TO BETTER KNOW YOUR COUNTY:

FAQs About Calvert's Environment

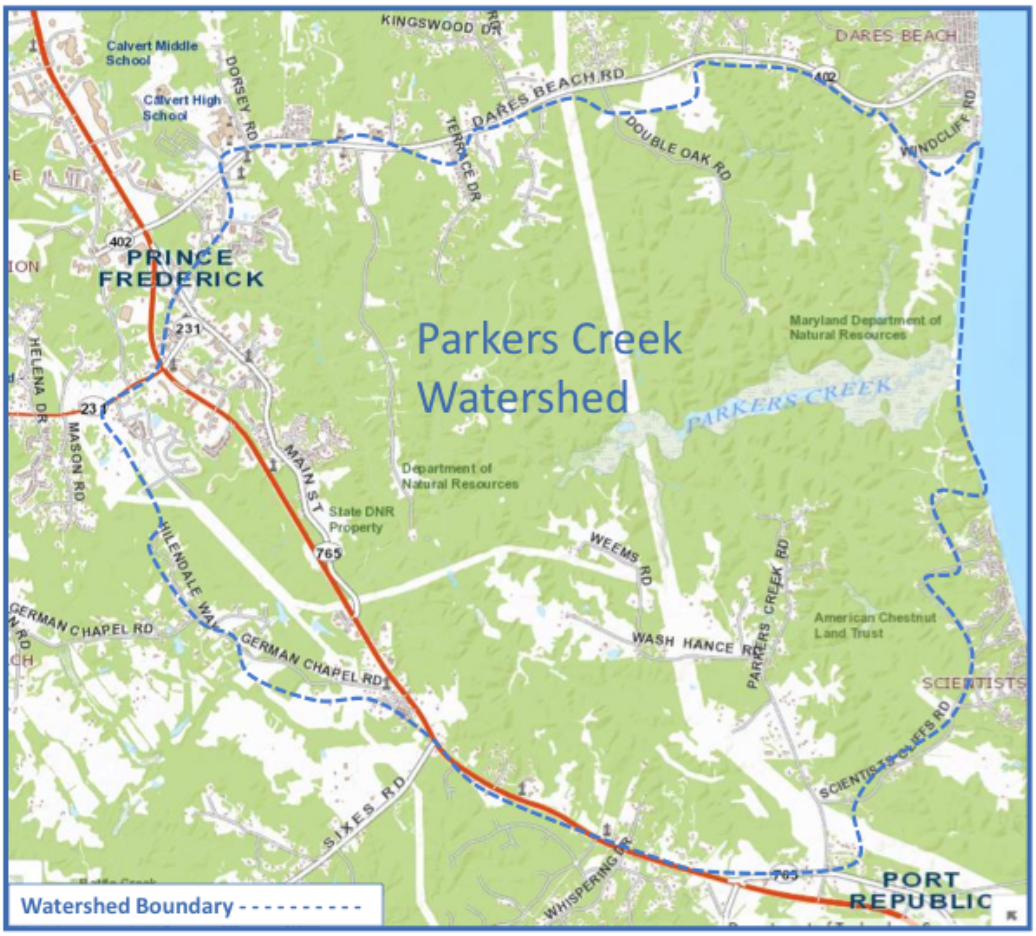
Formed in 1975, the Calvert County Environmental Commission (EC) is a volunteer advisory committee charged to make recommendations, after thorough study and deliberation, to the Board of County Commissioners (BOCC) on matters pertaining to the environment of Calvert County. The EC's arena of activities includes, but is not limited to, water resources, biodiversity, sustainability, aesthetic impact, socio-economic impact, and the general health and welfare of county residents. Knowledgeable residents can help the EC garner information on environmental issues and make more informed recommendations to the BOCC. These Frequently Asked Questions (FAQs) and answers were developed by the EC to help educate county residents. This list of FAQs will be expanded and updated as needed. If you have a question that doesn't appear here, go to the "Can I Ask a Question?" section at the end of this FAQs list and submit your question.

WATER RESOURCES

Water

1. What is a watershed?

A watershed is the area of land on which all precipitation that falls flows downhill to a common outlet like a stream, river, or estuary. One local example is the Parkers Creek Watershed that drains 7,949 acres in Calvert County that lie east and north of MD 765\ and south of Dares Beach Road. Parkers Creeks flows east into Chesapeake Bay [see watershed map below]. For more information, visit:
https://water.usgs.gov/edu/watershed.html



2. Where are the largest watersheds in the County?

The five largest watersheds in Calvert County are Hunting Creek (19,229 acres; 6.0% impervious land cover; 57% forested), St. Leonard Creek (18,973 acres; 4.8% impervious, 64% forested), Fishing Creek (13,278 acres; 5.7% impervious, 67% forested), Hall Creek (10,445 acres; 7.1% impervious, 48% forested), and Parkers Creek (7,949 acres; 4.2% impervious, 73% forested). Data were obtained from the Calvert County Technology Services Department and are derived from 2011 land use/land cover information.

3. How much precipitation does Calvert County receive each year?

On average, about 43 inches of rainfall and 14 inches of snow, or about 45 inches of equivalent rainfall--assuming a ratio of snowfall in inches to equivalent rainfall in inches of 10:1 for average snowfalls occurring when air temperatures are around 30 F

(http://www.nc-climate.ncsu.edu/). Wetter snowfalls occurring at warmer temperatures will have ratios of snowfall in inches to equivalent rainfall in inches closer to 5:1 and therefore yield more liquid precipitation. April tends to be the driest month and September the wettest. Although, typically, Calvert County doesn't have distinct dry and wet seasons.

4. How old is the Chesapeake Bay and how did it form?

The present Chesapeake Bay began to form around the end of the last ice age, as rising sea levels from melting ice sheets began to flood the lower valley of the Susquehanna River about 10,000 years ago. By 8,000 years ago, the Bay east of Calvert County began to widen rapidly, becoming a two-layer estuary by around 6,000 years ago. The Bay is continuing to widen slowly due to shoreline erosion and flooding of low-lying areas. The early Native Americans were here before the present Bay began to form. Several earlier versions of Chesapeake Bay existed during other times of warm interglacial periods when ice sheet coverage of the Earth was reduced.

5. Where does the sand along Calvert County's beaches and on stream bottoms come from?

Geologists use the term "sand" to indicate materials with particle sizes of 0.01 to 0.02 inches in diameter. Most local sand is made of the common mineral, quartz, but other minerals resistant to weathering and erosion are also present in smaller amounts. These minerals were eroded from ancient hard rocks in the Piedmont and Appalachian regions (e.g., granite, gneiss, and quartzite) over many tens of millions of years. The eroded material was moved downslope and out onto the Coastal Plain by streams and rivers. Today, the sand is being redistributed by storm water, stream channel erosion, and by wave action from our beaches. Sands along the base of Calvert Cliffs are on average moving southward.

6. How many miles of streams drain Calvert County?

There are 243 miles of non-tidal and freshwater streams in the county. This estimate comes from the 1:100,000 scale base map used by the Maryland Biological Stream Survey conducted by the Department of Natural Resources (DNR). Use of a finer scale base map (e.g., 1:24,000) would result in more miles of streams, perhaps 25% more. The DNR number of 243 miles does not include larger than 4th order freshwater or tidal streams. Calvert County's streams drain 22, 12-digit watershed. Most of the 18 largest

county streams like Lyons, Hunting, Battle Creek, and St. Leonard creeks drain into the Patuxent River. Two of the larger Bayside streams are Fishing and Parkers creeks that drain into Chesapeake Bay. For more information on DNR's stream survey, go to*:* *http://dnr.maryland.gov/streams/Pages/mbss.aspx*

7. How many kinds of fish are found in the Chesapeake Bay, in the Patuxent River, and in the County's freshwater streams?

More than 350 species (kinds) of fish have been found in the Chesapeake Bay and its tributaries. Within the mainstem Bay, 211 fish species are known to occur. Only 32 species are considered year-round residents. The rest are spawning migrants and seasonal visitors. For more information on Bay fishes, see *Murdy and Musick. 2013. Field guide to the fishes of the Chesapeake Bay. The Johns Hopkins University Press, Baltimore, MD. 345 pages.*

Depending on the source, between 33 and more than 100 fish species occur in the Patuxent River basin. For the mainstem portion that flows past Calvert County, 33 fish species is the best estimate. *http://www.paxriverkeeper.org/about-us/about-the-river/*

The Maryland Biological Stream Survey conducted by the Department of Natural Resources collected 33 fish species in Calvert County's freshwater streams. The Eastern Mudminnow was most commonly encountered, followed by Redfin Pickerel, American Shad, Blacknose Dace, and Bluegill on the top five list. For details, see:

Millard, C.J., P.F. Kazyak, A.P. Prochaska. 2001. CALVERT COUNTY: Results of the 1994-1997 Maryland Biological Stream Survey: County-Level Assessments. CBWP-MANTA-EA-01-29. Maryland Department of Natural Resources, Annapolis, MD.

8. Who monitors the health of Calvert County streams?

Healthy streams will typically contain a large and diverse community of aquatic organisms with good water quality, a wide range of suitable habitat, and a forested riparian (streamside) areas. Healthy streams are essential in Calvert County to protect the Patuxent River and the Chesapeake Bay.

Streams in the county are monitored by the Maryland Department of Natural Resources (DNR), Calvert County Planning & Zoning Department (P&Z), the University of Maryland's Chesapeake Biological Laboratory (CBL), and the American Chestnut Land Trust (ACLT).

DNR has been monitoring biology, chemistry, and physical habitat in county streams since 1995. As of 2015, DNR's Maryland Biological Stream Survey has sampled 49 stream sites in the county. Additional sites will be sampled in 2017 and 2018. DNR's volunteer-based Stream Waders Program sampled 99 stream sites in Calvert County between 2000 and 2015.

CBL monitors water quality in 14 tidal streams, in addition to conducting research projects in the Patuxent River. In response to the rapid growth of marinas and residential dwellings along the shores of Solomons Harbor, annual water quality assessments in the harbor and also in three tributaries in the Mill Creek watershed (Back, St. Johns, and Mill creeks) have been conducted since 1987. Long time series of monitoring data are very important for tracking temporal changes.

P&Z staff and citizen volunteers are sampling 28 non-tidal streams to monitor nutrient concentrations and loads. Funding for this monitoring program comes from the Cove Point Natural Heritage Trust.

Staff and volunteers with ACLT are monitoring water quality in several tributaries to Parkers Creek. In 2017, ACLT also started to monitor the fish community in the tidal portion of Parkers Creek and also in several non-tidal tributaries.

9. What are the current conditions of County streams, the Patuxent River, and the Bay?

Results from the Maryland Biological Stream Survey conducted by the Department of Natural Resources (DNR) plus their volunteer-based Stream Waders Program show that over half of the non-tidal and freshwater streams in Calvert County are in poor or very poor ecological condition. That assessment means that almost 140 miles of streams have been degraded by stormwater runoff and other stressors and are candidates for restoration. On a more positive note, the remaining 100+ miles of streams are still relatively healthy and should be protected. Index scores for the benthic macroinvertebrate and fish communities were highest in Lyons Creek and lowest in Fishing Creek. Another positive finding is that nitrate-nitrogen concentrations were very low in all county streams sampled by DNR. The major factor degrading our streams seems to be poor physical habitat quality. Recent analyses of DNR data conducted by Ron Klauda (rjklauda@gmail.com) showed that fish community index scores were higher in county streams that flow into the Patuxent compared to those streams that flow directly into the Bay. No east-west differences in index scores were found for the benthic macroinvertebrate community. Reasons for the east-west differences in stream fish communities are not known and will require further study.

The lower 35 or so miles of the 110-mile long Patuxent River estuary, the longest river completely within Maryland, flow along the western and southern edges of Calvert County before entering Chesapeake Bay. Although there have been several upgrades to the nine major and several smaller waste water treatment plants that discharge about 70 million gallons of water to the river every day, water and habitat quality remain poor. The latest report card for the Patuxent gave it a grade of D (see *www.ecoreportcard.org* for more information). Every second Sunday in June since 1988, Bernie Fowler, former Maryland State Senator and long-time Calvert County resident, leads a wade-in at Jefferson Patterson Park to measure water clarity in the Patuxent using the “Bernie Fowler Sneaker Index”. On June 10, 2018, Bernie lost sight of his white sneakers at a water depth of 36 inches on his bib overalls, down from 41.5 inches in 2017, but still better than most years since 2000 (*The Calvert Recorder, June 13, 2018)*. Measurements in previous years have been as deep as 44.5 inches in 1997 and as shallow as 8 inches in 1989*).* Much work remains to be done to restore the Patuxent to what it was like during the 1950s and early 1960s (*http://sustainablecalvertnetwork.com/?p=1468*).

The Chesapeake Bay is the eastern boundary of Calvert County, about 30 miles long from North Beach to Solomons Island. Since the late 1960s, water quality in the Bay has declined. The most severe problems occur in the mid-Bay region, some of which is adjacent to Calvert County (*http://sustainableclavertnetwork.com/?p=1468*). Major problems include algal blooms, dead zones with very low dissolved oxygen levels in the

water, the disappearance of sea grasses, and other even more complicated water chemistry issues. However, in August 2017, DNR reported that dissolved oxygen conditions in the Maryland portion of the Bay were improved and the “dead zone” volume in August was much smaller than the previous 30-year average. For more information, go to: *www.chesapeakebay.net* and *eyesonthebay.dnr.maryland.gov*

10. What are the major threats to the health of our streams, the Patuxent, and the Bay?

The major threats to aquatic ecosystems are almost always human population growth and the associated development and land use changes that come along with growth. These major threats are manifested as impacts to county streams, the Patuxent, and the Bay via a long list of stressors. There is no single 'smoking gun'. Natural disturbances such as floods and droughts keep even healthy aquatic systems in a state of dynamic rather than stable equilibria. So the plants and animals (the biota) living there are adapted to an ever-changing environment. But human influences often magnify the intensity and/or increase the frequency of disturbances and impose unnatural changes that can overwhelm the innate resiliency of aquatic biota. For streams, the stressors include increases in impervious (non-absorbing) land cover, increases in storm water runoff, more channel erosion and sedimentation, loss of streamside forests, inflow of road salts and other contaminants, blockages, competition with invasive species, and global warming/climate change. Since the adverse effects of these stream stressors cascade down slope, they also threaten the health of the Patuxent and the Bay----where excess nutrients and sediments plus chemical contaminants and invasive species are especially important threats.

11. Where does our drinking water come from?

Calvert County residents rely on water that comes from deep underground--mostly from the Piney Point and Aquia aquifers--for drinking, bathing, flushing toilets, watering lawns, and all other household and commercial uses. The Magothy aquifer, below the Piney Point and Aquia aquifers, underlies the northern half of the county and is currently much less used than the two shallower aquifers. Currently, groundwater withdrawals in Calvert County total 6.3 million gallons per day (MGD), with 3.4 MGD used for public supplies and 2.9 MGD for domestic uses. Even deeper aquifers (Upper Patapsco, Lower Patapsco, and Patuxent) offer other potential groundwater supplies.

12. What is an aquifer?

An aquifer is an underground layer of water-bearing permeable rock, rock fractures, or gravel/sand/silt from which water can be withdrawn using a water well. Aquifers can occur at various depths below the land surface. The top of the water level in an aquifer is called the water table. Aquifers act as huge underground store houses or reservoirs of water.

13. How deep are the aquifers from which the county gets its water?

In Calvert County, the Piney Point aquifer lies between 75 and 230 feet below sea level. The Aquia aquifer is deeper and lies between 100 and 480 feet below sea level. Deeper still is the Magothy aquifer that ranges in depth from about 350 feet below sea level in the northern part of the county to about 640 feet below sea level in central Calvert County at the southern-most extent of this aquifer (*http://www.mgs.md.gov/publications/report_pages/OFR_12-02-20.html*).

14. Do aquifer levels vary by location, between aquifers, and over time?

Yes. In the Piney Point aquifer, current water levels range from about 30 feet above sea level in the central part of Calvert County to about 20 feet below sea level at Solomons Island. In the Aquia aquifer, current water levels range from about 40 feet below sea level in the northern part of the county to about 150 feet below sea level at Solomons Island. Water levels in the Magothy aquifer range from about 25 feet below sea level in the northern part of the county go about 50 feet below sea level in central Calvert County.

http://www.mgs.md.gov/groundwater/water_level_mapper.html

15. What's the latest on groundwater quantity and quality under Calvert County?

Quantity

The Piney Point aquifer has proven to be a reliable, long-term source of groundwater in Calvert County. Water levels remain substantially above the Aquia aquifer levels, particularly surrounding major well fields.

Although water levels have declined significantly in the Aquia aquifer over past decades, current trends are stabilizing because groundwater withdrawals in St. Mary's County have been reduced. Projected water demands for domestic uses in Calvert County could be met by increased withdrawals from the Aquia aquifer without reducing water levels below safe levels. Shifting a portion of public-supply withdrawals from the Aquia aquifer to the deeper Patapsco aquifers would result in an increase in available drawdown.

The Magothy aquifer underlies the northern half of Calvert County and is rarely used as a water supply. There are only six permitted users of the Magothy aquifer in the county at this time: Cavalier Country, Northern High School, Shores of Calvert, Shoppes at Apple Green, Swan Farm, and Dunkirk Business Park. There is likely no domestic usage of water from the Magothy aquifer in the county. Since this aquifer is so rarely pumped, long-term sustainability is a less important issue at this time.

Given the limited extent to which the Upper Patapsco and Lower Patapsco aquifers are currently being used in Calvert County, significant groundwater supplies are available. The Lower Patapsco aquifer is being used for public water supply in Prince Frederick and industrial water supply at Cove Point. Both of these deeper aquifers could supplement the Aquia aquifer for larger groundwater users in the future.

The deepest aquifer in Maryland's Coastal Plain, the Patuxent, has not been tapped in Calvert County. Limited data from this aquifer in Charles County suggests that groundwater capacity potential may be less than in the upper (shallower) aquifers.

Quality

Both the Piney Point and Aquia aquifers have excellent water quality and typically require little if any treatment. Both groundwaters are sodium-bicarbonate types with moderate to relatively high pH (7.0-8.5), low total dissolved solids (less than 200 mg/L), and low iron levels (less than 0.5 mg/L). In northern Calvert County, both aquifers can have higher calcium and iron levels, resulting in nuisance problems such as staining and scale formation on plumbing fixtures. In the southern part of the county, the Aquia aquifer contains naturally-occurring arsenic at levels above the U.S. EPA's maximum contaminant level of 10 ug/L. Not all wells tapping the aquifer have elevated arsenic levels.

The Magothy aquifer is a calcium-bicarbonate type with iron levels typically higher (greater than 0.5 mg/L) than in the Piney Point and Aquia aquifers. Information on groundwater quality in the Magothy aquifer under Calvert County is limited because of the scarcity of wells tapping into this aquifer.

Groundwater in the Upper Patapsco aquifer (based on analyses of only two wells) has relatively low total dissolved solids (less than 130 mg/L), moderate pH (7.0-7.9), and iron levels as high as 4.9 mg/L. Groundwater in the Lower Patapsco aquifer (based on analyses of only one well) has relatively low total dissolved solids (less than 260 mg/l), high pH (8.7), and relatively low iron levels (0.1 mg/L).

Limited data from wells in Charles County suggest that groundwater quality in the deepest Patuxent aquifer is generally good.

http://www.mgs.md.gov/publications/report_pages/OFR_12-02-20.html

http://www.mgs.md.gov/publications/report_pages/RI_78.html

http://www.mgs.md.gov/groundwater/arsenic%20interactive.html

16. What can County residents do to protect our water resources?

Water conservation should be diligently pursued to avoid declining groundwater levels and to ensure sustainable supplies. While perhaps of more benefit to the shallower water-table aquifers, residents should be careful not to contaminate ground surfaces with common household and garden chemicals, used motor oil, etc. that can leach into the groundwater aquifers. Because groundwater is the only source of potable water in Calvert County, collection/use of rainwater for watering plants and livestock should be encouraged. Reuse of "gray" water should also be considered to further conserve groundwater supplies.

17. What department or agency is the County will test well water for homeowners?

No department in Calvert County tests well water for homeowners. The Department of Health located in the County Services Building, Prince Frederick, can provide a list of water testing companies to homeowners who are interested in having their well water tested (410-535-5400).

18. What is the definition of a Critical Area?

The “Critical Area” encompasses 1) all land within 1,000 feet of the mean high water line of tidal waters or the landward edge of tidal wetlands, and 2) all waters of and lands under the Chesapeake Bay and its tributaries including the Patuxent River. The Chesapeake Bay “Critical Area” was created to address the impacts of land development on habitat and aquatic resources under the Chesapeake Bay Critical Area Protection Act (1984).

To learn more about the Critical Area, visit the Chesapeake Bay Critical Area section of the Calvert County webpage by following links Services > Planning and Zoning > Environmental Section > Critical Area, or by clicking http://www.co.cal.md.us/index.aspx?nid=1246 , or call the Calvert County Department of Planning & Zoning at 410-535-2348.

19. How do I find out if I live or own property in a Critical Area?

Calvert County has an interactive map designed to help property owners determine if their property is in the Critical Area. Check this link to more information on the Calvert County Critical Area webpage:

http://www.co.cal.md.us/index.aspx?nid=1246

Sea Level Rise/Global Warming/Climate Change

1. Is sea level rise occurring in Calvert County?

Yes. Mean sea-level rise in the mid-Atlantic region (a “hot spot” of vulnerability that includes Chesapeake Bay) is currently almost 4 millimeters per year, more than twice the global mean increase. As a result, nuisance flooding along the mid-Atlantic coast,

including Calvert County, is occurring much more often than 50 years ago. Of the top 10 areas in the United States that are experiencing nuisance flooding, Annapolis, MD, holds the record with the most days—40 (*Tucker, A. 2017. Climate Change and the Chesapeake Bay. Chesapeake Environmental Protection Association, Inc. Fall 2017 Newsletter*). Climate model projections for mean sea-level rise scenarios by the end of this century in the mid-Atlantic region vary from about 0.4 meter (1.3 feet) to 1.7 meters (5.6 feet) in Annapolis, MD, and Norfolk, VA. For more details, go to:

http://www.nature.com/nclimate/journal/v7/n7/full/nclimate3325.html

http://www.chesapeake.org/stac/presentations/258_Ezer_STAC_Mar2016.pdf

https://tidesandcurrents.noaa.gov/sltrends/sltrends.html

2. What factors are contributing to the observed sea-level rise in Chesapeake Bay and will likely contribute to projected increases?

Almost all climate scientists agree on the relative causes of sea-level rise. They attribute human-induced global warming caused by the emission of greenhouse gases (e.g., carbon dioxide) to be the most important factor. Planet Earth is getting warmer. Land subsidence (sinking) associated with post-glacial rebound (also called glacial isostatic adjustment), groundwater withdrawals, and sediment compaction are smaller but still important contributors to sea-level rise in Chesapeake Bay. As the Earth warms, sea level rises due to melting of the polar ice caps, other glaciers and ice sheets in northern latitudes and high elevations, and the thermal expansion of warmer upper layer ocean waters. Climate models suggest that more precipitation will fall on the mid-Atlantic region and further raise sea level as the climate changes. In the future, the Chesapeake Bay will widen due to sea-level rise. As a result, wave energy will increase, due to a longer wind fetch from the north east and east, and increase the frequency and extent of shoreline flooding and erosion in low-lying areas along Calvert County's eastern shore. For more details, go to:

https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

Sella, G.G., et al. 2007. Observations of glacial isostatic adjustment in "stable" North America with GPS. Geophysical Research Letters 34, L02306. *http://onlinelibrary.wiley.com/doi/10.1029/2006GL027081/full*

Egglelston, J. and J. Pope. 2014. Land subsidence and relative seal-level rise in the southern Chesapeake Bay region. U.S. Geological Survey Circular 1392, 30 pages. *https://pubs.usgs.gov/circ/1392/*

3. What are Calvert County agencies doing to deal with current problems associated with sea-level rise and what actions are being taken to adapt to predicted increases in 2050 and beyond?

Because sea-level rise is already causing and will continue to cause periodic flooding problems in low-lying areas of the county, property owners can consult flood hazard maps at this link:

calvertgis.co.cal.md.us/Html5_272/Index.html?configBase=http://ccg-gisweb02.calvert.ccg.local/Geocortex/Essentials/GC_PROD/REST/Sites/Flood_Hazard_Map/HTML/virtualdirectory/Resources/Config/Default

These maps are designed to help property owners determine their current and future risks from flooding. They can also assess the impact to their properties by recent revisions to the Federal Emergency Management Agency's (FEMA) flood hazard zones in Calvert County.

The county's Department of Planning & Zoning (in concert with the Department of Public Safety's Emergency Management Division) is preparing a series of area-specific flood mitigation plans for the most vulnerable communities. Plans for Cove Point and Broomes Island were completed and adopted. A draft plan for Breezy Point and Neeld Estates is being reviewed and finalized. Plans for Solomons Island, North Beach, and Chesapeake Beach will be completed next. To date, three flood prone homes in the Critical Area have been elevated in Calvert County and one home was demolished using FEMA grant monies, with 25% of the cost paid for by the home owners.

4. What was the highest recorded storm surge along Calvert County's coastline and when did it occur?

On August 23, 1933, the Chesapeake Hurricane made landfall near Virginia Beach, VA. For the next two days, it churned north and west. The eye of this storm traveled up the west side of Chesapeake Bay. Record high tides occurred along the entire western shore of the Bay. At Washington, DC, the record storm surge reached 11 feet (https://www.weather.gov/lwx/hurricane_history).

Stormwater Runoff and Management

1. What is storm water runoff and why does it need to be managed?

Stormwater runoff is rain and melting snow that flows off rooftops, driveways, lawns, sidewalks, streets, roads, parking lots, and construction sites rather than soaking into the ground. Storm water runoff usually does not go through a wastewater treatment plant and can therefore carry many pollutants directly into streams, rivers, lakes, and estuaries. These pollutants can harm fish and wildlife, kill aquatic plants, foul drinking water supplies, and make recreational areas unpleasant and unsafe. Storm water runoff can also cause stream channel erosion during high-flow storm events, loss of aquatic habitat, and deposition of sediment downstream. Stormwater runoff is the fastest growing source of pollution to the Chesapeake Bay.
http://www.chesapeakebay.net/issues/stormwater_runoff

2. What are the best methods available to manage stormwater efficiently and minimize environmental impacts?

Mature forests, wetlands, and other vegetated areas trap rainfall, snow melt, and pollutants—thereby slowing the flow of stormwater runoff and increasing infiltration (absorption or soaking into the ground). These ‘natural’ methods, the best ways to manage stormwater, are usually removed or degraded during urban and suburban development and replaced with hardened (impervious) surfaces. The new impervious surfaces reduce how much storm water soaks into the ground, resulting in more runoff. Dry and wet ponds are widely used to intercept and store stormwater runoff and also settle out suspended sediment and pollutants. More effective stormwater management methods are captured by the concepts of environmental site design (ESD) and low impact development (LED). These innovative methods include cluster housing designs with narrower streets, smaller parking lots, parking garages, shallow front yards, fewer sidewalks, landscaped cul-de-sacs where stormwater is directed to cisterns, rain gardens, vegetated buffers, swales, grassy channels, and bioretention ponds.

3. Who regulates stormwater runoff in the County?

The Calvert County Department of Public Works is responsible for the coordination and enforcement of the provisions described in the “Calvert County Stormwater Management Ordinance” adopted on May 4, 2010. To peruse this document, go to:

http://www.co.cal.md.us/

This county Ordinance incorporates rules and guidelines pertaining to stormwater management issued by the Maryland Department of the Environment:

MDE.maryland.gov/programs/Water/StormwaterManagementProgram/pages/index.aspx and the U.S. Department of Agriculture’s Natural Resources Conservation Service, Maryland Office: https://www.nrcs.usda.gov/wps/portal/nrcs/site/md/home/

4. What is Calvert County doing to manage stormwater?

The county adopted the “Calvert County Stormwater Ordinance” on May 4, 2010. The Ordinance applies to all new and redevelopment projects that had not received final approval of erosion/sediment control and stormwater management plans by the adoption date. The purposed of the Ordinance is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with increased stormwater runoff. The goal is to manage stormwater by using environmental site design (ESD) to the maximum extent practicable; to restore, enhance, and maintain the chemical, physical, and biological integrity of streams; minimize damage to public and private property; and reduce the impacts of land development. Agricultural land, additions or modifications to existing single family detached residential structures, development that does not disturb more than 5,000 square feet of land area, and land development activities that are regulated under specific State laws that provide for managing stormwater runoff are exempt from the provisions of Calvert County’s 2010 Ordinance.

5. How does impervious land cover affect stormwater runoff?

More impervious (hard surfaces) land cover results in less infiltration (absorption) of stormwater and therefore more runoff. According to the U.S. Environmental Protection Agency, the presence of roads, rooftops, parking lots, sidewalks, and other impervious surfaces in urban areas means that a typical city block generates 5 times more runoff than a forested area of the same size during the same rain event.

6. What is a 100-year storm or flood? What about a 10-year storm or flood?

A 100-year storm is a rainfall event with a 1 in 100 (1%) chance of being equaled or exceeded in any given year *(https://water.usgs.gov/edu/100yearflood.html*). A 10-year storm has a 10% chance of being equaled or exceeded in any given year.

Wastewater Disposal Systems

1. What is wastewater, how is it handled and what kinds of wastewater disposal systems are in use in Calvert County?

Wastewater is considered to be all sewage and water leaving residences, municipal buildings, and businesses through a plumbing system. The types of systems available and in use in Calvert County are:

- **P**ublicly-**O**perated **T**reatment **W**orks (POTW) also commonly known as a sewer system.
- Privately-operated treatment systems are financed and built by a developer to handle wastewater produced by residences or businesses in a specific development. The Calvert Gateway Shopping Center in Dunkirk is an example of a privately-operated system.
- A septic system comprised of a septic tank and a drain field. There are generally two types of tanks used in a septic system.
    - The first is a conventional (or traditional) septic tank that is a “passive” unit, where wastewater flows into the tank and separation of sewage (scum, sludge, liquid effluent or overflow) occurs naturally with solids settling to the bottom of the tank and liquid effluent flowing into the drain field.
    - The second is a **B**est **A**vailable **T**echnology (BAT) pre-treatment system using a nitrogen-reducing technology to separate and process the sewage entering the septic tank. This advanced technology requires the use of an electrical pump, which is part of the septic tank treatment system. The effluent pumped from the holding tank goes to a filter unit containing sheets of a synthetic fabric where microorganisms, such as bacteria, process and remove impurities such as nitrogen from the effluent. This effluent is recirculated between the tank and filter and discharged into a drain field.

2. How does a septic system function?

Septic systems have a living component that relies on bacteria to biologically break down solid wastes, with some additional chemical conversion.

3. As a home or business owner and user of these systems, what should I know and do to make them function most effectively?

Unless your home or business is connected to a POTW, it is important to know which system you use and its size, so it can be maintained properly. Excessive use of garbage disposals should be avoided with septic systems, as this will accelerate the accumulation of solids in the tank leading to the need for more frequent pump-outs.

4. Why does my septic tank need to be pumped out?

Pumping septic tanks minimizes the amount of solids entering the drain field. If pumping is not done on the recommended schedule, the drain field will eventually become clogged, fail, and need to be replaced. In addition, regular septic tank pumping can aid in reducing the flow of nutrients, particularly nitrogen, into Chesapeake Bay.

5. Where does the effluent pumped from a septic tank end up?

Effluent pumped from septic tanks is transported to a local waste water receiving site (Solomons Waste Water Treatment Facility) where it is treated as publicly-collected waste water. Typically, this waste water receiving site is far more efficient at removing nitrogen.

6. How often does my septic tank need to be pumped out?

That depends on the type and size of your septic tank and the number of people in your household. A general recommendation for conventional septic tanks is every 2 to 3 years. A BAT system should be pumped every 8 to 12 years. Your septic service contractor should be able to tell you if your pumping frequency is sufficient to maintain a functioning drain field. Information about septic system maintenance can be found at: *extension.umd.edu/learn/septic-systems-and-their-maintenance*

7. What should I not flush or put into my wastewater disposal system?

For all of the systems in use in Calvert County (POTW, private systems, conventional septic tanks, and nitrogen-reducing pre-treatment systems), unused

medications/pharmaceuticals, flammable or toxic products, petroleum products, pesticides/weed killer/fertilizer/other lawn & garden chemicals, paint/paint thinners, large amounts of cooking grease, disposable diapers/wipes, feminine hygiene products, and condoms should NOT be put into any of these systems.

- For privately-operated treatment systems, the developer or development management staff should provide residents and businesses with any additional restrictions.
- For both types of septic tanks, bear in mind these systems rely on healthy bacteria for proper function, so it is critical to avoid killing those bacteria/organisms with toxic chemicals.
- For conventional tanks, avoid the use of products containing lye (chemical drain cleaners, oven cleaners), floor wax/other waxes, products with high levels of chlorine (bleach, pool chemicals, some automatic toilet bowl cleaners), and powdered laundry detergents or detergents containing phosphates.
- In addition to these lists of precautions for conventional septic tanks, water softener backwash and special additives that are advertised to enhance the performance of the tank or system should not be flushed in BAT systems. In addition, RV wastes should not be discharged into the system and washing machine lint discharge should be minimized (clean the filter before every load).

8. Are there specific types of septic systems that can/must be used in the Critical Area and what should homeowners do to update/comply with regulatory changes?

If you live in a Critical Area (within 1000 feet of tidal waters) in Calvert County, all new construction and replacement of older conventional septic systems must install and use BAT/nitrogen-reducing septic systems. A BAT system consists of an advanced pre-treatment unit and the associated drain field. The advanced units either use aeration or recirculation to promote biological action. Through this process, organic nitrogen and ammonia in the sewage are converted to nitrogen and released as a harmless gas into the atmosphere rather than leaking as biologically-available nitrogen into the groundwater and downslope streams.

Grants can be obtained from the **B**ay **R**estoration **F**und (BRF) to provide financial and technical assistance to upgrade an outdated and inefficient conventional septic tank with the BAT pre-treatment system. Priority for grants is given to homeowners with failed or failing septic systems in the Critical Area, although those not within the Critical Area can also apply for the grant. To qualify for a grant, the existing drain field

must be functional, otherwise the homeowner is responsible for the cost of a new drain field plus a fee for the permit. The BAT system purchase and installation costs are covered by the grant.

The BAT system can remove an additional 50 to 75% of the total nitrogen before the effluent enters the drain field. Even a regularly maintained conventional septic system can remove only about 10% of the available total nitrogen in the effluent that flows to the drain field (*https://www.chesapeakebay.net/documents/Final_OWTS_Expert_Panel_WQGIT_approved_07142014.pdf*).

Studies have shown that BAT systems also render raw wastewater 98% cleaner, thereby extending the life of the drain field.

More information can be found on the Calvert County BRF web page: *https://www.calverthealth.org/community/environmentalhealthservices/PDF/brfproc.pdf*

and at the Maryland Department of the Environment's webpage: *https://mde.maryland.gov/programs/Water/BayRestorationFund/Pages/Index.aspx*

County residents interested in upgrading their conventional septic system to a more efficient nitrogen-reducing system should contact:

- Gregory Deboe (*gregory.deboe@maryland.gov*, 410-535-3922) or
- Matthew Cumers (*matthew.cumers@maryland.gov*, 410-535-3922) with the Calvert County Health Department.

9. What is the installation cost of a BAT septic system compared to a conventional septic system?

These costs would depend on the length of the drain field and size of the septic tank. A permit (fee required) is the same for both systems. If a drain field needs to be replaced, the cost may run from $5,000-$8,000. A conventional septic tank will cost about $5,000-$7,500 to install. The current cost of a BAT pre-treatment septic system is more, at about $15,000-$20,000.

Can I Ask a Question?

Can’t find answers to your questions in this list of FAQs? Ask the Environmental Commission by filling out the form below. We will do our best to answer your questions in a timely manner. We may even add them to our FAQs.

Name:

Email:

Question: