

CHAPTER 7 - ENVIRONMENT

Introduction

The development of Southampton County has been shaped and influenced by its topography, soils, prevailing winds, and the natural resources found within its borders and in surrounding localities. The County benefits from its location between the seashore and the mountains of southern Virginia, and acts as a natural conduit for goods passing between these areas. Southampton County's location and natural resources have also made it an ideal site for agriculture and a number of industries. Forested lands provide plentiful timber and the fertile, sandy soils support the production of many crops, including corn, soybeans, cotton, and peanuts.

This chapter summarizes the principal environmental features of Southampton County and its surroundings. This summary aids in defining issues which must be considered in the development of a sound land use plan and the regulatory measures which will be necessary to accomplish the community's development goals.

Climate

With its location near the Atlantic Ocean, Southampton County enjoys a moderate climate year-round. The nearest National Weather Service Station is located at Holland (station Holland 1 E) in the city of Suffolk. Data from this station indicates that the average annual temperature is 58.7 degrees, with summer temperatures that average 75.1 degrees and winter temperatures that average 39.8 degrees. The frost-free growing season extends from about April 25th to October 10th, providing a growing season of approximately 177 days. Southampton County receives an average annual rainfall of 45.75 inches and an average annual snowfall of 4.49 inches. Winds prevail from a southwesterly direction and are of low velocity. According to the National Climatic Data Center, hurricanes are not common in the region while thunderstorms, severe lightning, and high winds occur more regularly.

Per the National Weather Service, the following significant events occurred in the County between January 1, 2010, and December 31, 2020.

	2010
1/30/2010	Winter Storm, 6-9" of snow
10/27/2010	EF0 tornado, Courtland area, carports, sheds, and residences impacted
12/25/2010	Winter Storm, 8-13" of snow
	2011
4/16/2011	EF0 tornado, Drewryville, Manry area, trees, sheds impacted
8/27/2011	Tropical Storm winds, Courtland area, downed trees, heavy rain (6-11"), structural damage, significant crop damage, associated with Hurricane Irene
	2012
8/28/2012	Heavy rain, Capron, Adams Grove area, along US 58, numerous roads closed, including parts of US 58, over 6" of rain

	2014
7/10/2014	Straight line winds west and southwest of Adams Grove area, egg-sized hail
7/24/2014	60 MPH winds along Rt 460, near Sedley, Camp Corner, Unity, trees and utility lines downed, near Sussex County line
	2016
4/5/2016	Freeze, 25-28 degrees for eleven hours, widespread crop damage to fruit trees, shrubs, winter wheat, barley, hay grass
4/10/2016	Freeze 25-28 degrees for six hours, widespread crop damage to fruit trees, shrubs, winter wheat, barley, hay grass
9/2/2016	Tropical Storm Hermine, heavy rain bands
9/21/2016	Flooding from heavy rains, numerous roads closed or washed out, Little Texas area
10/8/2016	Flooding across County from heavy rain in areas from Branchville to Hunterdale, 4-9" of rain, numerous roads closed for several days, many homes and businesses impacted
	2017
1/16/2017	Heavy snow, 5-9" of snow
3/31/2017	Quarter-sized hail in Courtland and Drake Corners areas
5/5/2017	Tornado, EF0, Vicksville and Camp Corner area, traveled along Rt 460, Warrique Road area
5/27/2017	Quarter-sized hail in Drewryville area
	2018
1/3/2018	5-11" of snow, highest across area from Courtland to Hunterdale/Franklin area
	2019
4/19/2019	EF1 tornado, Sebrell, Manry, and Green Plain area
	2020
8/3-4/2020	EF2 tornado spawned by Hurricane Isaias, General Thomas Road to Sebrell, numerous businesses and homes damaged or destroyed
9/9/2020	Heavy rain, road closings, Route 35, Barhams Hill, Newsoms, Shiloh, Drewryville area
9/29/2020	EF0 tornado, Black Creek area
11/11-12/2020	Heavy rain, flooding, numerous roads impassable, washed out areas on Rt 35, Sedley and Green Plain area

Flooding, hurricanes, hail, and thunderstorms and lightning are a likely occurrence in Southampton County, as throughout much of the southeastern United States. Mitigation efforts may take many forms, seeking to limit the impacts of these events. The County's adopted 2017 All-Hazard Mitigation Plan addresses a number of mitigation efforts.

(NOTE: The All-Hazard Mitigation Plan is undergoing updating at this time. New information will be included in the County Plan as available, 2021.)

Air Quality

The Virginia Department of Environmental Quality (DEQ) monitors air quality in Southampton County. DEQ monitors for Critical Pollutants including sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter (PM 10 and PM 2.5). All of these pollutants can injure health, harm the environment, and cause property damage. These pollutants can injure humans by causing respiratory and cardiovascular problems, harm the environment by impairing visibility, and cause damage to animals, crops, vegetation, and buildings.

There are thirteen (13) companies and organizations in Southampton County that impact air quality, but none of the impacts are sufficient to be noted at the harmful level. The

closest air monitoring station to Southampton County is located at Holland in the city of Suffolk (station 183-F). The Enviva Pellets Plant on Rose Valley Road recently updated their air quality plan, and the Hampton Farms-Peanut Division Franklin Plant on General Thomas Highway has received waivers to some air quality standards.

One pollutant, ozone, is a gas comprised of three oxygen atoms. Ground-level ozone occurs when chemicals found in the atmosphere at the earth's surface react with the presence of intense sunlight. Ozone is harmful because it can provide a variety of health problems, as well as damage to plants and materials. High level of ozone are common in more heavily-developed areas. However, since the chemicals needed to form ozone can travel hundreds of miles from their source, even rural areas with few pollutant emissions can occasionally experience high ozone levels. The 1990-2020 Historic Ozone Exceedance Day Count notes the number of days each year that the ozone level exceeds the federal standards. The highest number of high-ozone days per year occurred in 1993. Between 2013 and 2020, there were no days noted at the Holland station in Suffolk that exceeded the ozone standards except one (1) day in 2016.

Topography, Geology, and Soils

Virginia's Coastal Plain is predominantly flat with only slight variations in topography. The marine or oceanic terraced topography of the Coastal Plain was formed over the last few million years as sea levels rose and fell in response to the repeated melting and growth of large continental glaciers. The current areas of higher elevation (scarps) are former shorelines that existed as the ocean was receding. The principal escarpment in Southampton County is the Surry Scarp, which crosses the County from northeast to southwest, interrupted only by alluvial plains along the major rivers.

Southampton County lies within the western portion of the coastal plain of Virginia and has elevations ranging from near sea level at the confluence of the Blackwater and Nottoway Rivers in the southeast to approximately 130 feet above sea level in the west. The entire county drains through the Blackwater, Meherrin, and Nottoway Rivers to the Chowan River and the Albemarle Sound in North Carolina. Most of the County has adequate relief to facilitate drainage, although there are broad poorly drained areas in the vicinity of Boykins, Branchville, Corinth, Franklin, and Ivor. Except for the surface mining of sand, generally near the Nottoway and Blackwater Rivers, extraction of minerals has been limited in the County.

Soil type, drainage, and slope are important characteristics to consider when determining the potential uses of certain soils, particularly those classified as highly erodible soils. Dominant soil types in Southampton include Slagle fine sandy loam (25%), Emporia fine sandy loam (13%), and Uchee loamy sand (8%). About 71% of the soils in the County are classified as moderately well to well drained.

Much of the County is also considered prime farmland. Moreover, soils such as the Craven fine sandy loams are considered to be agricultural soils of statewide importance. Approximately 7% of the soils in Southampton County have slopes of 6% or greater, and

about 2% are classified as highly erodible soils. Generally, soils with slopes of 15% or greater are concentrated in small pockets near rivers and streams. Per the USDA Natural Resources Conservation Service, the following soils make up Prime and Important Farmlands in the County:

All areas are Prime Farmland

- Altavista fine sandy loam, 0-2% slopes and 2-6% slopes, rarely flooded
- Bojac loamy sand, 2-6% slopes, very rarely flooded
- Craven fine sandy loam, 0-2% slopes and 2-6% slopes
- Emporia fine sandy loam, 0-2% slopes and 2-6% slopes
- Exum silt loam, 0-2% slopes
- Munden loamy sand, 0-2% slopes and 2-6% slopes, rarely flooded
- Nansemond loamy fine sand, 0-2% slopes, 2-6% slopes
- Slagle fine sandy loam, 0-2% slopes and 2-6% slopes
- State fine sandy loam, 0-2% slopes and 2-6% slopes, very rarely flooded

Farmland of Statewide Importance

- Craven fine sandy loam, 6-10% slopes
- Emporia fine sandy loam, 6-10% slopes
- Slagle fine sandy loam, 6-10% slopes

Prime Farmland if drained

- Augusta sandy loam, 0-2% slopes, rarely flooded
- Myatt loam, 0-2% slopes
- Nimmo sandy loam, 0-2% slopes
- Tomotley sandy loam, 0-2% slopes, rarely flooded
- Yemassee fine sandy loam, 0-2% slopes

The location of prime and important farmlands with regard to soil types is a consideration in making decisions regarding future development, and soils maps are an important part of any discussion regarding changing the use of property from an agricultural use to a use that removes the land from agricultural use. A map highlighting areas designated as "Not Prime Farmland" by the USDA Natural Resources Conservation Service is provided, permitting non-agricultural development to be directed to areas with more marginally- productive farmland.

Wetlands and Floodplains

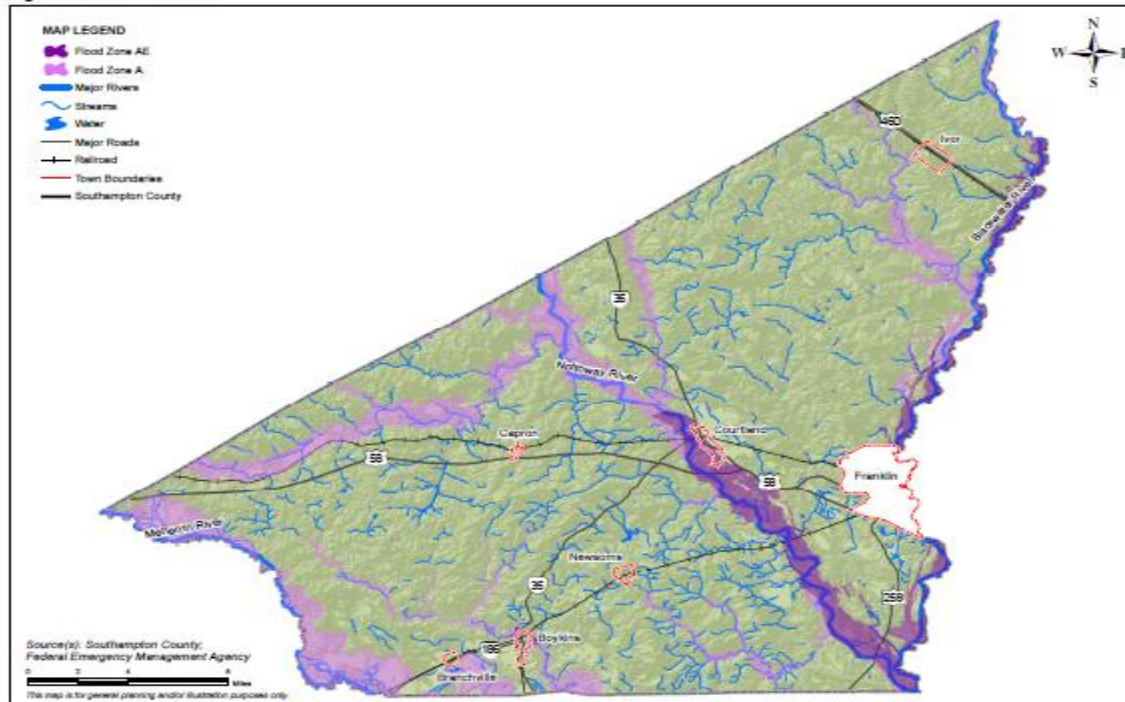
Wetlands are defined based on soil characteristics, the presence of certain types of vegetation, and the presence of water in the soil for all or part of a year. Wetlands fulfill many valuable functions, including flood conveyance and storage, sediment and pollution control, ground water recharge, wildlife habitat, open space, recreation and education. There are extensive areas classified as wetlands throughout the County, particularly along the Blackwater and Nottoway Rivers and their tributaries. Generally, these areas should be

conserved and are not suitable for development without appropriate mitigation. A portion of the County's industrial park off Rt. 671 is a wetland and stream mitigation bank, where purchasers who plan to impact wetlands or streams in a drainage area may purchase credits elsewhere in the same drainage area to allow such development. Permits from the U.S. Army Corps of Engineers and State of Virginia are required for development in non-tidal wetlands.

Floodplains are defined as land that has been or may be covered by floodwater during a regional flood. A floodplain includes the floodway (the river or moving water) and the flood fringe, or the area that is covered with standing water during a flood. All of the County's main streams flow slowly toward the south and generally parallel to the principal topographic belts. The main streams have broad floodplains, substantial portions of which are covered by wooded swamps. Tributaries to the main streams may also flow through swamps, but these swamps are generally not wide.

Southampton County was severely impacted by hurricanes and subsequent flooding in September 1999. Subsequently, Southampton County initiated rehabilitation assistance and land acquisition programs through the Federal Emergency Management Agency and the Virginia Department of Housing and Community Development to repair flood-damaged properties and convert many of the most vulnerable properties to permanent open space. The County has acquired a number of properties at both the northern end and the southern end of the County along the Blackwater River and nearby neighborhoods so as to eliminate repeated flooding of residences. Southampton County residents are eligible to take part in the National Flood Insurance Program, which provides flood insurance to structures in mapped areas at subsidized rates.

Figure 4.1: Flood Zones



Per the 2012 All Hazard Mitigation Plan, Southampton County contains four areas of repetitive flood loss properties, including property in the area of No Head Lane, Hanging Tree Lane, Pretlow Road near Blackwater Drive, and the Battle Beach Road area. A repetitive flood loss property is defined as any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program within any ten year period beginning in 1978. There are seven repetitive loss properties in the County, totaling 14 claims of \$343,929. Additionally, there are 76 other residential properties in the repetitive loss areas that potentially face the same flooding conditions as the seven repetitive loss properties. Following are maps indicating the areas in and around Courtland and in and around Boykins that show the location of the flood zone, and the locations of buildings within those zones. Capron and Ivor are not shown on individual map figures because these communities have no identified flood hazard areas.

(NOTE: The All-Hazard Mitigation Plan is undergoing updating at this time. New information will be included in the County Plan as available, 2021.)

Figure 4.2: Flood Zones Within and Around the Town of Courtland

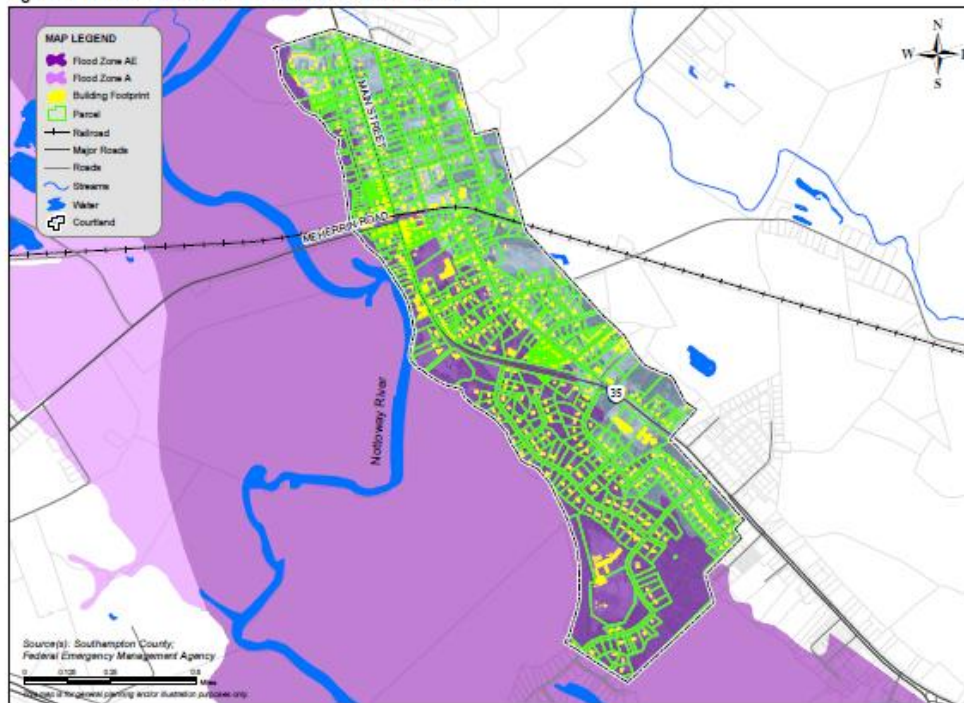
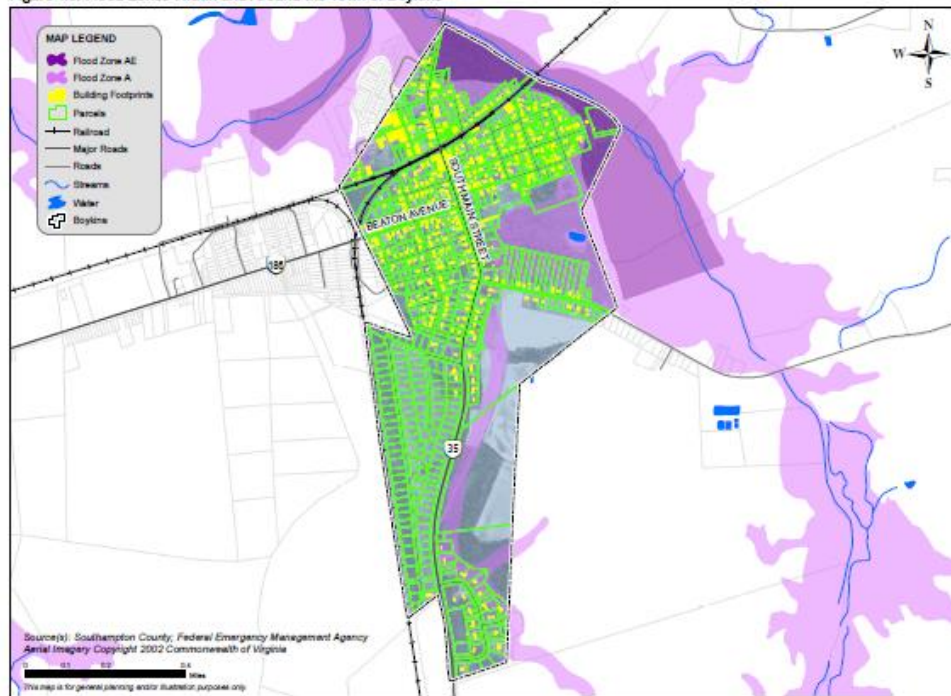


Figure 4.3: Flood Zones Within and Around the Town of Boykins



Climate Change

The Hampton Roads Planning District Commission (HRPDC), with partial funding by the Virginia Coastal Zone Management Program, provided a Climate Change Report in 2012 focused on climate change adaptation. The following information was provided in that report:

HRPDC worked on a three year Sustainable Coastal Communities Focal Area Grant. The first year of the study focused on the broad impacts of climate change in Hampton Roads. The second year focused on analyzing the region's vulnerability to storm surge flooding. The final year focused on the impacts to the region's population, infrastructure, economy, and natural resources from sea level rise. The coastal areas, including Chesapeake, Hampton, Norfolk, Poquoson, Portsmouth, and Virginia Beach, were the most vulnerable to the effects of flooding during storm events, but Southampton County is impacted as well to a considerably lesser extent.

Long-term development planning and infrastructure investments are areas in which localities may consider the effects of sea level rise so as to limit the vulnerability of the built environment to changes in sea levels and the extent of storm surge flooding. Long-term trends in sea level rise are a starting point to assess the future consequences, but recent climate change science indicates sea level will rise more quickly than was experienced in the 20th century.

Sea level rise on the global level occurs when ice melts from glaciers and ice sheets, and as the ocean warms. Science indicates that both atmospheric and ocean temperatures are warming, causing more ice to melt and increasing the amount of water in the world's oceans. Hampton Roads is influenced by both the increase in ocean water levels and subsidence, which is the sinking of land. Subsidence in this area is thought to be caused by the rebound of land once covered by glaciers (glacial isostasy), consolidation of sediments in the Chesapeake Bay Impact Crater, and sediment compaction caused by groundwater withdrawals, the only cause that may be halted, slowed, or reversed.

The analysis identifies areas that could be inundated by sea level rise under three different scenarios, and calculates the population, property, and other assets in those areas to estimate the county's exposure to sea level rise. Spring high tide is used as a benchmark since lands above that line are now dry and additional sea level rise may convert these lands to wetlands and eventually water if not protected. The three estimates take into account the uncertainty of current elevation data, and are based on a one meter sea level rise by the end of the 21st century. Since the Hampton Roads area is experiencing sea level rise at a faster rate than the global average, the one meter expectation is plausible and defensible.

It is important to note that sea level rise estimates are not predictions of areas that would be inundated. The estimates only provide information that gives a general idea of which areas may be most vulnerable to sea level rise and are one factor to take into account when considering long range planning and infrastructure decisions. The historic rate of sea level rise is used as the "low" scenario. The "middle" and "high" estimates are based on estimates from the National Research Council which take into account more recent findings. **(Awaiting updated study, 2021)**

Table 15: Exposure to One Meter of Sea Level Rise above Spring High Tide in Southampton County, Virginia

	Total	Low Estimate	Middle Estimate	High Estimate
General				
Land Area (square miles)	602.4	0.0	7.8	10.9
Population	18,570	0	149	224
Housing Units	7,473	0	64	93
Built Environment				
Number of Parcels (intersection)	15,849	0	241	331
Number of Parcels (centroid)	15,849	0	117	161
Improvement Value of Parcels (intersection)	\$1,134,717,700	\$0	\$9,879,300	\$13,782,900
Improvement Value of Parcels (centroid)	\$1,134,717,700	\$0	\$6,037,400	\$7,379,400
Infrastructure				
Roads (total miles)	843.5	0.0	2.0	3.1
Roads (Interstate)	0.0	0.0	0.0	0.0
Roads (Primary)	128.6	0.0	0.5	1.1
Roads (Secondary)	647.6	0.0	1.0	1.4
Roads (Local or Private)	67.3	0.0	0.5	0.6
Economy				
Businesses	474	0	1	2
Employees	3,577	0	1	13
Total Value of Parcels (intersection)	\$2,438,989,700	\$0	\$55,470,700	\$68,210,300
Total Value of Parcels (centroid)	\$2,438,989,700	\$0	\$14,703,000	\$21,744,400
Natural Environment				
Protected Lands (acres)	3,419	0	209	292
VEVA – Outstanding (acres)	78	0	0	1
VEVA – Very High (acres)	189	0	79	99
VEVA – High (acres)	45	0	11	12

Source: HRPDC, “Climate Change in Hampton Roads, Phase III, Sea Level Rise in Hampton Roads, Virginia”, 2012
 VEVA: Virginia Ecological Value Assessment, a systematic ranking of all terrestrial and aquatic areas in Virginia’s coastal zone for their ecological value.

Areas Exposed to One Meter of Sea Level Rise above Spring High Tide, Southampton County, Virginia



Low Estimate Middle Estimate High Estimate

1 inch = 5.6 miles

Source: HRPDC, "Climate Change in Hampton Roads, Phase III, Sea Level Rise in Hampton Roads, Virginia", 2012

Energy Generation and the Environment

In recent years, Southampton County became home to a 100MW utility scale solar installation, and interest in solar-generated electricity continues to grow in Southampton County and throughout Virginia. Agricultural property owners are being offered the opportunity to repurpose farm and forestry land into solar facilities. Such opportunities are being presented to the property owners as a way to retain family land while

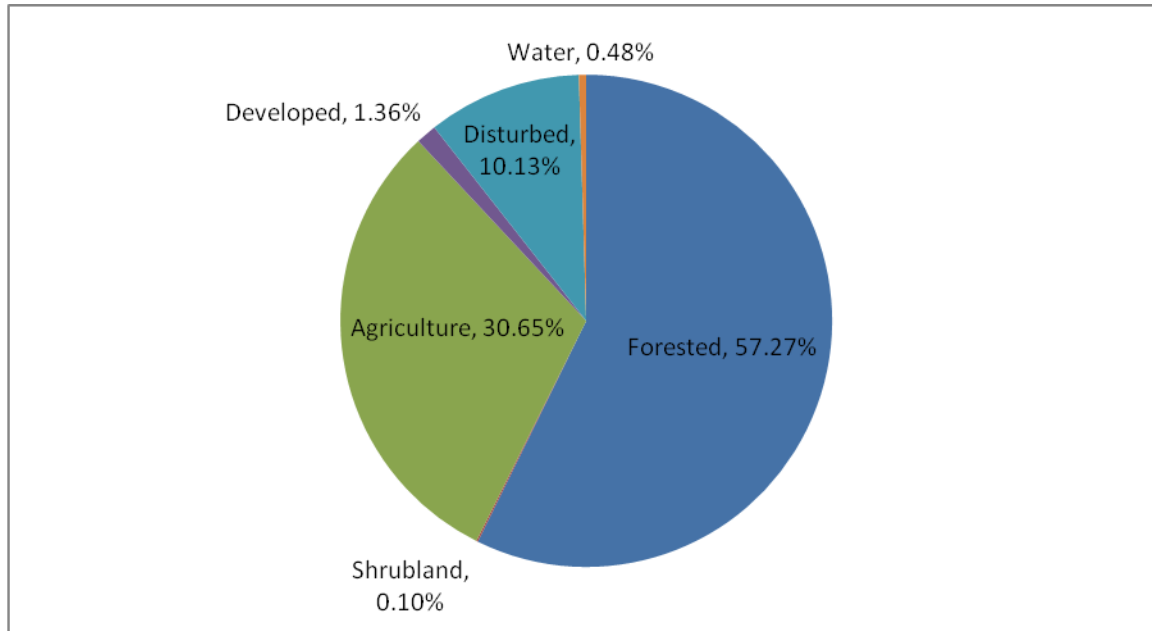
diversifying the use of the property.

The General Assembly has made strides in encouraging solar development throughout the Commonwealth, both what is commonly known as utility scale solar and smaller scale distributed solar projects. Both of these types of development help supplant the electricity created by nuclear, coal, wood, gas, and oil-fired plants at a lower environmental cost. Solar-generated electricity imparts no air quality impacts as no fuel burning is taking place. Fuel does not need to be transported to the power-generating facility, again reducing emissions from transportation. Sunlight is a renewable resource, and its harnessing does not diminish its availability. No waste is generated by the production of solar-generated electricity, so no ash or other material disposal is needed except when the facility is decommissioned or damaged panels need replacement. Solar-generated electricity does not contribute to increased levels of CO₂ and other harmful toxins in the environment. Unlike nuclear plants or hydroelectric plants, little water is used beyond what may be necessary for landscaping and ground cover. The generation of electricity through the use of solar technology has the potential to produce electricity with fewer impacts on the environment. A fuller discussion of the impacts of solar-generated electricity in Southampton County can be found in the Energy chapter.

Agricultural and Forest Lands

Agricultural and forested lands dominate the land cover in Southampton County and represent a rural heritage that is expected to continue into the future. Of the approximately 602.77 square miles that make up the County, 345.23 square miles, or 57.27% are devoted to forests. Dominant forest types include both hard and soft woods. The lowland forests are generally confined to the swamps and swampy areas, with hardwoods such as oak, gum, and cypress predominating. Extensive upland areas have been harvested and reforested in pine. Trees are of great importance in reducing soil erosion and in creating wildlife habitats, in addition to maintaining the rural character of the County. Agricultural and pasture lands account for another 184.73 square miles, or 30.65% of land in the County. Peanuts, cotton, corn for grain or seed, and soybeans are the primary crops. Per the Extension Service, Southampton County led the Commonwealth in the production of cotton, cottonseed and peanuts 2019, and was the sixth highest producer of grains, oilseeds, dry beans, dry peas, hogs and pigs in Virginia. Although wheat has typically not been a staple of Southampton County farming, its cultivation is increasing, as well as the production of sorghum. Figure 7-1 illustrates the land cover types in Southampton County.

FIGURE 7-1
Land Cover



Source: US Department of Interior USGS Land Cover Report

Surface Water Resources

The dominant surface water resources in Southampton County are the Blackwater, Nottoway, and Meherrin Rivers and their tributaries. These rivers have shorelines that are largely undeveloped and include pockets of old-growth cypress and tupelo trees. Their relatively slow moving, dark waters are also used extensively for boating and freshwater fishing, and both the Blackwater and the Nottoway Rivers are part of the Virginia State Scenic Rivers program for their entire length within the County. The Blackwater and Nottoway Rivers join near the North Carolina state line to form the Chowan River, a tributary of the Albemarle Sound. The Meherrin River flows into the Chowan River in North Carolina, about 12 miles below the confluence of the Blackwater and Nottoway Rivers. Although Southampton County derives its drinking water primarily from wells, both the Blackwater and Nottoway Rivers serve as surface water sources for the City of Norfolk during periods of high river flow.

Permitted wastewater discharges within the County come from six sources: Boykins Wastewater Treatment Plant, Capron Elementary School, Courtland Wastewater Treatment Plant, Solenis Incorporated, Southampton Correctional Complex, and the Southampton Power Station.

Facilities manufacturing, processing, or otherwise using listed toxic chemicals above certain thresholds are required to report to EPA's Toxic Chemical Release Inventory (TRI) annually. Three facilities in the County are EPA-regulated for TRI, including Atlantic Wood

Industries, Solenis Incorporated, and the Southampton Power Station.

Historically, the Chowan River basin has experienced sporadic but significant water quality problems, including algal blooms and occasional fish kills. Most issues have occurred below Southampton County in North Carolina, but these problems reflect the impacts of activities in Virginia on water quality in North Carolina. In an effort to coordinate non-point source pollution management efforts within shared watersheds, Virginia's Department of Conservation and Recreation (DCR) signed a Memorandum of Agreement (MOA) with the State of North Carolina in October 2001. Instituted through North Carolina's Albemarle-Pamlico National Estuary Program, the MOA commits the States of Virginia and North Carolina to work together to address water quality issues in the Chowan watershed. In addition, the states jointly fund a watershed field coordinator to examine water quality problems in waters draining to North Carolina, including the Chowan drainage basin.

In 2020, DEQ identified the following water body segments within Southampton County as impaired waters. DEQ's Impaired Waters report indicates that most violations were attributed to naturally occurring conditions, primarily because the County's slow moving rivers flow through swampy areas where the decomposition of vegetation hinders mixing and re-aeration of waters. Those waters that have been identified as impaired are scheduled for the development of Total Maximum Daily Loads (TMDLs), which are calculations of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards and an allocation of that amount to the pollutant's sources. TMDL development must take place within 12 years of an impaired waterbody's initial listing in the 305(b)/303(d) Water Quality Assessment Integrated Report. Whenever possible, impaired waters are combined in a watershed-based approach to TMDL development.

Waterbody	Location
Applewhite Swamp	Harrells Mill to Three Creeks
Assamoosick Swamp	Upper tributaries including Mill Run to Assamoosick Swamp
Black Creek	Wades Pond downstream to mouth
Blackwater River	Entire length in County
Buckhorn Creek	All of Northern Branch within Virginia
Buckhorn Swamp	Near Pope that crosses over Rt 652, ends below Hwy 657
Cypress Swamp	From Sedley downstream to Rt 611
Darden Mill Run	Headwaters near Newsoms downstream to Windbourne Millpond
Flat Swamp	Bellyache Swamp and Frank's Branch downstream to Tarrara Creek
Hunting Quarter Swamp	Mainstem
Meherrin River	Emporia Reservoir Dam to state line, including tributaries Fontaine Creek and Mill Creek
Mill Swamp	Mainstem from headwaters downstream to Nottoway River
Nottoway River	From confluence with Blackwater River at state line upstream to SR 619 near Purdy, including tributaries Assamoosick Swamp, Three Creeks,

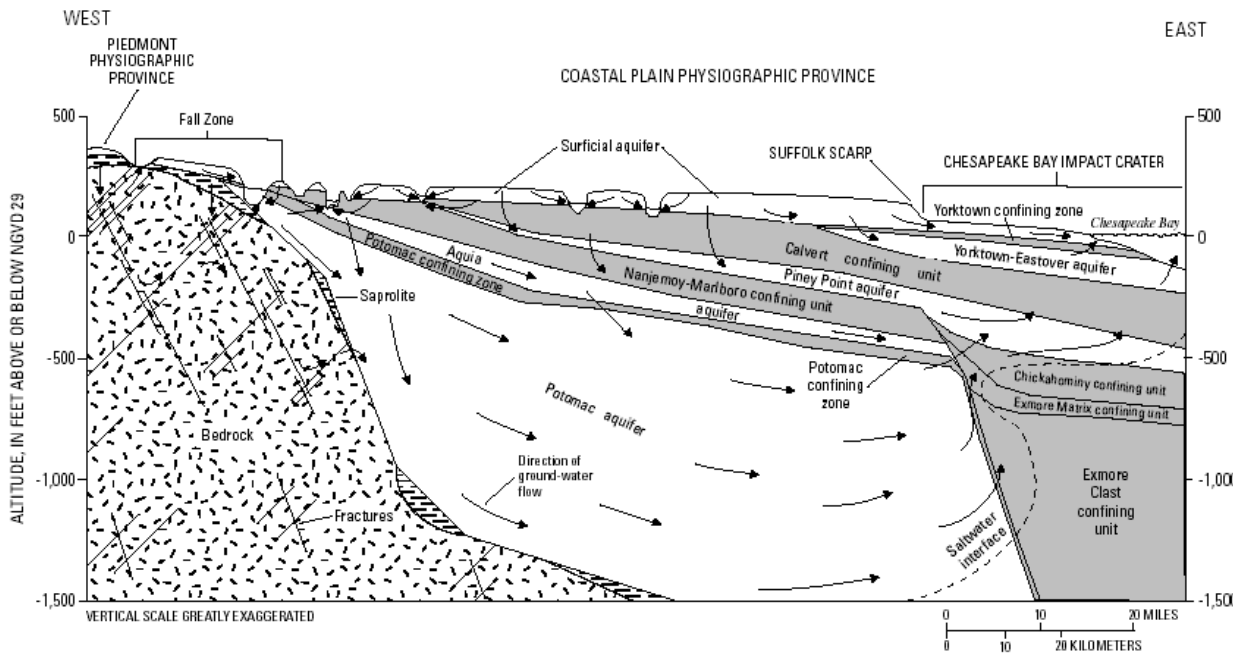
	Rowanty Creek, Hatcher Run, Arthur Swamp
Nottoway Swamp	Near Rt 611
Raccoon Creek	Mainstem
Round Hill Swamp	Between confluence with Seacock Swamp and Rt 623, and confluence of Horsepen Branch and Indigo Branch, north of Round Hill Road, west of Appleton Road
Seacock Swamp	Upper and lower Seacock Swamp
Tarrara Creek	Entirety of Tarrara Creek
Three Creek	Chatman Branch downstream to Southampton Correctional Farm including Angelico Creek, and from Otterdam Swamp to Browns Branch
Thweatt Branch watershed	Entire watershed including tributaries

Ground Water Resources

Water for public, private, and industrial use in the County comes primarily from ground water wells, although some agricultural irrigation comes from streams and ponds. Data from the United States Geological Survey (USGS) indicates that water withdrawals in the County totaled 39.94 million gallons per day (MGD) in 2005. The majority of the water withdrawals were from surface water sources (32.64 MGD) while the remainder came from ground water withdrawals (7.30 MGD). Most of the ground water withdrawals support thermoelectric uses (28.07 MGD).

The ground water system of southeastern Virginia consists of a series of aquifers separated by confining units of clay and silt. The aquifers are recharged along the Fall Line, the dividing line between the harder rocks of the Piedmont and the softer strata of the Coastal Plain. As shown on Figure 7-3, the water-bearing layers slope and thicken to the east. In addition to the unconfined Columbia water table aquifer, the U.S. Geological Survey (USGS) identifies seven confined aquifers (Lower Potomac, Middle Potomac, Upper Potomac, Virginia Beach, Aquia, Piney Point, and Yorktown-Eastover) beneath Southampton. The most productive aquifers in the area are the deepest, with both municipal and industrial wells using water from them. Over half of the domestic wells constructed since 1985 pump from the Potomac Aquifers. The water table aquifer is pumped primarily for small domestic, urban irrigation, and agricultural purposes.

Figure 7-3: Southeastern Virginia Aquifer System



Generalized hydrogeologic section and directions of ground-water flow in the Virginia Coastal Plain latitude relative to National Geodetic Vertical Datum of 1929.

Source: The Virginia Coastal Plain Aquifer System (from McFarland, E. Randolph, and T. Scott Bruce, *The Virginia Coastal Plain Hydrogeologic Framework*: Professional Paper 1731: US Geological Survey, Reston VA, 2006).

The Ground Water Management Act of 1992 designated eastern Virginia (east of Interstate-95 and south of the Mattaponi and York Rivers) as a ground water management area. In a ground water management area, withdrawals over 300,000 gallons per month require a ground water withdrawal permit. The Virginia Department of Environmental Quality (DEQ) issues the ground water withdrawal permits. The Ground Water Withdrawal Regulations require a technical evaluation of each withdrawal application. According to DEQ's 2004 Withdrawals Simulations report, "permits can only be issued if this assessment demonstrates that the proposed withdrawal in combination with all existing lawful withdrawals will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the historical prepumping water levels in the aquifer and the top of the aquifer." DEQ uses the USGS RASA groundwater model developed in 1990 to evaluate withdrawal applications and determine if the 80% criterion will be violated by additional withdrawals. Based on the permitted withdrawals in 2004, the 80% criterion is violated in the Middle Potomac, Upper Potomac, Aquia, and Yorktown-Eastover aquifers beneath portions of Southampton County. Because the 80% criterion has already been violated, it is unlikely that DEQ will approve many additional ground water withdrawals. **(Researching any updates, 2021)**

The largest water user in Southampton County is the Solenis, Inc. plant, which reported ground water withdrawals of approximately 5.5 MGD in 2005. The largest water user in the Southampton County region was International Paper's Franklin Mill. The mill did not

operate in 2011, although before its shutdown it was the largest permitted groundwater user in the region with average daily withdrawals of over 30 million gallons. During the mill shutdown, water level observations in aquifers indicated a slow and irregular recovery of potentiometric levels in the Potomac Aquifer, per the DEQ's October 2012 Status of Virginia's Water Resources report. The mill resumed operations during 2012, with subsequent potentiometric decreases. Monitoring of the Potomac aquifer and overlying aquifer levels at additional wells in the Franklin vicinity will assist in determining the extent of the potentiometric drawdown due to the mill.

The USGS has developed an updated ground water model for the entire commonwealth as of summer 2012. The model is capable of running at a one-hour time step, and includes simulations of all existing permitted point sources as well as all known withdrawals, including permitted, grandfathered and exempt, per the DEQ Status of Virginia's Water Resources report, October 2012. The model has been used to analyze surface water withdrawal applications for several years, and is used as part of a statewide assessment of the effects of water withdrawals and discharges on in-stream biology. DEQ anticipates the need for increased storage and expanded use of conjunctive systems to meet future water demands in some areas of Virginia.

The ground water from the Piney Point and Upper Potomac aquifers in Southampton County may contain naturally occurring fluoride concentrations above the EPA Safe Drinking Water Act standards. Fluoride removal can be successfully achieved through several available technological means including: reverse osmosis, electro dialysis reversal, ion exchange, and filtration containing activated alumina.

Stormwater Management

Revisions to the Virginia Stormwater Management (SWM) regulations were adopted in 2011 and became effective July 1, 2014. These regulations are an important part of the state's efforts to protect the quality of local waters and the Chesapeake Bay. In Southampton County, while we were not required to adopt a local SWM program until these new regulations went into effect, we had that option. In fact, the County has had an adopted SWM program in place since 2008. However, the revised SWM regulations require a revision of the County's regulations that will provide better service to the community and stronger protections for the environment. The Department of Environmental Quality (DEQ) revised the Stormwater Management regulations again in 2019 to improve water quality measures.

Prior to the revised stormwater management changes in 2011, developers of large scale projects requiring both stormwater management permit and plan had review and approval performed by County and Virginia's Department of Conservation and Recreation (DCR) personnel. Site inspections were performed by the County. Virginia transitioned the stormwater management program from DCR to the Department of Environmental Quality (DEQ) in summer 2013. The Stormwater Regulations adopted in July 1, 2014 require County personnel under the Department of Community Development to Administer, Plan

Review and inspect the permitting process for DEQ and collect permit fees. The County is required to remit 28% of the permit fees to DEQ and retain 72% of those fees locally. This local permitting function has several benefits to localities, including:

- Local governments can implement the SWM program more efficiently and effectively for developers and property owners.
- Local governments can address local water quality issues directly.
- Quality control of construction activities is maintained through frequent site inspections to ensure compliance with DEQ regulations.
- The permitting process becomes more service-oriented, making the local government a one-stop-shop for the applicant through the Department of Community Development – Environmental Services Division.
- Local natural resources are better protected with local knowledge reviewing and approving plans under state guidelines.
- Local governments have the opportunity to be more stringent than the state guidelines when necessary to protect environmentally sensitive areas and to encourage and Low Impact Development (LID) in suitable areas.
- The small revenue stream is produced to assist with the costs for additional training/certifications, plan review and inspection services.

The Erosion and Sediment Control (E&S) program regulates land disturbing activities (LDA) and is currently administered by the Department of Community Development – Environmental Services Division (County). Residential LDA typically don't exceed 10,000 square feet and are administered using the Agreement In-Lieu of an Erosion and Sediment Control Plan. Commercial LDA usually exceed 10,000 square feet and require the issuance of a County Land Disturbance Permit. The County was already administering the main elements of a comprehensive SWM, including administration, permitting, plan review, inspection, and enforcement. The current SWM requirements involve adoption of the stormwater management ordinance that is integrated with the County Code and requires local plan review and inspection of permanent Best Management Practices (BMP) devices and practices by the Environmental Engineer. DEQ staff has developed on-line technical assistance classes and guidance for training and equipping local staff members to implement the requirements of the stormwater ordinance, which became effective July 1, 2014 and revised July 1, 2019.

Natural Heritage Resources and Conservation

Statewide, natural heritage resources include plant and animal species as well as communities with special status. The Virginia Division of Natural Heritage database reports that Southampton County contains several communities or plant species of concern. These include three federal/state listed endangered species: the red-cockaded woodpecker, the Roanoke logperch (fish), and the eastern big-eared bat. The red-cockaded woodpecker is known to nest and live year-round in mature, living pine trees (saw-timber), particularly loblolly pines infected with red heart disease. A federal/state threatened species with known distribution throughout southeastern Virginia, the bald eagle, has also been observed in Southampton and is likely to occupy wooded areas along the rivers year-

round. State threatened species found in Southampton include Mabee's salamander, the Atlantic pigtoe (mussel), and the reclining bulrush (vascular plant). In addition to endangered and threatened species, the Department of Game and Inland Fisheries designates another six plants and animals as either federal or state species of concern with known or likely occurrences in Southampton County.

According to the Virginia Division of Natural Heritage, there are no Natural Heritage Preserves currently located in Southampton County. The Nature Conservancy has made all three major river systems in the County part of the Southern Rivers Program, which is an effort to protect the area's waters and adjacent lands through partnerships, land acquisition, ecological management, and other conservation strategies.

Conservation easements, which are private agreements between property owners and an entity that will manage the perpetual preservation of property in an undeveloped state, continue to increase in the County. Additionally, the County is home to over 100,000 acres of property in 39 Voluntary Agriculture and Forestal Districts, retaining the land in agriculture, forestry and open space generally for a term of ten (10) years. These programs preserve the agricultural heritage of Southampton County.

Strategic Planning for the Preservation of Natural Systems and Rural Character

Southampton County has a wealth of natural resources and an advantageous location between the Atlantic Ocean and the rolling hills of the Virginia Piedmont. Relatively flat topography and good soils make the County an ideal place for agriculture. An abundance of forested areas provide the County with natural beauty as well as economic and environmental benefits. Southampton County's position as a rural locality with plentiful green space will allow it to set aside areas that should be preserved for recreation, environmental quality, and wildlife habitat when development pressures increase. As development pressures increase it will be critically important to plan for the protection of these significant natural systems and the county's rich agricultural heritage. An emerging approach to strategic open space protection is known as "green infrastructure". Just as roads and utility systems are planned in interconnected networks, green infrastructure involves the identification and protection of open space networks to provide an integrated system of critical habitat areas, working lands and open space. A well-planned green infrastructure network could provide multiple benefits for the residents of the county.

The recently completed Hampton Roads Conservation Corridor Study (HRCCS) presents a green infrastructure based approach to conservation planning in Hampton Roads. The corridor system identified in Southampton County buffers the Blackwater, Nottoway and Meherrin Rivers and many of their tributary streams. This network could be expanded to include prime agricultural and forested lands and parks in order to help meet Southampton County's planning goals.

Implementation Strategies include:

- a. Encourage careful management of the natural resources of the County to enhance both the environment and the economic base of the County. The production of field crops, the raising of animals, the production of trees as a crop, recreational and tourism uses focused on the environment, as well as preservation of wildlife and natural beauty should be recognized as elements of the management program.
- b. Support programs and initiatives that protect and conserve fragile groundwater resources, as well as the rivers, streams, aquifers, and wetlands within the County.
- c. To protect groundwater resources, amend the zoning and subdivision ordinance to allow the use of septic systems only on property with A-1 and A-2, Agricultural zoning designations and the RR, Rural Residential zoning designation. Amend the zoning ordinance to consider the use of septic systems for properties with M-1, M-2, and M-3, Industrial zoning designations in areas not possible to serve with public sewer service.
- d. Support programs and initiatives that protect the land capable of producing crops. Include information available from USDA and Natural Resources Conservation Service in deliberation of requests for Zoning Map Amendments and Comprehensive Plan Amendment requests. Limit the use of land designation as Farmland of Statewide Importance or Prime Farmland to the extent possible for non-agricultural uses.
- e. Continue to support the Voluntary Agriculture and Forestal District Program as a way to protect agricultural land and open space.
- f. Support programs and initiatives that protect and promote the scenic and recreational value of the County's waterways and wetlands for use by County residents and visitors. Provide information on County website of Nottoway and Blackwater Rivers State Scenic River designations, as well as locations for the public to access the rivers.
- g. Support programs and initiatives that manage County forests to provide the best combination of recreational uses, wildlife habitat, and forest products production.
- h. Support programs and initiatives that reduce and work toward the elimination of pollution and wasteful use of air, water, soil, and other natural resources in cooperation with regional, state and federal agencies.
- i. Support programs and initiatives that eliminate waste and unnecessary destruction of plant life and encourage re-vegetation practices. Adopt zoning ordinance amendments that limit clearing in conjunction with construction activities.
- j. Adopt zoning ordinance amendments requiring landscaping of parking lots for non-residential uses to help limit heat-island effect.
- k. Enforce zoning and subdivision regulations and support state and federal programs and regulations intended to protect water quality. Adopt zoning ordinance amendments requiring minimum 50' undisturbed vegetative buffers along all USGS streams or perennial streams as indicated by the use of valid in-field indicators of perennial flow.
- l. Continue participation in regional programs to protect environmental resources and manage impacts on water resources.
- m. Continue and expand educational programs of the Recycling and Litter Control Council, such as programs to reduce waste and promote reuse and recycling by residents and businesses.

- n. Continue to review long-term alternatives to the current solid waste management program.
- o. Engage in discussions leading to an understanding of the effects of climate change on the environment and development in County.
- p. Encourage opportunities for alternative and renewable energy sources for County properties and private property. Provide density bonus for multi-family development that provides for solar use in individual units.
- q. Encourage Planning Commission and Board of Supervisors to work together regarding siting of utility scale solar development, to provide electricity through a renewable source while protecting the most productive farm and forest land.
- r. Encourage provision of EV charging stations in new residential subdivisions as well as commercial and industrial development so as to make use of EVs more practical and begin to limit reliance on fossil fuels for private vehicle use.
- s. Continue compliance with erosion and sediment control and stormwater ordinances, and commit to continuing inspection and enforcement program.
- t. Encourage Health Department to require evidence of septic system pump-out every five (5) years to help ensure groundwater quality and protect nearby streams and waters.