Section 6

Purpose

One of the many factors that contribute to the high quality of life in Hanover County is the exceptional quality of its land, water, air and natural heritage resources. It is important to balance preservation of the County's natural resources and environmental quality with the need for accommodating population growth and economic development.

Guided by federal, state and county regulations that are designed to preserve and conserve the County's natural resources, integration of innovative development processes can best ensure that growth and development is planned in an orderly fashion to complement the environment.

It is important to balance preservation of the County's natural resources and environmental quality with the need for accommodating population growth and economic development.

The purpose of this chapter is to:

- Provide an overview of the County's natural resources through resource inventories;
- Review existing regulations that affect the resources; and
- Identify strategies and policies to preserve and conserve resources while allowing innovative development

Goals

- Have a vibrant community while preserving natural resources
- Preserve and protect Hanover's valuable natural resources for the health and enjoyment of present and future generations
- Provide for orderly planned development, population growth, and economic development while preserving the County's natural resources and environmental quality

Objectives

- To consider the value of existing natural resources in conjunction with future development
- To protect, preserve and conserve the County's natural resources from degradation and loss
- To make effective use of existing regulations to protect and enhance environmental quality while incorporating innovative development standards based on best practices

Resources Inventory

Natural Resources Inventory

Land

- **Physiography** - There are more than 20 physiographic provinces in North America; Virginia has five of these provinces. Hanover County lies astride the Fall Line, which generally runs along the right-of-way of the Richmond, Fredericksburg and Potomac Railroad. The Coastal Plain is to the east of the Fall Line and the Piedmont Plateau is to the west. Therefore, Hanover County and the Town of Ashland are within both the Coastal Plain and Piedmont Plateau physiographic provinces. Within Hanover County, elevation ranges from about sea level on the eastern end of the Pamunkey River to about 370 feet above sea level on the highest ridges (Hanover County Soil Survey, 1980). Four (4) foot contour elevations which were created in 2006 can be viewed online within the County's Geographic Information System (GIS).

There are both shallow and deep water aquifers in the Coastal Plain. The shallow aquifers have more interaction with surface water and contaminants. The deep aquifers are recharged miles away and present a much more complex problem when contaminated. (College of William and Mary, Department of Geology, Coastal Plain Province: The Geology of Virginia, 2010).

- **Climate** - Hanover County and the Town of Ashland lie within the Humid Subtropical Climate Zone, which is characterized by hot, humid summers and cool winters. Significant amounts of precipitation occur in all seasons within this zone. Precipitation in the winter months is associated with large storms that the westerlies steer from west to east. Most precipitation in the summer months occurs during thunderstorms or the occasional hurricane or tropical storm.

  The average temperature for Hanover County varies from 36.2 degrees Fahrenheit in January to 76.5 degrees Fahrenheit in July. The average annual precipitation for Hanover County is 42.05 inches. On average, February is the driest month with an average precipitation of 2.87 inches and August is the wettest month with an average precipitation of 4.34 inches. In terms of snowfall, January and February are nearly even with averages of 4.8 and 4.7 inches of snowfall, respectively. Annually, Hanover County receives approximately 14.6 inches of snowfall (Southeast Regional Climate Center, 2010).

- **Soils** - Hanover County is characterized by gently rolling hills that are heavily wooded (in undeveloped areas) and bisected by streams and small rivers. There are two distinct geologic and hydrogeologic settings in Hanover County: the eastern portion of the County is located within the Coastal Plain Physiographic Province and the western portion of the County is in the Piedmont Physiographic Province. The Coastal Plan Physiographic Province is comprised of unconsolidated marine and non-marine sediments overlying a crystalline rock complex. A major fault zone, the Fall Line, separates the Coastal Plan Physiographic Province from the Piedmont Physiographic Province. The Piedmont Physiographic Province is comprised of massive igneous and metamorphic rocks.

The western third and eastern third of the County have significant areas of highly erodible soils (soils that have an Erodibility Index of 8.0 or higher). Most areas with steep slopes occur along streams and rivers, especially where these watercourses traverse the Fall Line. At the Fall Line, the banks of several rivers, particularly the South Anna River, have relatively steep bluffs formed of exposed rock. In the eastern part of the County, steep slopes are concentrated along the tributaries that feed the Pamunkey River (Totopotomoy Creek, Mechumps Creek, Crump Creek and Parsleys Creek).

Soil maps are available in the Planning Department and can be viewed online within the County's Geographic Information System (GIS). Also available as a GIS layer is 'prime agricultural soils' which is data from the Natural Resources Conservation Service (NRCS).

< Water

In July 2011, the County, in conjunction with the Town of Ashland, adopted a Long Range Water Resources Plan (LRWRP) to identify existing and future water resources. Major elements of this adopted plan include:

- **Watersheds** - Hanover County lies primarily within the York major watershed; however, the southernmost portion of the County lies within the James major watershed. The County is located within three primary sub-watersheds: the Pamunkey sub-watershed, the Middle James River watershed, and the Lower James sub-watershed. There are a total of nine stream gauging and well monitoring stations in Hanover County. The eastern portion of the County, east of I-95, falls within the Eastern Virginia Groundwater Management Area. (Virginia Department of Conservation & Recreation (VDCR), 2010).

- **Hydrology, groundwater and surface water** - Large diameter wells, generally larger than six inches, have been dug or drilled into the soil and weathered rock of the Piedmont, and into the fluviomarine sediments of the Coastal Plain. These wells are commonly less than 60 feet deep. They yield small quantities of groundwater that is moderately soft, sometimes slightly turbid, and are susceptible to contamination. Maps showing the depth to the water table in Hanover County, the available water supply in Hanover County and the groundwater withdrawals by county in Virginia can be found in the LRWRP.

  Small diameter wells have been drilled to a depth of as much as 200 feet into the Piedmont and as much as 350 feet into the Coastal Plain. Some of these wells yield as much as 50 gallons per minute. Several wells in the eastern part of the County yield more than 100 gallons per minute (Hanover County Soil Survey, 1980).

  Hanover County has a diverse and complex mix of groundwater and surface waters, including tidal and non-tidal streams, wetlands, ponds, aquifer recharge areas, and confined and unconfined groundwater aquifers. The County is divided into two major drainage areas, the Chickahominy River and the Pamunkey River Basins. The smaller Chickahominy Basin contains about 15 percent of Hanover's 473 square miles and drains southward into the Chickahominy River and eventually the James River. Although small by comparison to the Pamunkey River Basin, this southern drainage area contains a majority of the County's Suburban Service Area (SSA). The larger Pamunkey River Basin is composed of the North Anna, South Anna, and Pamunkey Rivers, all of which drain into the York River Basin. The northern drainage area, which is predominantly rural, includes about 85 percent of the County. The Town of Ashland straddles the two drainage areas.

  Groundwater sources vary widely in the Piedmont province for water quality and quantity. High iron levels and acidity are the two most common problems. Due to these variances, well monitoring and well site evaluation are two important actions to ensure the water source is available and not contaminated.

- **Wetlands** - Wetlands are transitional areas between dry uplands and bodies of water. Hanover's wetland complexes, whether tidal or non-tidal, consist of vegetated marshes, swamps, bogs, bottomlands, shallow open waters, non-vegetated beaches, sandflats, and mudflats. Wetlands provide a multitude of benefits including, but not limited to, filtering pollutants and sediment, serving as a barrier to and a means to absorb floodwaters, buffering and stabilizing shorelines and stream banks from erosion, recharging groundwater resources, and serving as breeding and nesting grounds for plant and wildlife.

  Most of Hanover County's wetlands exist along stream corridors. The majority of the wetlands are found along the middle and lower Pamunkey, Newfound River, Totopotomy Creek, Beaverdam Creek, and Mechumps Creek. Additional wetlands are found in the concentrated areas within the geographic center of the County. The lower part of the Chickahominy River has the greatest expanse of wetlands.

  In addition to federal and state endangered species and wetlands regulations, the County's and the Town's respective Chesapeake Bay Preservation program regulates wetlands within Chesapeake Bay Preservation Areas (CBPAs), limits new development in wetlands, and requires a 100' buffer around certain wetlands.

- **Water Supply** - The analysis indicates that Hanover County and the Town of Ashland will have an adequate public water supply through the 2042 planning period with the addition of the Verdon Quarry reservoir site (with necessary permitting and funding in place by 2027) and continued implementation of water conservation measures and drought response management procedures and policies. The LRWRP does not suggest or recommend the future local regulation of self-supplied users or private community systems.

Natural Heritage Features

- **Natural Heritage Resources** - Natural heritage resources as identified by the Virginia Department of Conservation and Recreation – Division of Natural Heritage (DCR - DNH) include the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations such as caves and karst features. Hanover County has thirty-eight (38) natural heritage resource sites. The data provided by DCR related to the sites is also available as a layer of the County's GIS.

  The Virginia Natural Heritage Program of DCR has developed the Virginia Natural Landscape Assessment (VaNLA) for identifying, prioritizing, and linking natural lands in Virginia. These natural lands, or cores, are assigned an Ecological Integrity Score. In general, higher scores are given to areas that are more biologically diverse, part of a larger complex of natural lands, and contribute to water quality enhancement. In 2009, the Richmond Regional Planning District Commission (RRPDC) prepared a regional assessment, including Hanover County, to identify the Priority Conservation Areas (PCA) using the VaNLA process. The PCAs form a natural basis for strengthening green infrastructure through riparian connections within large intact cores along drainage ways such as along the South Anna above Ashland, the Little River, and along the Pamunkey and North Anna Rivers between Hanover and Caroline counties.

- **Threatened or Endangered Species or Habitats of Concern** - As identified in the tables below, a number of species have been classified by either the Virginia Department of Game and Inland Fisheries (VDGIF) through the Biota of Virginia (BOVA) survey or VDCR-DNH as a *Threatened or Endangered or a species which merits special concern regarding the long term viability and health of the species*. A Wildlife Action Plan has been prepared by the VDGIF for a number of these species. A map showing the areas designated as protected habitat areas can be found in the 2011 Long Range Water Resources Plan.

Table 6-1 Threatened or Endangered Species for Hanover County

Virginia Department of Game and Inland Fisheries

STATUS	COMMON NAME	SCIENTIFIC NAME
SE	Bat, Rafinesque's Eastern Big-Eared	Corynorhinus Rafinesquii Macrotis
SE	Rattlesnake, Canebrake	Crotalus Horridus
ST	Sandpiper, Upland	Bartramia Longicauda
ST	Shrike, Loggerhead	Lanius Ludovicianus
FSST	Eagle, Bald	Haliaeetus Leucocephalus
ST	Floater, Green	Lasmigona Subviridis
ST	Shrike, Migrant Loggerhead	Lanius Ludovicianus Migrans
FSSS	Lance, Yellow	Elliptio Lanceolata
SS	Heron, Little Blue	Egretta Caerulea Caerulea
SS	Wren, Winter	Troglodytes Troglodytes
SS	Frog, Carpenter	Lithobates Virgatipes
CC	Turtle, Spotted	Clemmys Guttata
SS	Harrier, Northern	Circus Cyaneus
SS	Night-Heron, Yellow-Crowned	Nyctanassa Violacea Violacea
SS	Owl, Barn	Tyto Alba Pratincola
SS	Lampmussel, Yellow	Lampsilis Cariosa
SS	Creeper, Brown	Certhia Americana
SS	Dickcissel	Spiza Americana
SS	Egret, Great	Ardea Alba Egretta
SS	Finch, Purple	Carpodacus Purpureus
SS	Kinglet, Golden-Crowned	Regulus Satrapa
SS	Moorhen, Common	Gallinula Chloropus Cachinnans
SS	Nuthatch, Red-Breasted	Sitta Canadensis
SS	Tern, Caspian	Sterna Caspia
SS	Thrush, Hermit	Catharus Guttatus
SS	Warbler, Magnolia	Dendroica Magnolia
SS	Otter, Northern River	Lontra Canadensis Lataxina

FE=Federal Endangered; FT=Federal Threatened; FC=Federal Candidate; FS=Federal Species of Concern (not a legal status; list maintained by USFWS Virginia Field Office);
SE=State Endangered; ST=State Threatened; SS=State Special Concern (not a legal status).

Source: Fish and Wildlife Information Service. 384 Species Booklet for Fish, Amphibians, Reptiles, Birds, Mammals, Mollusks, Other Aquatic Invertebrates, Terrestrial Invertebrates, Marine Mammals, Plants in (085) Hanover County. Virginia Department of Game and Inland Fisheries, 2009, http://www.vafwis.org/fwis (accessed July 12,.2010).

Table 6-2 Threatened or Endangered Species for Hanover County

Virginia Department of Conservation Resources

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	LAST YEAR OBSERVED
Amphibians				
Ambystoma Tigrinum	Tiger Salamander		LE	1973
Siren intermedia	Lesser Siren			2009
Birds				
Haliaeetus Leucocephalus	Bald Eagle		LT	2002
Bivalvia (Mussels)				
Alasmidonta Heterodon	Dwarf Wedgemussel	LE	LE	1972
Elliptio Lanceolata	Yellow Lance	SOC	SC	1995
Lampsilis Cariosa	Yellow Lampmussel		SC	1991
Lampsilis Radiata	Eastern Lampmussel		SC	1985
Lasmignona Subviridis	Green Floater		LT	1972
Communities				
Natural Community	Coastal Plain/Piedmont Acidic Seepage Swamp			2008
Natural Community	Coastal Plain/Piedmont Swamp Forest			2006
Natural Community	Mountain/Piedmont Basic Woodland			1995
Heteroptera (True Bugs)				
Sigara Depressa	Virginia Piedmont Water Boatman	SOC	LE	1969
Lepidoptera (Butterflies & Moths)				
Acronicta Albarufa	Barrens Dagger Moth			1998
Vascular Plants				
Asclepias Purpurascens	Purple Milkweed			2002
Desmodium Tenuifolium	Slim-leaf Tick-trefoil			1978
Helenium Brevifolium	Shortleaf Sneezeweed			2006
Mimosa Quadrivalvis Var. Angustata	Little-leaf Sensitive-briars			1986
Sarracenia Purpurea Ssp. Venosa	Southern Purple Pitcher-Plant			1987
Tetragonotheca Helianthoides	Pineland Squarehead			1972
Triadenum Tubulosum	Large Marsh St. John's Wart			2006

Federal Status: LE - Listed Endangered; SOC - Species of Concern species that merit special concern (not a regulatory category)

State Status: LE - Listed Endangered; LT - Listed Threatened; SC - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)

Source: Virginia Natural Heritage Program. Natural Heritage Resources by County: Hanover County. Virginia Department of Conservation and Recreation, 2002, http://www.dcr.virginia.gov/natural_heritage/dbsearchtool.shtml (accessed 07.12.2010).

< Mineral Extraction

- The mining of sand, clay and granite is an active endeavor in the County. Martin Marietta's Verdon Quarry (granite) and U.S. Silicia's Rockville Quarry (aplite) are two of the larger operations.

  Mineral extractions can be an economic benefit to the County, however, some of these uses can produce impacts related to noise, vibration, and dust on the neighboring land uses. Mineral extractions, such as natural gas, that can co-exist with residential uses are encouraged.

< Forests, Agriculture, and Conservation Lands

- **Forests** - *Existing Land Use Inventory* (RRPDC, July 2012) – The Richmond Regional Planning District Commission (RRPDC) completed a regional land use inventory on a parcel basis, using a region-wide methodology analyzing 2009 aerial imagery and local GIS information. Two of the regional land use classifications show "Ag/Forest", (40%/60% of either agricultural or forest land cover) and "Forest" (80-90% tree covered parcels). Neither of these categories are meant to represent active commercial or timbered forest land. This process identified 67,309 acres (23%) of "Ag/Forest" land and 85,278 acres (30%) shown to be covered in forest. Thus, nearly one-half of the County land area appears to be covered forested or a mixture of agriculture and forest land.

- **Agricultural Soils** - A county-wide layer of soils most suitable for agriculture has been created within the County's GIS using the Natural Resources Conservation Service (NRCS). This layer does not necessarily identify active farms, but provides an indication of soils that would be conducive to best support agriculture.

- **Conservation Lands**

  - Rural Conservation (RC) subdivisions – As of January 2013, thirty-four (34) RC subdivisions have been developed in the County, and are shown as a GIS map layer in the County's inventory. The RC Zoning District regulations (Article 5, Section 1A of the Zoning Ordinance) calls for a minimum of 70% of the net acreage of a district to be placed in a conservation area. A total of 5,466 acres are included in conservation through this zoning tool.

  - Conservation Easements – A "conservation easement" is a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs. A county-wide 'conservation easement' layer has been created within the County's GIS by the DCR

  - The Code of Virginia authorizes localities to adopt districts designed to protect working farm and forest land. These Agricultural and Forestal Districts (AFDs) are voluntary agreements between landowners and the locality, and offer benefits to landowners that agree to keep their land in its current use for a period of 4 to 10 years. Hanover County currently has eight (8) AFDs consisting of approximately 14,115 acres

  - Federal and State Conservation Lands– There are several parcels in the County that are designated as a Federal or State Conservation Land. This information is also a layer in the County's GIS created by the DCR

  - Open Space Land Act – There are several parcels in County that are designated as Open Space Land. This information is also a layer in the County's GIS created by the DCR

< Air Quality

Local air quality is an important quality of life issue with the potential to adversely impact the health and prosperity of individuals, local businesses, and government operations. Virginia DEQ monitors level of ozone and particle pollution from stations around Virginia. Both of these are pollutants that, at high levels, may raise health concerns in some people. (http://deq.state.va.us/).

Issues and Current Regulations

1. Stormwater Management

Hanover County operates a stormwater program to address stormwater runoff and localized flooding in an effort to protect water quality and control water quantity. The program's regulations apply to both new development and redevelopment throughout the County and require minimizing the use of paved surfaces and regulating the amount of land disturbance near streams.

The Department of Public Works develops and implements programs to comply with state and federal regulations involving stormwater management, erosion and sedimentation control, Chesapeake Bay Preservation Act and floodplain. The Department is responsible for managing the County's Municipal Separate Storm Sewer permit obtained from the Virginia Department of Conservation and Recreation. The National Pollutant Discharge Elimination System (NPDES) Phase II permit involves coordinating programs to ensure water quality goals are established and met for the County.

Stormwater runoff is also addressed in the *Hanover County Drainage Design Handbook*, which is used to establish detailed design criteria for implementing the requirements of the County's Floodplain and Drainage Control Ordinance. As discussed in the Handbook, the stormwater drainage system should serve three purposes: 1) shall be designed to account for both on-site and off-site stormwater; 2) shall discharge water into a natural drainage way; and 3) shall carry water to a point where it will flow by gravity downstream to where it can connect with sufficient, existing systems.

2. Federal Clean Water Act – National Pollutant Discharge Elimination System (NPDES) Requirements

Hanover County and the Town of Ashland are subject to the requirements of the federally mandated NPDES program related to discharges from their publicly owned and operated municipal separate storm sewer systems (MS-4). In the Commonwealth of Virginia, the program is administered by the Virginia Department of Conservation and Recreation under the Virginia Stormwater Management Program (VSMP). State oversight responsibility for the program rest with the Virginia Department of Environmental Quality (DEQ). To comply with this mandate, the County has maintained its coverage under the State's MS-4 general discharge permit regulations in five-year periods since 2003. The current permit is expiring in July, 2019. The County will file future registrations for the permit phase beginning July 1, 2019 and beyond.

The County maintains a Program Plan which is updated in accordance with the requirements of the State's MS-4 general permit. This MS-4 Program Plan contains the EPA's required six minimum control measures along with specific measurable goals and interim milestone completion dates for each, as well as the person or persons responsible for their implementation. In addition to the minimum control measures, the County is required to address a number of other pollution reduction requirements including new provisions for addressing Total Maximum Daily Loads (TMDLs).

3. Total Maximum Daily Loads (TMDLs)

TMDLs and plans to address TMDLs are emerging as a significant consideration for local government and in particular local land use plans. This is in part due to the relationships between development and water quality impacts from stormwater runoff from developed areas and lawns and other human activity impacts. Nutrients, bacteria and other pollutants make their way into our runoff systems. These pollutants are the result of human activities such pet waste management (or lack of), litter, yard waste management, fertilizer application to lawns and other activities that have the potential to pollute runoff entering our creeks and streams.

The largest TMDL affecting the County at this time is the Chesapeake Bay TMDL. This particular TMDL has implications for the County with regard to both new development standards for stormwater runoff and emerging mandated responsibilities to retrofit and control polluted stormwater runoff from existing developed lands.

Hanover County has adopted a stormwater management program to conform to new state regulations to become effective by July 2014. This new program consolidates the issuance of permits for stormwater management at the local level and adds increased quality and quantity requirements on new development with a primary intent to meet state and federal goals for water quality in the Chesapeake Bay and state waters. In addition, the Chesapeake Bay TMDL and corresponding Virginia Watershed Implementation Plan (WIP) has established significant goals for reducing pollution particularly for urban, and agricultural sources. These policies will have a significant influence on Hanover County over the next 5 to 15 years. Specifically, under state and federal statutes, Hanover County will be required to implement new programs including increased water quality related treatments at our waste water treatment plants and within existing developed areas to reduce nitrogen, phosphorus and sediments, and address requirements of TMDLs. These changes will result in millions of dollars of expenditures at the local level to accomplish these goals as stipulated in state and federal law. A major reevaluation of the Chesapeake Bay Program and model is anticipated in 2017 which will define and redefine these goals further affecting both the urban and rural land owners of Hanover County. In addition, state and federal activities related to TMDL planning will continue to affect Hanover County and land use practices throughout the community.

In addition to the Chesapeake Bay TMDL, The DEQ tests waterways in Virginia for 130 different pollutants to determine if they are suitable for swimming, fishing, and drinking. DEQ also maintains lists of waterways that do not meet standards and are considered impaired. "Total Maximum Daily Loads" or TMDLs are plans that have been developed to restore water quality in impaired waters in response to these DEQ monitoring findings.

There are a number of TMDLs in Hanover County Watersheds. These include segments of the Pamunkey River including Mechumps Creek and Matdequin Creeks and the Chickahominy River. At this time two (2) TMDLs, in addition to the Chesapeake Bay TMDL, have waste load allocations. The Department of Environmental Quality is actively developing implementation plans for pollution abatement in these watersheds. More are anticipated to be developed to address stream segments with limited water quality. In accordance with the federally mandated Municipal Separate Storm Sewer System permit, Hanover County will be required to take planning and implementation actions to address these TMDLs.

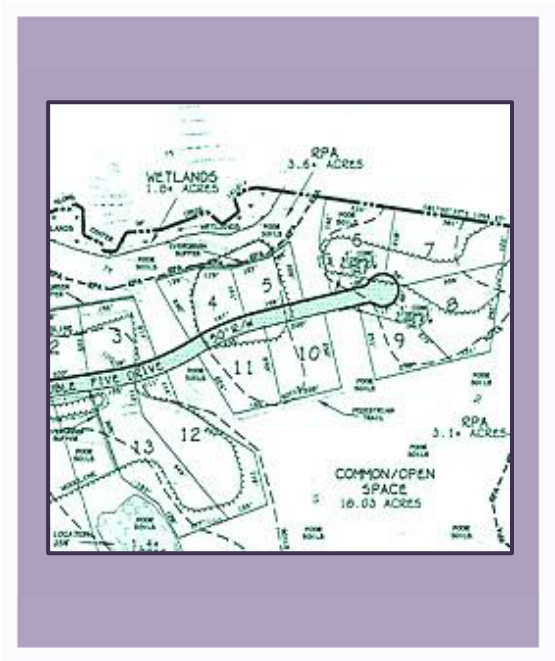
For more information about these TMDLs visit the DEQ website at: http://www.deq.state.va.us/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLDevelopment/DocumentationforSelectTMDLs.aspx or contact the Hanover Department of Public Works.

4. Chesapeake Bay Preservation Act Program

The Chesapeake Bay Preservation Act Program (CBPA), which was adopted by the Town and County in 1990 and 1992, respectively, requires the improvement of water quality of the Chesapeake Bay through proper land use management strategies County wide. This program was a precursor to the requirements of MS4 and includes other environmental requirements; however, there are some overlapping elements. This Program has been revised a number of times, most recently in 2003 in response to state law changes. The overall goal of the CBPA is to improve the quality of the water entering the Chesapeake Bay by requiring pollution prevention practices when developing environmentally sensitive lands throughout Virginia. Localities which are subject to the Act, including Hanover and Ashland, are required to incorporate water quality standards into their comprehensive plan, zoning ordinance, subdivision ordinance, and erosion and sedimentation ordinance.

Chesapeake Bay Preservation Areas consist of the following:

- **Resource Protection Areas** are buffers adjacent to county waterways which are intended to help protect water quality. Resource Protection Areas (RPA) include tidal wetlands, tidal shores, nontidal wetlands (connected by surface flow and contiguous to tidal wetlands or to perennial streams), and a 100-foot buffer adjacent to and landward of other RPA components. Development within RPAs is limited to water-dependent uses and redevelopment. Although an option to designate Intensely Developed Areas (IDAs) for areas of concentrated development within an RPA where development has severely altered the natural state of the area is available, Hanover County has not identified any areas where IDAs are appropriate.



- **Resource Management Areas (RMA)** include areas with highly erodible soils, highly permeable soils, flood plains, and nontidal wetlands not included in RPAs. If these components are not adjacent to RPAs, the Resource Management Areas (RMA) consists of an area 150 feet contiguous to and landward of the RPA. Development within an RMA is allowed provided that certain development standards, as set forth in the Hanover County Code, are followed to ensure water quality is protected.

  The Chesapeake Bay Act regulations require that new development and redevelopment minimize non-point source pollution from stormwater runoff, erosion and sedimentation as well as maximize rainwater infiltration. This is addressed in eleven (11) management measures and is accomplished by use of a variety of Best Management Practices (BMPs), such as:

  a. Minimizing land disturbance
  b. Preserving indigenous vegetation
  c. Minimization of impervious cover
  d. Erosion and sedimentation control measures
  e. Control of stormwater run-off and quality

- The CBPA also requires localities address nonpoint source pollution related to agricultural and forestry in their ordinances. Hanover County partners with the Hanover Caroline Soil and Water Conservation District (see below), U.S.D.A. Natural Resource Conservation Service, Virginia Cooperative Extension and the Virginia Department of Forestry to implement these requirements.

- In addition to new development, agricultural and forestall activities, the Chesapeake Bay Preservation Act requires certain implementation of other measures affecting existing development. One of these includes the requirement to pump out septic tanks once every five (5) years when located within Chesapeake Bay Preservation Areas. Alternatively residents can have a sewage handler inspect the tank and certify it does not need to be pumped or a Virginia Department of Health approved filter may be installed. The Hanover County Department of Public Works is required under the Act to monitor and enforce these requirements.

5. Comprehensive Coastal Resource Management

Issue Statement (Comprehensive Coastal Resource Management)

Coastal ecosystems reside at the interface between the land and water, and are naturally very Complex. They perform a vast array of functions by way of shoreline stabilization, improved water quality, and habitat for fishes, from which humans derive direct and indirect benefits.

The science behind coastal ecosystem resource management has revealed that traditional resource management practices limit the ability of the coastal ecosystem to perform many of these essential functions. The loss of these services has already been noted throughout coastal communities in Virginia as a result of development in coastal zone areas coupled with common erosion control practices. Beaches and dunes are diminishing due to a reduction in a natural sediment supply. Wetlands are drowning in place as sea level rises and barriers to inland migration have been created by construction of bulkheads and revetments. There is great concern on the part of the Commonwealth that the continued armoring of shorelines and construction within the coastal area will threaten the long-term sustainability of coastal ecosystems under current and projected sea level rise.

In the 1980s, interest arose in the use of planted wetlands to provide natural shoreline erosion control. Today, a full spectrum of living shoreline design options is available to address the various energy settings and erosion problems found. Depending on the site characteristics, they range from marsh plantings to the use of rock sills in combination with beach nourishment.

Research continues to support that these approaches combat shoreline erosion, minimize impacts to the natural coastal ecosystem and reinforce the principle that an integrated approach for managing tidal shorelines enhances the probability that the resources will be sustained. Therefore, adoption of new guidance and shoreline best management practices for coastal communities is now necessary to insure that functions performed by coastal ecosystems will be preserved and the benefits derived by humans from coastal ecosystems will be maintained into the future.

Policy Statement

In 2011, the Virginia Assembly passed legislation to amend §28.2-1100 and §28.2-104.1 of the Code of Virginia and added section §15.2-2223.2, to codify a new directive for shoreline management in Tidewater Virginia. In accordance with section §15.2-2223.2, all local governments shall include in the next revision of their comprehensive plan beginning in 2013, guidance prepared by the Virginia Institute of Marine Science (VIMS) regarding coastal resource management and, more specifically, guidance for the appropriate selection of living shoreline management practices. The legislation establishes the policy that living shorelines are the preferred alternative for stabilizing eroding shorelines.

This guidance, found within the Comprehensive Coastal Resource Management Portal (CCRMP), is being prepared by VIMS for localities within the Tidewater region of Virginia (which includes Hanover County). It explicitly outlines where and what new shoreline best management practices should be considered where coastal modifications are necessary to reduce shoreline erosion and protect our fragile coastal ecosystems. This guidance will include a full spectrum of appropriate management options which can be used by local governments for site-specific application and consideration of cumulative shoreline impacts. The guidance applies a decision-tree method using a based resource mapping database that will be updated from time to time, and a digital geographic information system model created by VIMS.

Recommendations

- Refer to the guidance presented in the locality's Comprehensive Coastal Resource Management Portal (CCRMP) prepared by VIMS to guide regulation and policy decisions regarding shoreline erosion control
- Utilize VIMS Decision Trees for onsite review and subsequent selection of appropriate erosion control/shoreline best management practices: http://ccrm.vims.edu/decisiontree/index.html
- Utilize VIMS' CCRMP Shoreline Best Management Practices for management recommendation for all tidal shorelines in the jurisdiction
- Consider a policy where the above Shoreline Best Management Practices become the recommended adaptation strategy for erosion control, and where a departure from these recommendations by an applicant wishing to alter the shoreline must be justified at a hearing of the board(s)
- Encourage staff training on decision making tools developed by the Center for Coastal Resources Management at VIMS
- Follow the development of the state-wide General Permit being developed by Virginia Marine Resources Commission (VMRC)
- Ensure that local policies are consistent with the provisions of the permit
- Evaluate and consider a locality-wide permit to expedite shoreline applications that request actions consistent with the VIMS recommendation
- Seek public outreach opportunities to educate citizens and stakeholders on new shoreline management strategies including Living Shorelines
- Follow the development of integrated shoreline guidance under development by VMRC
- Evaluate and consider a locality-wide regulatory structure that encourages a more integrated approach to shoreline management
- Consider preserving available open spaces adjacent to marsh lands to allow for inland retreat of the marshes under rising sea level
- Evaluate and consider cost share opportunities for construction of living shorelines

6. Floodplains

The Federal Emergency Management Agency (FEMA) produces flood maps called Flood Insurance Rate Maps (FIRMs). These maps illustrate local flood risk to help keep people and property safe from flooding. These maps are available in the Department of Public Works and can be viewed online within the County's Geographic Information System (GIS). Development within the floodplain must address floodplain regulations and building code requirements.

7. Solid Waste and Recycling Services

The Solid Waste Division of the Hanover County Department of Public Works maintains six solid waste service convenience centers, as well as a transfer station off U.S. Rt. 301 where residents may dispose of household waste and recyclable items. Municipal waste is taken to an out of county landfill.

Hanover-Caroline Soil and Water Conservation District – The Hanover-Caroline Soil and Water Conservation District (H-CWCD) is a political subdivision of state government responsible for developing programs to conserve soil, water, and related natural resources within its boundaries. A Board of Directors, composed of four elected directors and two appointed directors, governs the business and activities of the District. The District administers the following programs:

- **Chesapeake Bay Preservation Act, TMDL and Tributary Strategies Implementation**:
  The District administers the agricultural regulations of the state-mandated Chesapeake Bay Preservation Act (CBPA). This is accomplished by helping agricultural landowners and operators install and maintain riparian buffers, manage fertilizer and chemical use through the implementation of Soil and Water Quality Conservation Plans, and reduce sediment to waterways through the implementation of Best Management Practices (BMPs).

- **Virginia Agriculture BMP Cost-Share and Tax-Credit Program**:
  The District receives funds from the Virginia Department of Conservation and Recreation to administer the Virginia Agriculture BMP Cost-Share and Tax-Credit Program (VACS) Program in Hanover and Caroline Counties. The program provides incentives to agricultural landowners and producers to apply BMPs to their land. Through this program, Hanover farmers have been able to install waste management systems for dairy and poultry manure, grazing systems for cattle, permanent vegetation on cropland, stabilization of critical erosion areas, nutrient management on cropland, and riparian and field buffers.

- **Agricultural Technical Assistance**:
  The District works closely with Hanover County Public Works to address Erosion and Sediment (E & S) Control on properties undertaking land conversions from forestry to agricultural uses. The District also provides conservation planning assistance on new farms/farmettes in Hanover and Caroline Counties.

- **Agricultural Stewardship Act Implementation**:
  The H-CSWCD works closely with the Virginia Department of Agriculture and Consumer Services (VDACS), who administers the Act, on local water quality problems including the investigation and resolution of both formal and informal water quality complaints.

- **Flood Control**:
  The H-CSWCD operates and maintains Springfield Lake Dam No. 52-B under provisions of Public Law 566 which provides watershed protection and flood prevention for a 3,150 acre watershed.

- **Public Outreach, Information and Environmental Education**:
  The District administers programs on a wide variety of conservation topics such as point and non-point source pollution, water quality, soils, watersheds, erosion, and the Chesapeake Bay.

8. Threatened or Endangered Species and Habitats of Concern

The Endangered Species Act (ESA) of 1973 (7 USC 136; 16 USC 1535 et seq.) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The ESA prohibits any action, administrative or real, that results in a “taking” of a listed species, or adversely affects their habitat.

Virginia law protecting threatened or endangered species also affects the ability to develop water supply resources. A Virginia Water Protection Permit (VWPP) is required for withdrawals from surface waters. In evaluating the VWPP application, the Virginia Department of Game and Inland Fisheries (VDGIF), the Virginia Department of Agriculture and Consumer Services (VDACS), and the Virginia Department of Conservation and Recreation, Division of Natural Heritage (VDCR-DNH) evaluate the effect of VWPP requests. VDGIF is responsible for the protection of animal species and VDACS is responsible for the protection of plants and insects. Both agencies work with VDCR-DNH to maintain an inventory of known occurrences of species of concern.

9. Land Conservation

Hanover utilizes the following programs and regulations to encourage land conservation:

- **Land Use Program**:
  A state program adopted by County ordinance, which provides for the assessment of land based on use value rather than market value. A portion of the real estate taxes are deferred to encourage land to remain in agriculture, horticulture, forest use, or open space.

- **Zoning Regulations:**
  Various zoning districts encourage the preservation of open space, especially located around environmentally sensitive areas. One of the purposes of the RC, Rural Conservation District in particular, is to provide assurances that open space will be preserved and maintained, in conjunction with sufficient design flexibility to provide an incentive to develop cluster residential development with open space. The RS, Single Family Residential District, RM, Multi-Family Residential District, MX, (Mixed Use) District, and BP, Business Park District also contain minimum open space requirements.

- **Virginia Open Space Land Act**
  Localities in Virginia have been given the authority to acquire or designate property for use as open-space land. There are several parcels in Hanover County that have been designated as such under this Act. These parcels can be viewed on the County's GIS. This data is from the DCR.

10. Air Quality

The Clean Air Act is a federal law that provides for the protection of human health and the environment. The original Clean Air Act was passed in 1963, and the 1970 version of the law resulted in the creation of the U.S. Environmental Protection Agency (EPA), which was charged with setting and enforcing ambient air quality standards. The law was amended in 1977, and most recently in 1990. Most of the activities of the Virginia Department of Environmental Quality's Air Division come from mandates of the Clean Air Act and are overseen by the EPA.

Hanover's Comprehensive Plan identifies a transportation network to support local and regional transportation needs. Locally, Hanover's role in transportation improvement projects that relieve congestion and improve traffic flow at intersections and along other roadway segments is one mechanism implemented to help improve air quality. These projects are frequently funded, in part or whole, by federal transportation dollars administered by the Metropolitan Planning Organization (MPO). Hanover's participation with this regional organization and road planning and construction activities are the primary activities related to local Air Quality improvement and protection.

Hanover County has also agreed to participate in the Ozone Advance Action Plan program on a voluntary basis. The Action Plan acknowledges efforts and activities underway in the Richmond and Tri-Cities areas, documents their air quality benefits, and uses this information to determine how the Richmond and Tri-Cities areas are working to improve air quality in our regions. It also notes at the end of the Action Plan that the Virginia Department of Environmental Quality (VDEQ) intends to report annually to the EPA on the programs contained in the document with VDEQ coordinating with stakeholders (i.e. participating jurisdictions, the Richmond and Tri-Cities MPOs, state and regional transportation agencies, and others). This reporting to the EPA uses a checklist approach noting that the checklist is not prescriptive or mandatory. This approach should serve as a useful way to review and report progress for the region while keeping requirements for our participation to a minimum.

11. Noise

A quality environment also includes the moderation of noises originating from various land uses. Loud noises can be detrimental to the quality of life. Hanover has a noise ordinance (Chapter 16 of the Hanover County Code) in effect that promotes an environment for its residents free from noise that jeopardizes their health or welfare or degrades their quality of life. Civil and criminal penalties can be assessed to violators of the noise ordinance if they are found guilty in a court of law. Maximum decibel levels have been established for residential, commercial and industrial zoning districts.

12. Outdoor Lighting Standards

Hanover County has a lighting ordinance (Article 5, Division 6 of the Zoning Ordinance) that promotes quality outdoor lighting while minimizing glare, reducing light pollution, minimizing energy consumption, and to promote safety and security. The County's lighting ordinance focuses on outdoor lighting that is downward directional or "full cut-off". Without an effective lighting ordinance in place, the County is powerless to control the quantity and quality of lighting in the community.

Strategies

- Encourage developers and businesses to utilize innovative development practices to protect the environment
- Promote and support the preservation of surface and groundwater resources to provide adequate drinking water and recreation
- Encourage the reclamation of quarry and landfill sites
- Assist and support the preservation of agricultural and forestal uses
- Support the implementation of the Long Range Water Resources Plan
- Encourage the protection of natural heritage resource areas by identifying the existence of these sites during zoning application review
- Implement reasonable standards to protect natural, cultural, and historic resources
- Encourage land use decisions that protect wetlands, waterways, and other environmentally sensitive areas
- Support public education and awareness of the benefits of E & S measures, best management practices (BMPs), and other nonpoint source pollution controls
- Include Low Impact Development (LID) techniques in the parking section of the Zoning Ordinance to minimize impervious surfaces to reduce the impact of stormwater runoff

Strategies, Cont'd.

- Promote tree protection, especially in environmentally sensitive areas
- Encourage the protection of Chesapeake Bay Resource Protection Areas (RPAs) in the review of new development proposals
- Reduce waste going to landfills by promoting awareness the County's recycling program as well as continued expansion of the program
- Improve air quality by promoting the reduction of automobile dependency through encouragement of walkable communities and mixed use development within the Suburban Service Area
- Encourage energy efficiency and green building practices in the construction of new homes and businesses, as well as County government buildings and schools
- Encourage conservation of agricultural and forestal lands through the Zoning and Subdivision ordinances