sites/default/files/_docs/programs/bay-wise/FS707-MeltingIceSafely.pdf**
- Using Deicers Properly; **http://www.michigan.gov/documents/ch2-deice_51438_7.pdf**
- Winter Weather, Chemical Deicers, and the Chesapeake Bay; **https://code250.gsfc.nasa.gov/docs/Winter%20Weather,%20Chemical%20Deicers%20and%20the%20Chesapeake%20Bay.pdf**

Maintaining Your Vehicle

Vehicle maintenance is an important and easy way to reduce the amount of oil, heavy metals, and other toxic chemicals reaching our drinking water. After oil has leaked from a car onto a driveway, rainwater washes it into the street, toward the nearest drainage pipe. This water then flows to the nearest stream or river. It is estimated that 180 million gallons of oil are disposed of improperly each year. A single quart of oil can contaminate 250,000 gallons of drinking water.

Image credit: Chesapeake Bay Drainage
http://www.bayactionplan.com/stormwater-management/

Check your vehicle regularly for oil leaks and drips. If leaks or drips are found, fix them as quickly as possible. Use ground cloths or drip pans when leaks are found, while changing the oil, or when working on the engine. If a spill occurs while changing the oil or working on the engine, clean up the spills immediately and properly dispose of the clean up materials.

Collect used oil in containers with tight fitting lids (i.e. plastic jugs). Be sure to recycle the oil in the proper locations. Auto supply stores, car care centers, and gas stations usually accept used oil. Do not mix waste oil with gasoline, solvents, or other engine fluids. If mixed the oil will become contaminated and will not be able to be reused. Motor oil, antifreeze, transmission fluid, or other engine fluids should never be dumped onto roads, down the storm drain or catch basin, onto the ground, or into a ditch.

Image credit: Drains to Our Streams
https://www.fairfaxcounty.gov/nvswcd/stormdrained_flier.pdf

Where To Get Help for vehicle maintenance information

- Vehicle Maintenance;
  http://www.dmv.org/how-to-guides/vehicle-maintenance.php
- Top 10 Car Care Tips;

https://www.kbb.com/car-advice/articles/top-ten-car-care-tips/

- Vehicle Maintenance Tips;
  http://www.ase.org/resources/fuel-efficiency-top-tips-save-gas-and-money

Impacts of Recreation on Natural Resources

As the demand for recreational opportunities rises, population increases, and available undeveloped areas shrink, the impacts of recreation on natural resources become more pronounced. In order to preserve the value of natural areas it is critical to evaluate the footprint that various forms of recreation leave on the environment. Areas used for recreational activities must be managed to minimize such impacts.

Trail widening has occurred where trail users have tried to avoid muddy places in the trail. When using trails hike or bike through muddy areas to prevent widening of the trail.

Signs like this one located at The Fair Hill Nature Center should be followed at all times to ensure minimal impacts in environmentally sensitive areas.

Recreational activities include hunting, fishing, hiking, backpacking, skiing, mountain biking, rock climbing, rafting and kayaking, bird watching, off-road vehicular travel, and cultural observations and explorations. Some recreational activities have more of an impact on the surrounding environment than others. Potential impacts include changes in water quality and surface flow, compaction and erosion of soil, non-native species introduction, and air and water pollution.

Many public recreation areas post information to help people apply responsible recreational practices. Some recreational clubs provide literature to ensure participants enjoy their favorite activities in a sustainable manner. The answers to many questions regarding responsible recreational practices can be answered using website sources like the ones listed below.

Where To Get Help for impacts of recreation on natural resources

- Recreational Impacts on Natural Resources; **http://www.ccgov.org/home/showdocument?id=338**
- Recreational Activities in the Chesapeake Bay Watershed; **https://www.nps.gov/chba/planyourvisit/things2do.htm**
- Maryland State Parks and Forests: Outdoor Adventures; **http://dnr.maryland.gov/publiclands/Pages/default.aspx**
- Leave No Trace; **http://www.lnt.org/programs/principles.php**

Land Preservation

Maryland is rapidly being developed, and once forested and open spaces are quickly being transformed into housing developments and shopping centers. Several agencies in Maryland have a goal of preserving farmland, forests, and open spaces. Some of these agencies are listed and described below.

Cecil County Office of Planning and Zoning Maryland Agricultural Land Preservation Foundation Program; Cecil County Purchase of Development Rights Program; Transfer of Development Rights Program: The goal is to preserve enough agricultural land to use as a base for food and fiber for current and future residents of Maryland. 410-996-5220; 200 Chesapeake Blvd., Elkton, MD 2192; **http://www.ccgov.org/government/economic-development**

Cecil Land Trust: This non-profit organization preserves farmlands, woodlands, natural habitats, and historic and rural communities in Cecil County. 135 Main Street, Elkton, MD 21921; **http://www.cecillandtrust.org/**

Cecil Soil Conservation District: The Cecil SCD works with Federal, State, and County programs and organizations to provide technical and financial assistance in Cecil County for the installment and maintenance of conservation practices. A landowner's participation in most agricultural land preservation programs requires the implementation of a Soil and Water Quality Conservation Plan. Such plans include practices aimed to reduce erosion, improve water quality, improve wildlife habitat, an improved agricultural, nutrient, and livestock management. The District works with U. S. Department of Agriculture and Maryland Department of Agriculture to provide cost-share assistance in conservation practices. 410-398-4411 ext. 3; **http://www.cecilscd.com**

Eastern Shore Land Conservancy: Through strategic land conservation and sound land use planning, the Eastern Shore Land Conservancy aims to sustain the Eastern Shore's rich landscapes. 410-827-9756; P.O. Box 169, Queenstown, MD 21658; **http://www.eslc.org/index.php**

Maryland Environmental Trust: Created in 1967 by the General Assembly, the Maryland Environmental Trust preserves open land, such as farmland and forests. The MET uses voluntary conservation easements to preserve the land. 410-514-

What is the Cecil Soil Conservation District?

The mission of the Cecil Soil Conservation District is to provide information, technical assistance, and education in conserving the county's natural resources. The District plays a critical role in preventing soil loss and promoting water quality to protect the Chesapeake Bay.

When the District was established on June 26, 1945, agriculture was the dominant land use in Cecil County, as it was in most of America. Today, Soil and Water Quality Conservation Plans are developed for individual farms that inventory natural resources, list soil erosion and water quality problems, and identify practices that would help solve pollution problems and improve soil, water, and air quality. This facilitates the requirements for the Critical Area law, agricultural preservation participants, and USDA Program compliance.

Cecil Soil Conservation District was organized under the laws of the State of Maryland and is a separate legal subdivision of the State. The District includes all of Cecil County and is governed by a Board of Supervisors. The District is responsible for natural resource conservation programs in Cecil County.

Each year the Cecil Soil Conservation District sponsors and coordinates the Cecil County Envirothon. The Envirothon is a series of environmental competitions in which teams of high school students solve real-life, interactive environmental problems in a natural setting. The students compete in five topics: Wildlife, Forestry, Soils, Aquatics, and a current environmental issue. Cecil schools compete every May to earn a place in the Maryland competition. The State winners advance to the International Canon Envirothon Competition. To learn more about the Envirothon or to view competition results visit **https://www.cecilscd.com/education-outreach**

The District reviews and approves erosion and sediment control plans that developers, by law, must submit in order to obtain a grading permit from the County. Activities requiring a plan include clearing, grading, forest harvest, and other soil disturbances. Practices outlined on the plan work to minimize the disturbed soil flowing from a site and decrease sediment's impact on our waterways or environmentally sensitive areas.

For more than half a century, the District has worked to encourage landowners to see themselves as stewards of the land, with a responsibility to pass their property on to future generations in a better state than when the land was received. Please visit **http://cecilscd.com** for more information on natural resource education and programs including camps, scholarships, competitions and conservation information for all ages.

Fair Hill Nature Center

Maryland's Department of Natural Resources purchased nearly 5,700 acres from the heirs of William DuPont, Jr. in 1975, creating the Fair Hill Natural Resource Management Area. Fair Hill Nature Center opened on Earth Day in 1990. The Fair Hill Environmental Foundation, Inc. is a private, non-profit, natural history, and environmental learning center serving students and adults. The goal of the Fair Hill Nature Center is to promote responsible stewardship of the land through the appreciation and understanding of our environment.

Fair Hill Nature Center has partnered with Cecil Soil Conservation District to provide an outdoor nature school to elementary school students in the county. The primary goal of the outdoor school is to raise awareness among children and adults about the relationships that occur in nature and the interdependence of the environment, our health, the economy, and culture. Over the past 15 years the nature school has provided environmental education to 8,000 children per year.

The Fail Hill Nature Center's vision for the future is a regional community where people protect, respect, and preserve the natural environment and its natural resources. Partnering with the Fair Hill Nature Center is one of the many steps that Cecil SCD has taken to ensure that this vision of the future becomes a reality.

Visit The Fair Hill Nature Center today at
http://http://fairhillnature.org/index.html

The Fair Hill Nature Center as seen from the
Cecil SCD- sponsored
created wetland.

Environmental Reference Guide

Cecil County Government
200 Chesapeake Blvd.
Elkton, MD 21921
http://www.ccgov.org

Cecil County Government Departments

Commissioners Office 410-996-5201
Economic Development Agriculture Office 410-996-5350
Emergency Services 410-996-5350
Environmental Health 410-996-5160
Health Department 410-996-5550
Land Records 410-996-5103
Permits and Inspections 410-996-5235
Planning and Zoning 410-996-5220
Public Works 410-996-5259
- Development Services 410-996-5265
- Engineering and Construction 410-996-5268
- Roads Division 410-996-6270
- Solid Waste Division 410-996-6275
- Water and Wastewater Division 410-996-6260
- Weed Control 410-287-4638

Cecil County Farm Bureau
20 Peach Rd.
Elkton, MD 21921
410-398-3228 or 410-392-4226

Cecil Soil Conservation District
105 Chesapeake Blvd. Suite B-3
Elkton, MD 21921
410-398-4411, ext. 3
http://www.cecilscd.com

Center for Watershed Protection
8390 Main Street, 2nd Floor
Ellicott City, MD 21043
410-461-8323
http://www.cwp.org

Chesapeake Bay Foundation
Phillip Merrill Environmental Center
6 Herndon Ave.
Annapolis, MD 21403
410-268-8816
http://www.cbf.org

Chesapeake Bay Trust
60 West Street, Suite 405
Annapolis, MD 21401
410-974-2941
http://www.cbtrust.org

Fair Hill Nature Center
630 Tawes Dr.
Elkton, MD 21921
410-398-4909
http://fairhillnature.org/index.html

Maryland Cooperative Extension
200 Chesapeake Blvd., Suite 1500
Elkton, MD 21921
410-996-5280
http://extension.umd.edu/topics/agriculture

Maryland Department of Agriculture
50 Harry S. Truman Parkway
Annapolis, MD 21401
410-398-4411 ext. 3 (local)
410-841-5700
http://www.mda.state.md.us

MD Department of the Environment
1800 Washington Blvd.
Baltimore, MD 21230
410-537-3000
http://www.mde.state.md.us

MD Department of Natural Resources Forest Service (County Office)
Black Hill Ranger Station
130 McKinney Town Rd.
North East, MD 21901
410-287-5777

MD Department of Natural Resources
580 Taylor Ave.
Tawes State Office Building
Annapolis, MD 21401
1-877-620-8267
http://www.dnr.state.md.us

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190
1-800-822-9919
http://www.nwf.org

Octoraro Watershed Association
517 Pine Grove Rd
Notthingham, PA 19362
717-539-2132
http://www.theowa.org

Sassafras River Association
P.O. Box 333
Georgetown, MD 21930
410 648-6994
http://www.sassafrasriver.org

USDA-Natural Resource Conservation Service
339 Busch's Frontage Rd., Suite 301
Annapolis, MD 21409
410-398-4411 ext. 3 (local)
or 410-757-0861
http://www.md.nrcs.usda.gov

*All websites listed in the green reference boxes or as image credits were used as sources to compile this booklet.

From My Backyard to Our Bay