2026 COMPREHENSIVE PLAN

NORTHUMBERLAND COUNTY, VIRGINIA

Adopted April 9, 2026

2026 Comprehensive Plan
Northumberland County, Virginia

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TABLE OF CONTENTS

CHAPTER 1
ANALYSIS OF PHYSICAL AND ENVIRONMENTAL CONDITIONS

CHAPTER 2
LAND USE PLAN

CHAPTER 3
WATER QUALITY AND SHORELINE PROTECTION PLAN

CHAPTER 4
PUBLIC FACILITIES AND SERVICES

CHAPTER 5
ISSUES, GOALS AND STRATEGIES

Key Graphics

Glossary of Frequently Used Acronyms

Any comprehensive plan from government will inevitably refer to government agencies and processes each with their own acronyms. Below is a list of frequently used acronyms contained in this document. Mark this page for reference while reading this document. Note that other acronyms are occasionally used throughout, but they are defined in the section where they are used.

CBRMA	Chesapeake Bay Resources Management Area
CBRPA	Chesapeake Bay Resource Protection Area
EDC	(Northumberland County) Economic Development Commission
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
IDA	Intensely Developed Areas
LID	Low Impact Development
NNCBPAA	Northern Neck Chesapeake Bay Public Access Authority
NNGQMP	Northern Neck Groundwater Quality Management Plan
NNPDC	Northern Neck Planning District Commission
PREP	VDEQ Pollution Response Program
RMA	Resource Management Areas
RPA	Resource Protection Areas
SAV	Submerged Aquatic Vegetation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VIMS	Virginia Institute of Marine Sciences
VIRGIS	Virginia Geographic Information System
VMRC	Virginia Marine Resources Commission
VPDES	Virginia Discharge Elimination System

PREAMBLE

Northumberland County Origins and Future

Northumberland County, whose name came from a British noble house of the same name, was formed in 1648[1] as a subdivision of York County. At that time the County's area covered all of the combined territory now contained in Northumberland, Lancaster, Westmoreland and Richmond counties. One of the area's first known settlers, Colonel John Mottram, established a plantation known as "Coan Hall" near the mouth of the Coan River. Colonel Mottram later represented Northumberland County in the House of Burgesses. Within a few years of its establishment, Northumberland County was subdivided to form the other counties of the Northern Neck.

County government in Virginia, as it is structured today, first began to take shape after Virginia adopted a new Constitution in 1869. That constitution established county governments with an elected "Board of Supervisors" replacing a system of local government in which all of a county's governmental powers were vested in the Circuit Court. A previous constitutional amendment in 1851 provided for the election of certain local officers (appropriately called constitutional officers) to be elected by county voters. Today's Northumberland County government operates essentially under the form of government just described.[2]

During its early years, the economy of the County, as for most of the Southern colonies, was based on agriculture, tobacco being the principal crop. The orientation of the local economy was mainly toward other communities that could be reached by water transportation because there was no viable transportation linkage to major cities in Virginia. Several steamship lines served ports in the County which connected the economy to other ports on the Chesapeake Bay. This changed when automobile travel became the principal travel mode in the 20th century. By 1926 the Downing Bridge, across the Rappahannock River at Tappahannock, opened commercial routes to Richmond, and later the Robert O. Norris Bridge linked the Northern Neck with Middle Peninsula and Hampton Roads communities.

Route 360 forms the principal internal transportation corridor within the County as well as links the County to Richmond and other market areas to the west. Route 202 connects to Route 3 to provide a corridor to Northern Virginia and the District of Columbia. It also connects to Route 301 and then to Baltimore.

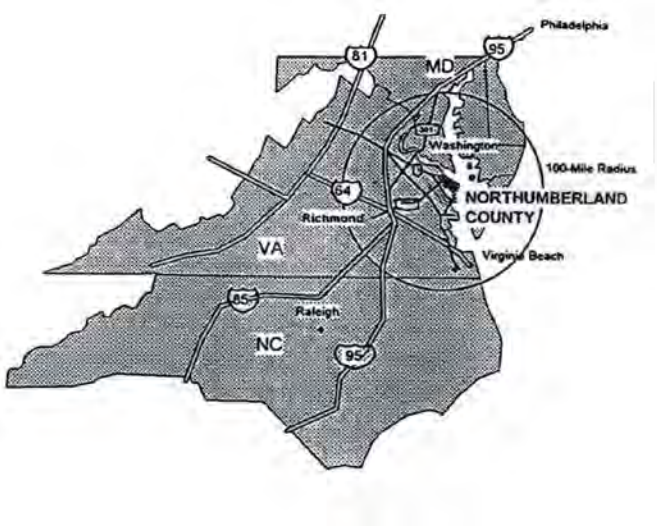
While the County is to some extent isolated from the rest of the State, it has a number of advantages due to its location, among which are the following:

- The County is within less than two hours' ground transportation from all points of Virginia's "urban corridor" which has been documented as that area of the State where most of the future growth is likely to occur.

[1]Virginia Historic Landmarks Commission.

[2]Source: Virginia County Supervisor's Manual.

- At the upper end of the urban corridor lies Metropolitan Washington, D.C. and immediately to the north thereof are Baltimore, Philadelphia, and other large cities of the Northeast Corridor.
- The many miles of waterfront property have made the County attractive to private developers and private citizens seeking second homes or retirement homes.
- The opportunities for recreational sports and fishing encourage a large increase in population during the summer months.



In the County, there are several unique factors that affect growth:

1. A major factor in the past has been the availability of attractive water-front land. The growth of the past decade has been almost entirely from people establishing homes within the County, mostly in prime water-front locations. Most of such people are retired and fit into the second pattern of the economy as described in the previous paragraph. Because they bring with them their own assets and income, the related job expansion is to provide services for this group.
2. There are a number of baby-boomers looking forward to retirement and are purchasing waterfront lots and building weekend homes for eventual retirement and full-time residents.
3. There is another population that is present in the County only during certain periods of the year. Although it is difficult to quantify the numbers of vacationers who come to the County during weekends, holidays and throughout the summer months, they are known to make a substantial contribution to the economy of the County. The second and third groups overlap.
4. There are a substantial number of people living in the County who commute to work outside the County and a lesser number of others who come into the County for work.

During the early-to-mid 1900s, the County lost both agricultural employment and population. This mirrored trends nationwide as rural populations moved to urban areas seeking job opportunities. The County has a renewed growth; however, but during the last several decades and today the traditional industries of fishing, agriculture, and food processing, boat building and boat repair have not shared in this growth. The most rapidly growing new “industry” is a combination of tourism and retirement.

Seasonal housing represents approximately 36.9 percent of the total housing stock in the County, and this market combined with the influx of retirees has stimulated growth in construction, real estate and insurance, services, retail and communications, transportation and utilities employment. However, the economic downturn after 2007 dramatically decreased the amount of new construction occurring in the County, and to date has not fully recovered. The unique characteristics of the County's economy and population result in the economy "booming" in the summer and fall months with stability provided by a substantial year-round retirement community.

The County is second out of all Virginia counties in the proportion of its population that is 65 years of age or older (30.1%); and it also has the second highest median age of any county in Virginia at 53.6 years. Conversely, the proportion of young adults and children is comparatively low. Growth is accounted for by in-migration since vital statistics report that deaths outnumber births almost 2:1 with an annual difference of a net loss of approximately 100 people. With comparatively fewer children to educate and increasing property values, the County's taxes remain low and enhance its attractiveness to retirees.

Low interest rates during the 1990s and especially in the early 2000s stimulated home construction nationally as well as locally; this market not only is cyclical but very sensitive to interest rate changes. Although higher interest rates may slow the rate of construction of new homes temporarily, tax laws still favor ownership of both first and second homes. The latter market comprises a large share of home construction within the County as does retirement homes.

These demographics affect growth strategies. Many people in the County enjoy the tranquility in the area and do not want that to change. Generally, they are retirees or not full-time residents and therefore are generally not personally directly affected by the absence of employment opportunities. On the other hand, much of the working age population and those with school-age children would like to have more growth both for their own career growth opportunities but also for fear their children will go off to college and have no career opportunities to come back to. Ironically, it is the retirees in the first group who require more public services to maintain their health and their homes and therefore need, if not want, more local service providers. This dichotomy has a profound impact on decisions about how the County grows, or not.

At any point in time, a “Comprehensive Plan” cannot fulfill the promise of being comprehensive if for no other reason than that there are so many variables and unknowns many of which are beyond the control the County. Nonetheless, such a plan can help not only describe the current state of the County, as Chapter 1 does, but it can also point to short-term opportunities, particularly those over which the County does have some control. For this reason, and to promote community discussion about these issues and opportunities, this plan offers the following “Pillars of Community Growth”.

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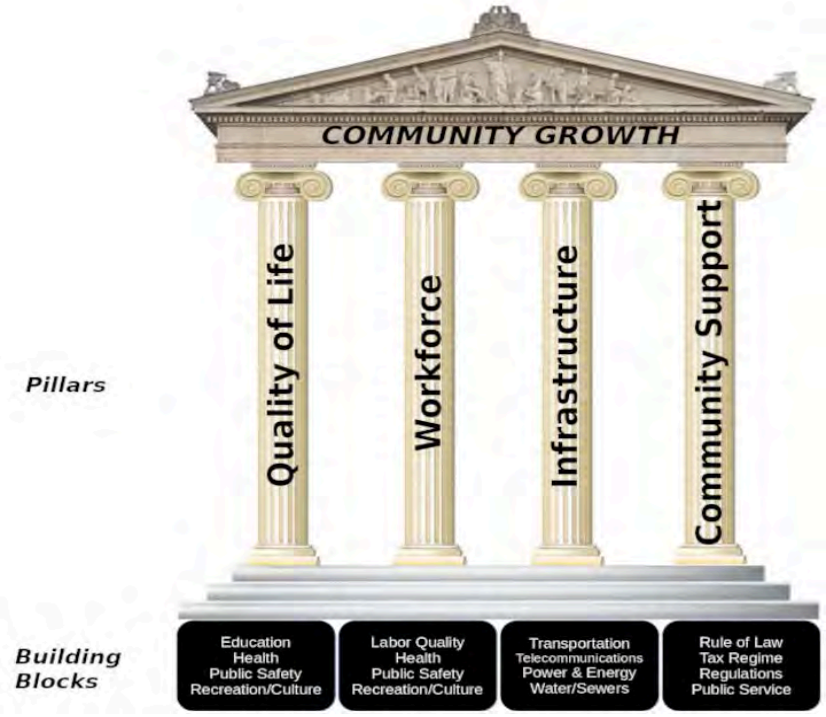
THE PILLARS OF COMMUNITY GROWTH[3]



A key variable in decisions about future actions is the amount of resources, primarily money, available to help foster growth and change. Another benefit of a comprehensive plan is to assess the challenges as well as the opportunities in order to decide what, if anything, to invest in. To help do this the "Pillars of Community Growth" represent the pillars and building blocks on which growth in an area depends. By assessing a county's strengths and weaknesses, community leaders can decide what are the most cost-effective investments in the short, intermediate and long term. No community can do everything at once, even the wealthiest and/or most populace.

Community leaders can work with citizens groups to assess the strengths and challenges in Northumberland County using the **assessment tool provided in Appendix B**. With this and the overall guidance of the Comprehensive Plan, community leaders can decide "What's next?" The answer to that question is for the people of Northumberland County and beyond the scope of a Comprehensive Plan.

3 The Pillars for Community Growth is adapted from a publication by Gartner entitled "Can Government Create Economic Growth by Becoming an IT Hub?" published April 15, 2021 and written by John Kost.

Introduction to the Comprehensive Plan for Northumberland County

The Comprehensive Plan for Northumberland County has two broad objectives:

1. **To identify long-range and strategic community needs of the County's growing population**
2. **To provide a planning framework designed to guide physical change which comes in response to such growth**

The Virginia Code (starting with Title 15.2-2223) authorizes all local governments to prepare and administer comprehensive plans and related regulatory functions. Comprehensive Plans are mandated for all of Virginia's local governments by these statutes; and it is also a requirement that they be reviewed every five years (Title 15.2-2230). Tools for implementing such a plan include a subdivision ordinance, and a zoning ordinance. The subdivision ordinance is mandated by the general planning statutes. Zoning was first mandated by the Chesapeake Bay Preservation Act (1989) but the County has had a zoning ordinance (authorized by the general planning statutes) since 1974. Regulations adopted pursuant to the Chesapeake Bay Act establish the following planning requirements for comprehensive plans of communities under their jurisdiction.

- **Physical Constraints to Development**: which addresses those natural geographic qualities which seriously limit the potential for development.
- **Protection of Potable Water Supply**: which is concerned about protecting the existing and potential supply of drinkable water within the community.
- **Shoreline Erosion Control**: which focuses on the loss or potential loss of shorelines due to erosion caused by wind, waves and boat wakes.
- **Access to Waterfront Areas**: which deals with access and potential access to areas for private as well as public use.
- **Redevelopment of Intensely Developed Areas and Other Areas Targeted for Redevelopment**: which focuses on opportunities to reduce pollution through conversions of existing development.

To accomplish this, the plan is organized as follows:

Table of Contents
Table of Maps
Glossary of Acronyms
Preamble
Chapters:

1. **Analysis of Physical and Environmental Conditions**
2. **Land Use Plan**
3. **Public Facilities and Services**
4. **Water Quality and Shoreline Protection Plan**
5. **Summary of Issues, Goals and Strategies**

Appendices:

A. **List of Historic Places in Northumberland County**
B. **Pillars of Community Growth**

CHAPTER 1

PHYSICAL AND ENVIRONMENTAL CONDITIONS

A. INTRODUCTION

This chapter of the Comprehensive Plan focuses on current physical and environmental conditions that may influence or limit the future use of land. Since the intent of this chapter is only to explore and report on the "as is" state of the County, it does not make recommendations for the future. Where appropriate, issues raised in this chapter are addressed in greater detail, with recommendations, in subsequent chapters. The conditions examined include both natural and man-made conditions which for purposes of analysis are grouped into the categories as listed in the Introduction. They reflect the planning emphasis of the Chesapeake Bay Preservation Act, with the exception of the category "redevelopment of intensely developed areas" since no areas in Northumberland County meet the Chesapeake Bay Act criteria of intensely developed areas.

These analyses will be used in later chapters as follows: in Chapter 2, Water Quality Preservation Plan, a strategy for meeting the requirements of the Chesapeake Bay preservation laws and regulations, will be organized around the same topics. In Chapter 3, the structural framework of the Future Land Use Plan and land use policies will flow from the analysis. In Chapter 4, the examination of the need for public facilities balanced against the environmental constraints. Finally, in Appendix A, environmental issues and strategies will be organized around these four topics, plus the issues of other chapters.

The format used throughout the Comprehensive Plan will follow the same five criteria of the Chesapeake Bay Preservation Act (see Introduction). Another important factor in selecting the format for this Chapter is the requirements of the Virginia statutes concerning comprehensive plans for local communities. In this regard, the analyses provide a thoroughly researched basis for determining need and formulating the substance of the comprehensive plan.

Maps displayed in this chapter were produced by the Northern Neck Planning District Commission (NNDPC) as well as the Northumberland County Planning Department using ESRI's ArcGIS 10.04 desktop GIS software.[1] They include a combination of maps prepared from VIRGIS sources and original maps prepared for this Plan by the NNPDC and the Northumberland County planner.

B. PHYSICAL FACTORS THAT INFLUENCE OR CONSTRAIN DEVELOPMENT

Many factors can influence the type as well as the timing of development and most of these are related to markets and economic conditions. Early in the life of this nation, most of the population relied on agriculture for both employment and to meet its needs for food and services. After the

[1]ArcGIS 10.4 is proprietary desktop mapping software created and marketed by Environmental Systems Research Institute (ESRI). VIRGIS data has previously been converted from its native DLG3- Optional format to ESRI ArcGIS Shapefile format by the NNPDC. VirGIS Raster Layers (elevation, erosion index) were imported using ESRI's Spatial Analyst extension for ArcView 3.2.

beginning of the industrial revolution, towns and urban places became more important as jobs and trade centers. As jobs were generated by industries, markets for housing, trade and services were generated as people moved from rural areas to urban places in order to be close to their work. This pattern resulted in mass migration to towns, cities and metropolitan areas during the last century. As a result, the rural areas lost population for most of the first three-fourths of the 20th century.

But certain areas appear to have a capacity to attract people for recreation or retirement based on the natural resources of the community itself and the quality of life. Some such communities have become magnets for retired people and great centers of tourism which, in and of themselves, function as job centers. Although still very much a rural community, the County has attracted a large retirement population as evidenced by the large amount of building that has been taking place along the County shorelines. It went through a long period of declining population, but for a decade or more the County is again experiencing growth, this time from the attraction of the County itself. With more miles of buildable shoreline than any other county in Virginia, the County has an asset that has become a growth generator. Waterfront development accounts for three out of four residential lots in the County and most of the new residential structures were built in the past two decades. A past demographic and economic study conducted as part of the research for previous comprehensive plans suggests that the County will see much more of this type of development during the next decade. However, there is a fixed amount of shoreline in the County, and each year, as more waterfront residences are constructed, that resource is reduced.

Certain parts of the County have already proved to be desirable as building sites, and since "success builds upon success" one might expect these areas to attract more development. The most suitable sites for waterfront development have already been developed, which forces new development into less suitable, more environmentally sensitive areas. The factors below need careful attention whenever new development is proposed, either waterfront or inland. In the following pages some of the most significant conditions that will influence or constrain development are dealt with in detail. They include:

1. Existing development
2. Topography, physiography and hydrography
3. Prime agricultural soils
4. Soil suitability for on-site sewage treatment
5. Shrink-swell soil factors
6. Flood-prone areas
7. Wetlands and natural habitat areas
8. Historic resources
9. Chesapeake Bay protected areas

Each of these topics is discussed briefly below. Where information is available, major physical features that would affect potential development are shown with a map. The narrative provides related descriptive information and significant observations as to how the conditions may influence planning policies.

1. Existing Development

Existing development has a powerful influence on future land use patterns because future development in rural communities almost always comes either as an extension of existing development or on new land but rarely as a replacement of existing buildings. Developers are encouraged to reuse/renovate existing buildings, as this makes good economic sense while at the same time preserving open space in the county. For purposes of planning for one or two decades, one might consider the existing development pattern as a fixed feature. This section reports on existing land use and existing subdivisions with a special analysis of shoreline subdivisions included.

a. Land Use

- Figure 1.1 gives a graphic picture of existing development in the County in 2024. This map was developed from E911 data obtained from the County Office of Building and Zoning in April 2024. The E911 data contains all addressable structures in the County.[2] Residential Structures: This category includes all dwellings that are not included in the other four categories below. As mentioned in the footnote, all addressable structures are included. This use is illustrated by round gray dots on the Existing Development Map (Figure 1.1). There are a total of 9,925 structures in this category shown in this illustration.

- Business/Commercial Structures: All commercial-type structures are included such as retail stores, offices, convenience stores, personal and business service shops, as well as industrial and marine structures. They are shown on the map as a round red dot. There are a total of 412 commercial structures indicated on the map. These structures were manually coded from the "Name" field in the E911 rural structures database.

- Public: This is a mixed category which includes mostly county buildings or facilities, schools, and church structures. There are 38 structures in this category, and they are shown on the map as a green dot. These structures were also coded from the E911 rural structures database.

- Semi-Public: This category includes civic organization structures such as hunt clubs, homeowner's associations, historical societies, and others. There are 105 of these structures, and they are shown on the map as a magenta dot. These structures were identified from the E911 rural structures database.

- "Vacant": This category included abandoned and/or uninhabited structures. These can be old barns, dilapidated seafood houses, old farmhouses and derelict sheds. Some structures were tagged as "Vacant" in the name field, while others were determined from local knowledge. There are 172 vacant structures shown on the map in a light gray color.

[2] Addressable buildings include garages, sheds, boathouses and other accessory structures, as well as commercial/industrial buildings, single and multifamily residences. The numbers of structures listed below may seem high; however, all are ground-truthed by the office of Building and Zoning. In addition, abandoned buildings are included in the data.

This map illustrates the primary characteristics of development in the County. It is concentrated along existing roads and along the waterfront. Residential development appears along all roads while most of the commercial development is located along the primary highways. A concentration of commercial development within several villages is especially visible from this map. While it appears there are substantial commercial structures along the waterfront, it is often a home-based business such as sign making, a tree service company or a utility. On the other hand, charter boat operations and seafood structures are water-dependent uses and are also shown.

The largest single category of land use is for agriculture and forestry as illustrated by the large amount of white area on the map. Farming and forest uses have remained relatively untouched by development at this stage, except for conversions of land to development along the various waterfronts.

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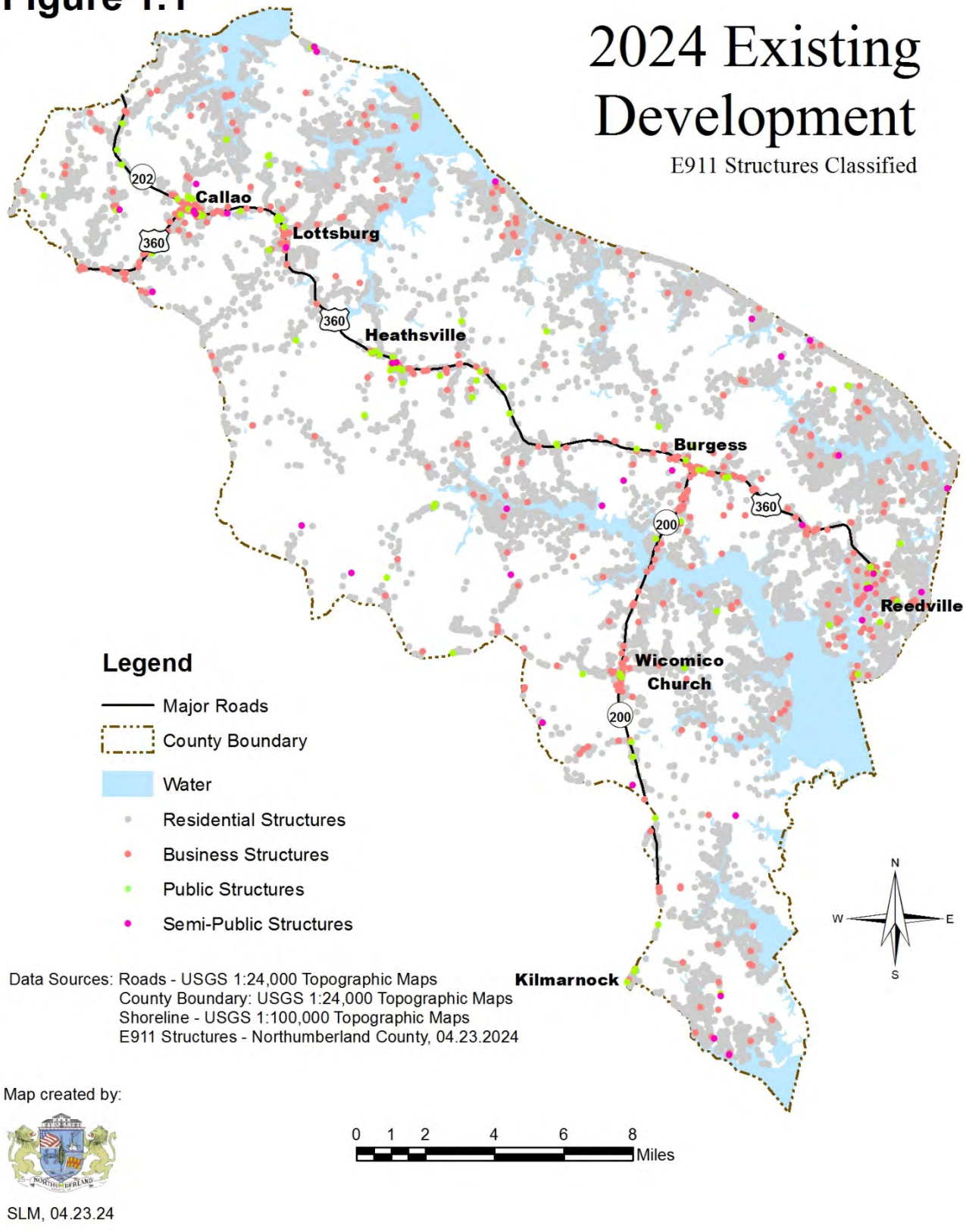
Figure 1.1


2024 Existing Development
E911 Structures Classified
202
Callao
360
Lottsburg
360
Heathsville
Burgess
360
200
Reedville
Wicomico Church
200
Kilmarnock
Legend
Major Roads
County Boundary
Water
Residential Structures
Business Structures
Public Structures
Semi-Public Structures
N
W
E
S
Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
E911 Structures - Northumberland County, 04.23.2024
Map created by:
SLM, 04.23.24
0 1 2 4 6 8
Miles

b. Subdivisions

New subdivisions are important in evaluating development potential because once subdivision lots are recorded and streets developed to serve them, as a practical matter, the landscape of that land is changed forever. This may account for the fact that subdivision ordinances were one of the first planning tools mandated by state legislation. Subdivisions have played an important part in the development of the County during the last two decades, particularly development along the waterfront. While data is available on individual subdivisions, there is no inventory of subdivisions and waterfront vs. non-waterfront properties. Anecdotal evidence indicates more than three-fourths of all subdivision lots are occurring in waterfront developments. Figure 1.2 provides a graphic representation of the location of major waterfront subdivisions located within the County. There is no single specific concentration of subdivisions on any of the rivers or creeks; they are dispersed along the shorelines throughout the County.

It appears that in many of the larger subdivisions, only a small share of the lots is actually on the waterfront; the remaining are inland lots. And while the majority of the waterfront lots have been developed with homes, most of the inland lots are still vacant. These vacant lots that are already platted can be developed quickly and could impact the demand for services in the County if the majority are developed.

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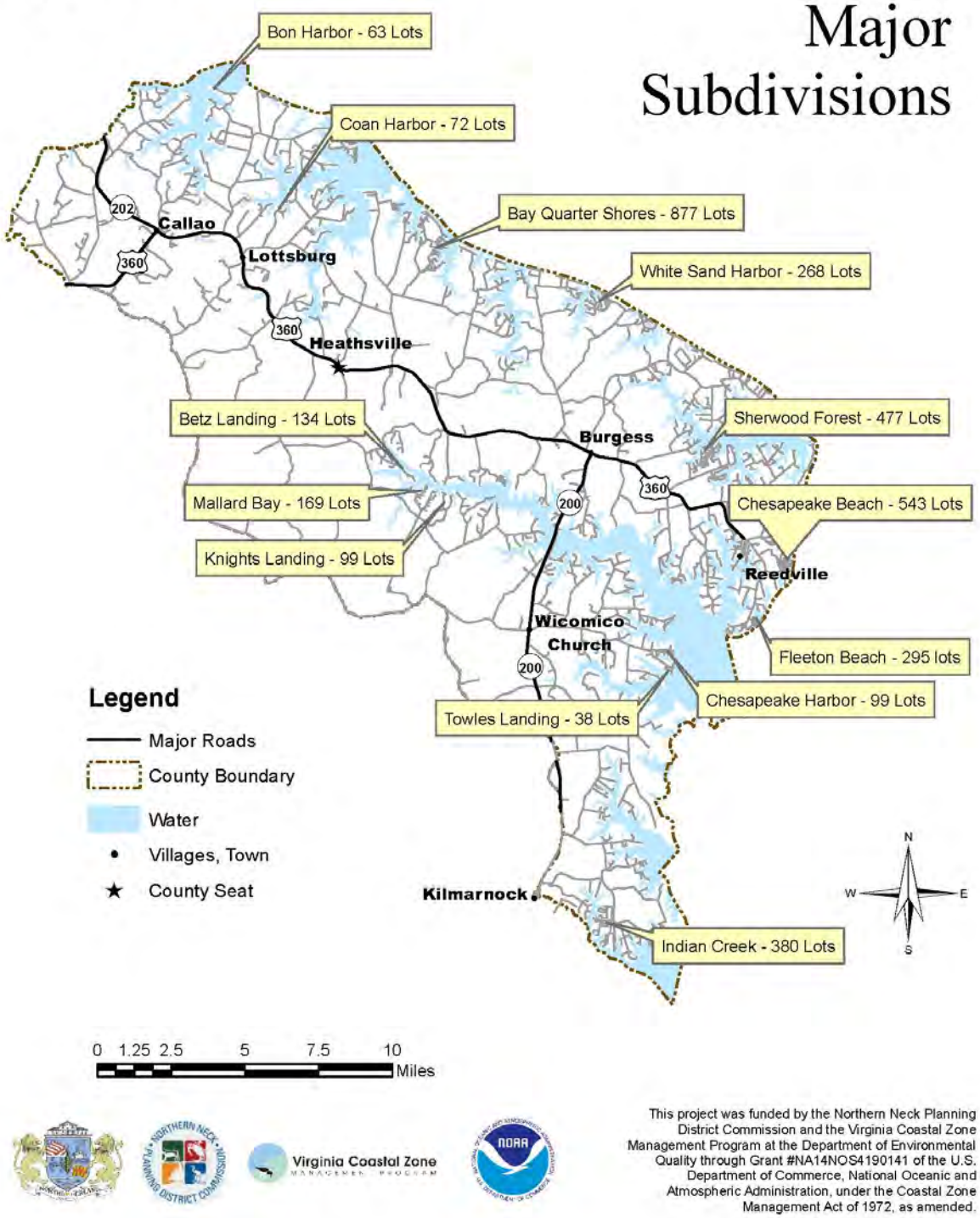
Figure 1.2



This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

2. Topography, Physiography and Hydrography

a. Topography and Physiography

The topography and physiography of lands can greatly influence surrounding natural resources. The amount and rate of runoff and groundwater discharge which ultimately reaches water bodies are influenced by the size, shape, and topographic, physiographic and hydrographic characteristics of a watershed. Typically, runoff rates and the potential for erosion increase as slopes increase.

Elevation levels within the County range from sea level to approximately 150 feet. Although the County lies within the Coastal Plain region, the County contains three physiographic sub-regions which vary from flat coastal lands to hillier areas. The fluvial river terrace sub-region includes tidal marsh areas along major rivers and creeks and some adjacent lands which range from 10 to 50 feet above sea level. The low marine terrace sub-region ranges from 10 to 15 feet above sea level and typically lies between the fluvial river terrace and the upland. The fluvial river terrace and low marine terrace physiographic sub-regions comprise a band of level terraces along most of the Chesapeake Bay and the lower portion of the Potomac River. The coastal plain upland sub-region includes the inland plateaus as well as the cliffs along the two major rivers in the County, with elevations ranging from 90 to 150 feet above sea level. Figure 1.3 shows the topography (elevations) of the County.

A conspicuous feature of the County's topography is an escarpment known as the "Suffolk Scarp". This feature which runs along the entire eastern coast of Virginia is located approximately two to three miles inland and is marked by a sharp drop in elevation at about 50 feet above sea level.

Figure 1.3 illustrates the principal topographic characteristics of the County. In particular, this map delineates clearly the Suffolk Scarp. The area between the "drop-off" and the shoreline of the Potomac River and Chesapeake Bay occupies nearly half of the County's total area and almost all of the area in demand for new development. Other maps and/or data appearing later in this Chapter will show that much of the area that lies seaward from the Suffolk Scarp is disadvantaged by poor percolation. In addition to the difficulty finding soils that are suitable for septic systems, much of the land along the internal rivers and streams have slopes in excess of 15 percent. There is the problem of increased soil erosion in cases where slopes are both "steep" and "highly erodible". Careful attention should continue to be given to ensure that new development is adjusted to these sensitive features of the soil and topography. *(Highly erodible soils will be discussed in more detail in C.3.b.)*

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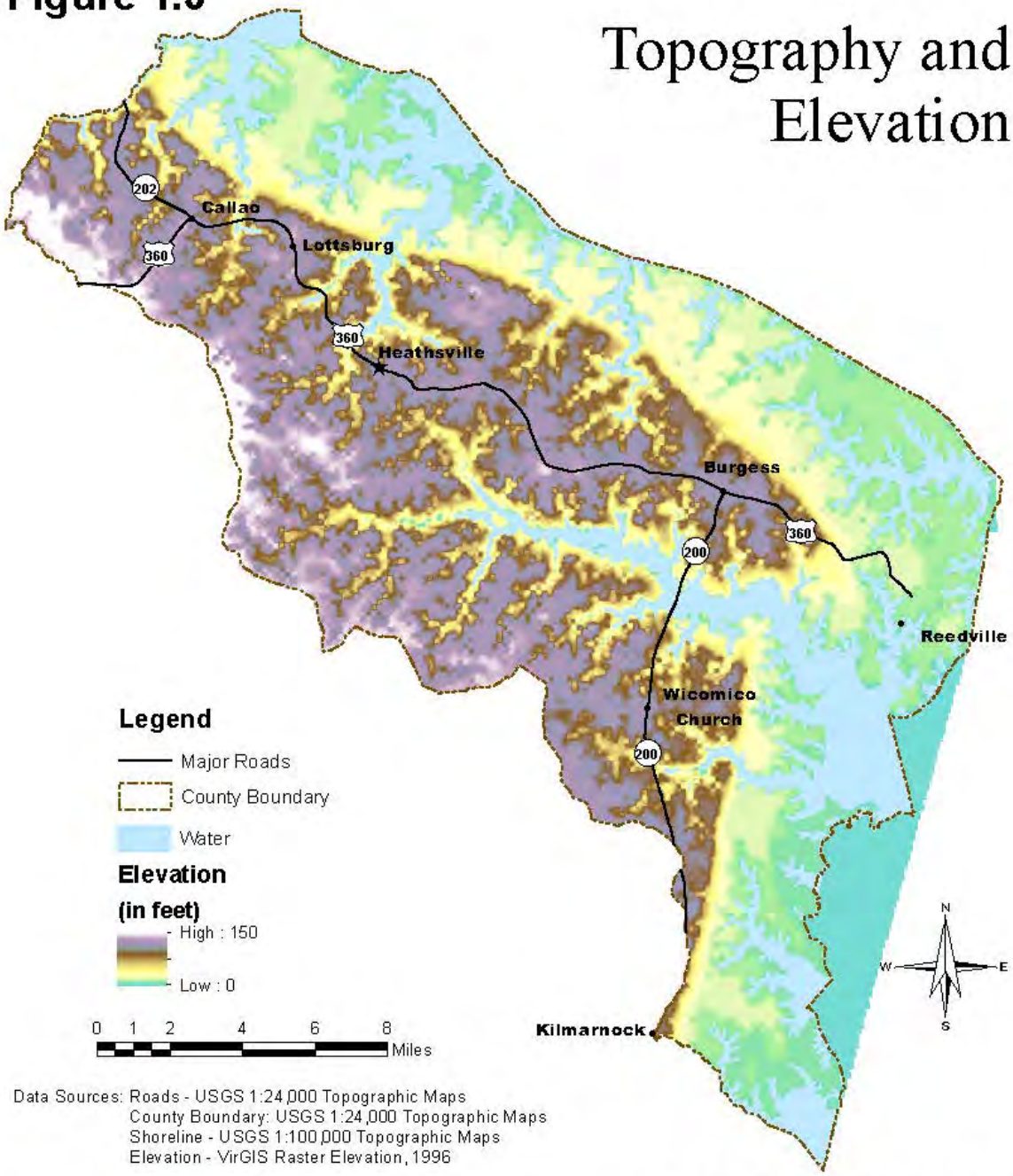
Figure 1.3

Topography and Elevation



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Elevation - VirGIS Raster Elevation, 1996

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b. Hydrography

Figure 1.4 presents the hydrography of the County – the locations of the streams, rivers and ponds. The County has an abundance of streams that channel water towards the rivers and eventually the Chesapeake Bay. The density of streams in the county is highest in the upland area, where the topography of the land creates headwater streams. As the land descends to the rural low shelf, the streams become less dense, as there is little topography that generates stream confluence.

Almost anywhere in the County, you are not far from a stream. Whether it is a small ephemeral stream, a larger perennial stream, or a free-flowing tidal creek or river, you seldom have to travel more than a mile in any direction to encounter flowing surface water. Most streams begin in the gullies and ravines in the upland that are forested. The streams then join with other first order streams to create second order streams and so forth, ever growing in size and volume. The larger rivers in the county, progressing from north to south are the Yeocomico, Glebe, Coan, (all draining into the Potomac) the Little Wicomico, Great Wicomico, Indian Creek and Dividing Creek (which drain into the Chesapeake Bay).

Nearby streams can be polluted by careless people. Citizens need to be aware that some of their routine actions could harm stream health. For example, over-fertilizing lawns, careless handling of automotive fluids, and other day-to-day activities can pollute nearby streams and groundwater. Care is needed to minimize human impacts on the surrounding surface and groundwater.

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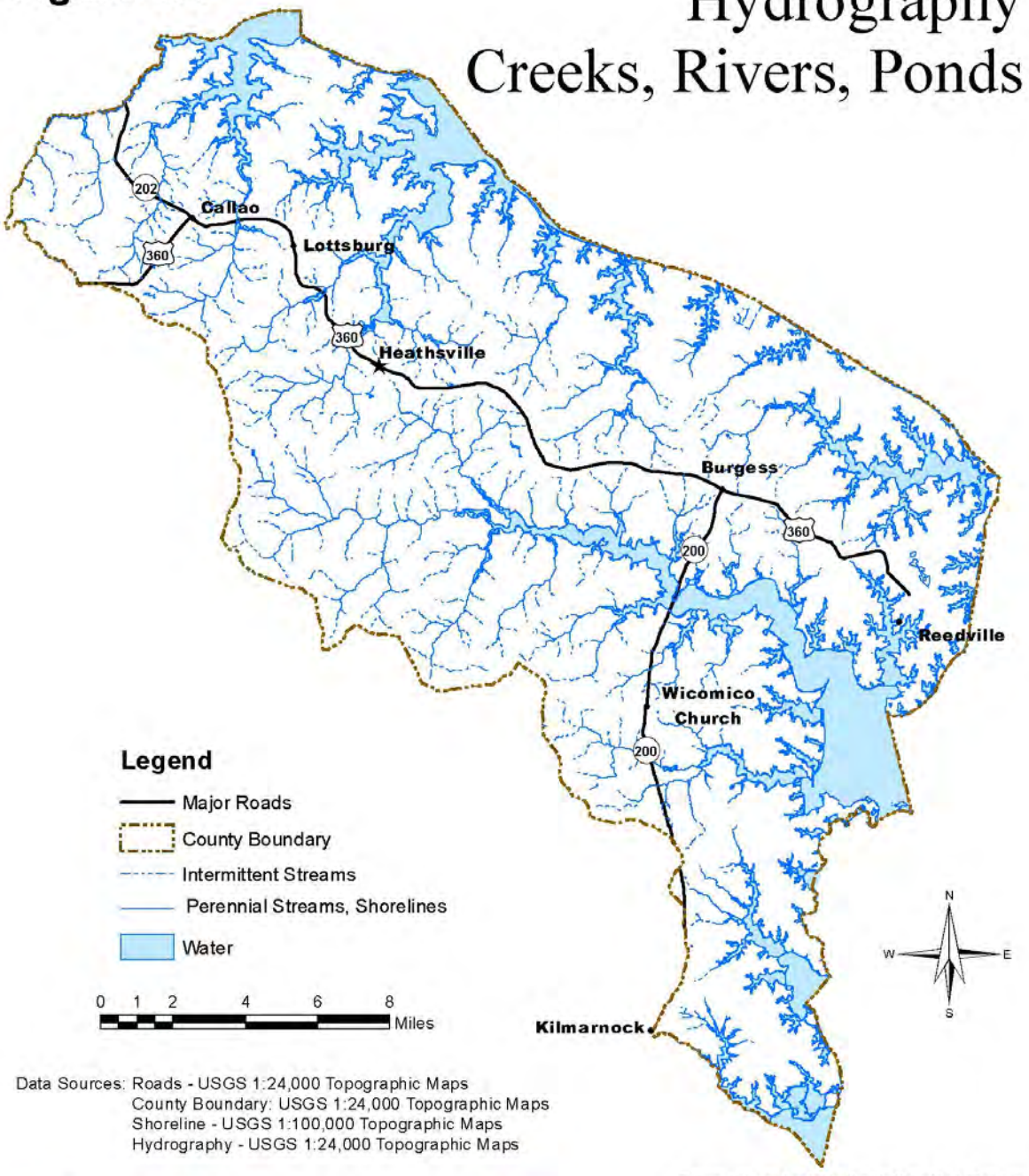
Figure 1.4

Hydrography
Creeks, Rivers, Ponds



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Hydrography - USGS 1:24,000 Topographic Maps

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3. Prime Agricultural Soils (Prime Farmland)

Prime agricultural soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They have the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to current farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Prime farmland soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding. Figure 1.5 presents the prime agricultural soils of the County.

All of the soil qualities that make for high agricultural production are also desirable characteristics for building sites. Thus, these soils are more likely to be built upon because of their suitability for supporting foundations and conventional septic systems. In addition to the favorable soil characteristics, these lands have been previously cleared of trees, shrubs and vegetation so that the land can be cultivated. Therefore, there are no costs associated with land clearing. A developer or landowner can begin construction as soon as the land changes ownership, putting additional developmental pressure on prime farmland.

Why should we be concerned with the loss of Prime Farmland?

Food is produced on prime farmland more efficiently and with less soil erosion, resulting in less pollution from sediment, nutrients and pesticides. When prime land is lost, it not only takes more non-prime land to produce the same amount of food but also results in lower returns per unit of production input. This means either higher domestic prices or fewer products to sell. In addition, if these areas are lost to production, more marginal lands may be cultivated, which could pollute nearby streams with sediment and phosphorus.

The United States is a food-exporting country. Loss of prime farmland, as mentioned above, eventually reduces our export potential or forces into production land previously considered marginal. Much of this marginal land should remain in forage or forestry production to prevent the land resource from being damaged. Often this marginal land is adjacent to the prime farmland. When this land is in forage or forestry, it acts to absorb any nutrients that do flow off the cultivated land. When this marginal land is pressed into production, the buffer action is lost, and pollution can be transmitted to nearby water bodies.

Loss of agricultural land to urban development, by and large, is irreversible. When cropland is diverted to forestry, forage production or recreation uses, the land can be easily returned to intensive crop production, if need be. However, when the land is developed (converted to urban or suburban land use or subdivided), it is impractical, if not impossible to bring such land back into production again. Policies may be established to protect desirable agricultural land and at the same time provide the property owner with the ability to take advantage of rising property values using open space concepts as discussed in Chapter 3.

Prime farmland is a component of healthy economy. The County has policies in place that can protect prime farmland so as to keep agricultural production at a high level (and generate taxable income) and reduce pollution at the same time. Deferred land use value taxation allows landowners that have their land in agricultural and forest production to pay less tax, so as to increase their return on investment. If the landowners develop the property, then they have to pay back the difference between the deferred tax amount and the standard tax amount for the prior five tax years. This policy helps keep farmland in production and may slow the conversion of farmland to residential property in the county. But this also constrains the development of needed housing, as will be discussed in chapter 4.

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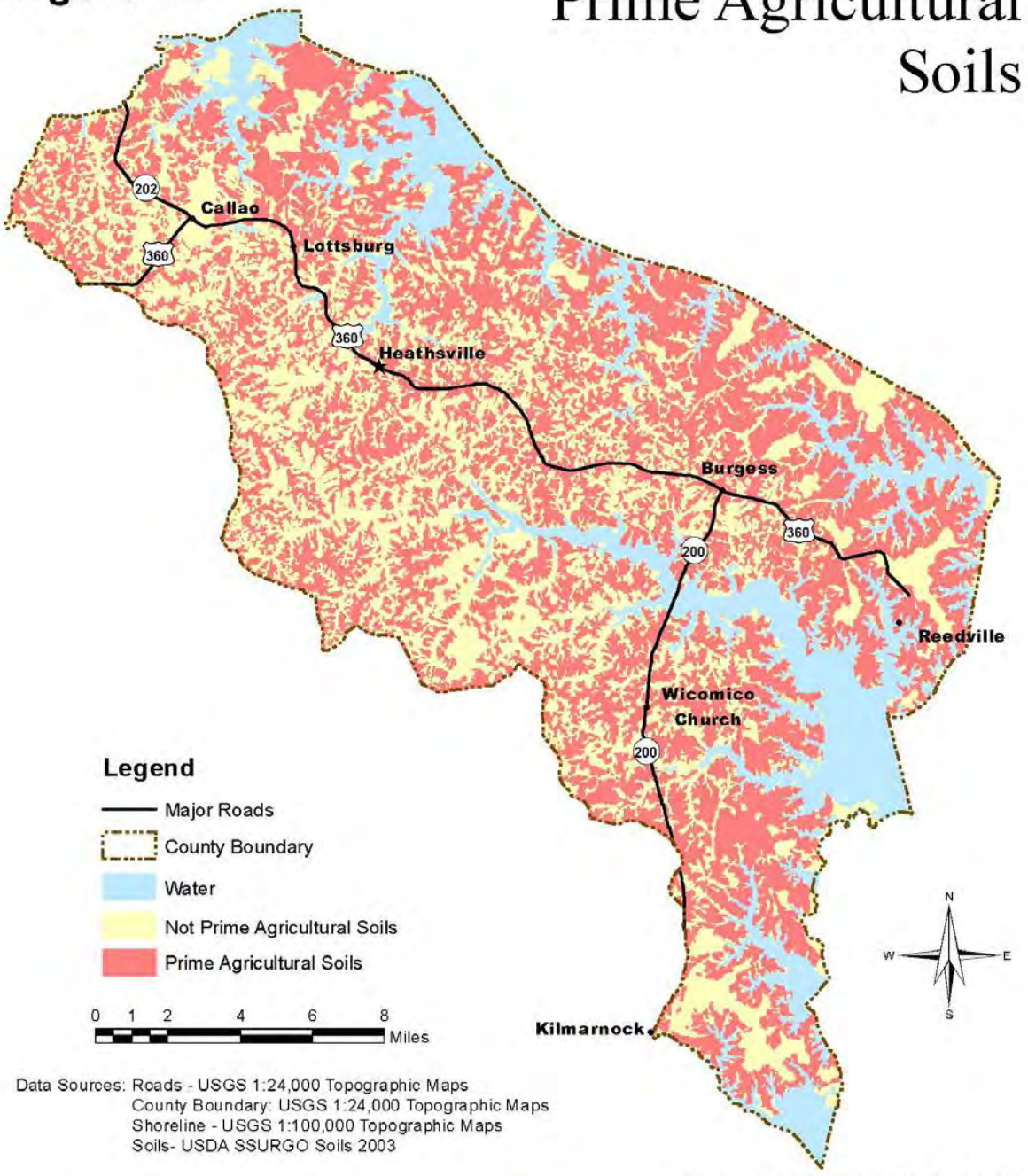
Figure 1.5

Prime Agricultural Soils



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Soils- USDA SSURGO Soils 2003

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

4. Soil Suitability for On-Site Sewage Treatment

One of the most important factors to consider in determining soil suitability for development in rural areas is the suitability of the soil for sewage disposal through the use of septic drain fields. Because the County is not serviced by a public sewage system (except for Reedville, Fleeton, Callao, and North Kilmarnock, see Figure 1.6, Sewered Areas Map), careful consideration must be given to the design, construction, and maintenance of septic tank systems or other on-site sewage disposal systems located on questionable sites such as those in flood prone areas, on steep slopes, or with poorly-drained soils.

Figure 1.7 showing Conventional Septic System Suitability, illustrates those areas within the County that have characteristics which are generally unsuited for establishing conventional septic tank drain fields. This map is a composite of factors from the United States Department of Agriculture's (USDA) Soil Survey that limit the soil's capacity to accept septic tanks. Locations of high-water tables, steep slopes, flood prone areas, and soils with inappropriate permeability rates were combined to determine areas in the County where soils are suitable to support septic systems. The county soil surveys are to be used as a planning tool, and as such, have limitations. No doubt, areas of suitable soils for septic tanks occur within the areas coded as "poor".

Most of the problem areas are in the low-lying area spanning a two-to-three-mile band that roughly parallels the Chesapeake Bay and the Potomac River shorelines. This area is characterized by elevations lower than 50 feet above sea level. In addition, there are a large number of smaller problem areas that run throughout the County. These are mostly located along streams and include stream banks and other steep slopes. The latter is a problem not only for septic tanks but also as a source of soil erosion. Erosion can result when unstable soil is disturbed particularly if the slope is steep.

Despite the conditions noted above, it can be observed from Figure 1.7 that most of the land area within the shelf area between the Suffolk Scarp and the shorelines may have acceptable soils for conventional septic tanks. Nevertheless, this is an area where caution should be used in selecting sites where on-site sewage disposal is necessary.

Some clay and silt soils in the County are poorly suited for sewage disposal because their low permeability characteristics limit the rate which water moves down through the soil. An example of this situation occurs in Callao, where Beltsville soils contain fragipan, a dense soil layer beneath the surface which contributes to water quality impacts and presents a risk to human health. Soils with extremely low permeability may cause septage to rise to the surface, and obvious risk to human health. The state standard is that a permeability of less than 0.6 (0.6 inches of percolation per hour) is unacceptable for conventional septic tank fields.

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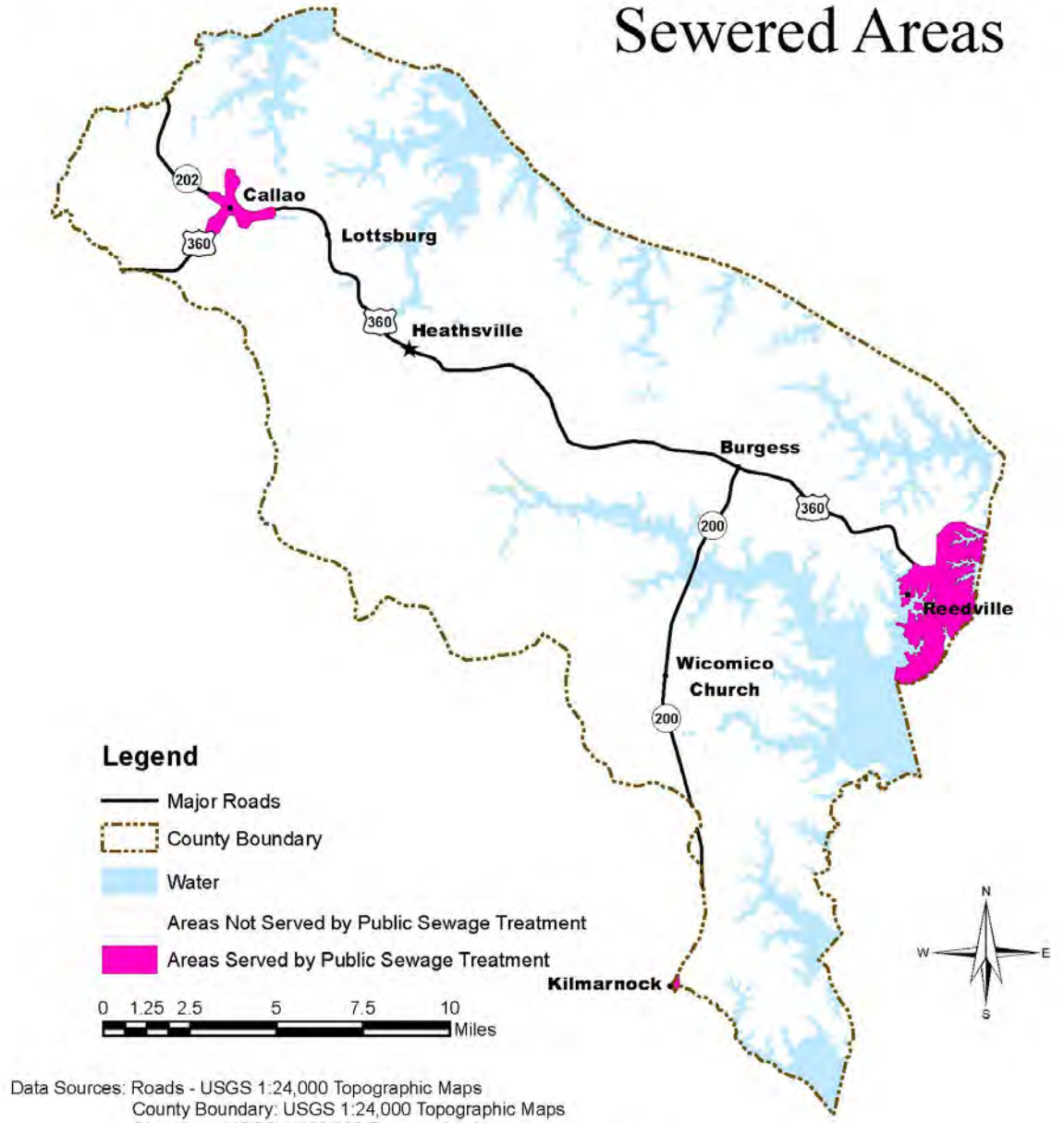
Figure 1.6



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Sewered Areas - VDH, DSS and Northumberland County staff

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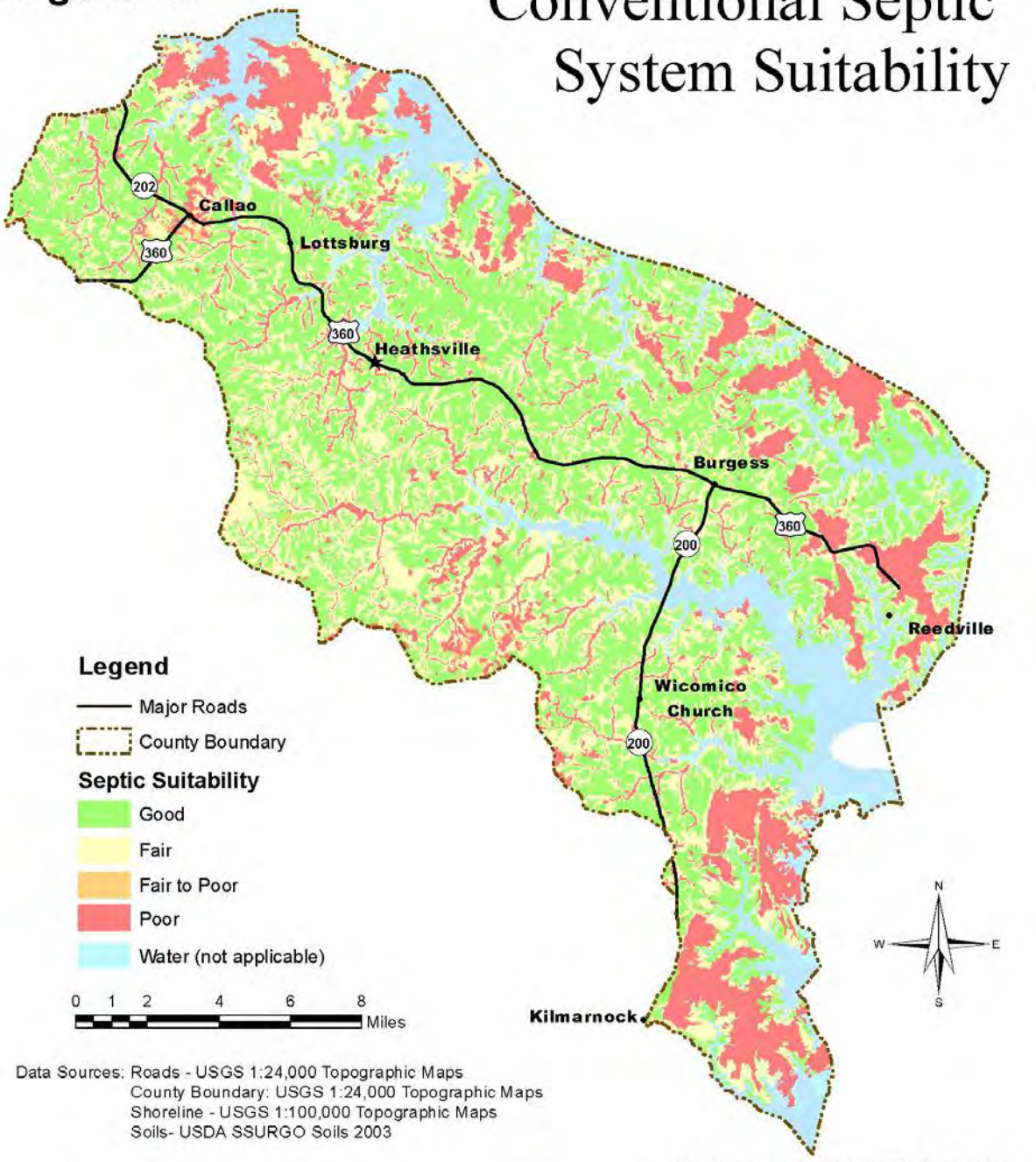
Figure 1.7

Conventional Septic System Suitability



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
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At the other end of the range, highly permeable soils are also unsuitable for installation of conventional septic systems, because the effluent moves through it too fast to provide adequate treatment, having the potential to contaminate groundwater. State standards establish "6.0 inches per hour" as the maximum permeability acceptable for septic tank installation

In summary, most of the development that is likely to occur within the County in the near future, given the large number of subdivision lots in scattered subdivisions, will require septic tanks - the only viable option for sewage disposal in these areas. The ability to install septic tanks will depend entirely upon the suitability of the soil for drain fields. The determination of whether the soil is acceptable for drain fields is to be made by the Virginia Department of Health (VDH) on a case-by-case basis. "Percolation", as the process for the ground accepting the outflow from septic tanks, refers to the rate that the water will pass through the soil while it is saturated. If percolation occurs too fast, then the septic tank fails because the drainage passes through the soil too quickly. If it occurs too slowly then the drainage may pass horizontally through the soil untreated and contaminate the underground water supply.

In 2000, the Commonwealth passed more stringent separation distances between septic absorption fields and the first occurrence of groundwater (the water table aquifer). At the same time, recent developments in technology have given rise to engineered residential septic systems that are allowed by VDH in areas previously deemed “undevelopable” due to soil conditions. Most rely on some type of secondary treatment to treat and disinfect the septage before releasing it into the ground. The cost of these systems is approximately three times the cost of a conventional septic system. There are systems that use peat moss to filter, systems that use low pressure to ”dose” the field, and others that use oxygen pumped into a chamber to treat septage. Regardless of the technology, a maintenance agreement between a qualified company and the property owner is required, as these systems must be maintained properly to protect groundwater. Annual reporting to VDH of the results of the inspection by a qualified inspection company is also required.

Every effort should be made to minimize threats to groundwater in the County, particularly because the County relies entirely on groundwater for its potable water. The groundwater of the surficial aquifer can be protected by increased vertical separation between a drain field and the water table. Such separation provides adequate biological treatment, minimizing contamination of surface and ground water. In 2000, the State passed more stringent separation distances between septic absorption fields and the first occurrence of groundwater (the water table aquifer). This law grandfathers existing septic systems to the old distance, provided they do not fail. However, if the conventional system fails, the new regulations take precedence. The implication of this is that some of the older septic systems, when they fail, may need to be replaced by engineered or alternative septic systems in order to meet VDH regulations.

Percolation and depth to groundwater testing should be completed prior to subdividing or platting land to ensure that purchased lots have primary and reserve sewage disposal areas on site. Homeowners should be encouraged to use water conservation devices to ease the load on septic systems. In addition, purchasers of land need to be aware that many developers have been creating reserve septic system drain fields to comply with the Chesapeake Bay Preservation Act that will only accept expensive engineered secondary treatment systems. While these small reserve drain fields may be due to site limitations, those who purchase land for residences need to know the economic consequences if the primary septic system fails. It is also important for

homeowners to understand that conventional septic systems have a lifespan of 25 to 30 years and that all, given enough time, will eventually fail. The best way to extend the life of a conventional septic system is to reduce the hydraulic load on the system and have it inspected or pumped every five years. Low flow water fixtures are the easiest way to reduce the hydraulic load on the system, while at the same time conserving potable groundwater. Garbage disposals should be avoided because they greatly increase the load of solids on the septic system.

5. Shrink-Swell Factors

Shrink-swell is the potential for volume change in a soil with a loss or gain in moisture. Volume changes occur mainly because of the interaction of clay minerals with water which varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of change in soil moisture content influence the amount of swelling of soils in place.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special engineering designs must be used to compensate in such conditions.

Figure 1.8 illustrates the general shrink-swell potential of the County's soils using a four-step classification.

- High shrink-swell soils (the lowest quality) are present within the area between the shoreline and the Suffolk Scarf, but this type of soil is not the dominant class even in this area which otherwise has some soil qualities that are averse to development.
- Low shrink-swell soils are present throughout the County but more dominant in the lower-lying areas of the high lands south and west of Routes 360 and 200. Low shrink-swell soils are more common in the drainage and stream basins of this portion of the County.
- Moderate shrink-swell is also found throughout the County and most commonly along the ridges between creeks and swales. Several points should be observed: (i) that most of the roads built by the Virginia Department of Transportation (VDOT) are located along the ridges where the better classes of soil are found; (ii) that almost all existing development occurs adjacent to existing roads which also have the advantages of the good soils; (iii) because of the distance between the tops of the ridges and the creeks and drainage ways that follow the valleys, development of this type has the least detrimental impact on water quality; and (iv) despite these advantages, the areas most in demand are in the lowlands where few of these conditions are present.
- The last category, none, is not significant because very little of the land area of the County is classified in this manner.

Overall, the county soils are within an acceptable range as to shrink-swell qualities, and this condition should not present any barrier to development that cannot be compensated for by engineering design.

6. Flood-prone Areas

Floodplains are low-lying land areas adjacent to rivers, streams, creeks, and other water bodies that are subject to periodic flooding when precipitation causes the volume of water to exceed the capacity of the waterway. Left in an unaltered, undeveloped state, floodplains can serve important natural, recreational, and historical functions.

There are a multitude of factors, such as topography, geographic orientation of the shoreline, depth and duration of flooding, and rate of water rise, which affect damage caused by a flood. The amount of flood damage is also affected by the extent of development within a floodplain since development can interfere with many of the natural functions that floodplains serve.

According to the County's Flood Insurance Study, the coastal areas of the County are vulnerable to tidal flooding from major storms such as hurricanes and northeasters. These types of storms produce large amounts of precipitation, high winds and low atmospheric pressure that cause large volumes of water to impinge against the shore. The topography of the area flooded, rate of rise of floodwaters, depth and duration of flooding, exposure to wave action, and extent to which structures have been placed in the floodplain determine the amount and extent of damage caused by any tidal flood.

The County has experienced major storms and flooding since the early settlement of the area. The most recent severe storm occurred in September of 2004 when winds from tropical storm Isabel in excess of 65 miles per hour pushed tides eight feet above normal levels and destroyed bulkheads, boathouses, and other waterfront structures in the Northern Neck and other areas along the Chesapeake Bay and Potomac River.

Congress established the National Flood Insurance Program in 1968. This program enables property owners to purchase federally backed flood insurance within communities which implement floodplain management measures to reduce flood risks to new development. Regulations of the National Flood Insurance Program specify requirements that must be included in local ordinances if a community wishes to participate in the program. Requirements of the program include regulation of buildings and other development in floodplain areas. The Federal Emergency Management Agency (FEMA) establishes flood risk data for insurance rating and floodplain management in addition to conducting Flood Insurance Studies and Maps for localities. The Flood Insurance Rate maps define flood hazard areas, or areas subject to inundation at 100-year and 500-year intervals. A 100-year flood zone has a one percent (1.0%) chance of being inundated in any given one-year period, whereas the 500-year flood zone has a two-tenths of one percent (0.2%) chance of being flooded in the same one-year period.

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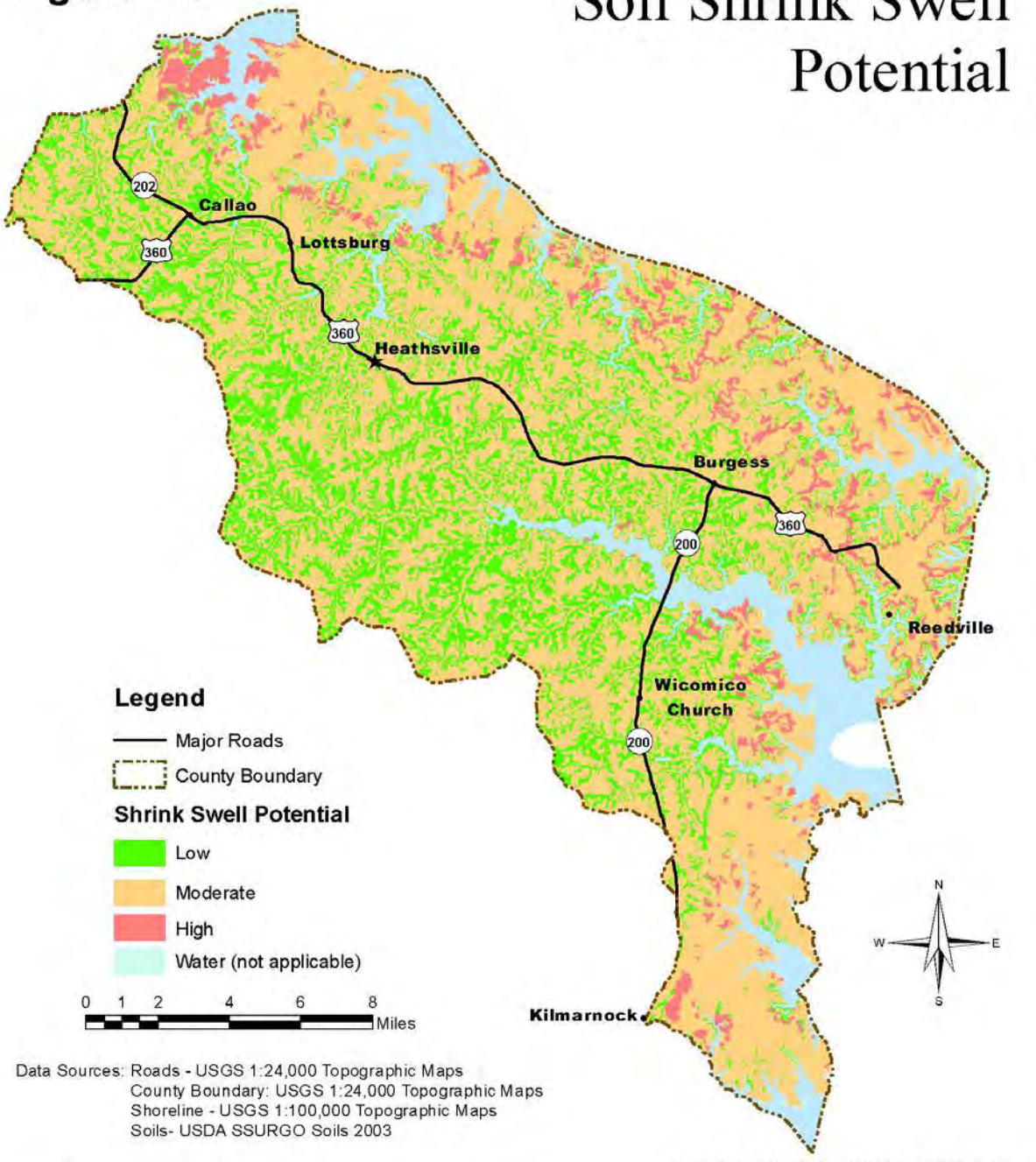
Figure 1.8

Soil Shrink Swell Potential



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Soils- USDA SSURGO Soils 2003

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FEMA has completed new Flood Insurance Rate Maps (FIRMs) for the County, which were adopted on February 18, 2015, and these maps are on file in the Office of Building and Zoning in the County Administration Building (old courthouse). The FIRMS are also in digital form in the County Geographic Information System (GIS). Figure 1.9 depicts FIRM 100-year (1.0% chance) and 500-year (0.2% chance) floodplains within the County.

FEMA's Flood Insurance Study determined that all development in the County's floodplains is subject to water damage. Some flood-prone areas are subject to high velocity wave action which may cause structural damage and severe erosion along the shoreline. Due to the exposure afforded by the expanses of open water (fetch) on the Chesapeake Bay and the Potomac River, the northern and eastern sections of the County are most vulnerable to wave damage.

There is considerable development in the County that is located within the 100-year floodplain shown on the Floodplain Map. It includes full-time dwellings, seasonal cottages, businesses and industries. This is understandable, given that most of the existing development within the County occurred before the flood zone maps were first prepared pursuant to a 1968 federal law. Even today an owner still has the option of building within a floodplain; however, most dwellings that are financed with insured loans are required by the mortgage insuring agency to purchase flood insurance, and/or raise the lowest habitable floor above the 100-year flood elevation.

Structural and natural elements that afford some protection against flooding include bulkheads, seawalls, jetties, and sand dunes. The regulatory flood protection measures are included in various codes and ordinances which regulate some aspect of development within floodplains, including State Uniform Building Code, the County's Floodplain Management Ordinance, Subdivision Ordinance, and Chesapeake Bay Preservation Ordinance.

The County's Floodplain Management Ordinance was enacted in May 1989, and subsequently revised and adopted on October 9, 2014, with an effective date of February 18, 2015. The general provisions of the ordinance include regulation of uses, activities, and development which will cause unacceptable increases in flood heights, velocities, and frequencies; restriction or prohibition of certain uses, activities and development within areas subject to flooding; requirement of protection or flood proofing for all uses, activities, and development in flood prone areas; and protection for individuals buying lands and structures unsuited for intended purposes because of flood hazards.

The County's Subdivision Ordinance requires those who subdivide land to provide information needed to determine if improvements such as drainage plans and flood control devices are necessary to develop the property. If improvements are necessary, the subdivider must provide plans with a surveyor's or engineer's statement that such improvements will be adequate for property development when properly installed.

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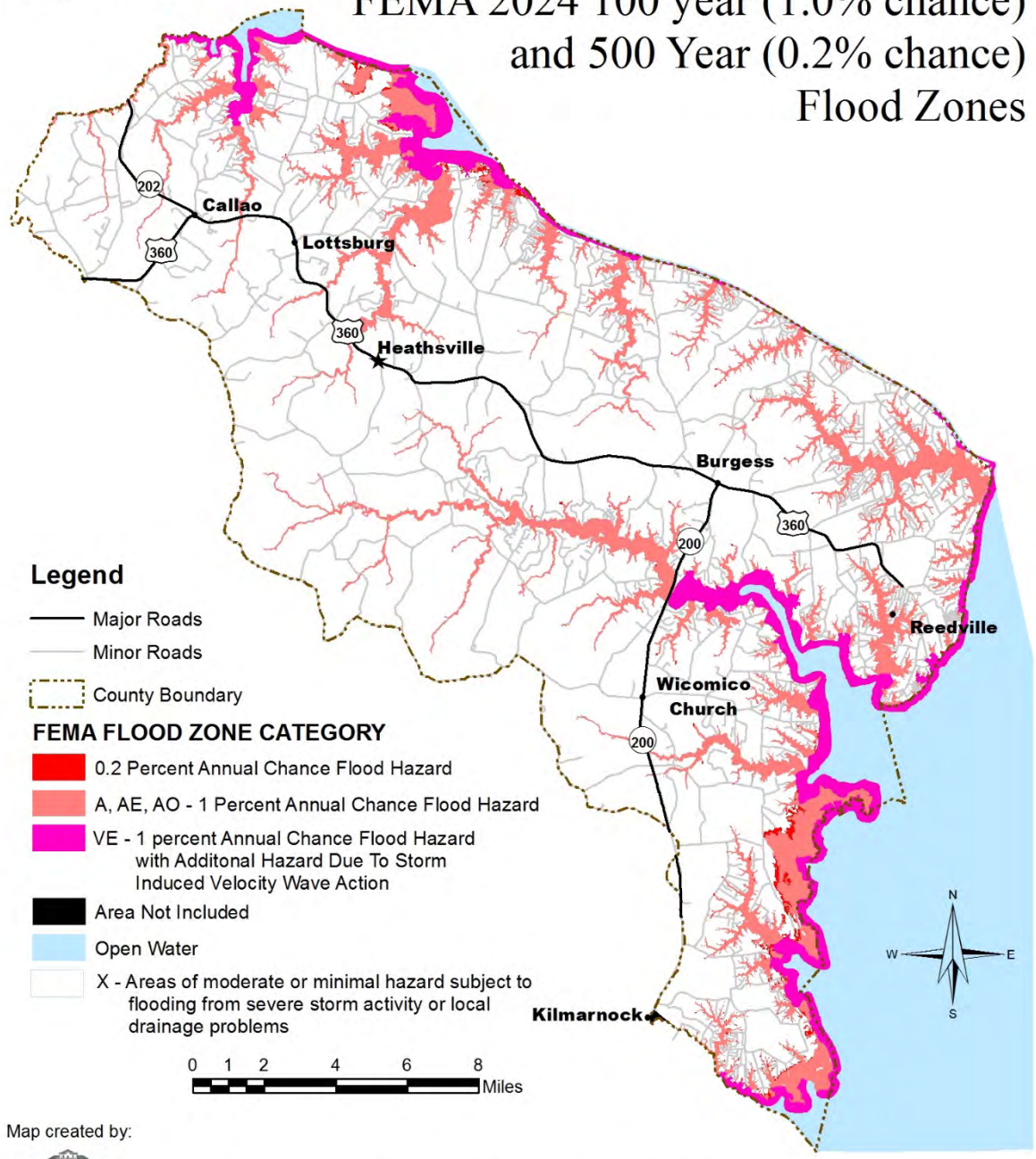
Figure 1.9

FEMA 2024 100 year (1.0% chance) and 500 Year (0.2% chance) Flood Zones



Map created by:

SLM, 06.24.24

Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Flood Zones- FEMA 6-2024

The County's Chesapeake Bay Preservation Act Ordinance limits development to within 100 feet of tidal waters connected with continuous flow. The 100-foot setback is created as a pollutant filter buffer strip but can serve as a flood hazard buffer also. In addition, the 100-foot setback also protects homeowners from the effects of shoreline erosion. All in all, the Bay Act requirements help protect both the Bay from pollution and the homeowner from natural forces.

7. Wetlands and Natural Habitat Areas

a. Wetlands

Wetlands are transitional areas between dry uplands and wet bottomland areas such as streams, rivers, bays, and other bodies of water. Often referred to as swamps, bogs, pocosins, and marshes, wetlands serve as a natural water filter for wastes and sediments, a barrier and an absorber of floodwaters, a buffer and stabilizer of the shoreline from coastal erosion, a recharge area for groundwater, and an important breeding and nesting ground for many important species of fish, bird, and plant life. Wetlands are often referred to as the "nurseries of the Bay". Wetlands also serve as valuable sites for recreation, open space, and education.

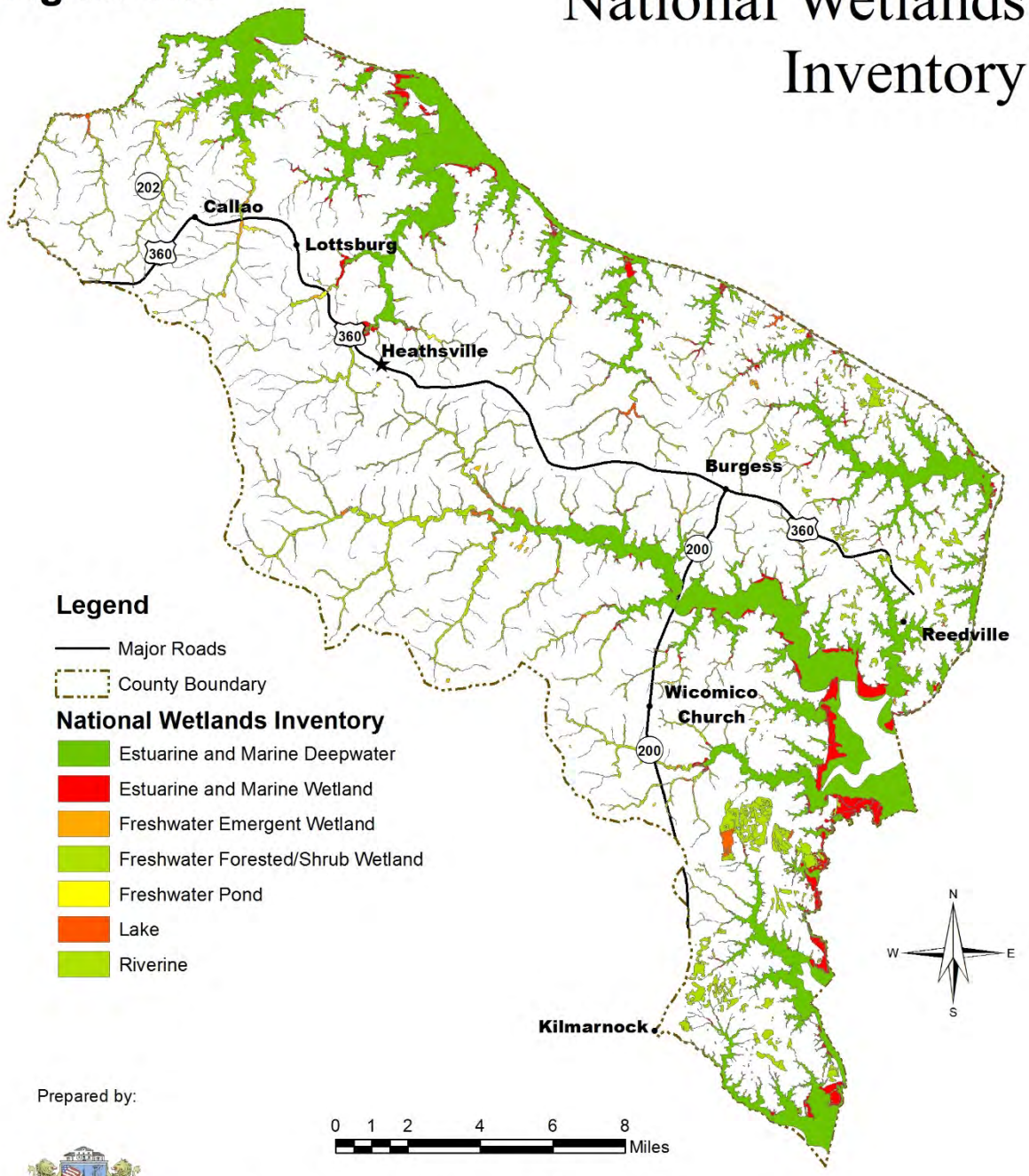
Wetlands are classified as either tidal or nontidal. Tidal wetlands are vegetated marshes, non-vegetated beaches, sandflats, and mudflats which receive regular tidal flooding by salt or brackish water. Tidal wetlands in the County are generally located along the bottomlands of major drainage streams subject to tidal action. Saltwater and freshwater marshes are typified by anaerobic mineral soils vegetated primarily by grasses, while mudflats and beaches do not support aquatic or terrestrial vegetation but nonetheless are valuable to many species of benthic organisms and wildfowl.

Nontidal wetlands, which may be adjacent to tidal marshes as well as farther inland, are beyond tidal influences, and are either continually or seasonally saturated by fresh water from either surface runoff or groundwater saturation. Due to seasonal and yearly variations, these types of wetlands are not as easily recognized, since there may not be any surface evidence of the presence of water during certain times of the year. To delineate the extents of these wetlands, experts use plant species, soil characteristics and other factors to separate wetland areas from upland areas.

According to the National Wetland Inventory, there are 1,560 acres of tidal wetlands in the County. Some of the larger marsh areas include approximately 157 acres in Dameron Marsh, 125 acres in Barnes Creek, and 85 acres on Hughlett Point. See Figure 1.10 for additional wetland locations in the County.

Figure 1.10

National Wetlands Inventory



For years, wetlands were considered undesirable wastelands and breeding grounds for mosquitoes which should be filled, drained, or altered. Consequently, millions of acres of wetlands were lost to a number of drainage and land-filling projects in order to convert them to agricultural lands or development sites. Wetlands are extremely vulnerable to physical and hydrologic changes such as dredging, filling, and water pollution, and lose their ability to perform natural functions when they are filled or drained. It has been estimated that between the mid-1950s and late 1970s, 11 million acres of wetlands were lost nationwide. During this period, Virginia lost approximately 57,000 acres of freshwater vegetated wetlands to agricultural conversion, channelization, forestry, pond, lake, and reservoir construction and other development. During the early 1970s, the science community began to realize the significant functions and importance of wetlands and as a result, a number of federal, state, and local regulations evolved to manage and protect both tidal and nontidal wetlands.

- Federal Regulations: Sections 401 and 404 of the Clean Water Act are the primary federal regulations which affect development on wetlands. Before a wetland can be filled or disturbed, a 404 permit must be obtained from the U.S. Army Corps of Engineers. State Regulations: The Commonwealth of Virginia began to regulate wetlands in the early 1970s, with the passage of the Virginia Wetlands Act of 1972. The purpose of this act was to ensure that wetlands of primary ecological significance shall not be altered or unreasonably disturbed. The following areas were exempted from this Act: agricultural, silvicultural, and horticultural activities; cultivation and harvest of shellfish and worms for bait; maintenance and repair of roads and railways; outdoor recreational activities that do not disturb wetlands; construction and maintenance of noncommercial piers, boat houses, and fences constructed so as to preserve tidal flow, construction of navigational aids; maintenance of man-made drainage ditches; governmental activities; and activities undertaken pursuant to emergency decrees.

  In June 1998, the US Supreme Court ruled that the Army Corps of Engineers did not have the authority to regulate draining of non-tidal wetlands not connected by surface flow. This precedent called the “Tulloch Ruling” opened the door to destruction of thousands of acres of non-tidal wetlands. To close this loophole and to protect the State Water Control Board’s mandate of “no net loss” of wetlands, legislation was introduced and passed in 2000 that requires landowners to get a state permit to drain any non-tidal wetland. The Virginia State Water Protection Permit now states that it is unlawful to “new activities to cause draining that significantly alters or degrades existing wetland acreage or functions”. This important State law effectively ended the practice known as “Tulloch Ditching” and affords a level of protection to non-tidal wetlands.

  Local Regulations: The Virginia Wetlands Act gave local governments authorization to establish local wetlands boards to exercise jurisdiction and review and issue permits for development on wetlands. In addition to establishing wetland regulations and wetlands boards pursuant to the Virginia Wetlands Act, the County adopted a Chesapeake Bay Preservation Area Ordinance that establishes a Chesapeake Bay Resource Protection Area (CBRPA) consisting of any wetlands plus a 100-foot vegetated buffer strip located landward from wetlands. Other regulations in the County that protect wetlands include the Floodplain Ordinance, Erosion and Sediment Control Ordinance, and Subdivision Ordinance. Figure 1.10 above illustrates United States Fish and Wildlife Service

(USFWS) National Wetland Inventory wetland locations within the County; although this map only shows polygon wetlands (most streams also have linear (line) wetlands associated along their entire length). The County has on file a hard copy of the National Wetland Inventory, as well as a digital copy on the County's GIS System. That source should be used for specific wetland locations and configurations, although field conditions and delineations take precedence over any map product.

The predominant locations for wetlands are along the many streams which flow into rivers that comprise its more than 509 miles of shoreline, according to data in Virginia Institute of Marine Science (VIMS), Comprehensive Coastal Inventory, Center for Coastal Resource Management's report Northumberland County Shoreline Situation Report. In that report, compiled in June 2003, 45 miles of eroding marshes and 246 miles of stable marsh buffers were observed and recorded. In 2014, the VIMS Comprehensive Coastal Inventory updated the 2003 report using onscreen digitizing over 2012 and 2013 aerial photos to create a new 2014 Digital Shoreline Situation Report. The 2014 report does not differentiate the shoreline stability of marshes as a category as the 2003 report does, however it does report there are 1,640 acres of marshes in the county. The 2014 report identified 427 miles of stable shoreline, 68 miles of unstable shoreline and 15 miles of shoreline where the erosion condition was unknown which equals 509 miles of total shoreline.[3]

b. Natural Habitat Areas

There are many sites within the County which are known to be a natural habitat resource for rare, threatened or endangered species which have been inventoried as part of a state or federal natural heritage program. Information for locating these sites can be found on an annual map created by the Virginia Department of Conservation and Recreation's (VDCR) Division of Natural Heritage Program entitled Natural Heritage Resources - Northumberland County. Due to the sensitive nature of natural heritage resources, that map is not shown in this plan. A hard copy of that map is on file at the County's Office of Building and Zoning and is used to screen site plans to see if they impact rare, threatened or endangered species. If proposed development should occur within the vicinity of these areas, the County should continue to examine each project so that development does no harm to the protected natural habitat site. People proposing development should and are required to identify the protected areas in detail on the site plans submitted for review by the County.

8. Historic Resources

The Virginia Department of Historic Resources (VDHR) is responsible for identifying and mapping known resources of historical and archaeological significance. In many communities throughout Virginia, this agency has sponsored the performance of in-depth surveys to identify both the location and historical context of buildings and sites of historic importance. VDHR

[3] The new 2014 Digital Shoreline Situation Report can be viewed here, using the Map Viewer: http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/virginia/northumberland/northumberland_disclaimer.htm

has not completed an in-depth study of sites for the County, although it maintains an incomplete record of about 120 possible historic sites and buildings that have been identified over a period of time. New projects, such as highway widenings, now require a survey of possible historic sites that are likely to be affected by the project. Should a countywide survey of possible historic sites be undertaken by VDHR, it is likely that 500 or more sites could be identified. In these surveys VDHR locates every building or site that is more than 50 years old.

Figure 1.11 depicts the general locations of sites that have been placed on the National Register of Historic Places.[4]

The list includes the following sites:

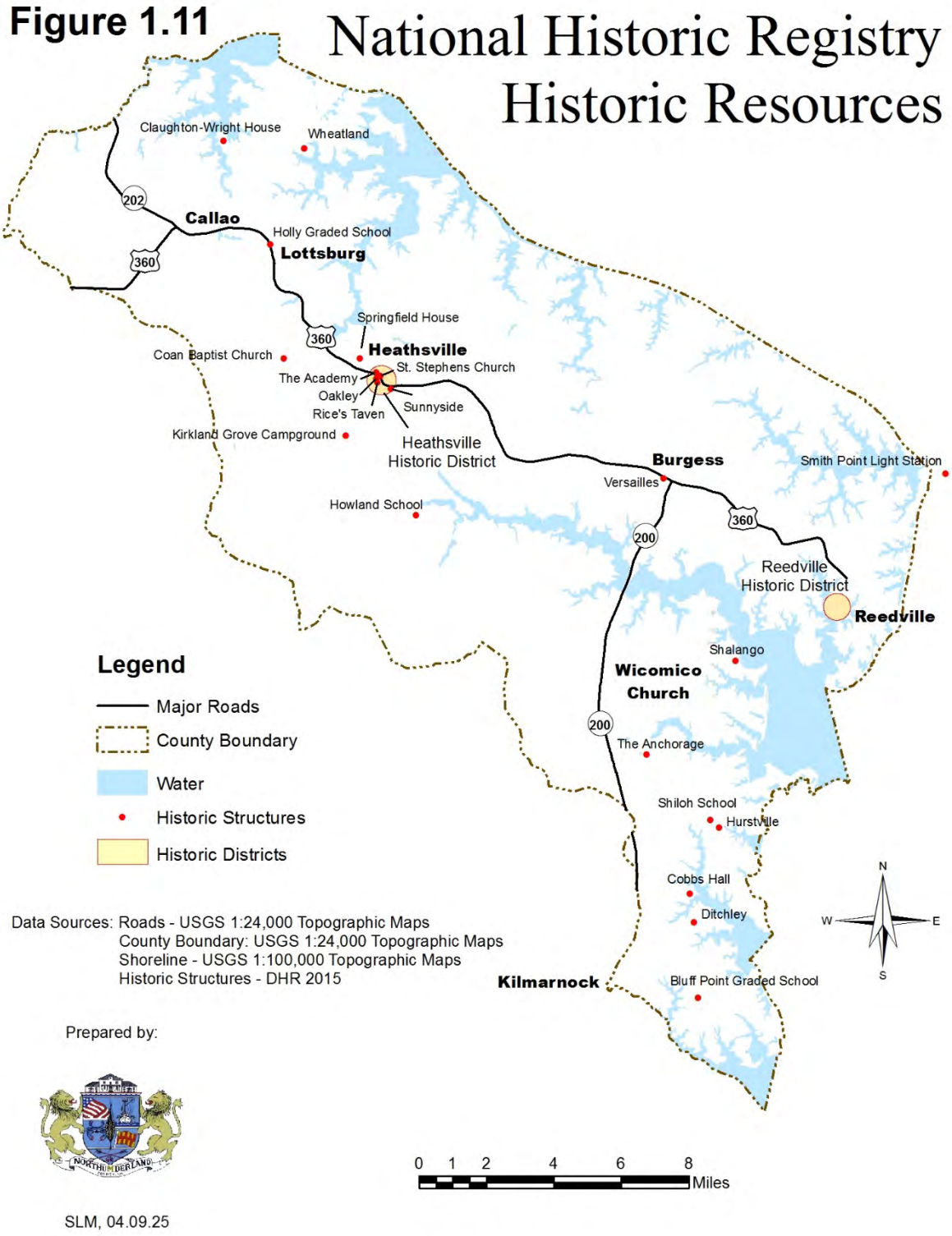
The Academy	The Anchorage	Claughton-Wright House
Coan Baptist Church	Cobbs Hall	Ditchley
Heathsville Historic District	Holly Graded School	Howland School
Hurstville	Kirkland Campground	Oakley
Reedville Historic District	Rice's Hotel	Shalango
Shiloh School	Smith Point Light Station	Springfield
St. Stephens Church	Sunnyside	Versailles
Wheatland		

Additional sites are listed in Appendix A. Historic landmarks and districts may be protected by the County through zoning regulations authorized in Section 15.2-2306 of the Code of Virginia. This legislation authorizes the local governing body to adopt an ordinance setting forth the historic landmarks within the County as established by the Virginia Landmarks Commission, and any other buildings or structures within the County having an important historic, architectural or cultural interest. The Code also enables the County to establish *"Historic Areas,"* which are defined as follows:

> *"An historic area (district) is an area containing buildings or places in which historic events occurred or having special public value because of notable architectural or other features relating to the cultural or artistic heritage of the community, of such significance as to warrant conservation and preservation."*

An historic district has been established in the Reedville community and one in Heathsville. Designation as an "historic district" may include an entire community or in such a district may be as small as a single building or site. When areas or sites are placed on the National Register of Historic Places, that status signifies that the sites contain historically and architecturally important collections of resources. Rehabilitation work performed on income-producing properties in historic districts may be eligible for Federal tax credits.

[4] http://www.nationalregisterofhistoricplaces.com/VA/Northumberland/state.html



The County may wish to continue the development of its historic resources through a comprehensive survey available through VDHR although the local government is usually

required to provide matching funds for the survey. With a complete survey of historic sites, the County would be in a position to prepare a Historic Preservation Plan as a future addendum to the Comprehensive Plan. See recommendations in chapter 3 section C(5)(a).

9. Chesapeake Bay Protected Areas

The Chesapeake Bay Preservation Act was adopted by the Commonwealth of Virginia to improve the quality of the water that enters the Chesapeake Bay. The Act established a cooperative state and local government program to protect water quality of the Bay and its tributaries and requires localities in Tidewater Virginia to incorporate general water quality protection measures into their comprehensive plan, zoning ordinance, subdivision ordinance, and erosion and sediment control ordinance. The Act also established the Chesapeake Bay Local Assistance Board (CBLAB) and Chesapeake Bay Local Assistance Department. The Chesapeake Bay Preservation Area Designation and Management Regulations were originally adopted in 1989 and were amended in 1991, 2001 and in 2012 as part of the Integration Bill. The Integration Bill moved the technical assistance portion of the Chesapeake Bay Preservation Act from the VDCR to the VDEQ Division of Water Programs, abolished the CBLAB and transferred the oversight of the Chesapeake Bay Preservation Act to the State Water Control Board.

The Regulations require Tidewater localities to define and protect Chesapeake Bay Preservation Areas; lands which if improperly developed may result in substantial damage to the Bay and its tributaries. These localities were required to adopt zoning regulations and establish a zoning district map delineating Chesapeake Bay Preservation Areas. The County's Chesapeake Bay Preservation Area Ordinance, patterned after a model ordinance provided by CBLAD, and became effective September 20, 1990. Chesapeake Bay Preservation Areas are classified into two categories: CBRPA and CBRMA's. The CBRPA is more restrictive of allowable uses than the CBRMA.

- CBRPA's consist of lands at or near the shoreline which possess intrinsic water quality. The regulations define CBRPA's as tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands, tributary streams, tidal shores, and other lands which provide for the removal, reduction, or assimilation of sediments, nutrients, and potentially harmful or toxic substances in runoff or groundwater discharge entering the Bay and its tributaries. A buffer area not less than 100 feet in width must be located adjacent to and landward of CBRPA's and along both sides of any tributary stream. The only permitted uses in CBRPA's are redevelopment of existing uses, water dependent uses such as piers, public utilities, railways and roadways, water wells, passive recreation uses, and historic preservation or archaeological activities.

- CBRMA's, as established by the County, contain all areas of the County that are not classified as Resource Protection Areas. The CBRMA includes lands that have the potential to cause significant water quality degradation if improperly used or developed. Any use permitted under the County's zoning ordinance is permitted in the CBRMA, provided all development meets performance criteria set forth in the Bay Act Regulations. Thus, all lands within the County are either in the CBRPA or the CBRMA.

- Intensely Developed Areas (IDA's) are areas of concentrated development within the CBRPA where development has severely altered the natural state of the area such that it has more than 50 percent impervious surfaces, public sewer and water is constructed and currently serves the area, and housing density is equal to or greater than four dwelling units per acre. Although some of the designation criteria may exist in certain areas of the County, there are no areas of concentrated development which meet all IDA criteria; therefore, the County has not designated any areas as IDA's.[5] IDA designation is optional on the part of the County.

In addition to defining Chesapeake Bay Preservation Areas, the Chesapeake Bay Preservation Area Designation and Management Regulations established Land Use and Development Performance Criteria to minimize non-point source pollution from stormwater runoff, minimize erosion and sedimentation, and maximize rainwater infiltration to reduce the introduction of nutrients and toxics and groundwater discharge of pollutants entering state waters affecting the Chesapeake Bay. Any use, development, or redevelopment of land in Chesapeake Bay Preservation Areas must meet several performance criteria to the satisfaction of the reviewing local government. The criteria include the following:

- preservation of indigenous vegetation
- minimization of land disturbance
- use and maintenance of best management practices (BMP's)
- minimization of impervious cover
- a plan of development review process and erosion and sediment control measures for development exceeding 2,500 square feet
- control of stormwater runoff and its quality
- requirement of a soil and water quality conservation and nutrient management plan for lands upon which agricultural activities are conducted within the CBRPA
- requirement of all wetlands permits prior to any land disturbance
- the inspection and pump-out (if necessary) of on-site sewage treatment systems at least once every five years
- requirement of a reserve sewage disposal site equivalent to the waste treatment capacity of the primary drain field for new development

Figure 1.12 shows the 100-foot CBRPA's delineated for the County.

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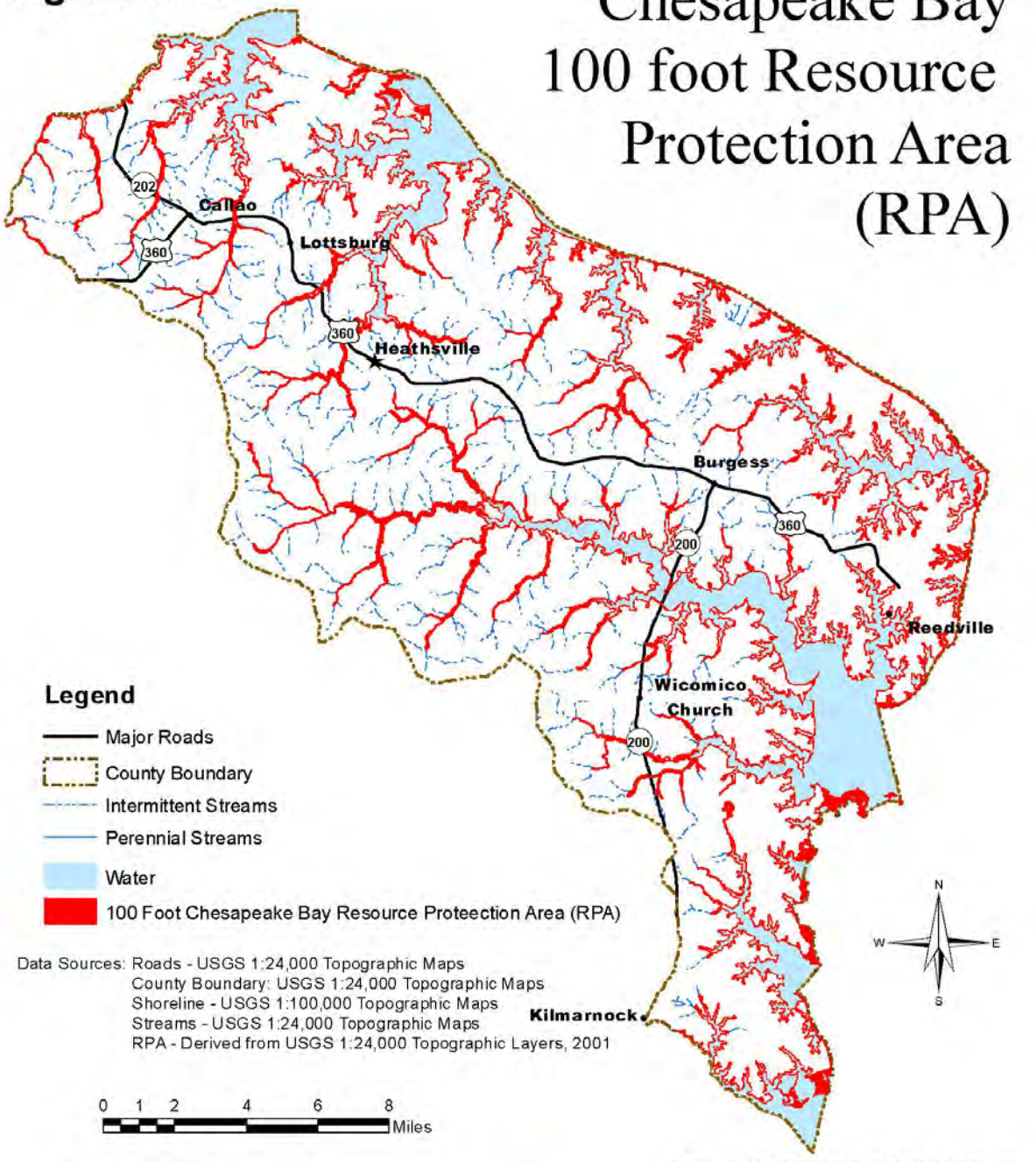
[5] Reedville is the only area that was considered, but it fails to meet the density requirement of four dwellings per acre which is part of the criteria for an IDA. See also Chapter 5 under "Policies relative to Intensely-Developed Areas.

Figure 1.12

Chesapeake Bay 100 foot Resource Protection Area (RPA)



This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

C. ANALYSIS OF CONDITIONS RELATED TO POTABLE WATER SUPPL

1. Groundwater

a. The Hydrologic Cycle

Water resources are often described in the context of a hydrologic cycle, which is the cyclical movement of water within the environment from atmosphere to land to sea to atmosphere again. Precipitation, infiltration, evaporation, and transpiration are the main mechanisms which move water from one location to another. Precipitation in the form of rain, snow, or hail can be intercepted by vegetation, infiltrate into the ground, or runoff into surface waters. Plants that intercept precipitation absorb moisture and transpire water molecules back into the air. Infiltrated water moves underground in storage areas between underground layers of rock or sediment, known as aquifers. Water that is not infiltrated eventually runs into depression areas, such as puddles, streams, lakes, rivers, and oceans. As exposed surface waters evaporate into the atmosphere, the hydrologic cycle continues.

b. Groundwater Aquifers[6]

Groundwater occurs during the hydrologic cycle when water moves into and through the earth's surface. In the County groundwater is stored in layers of permeable sand and gravel called aquifers. Three aquifers comprise the underground water supply for the County: the surficial (water table) aquifer; the Brightseat-Upper Potomac aquifer; and the Chickahominy-Piney Point aquifer. All of the aquifers slope downward from the Fall Line in the west to the Chesapeake Bay in the east.

- The water table aquifer: the uppermost aquifer system is close to the surface and is accessed by shallow wells. These shallow wells are the least expensive to construct. The water table aquifer is the most vulnerable of all the aquifers to contamination. The water table (unconfined) aquifer consists generally of fine sand and shells to depths reaching 80 feet or more and yields approximately 5 to 20 gallons per minute of moderately soft water that is generally satisfactory for domestic use. This aquifer is a historically significant and sustainable source for minor supplies of domestic groundwater in the County, supplying groundwater to farms, institutions, residences and other small users in the region.

- The Chickahominy-Piney Point aquifer is the shallowest artesian aquifer. The top of the aquifer is situated at approximately 350 feet below sea level in the vicinity of Reedville where the aquifer is approximately 140 feet thick. In the Callao region this aquifer is less than 100 feet thick, and its top occurs at a depth of approximately 200 feet below sea level. The Chickahominy-Piney Point aquifer yields 5 to 20 gallons per minute of moderately soft water with acceptable fluoride and sodium concentrations. It is a good source of potable water for moderate suppliers. This aquifer once served as a reasonable source of water for residents of the Northern Neck, but it has been superseded in importance by the deeper Brightseat-Upper Potomac aquifer system. Because of both quantity and quality problems, it is highly unlikely that this aquifer will ever be counted again to serve as a major source of groundwater for the Northern Neck.

[6] Reference USGS Professional Paper 1404-C

- The principal artesian aquifer underlying the County is the Brightseat-Upper Potomac aquifer. At Reedville, the top of this aquifer is situated at a depth of 658 feet below sea level. The total thickness of the water-bearing sands of this aquifer at this locality exceeds 220 feet. The aquifer thins gradually westward, and its top rises to a depth of approximately 530 feet below sea level in the vicinity of the Westmoreland County line. The Brightseat-Upper Potomac aquifer yields from 40 to 840 gallons per minute of soft, sodium-bicarbonated water, with slightly higher than normal chloride values in the southeastern most tip of the County. High sodium contents of greater than 200 parts per million are typical south of Wicomico Church.

In a report prepared in the late 1970s by the then Water Control Board (now VDEQ), it was concluded that under (then) current and projected rates of utilization, that groundwater should adequately meet the needs of the County through the year 2020.[7] However, that was 1978. The water levels in the major aquifers have been dropping 1.1 feet a year over the past few decades and the rate of decline in the vicinity of West Point, VA and in southern Maryland is approximately 3.5 ft/yr – in the same aquifers that supply the County. At the current rate of population growth and urban development, the critical Brightseat-Upper Potomac aquifer will be severely impaired by mid-century. For up-to-date information regarding groundwater studies, water supply planning and expansion of groundwater management areas, refer to Chapter 3 beginning on page 7.

c. Potable Water Supply (Wells)

Almost all developed sources of potable water in the County are supplied by wells. According to the 1990 Census, individual wells supplied potable water to 5037 households in the County and public or private systems supplied an additional 1754 households. Generally, three types of wells are found in the County: dug wells, drilled wells, and driven wells.

- Dug wells: range in depth from 8 to more than 80 feet, tap into the water table aquifer, and the yield and quality of water from them varies considerably. At low elevations, some dug wells yield brackish water when pumped heavily. Dug wells tap into the upper water table aquifer which is vulnerable to contamination from surface and sub-surface contamination sources. Health officials suggest that these wells be monitored carefully, especially the grout on the well casing, and when necessary, replaced with wells meeting current standards. In 1990, the County was one of the top ten localities in the Commonwealth having the most dug wells (2,211).

- Drilled wells: tap artesian (pressurized) water and range in depth from 300 to 900 feet. Deep drilled wells supply almost all of the water used by moderately heavy users including residential communities and industries. Homeowners, industries, and farmers favor them since they provide a substantial supply of good quality water. Oftentimes homeowners will replace a failing dug well with a drilled well for a more reliable potable water source.

- Driven wells: range in depth from 10 to 20 feet and are located primarily at lower elevations. Driven wells are not considered important water sources, since they

[7] State Water Control Board, Groundwater of the Northern Neck, Planning Bulletin 307, circa 1978

generally yield low quality or brackish water, and are not very common.

Although many residents and businesses in the County have their own wells, a number of denser developed areas are served by privately owned central water systems, which generally obtain water from the deepest aquifers. Blundon and Hinton Water Company operates a community water system in Reedville, serving more than 400 residents with current withdrawals of about 30,000 gallons per day. VDH rates the system's capacity at 200,000 gallons per day. The system consists of three deep wells and two elevated storage tanks; however, only two wells are presently in service. Only about five percent of the water from the Blundon and Hinton system is used for residential purposes, the rest of the water is used for industrial purposes.

There are other industrial and residential users which pump relatively large quantities of water; however, records are not available for systems that: do not pump at least 10,000 gallons per day; are not metered; or the VDEQ does not keep records on them. The VDH, Office of Water Programs, regulates public water supply systems that serve 25 or more people, or which have more than 15 connections for 60 days or more a year. Public water supply systems consist of:

- 38 Community systems, which serve towns, and subdivisions
- 4 Non-transient non-community systems which serve schools, municipal buildings, factories, and offices
- 20 Transient non-community systems which serve hotels, restaurants, marinas, campgrounds, and recreational areas[8]

According to year 2000 figures from the USGS, total groundwater withdrawals from the Northern Neck region are approximately 4.6 million gallons per day. Withdrawals are divided relatively evenly between domestic and industrial use, with most industrial uses devoted to washing seafood at processing plants. Presently, Reedville and the Town of Kilmarnock in Lancaster County are the major local water-demand centers affecting the County's water supply although most of Kilmarnock's demand is in Lancaster County.

Large users located outside the County affect the County, the Brightseat-Upper Potomac has no surface recharge area; consequently, any major water consumer that accesses this supply may alter the pressure within the aquifer and therefore the quantity and possibly the quality of water. With the County situated between two major “cones of depression” one to the southwest, the West Point paper mill, and one to the north, southern Maryland, the future of the groundwater supply of the County will be determined chiefly by the amount of pumpage in those two regions and not by water use by County residents. Currently, groundwater is being pumped from the artesian aquifers in these two pumping centers faster than it can be recharged (as evidenced by the continual decline of water levels in artesian wells). Because of the unique hydrogeologic environment of the Northern Neck, in which the natural groundwater circulation is measured in thousands, even tens of thousands, of years, the artesian aquifers are for all intents and purposes being "mined" of their

[8] Data gathered from the VDH, Office of Drinking Water website: https://www.vdh.virginia.gov/drinking-water/office-of-drinking-water/information-for-waterworks-owners/, Water_Works_Owner_Listing_2023_12_18.xlsx.

groundwater. A continuation of this water mining will lead eventually to a water supply crisis in much of Coastal Virginia.

d. Potential Contamination Sources

Potential groundwater contamination sources include landfills, lagoons, and other waste facilities. The Northern Neck Groundwater Quality Management Plan (NNGQMP)[9], created in 2003 by the Northern Neck Planning District Commission, outlines these potential contamination sources in detail, with map products that support text. When their locations are known these sources are generally permitted and monitored (point sources) but some groundwater pollutants such as pesticides, fertilizers, and road de-icing chemicals (non-point source pollution) are more difficult to monitor. The State's Groundwater Protection Steering Committee has assigned top priority to the following sources of groundwater contamination. The County is susceptible to contamination of its groundwater from most of these sources.

Underground Storage Tanks: Contamination of groundwater from underground storage tanks has increased steadily in recent years. Reports indicate that there are thousands of such tanks in use in the State, as well as a substantial amount of unused and abandoned tanks. All underground storage tanks eventually leak. Many contain petroleum products or other substances which have the potential to contaminate groundwater if leakage should occur. Groundwater pollution by petroleum products stored in underground tanks is a very serious problem that is relatively common and often occurs in the vicinity of gasoline service stations. In the County, the prevalence of underground heating oil tanks installed in the past is particularly troublesome. When homeowners upgrade their heating systems, they often switch from oil-fired furnaces to electric heat pumps. Due to cost concerns, many homeowners choose not to remove or properly decommission their underground storage tanks. Since residential heating oil tanks fall below the capacity threshold and thus are not required to be registered with VDEQ, there is no way to inventory or catalog the extent of this problem. The NNGQMP has a map of known leaking underground storage tanks in the County.

In Virginia, the Underground Storage Tank Program requires newly installed underground storage tanks to meet design, construction, and monitoring standards to prevent leaks and overflows and have corrective action plans with a detailed mitigation strategy in the event of a spill. VDEQ operates a Pollution Response Program (PREP), which investigates reported cases of groundwater contamination resulting from petroleum leaking from underground tanks. VDEQ has an interactive GIS web-mapping site[10] that allows users to zoom into their area of interest and examine up to date sites of petroleum releases. Once there, zoom in to a small area you are interested in, and on the right side of the screen the option for turning on "Petroleum Releases" appears. If you are not zoomed in close enough, the Petroleum Releases option is grayed out and you cannot turn it on, zoom in closer and the option should appear.

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[9] The plan is available on the NNPDC website for download at: https://drive.google.com/file/d/0ByoK_yGyvdj6RVg0TjN2WUxCQVU/view?usp=sharing&resourcekey=0-NfvO6_FLHmVY_hBguBX-UQ.

[10] https://data.virginia.gov/dataset/petroleum-release-sites/resource/14128c4f-8e07-47b9-a5a7-9869986a320f.

The Northern Neck Groundwater Quality Management Plan also has maps from the Northern Neck Emergency Operations Plan, Annex A1: Hazardous Material Response Plan that shows major gasoline and diesel fuel storage tanks sites in the County and their relative capacities.

Landfills: Various types of substances found in landfills have the potential to contaminate groundwater. Contaminants such as chemicals and fertilizers, hazardous waste, paint, varnish, and other materials may move through the ground and pollute the water table and deeper aquifers. The Virginia Department of Waste Management's (VDWM) regulations contain specific landfill design requirements and standards to prevent groundwater contamination. The NNGQMP has a map of historical landfills in the County. The Tri-County Landfill (which is located off Rt. 600 near Lara and is non-operational) is the only known historical landfill in the County and monitoring wells are in place to check for possible contamination (by VDEQ). Monitoring should continue into the foreseeable future to protect the groundwater of surrounding areas.

Lagoons and Holding Ponds: Lagoons and holding ponds often contain liquid waste produced by coal-fired power plants, rendering plants, fertilizer production operations, sewage treatment facilities, and other commercial activities which produce waste that can infiltrate into the ground and contaminate groundwater. The NNGQMP includes a map of the two known sewage lagoons in the County. One is currently in use for sewage at the Northumberland YMCA in Heathsville and the second is closed and near the end of Dungan Road off Coan Stage Road near Heathsville.

Septic Systems: Septic systems are considered a major threat to groundwater resources and are the leading contributor to the total volume of waste discharged directly into the ground. Nitrate contamination, household chemicals, septic cleaners, and wastes disposed of in underground absorption systems may pollute groundwater. Although many large mass drain field systems serve clusters of houses, schools, and commercial facilities in the County, the most common problem associated with on-site septic systems is contamination of individual wells. The NNGQMP has a map of properties in the from the NNNPDC Septic System Inventory that are served by septic systems, along with the type of septic system.

Groundwater contamination of the surficial aquifer can occur when septic systems are installed at sites where the soil or sediment is permeable that wastewater percolates too rapidly or where the soil or sediment is saturated. The extent of potential contamination is determined by construction and maintenance procedures as well as the density of septic systems in an area. The consequences of failing septic systems in highly concentrated areas can be far more serious than individual failures.

VDH is the agency responsible for regulating household septic systems and mass drain fields in the Commonwealth. The VDH’s primary concern has been protection of public health from surface ponding of sewage caused by soils which do not percolate and contamination of private wells from adjacent septic systems. VDEQ is responsible for the approval of commercial and industrial septic systems. While these systems are governed by the general requirements of a No-Discharge Program, no separate criteria or program exists for permitting these facilities.

Pesticides and Fertilizers: The most common chemical pollutant in the groundwater of the surficial aquifer is contamination from pesticides and fertilizers and is a complex problem. Although these chemicals are widely used and offer numerous benefits in farming, forestry, and lawn maintenance, their use is difficult to monitor and regulate. Contamination from pesticides and fertilizers in groundwater is dependent upon the rate of application, decomposition rate, water solubility of the substance, nature of the soil, and depth to groundwater. Although contamination from pesticides and fertilizers generally extends over a wide area at very low concentrations, increases may build up over years of use. The most common pollutant in the shallow groundwater aquifer in the Northern Neck is dissolved nitrates, and in many cases the level approaches the EPA's Maximum Contaminant Level (mcl) of 10 mg/liter. No doubt, septic systems contribute a substantial part of this load, in addition to chemical fertilizer application (both agricultural and residential).

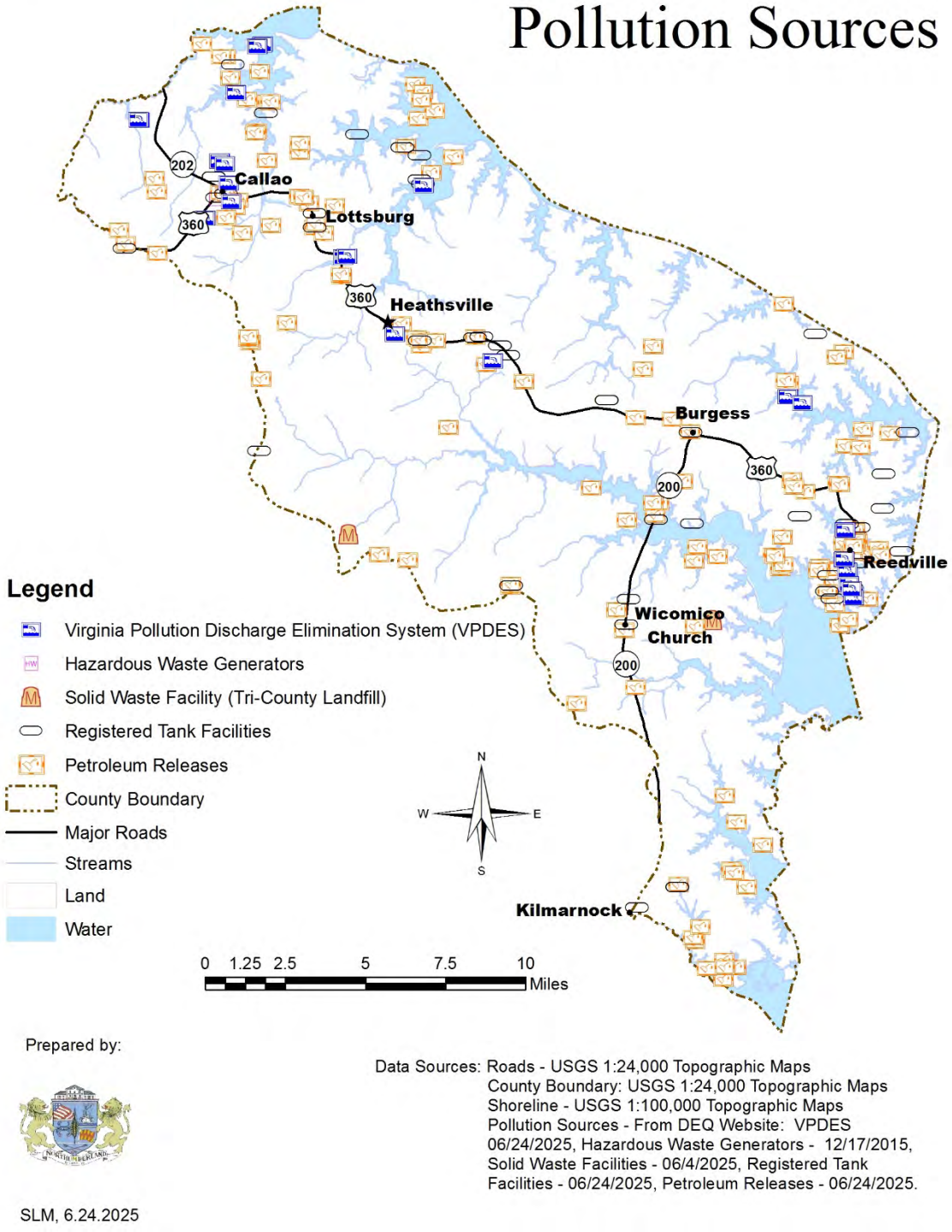
The problem of groundwater contamination by pesticides and fertilizers has been addressed by a number of federal and state regulations. Maximum contaminant levels for approximately a dozen pesticides were adopted by the EPA under the Safe Drinking Water Act. The Federal Insecticide, Fungicide, and Rodenticide Act and the Toxic Substances Act contain provisions which authorize the EPA and the Commonwealth to protect groundwater from pesticide contamination.

In 1989, Virginia passed the Pesticide Control Act which established a Pesticide Control Board with broad regulatory powers and authorized the Virginia Department of Agriculture and Consumer Services (VDACS) to regulate the registration, labeling, handling, and use of pesticides for certification of private and commercial applicators classified for restricted use. Although there are no specifications for application rates of fertilizer and lime sold in Virginia, these materials are required to be registered. Farmers within the 100-foot CBRPA are required to have a nutrient management plan that gauges the amount of fertilizer the soil needs in each field needs by soil testing. These plans, if followed properly, will minimize agricultural fertilizer over-application. The NNGQMP has a map showing the pesticide and nitrate leachability of soils in the County.

Hazardous Waste: The disposal or spilling of toxic and hazardous materials is another potential source of groundwater contamination. The federal legislation which regulates the identification and clean-up of sites containing hazardous waste is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Presently, no sites have been identified in the County. VDEQ is the agency responsible for maintaining the Commonwealth's Comprehensive Response Compensation and Liability Information System list. However, there are hazardous waste sites in neighboring counties. The NNGQMP has a map showing those sites on the Northern Neck peninsula.

Figure 1.12A shows pollution source locations for Virginia Pollution Discharge Elimination System (VPDES) Permits, Hazardous Waste Generators, Solid Waste Facilities, Registered Tank Facilities, as well as Petroleum Releases.

Figure 1.12a



Prepared by:

SLM, 6.24.2025

Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Pollution Sources - From DEQ Website: VPDES 06/24/2025, Hazardous Waste Generators - 12/17/2015, Solid Waste Facilities - 06/4/2025, Registered Tank Facilities - 06/24/2025, Petroleum Releases - 06/24/2025.

e. Programs Addressing Point and Non-point Pollution Sources

(1) Pollution Discharge Elimination System Permits

Any "point source" of pollution discharging into waters of the United States requires a NPDES permit. Industries and wastewater treatment plants which discharge pollutants into State waters are required to hold a VPDES permit. Point sources of pollution are pollution sources which are traceable to a single point, such as an industrial waste or municipal sewage discharge pipe. VDEQ regulates point source pollution dischargers by regularly monitoring the effluent of permit holders. A list of current point source dischargers in the County includes the following:

POINT SOURCE DISCHARGERS, 2025 - NORTHUMBERLAND COUNTY

VPDES Discharger	Receiving Stream
Public	
Reedville Sanitary District - Callao	Lodge Creek
Northumberland Middle & High School	Crabbe Mill Stream
Reedville Sanitary District	Cockrell Creek
Northumberland Family YMCA	Crabbe Mill Stream
Industrial	
Omega Protein, Inc.	Cockrell Creek/Ches. Bay

(2) Pollution Abatement Permit Program

Many other land uses activities that do not discharge directly into State waters have the potential to contaminate both surface water and groundwater through indirect discharges. Among such activities are the following types of uses:

- Storage of materials in pits
- Ponds and lagoons
- Sewage treatment plants
- Large commercial animal raising activities
- Application or disposal of sludge (animal or industrial waste)
- Recycling of wastewater
- Confined Animal Feeding Operations (CAFO’s)

Virginia's Pollution Abatement (VPA) Permit Program regulates and monitors activities in this class to ensure that groundwater sources are protected. Active Pollution Abatement Permits (June, 2024) within the County included the following activities: Lake Packing Co., Inc. (Permit Number VPA01406), for land application of seafood processing water.

(3) Mining Permits

Activities associated with industrial, manufacturing, and mining can contaminate groundwater and surface water, however, these are mostly associated with the use of water for coal mining. Declining groundwater levels, reduced surface water

recharge, diminished water quality and instream flow, extensive cones of depression, and saltwater intrusion may result from heavy groundwater and surface water usage and pumpage. Mining practices have the potential to affect the movement and recharge of groundwater, lower the water table, and disrupt aquifers. Again, most of these negative externalities are related to coal mining, not surface pit sand and gravel mining, which is the only type of mining occurring in the County today. As of 2024, there were seven sites in the County with mineral mining permits. Of those seven sites, most mine either sand or gravel or both. A total of 33.4 acres in the County are permitted for mining activities. 14.4 acres in the County have been reclaimed after mining activities cease.[11]

(4) Non-point Sources of Pollution

Non-point sources of pollution exist in every community. This category includes any pollutant whose point of generation cannot be traced to any identifiable facility and whose exact point of entry into the water course cannot be defined. Origins of non-point sources as classified by the VDEQ identifies the following classes: agriculture, forestry, construction, urban development, resource extraction, land treatment, disposal and hydrologic modifications.

With the passage of the Clean Water Act in the 1970's, point sources of pollution came under permitting and regulations. Today, point sources are mostly in compliance with permits, and the majority of uncontrolled pollution that is entering the nation's waterways is of a non-point source type. This type of pollution is most difficult to assess and control. The Clean Water Act set in place a mechanism to clean up waterways that are impaired. Every two-year's states report to the EPA those waters that do not meet federal clean water standards, and this report is called the 303(d) list. This list is often referred to as a "dirty waters" list. States must study the impairments, and formulate a clean up plan. The study of what is causing the pollutant specific impairment is called a Total Maximum Daily Load (TMDL) Report. The study seeks to determine the TDML of a specific pollutant that can be assimilated by the waterbody before clean water standards are violated.

TMDL's in the County are all a result of non-point source pollution. The County has fifteen TMDL Studies for impaired water body segments that will be completed by VDEQ. All fifteen segments are shellfish impaired waters, that is, the federal standard for fecal coliform bacteria concentration in waters used for harvesting of shellfish had been violated (exceeded). One TMDL study has been completed in the County, which covers the Coan and Little Wicomico Rivers. Nine of the fifteen segments are contained in this study. Other creeks in the county that have had shellfish TMDL's created by VDEQ are the Little Wicomico River; Cockrell Creek; Dividing Creek and Prentice Cove; Indian, Tabbs, Dymer, Antipoision Creeks; Mill Creek, Ball Creek, Cloverdale Creek; Owens Pond and Little Taskmakers Creek;

[11] The above data was gathered from the Virginia Department of Energy (VDE) online data found at: https://energy.virginia.gov/webmaps/MineralMining/

Cod, Presley, Hull, Rogers, Bridgeman, Cubitt and Hack Creeks; Mill Creek, UT, to Kissinger Millpond, Kissinger Millpond; and Yeocomico River.

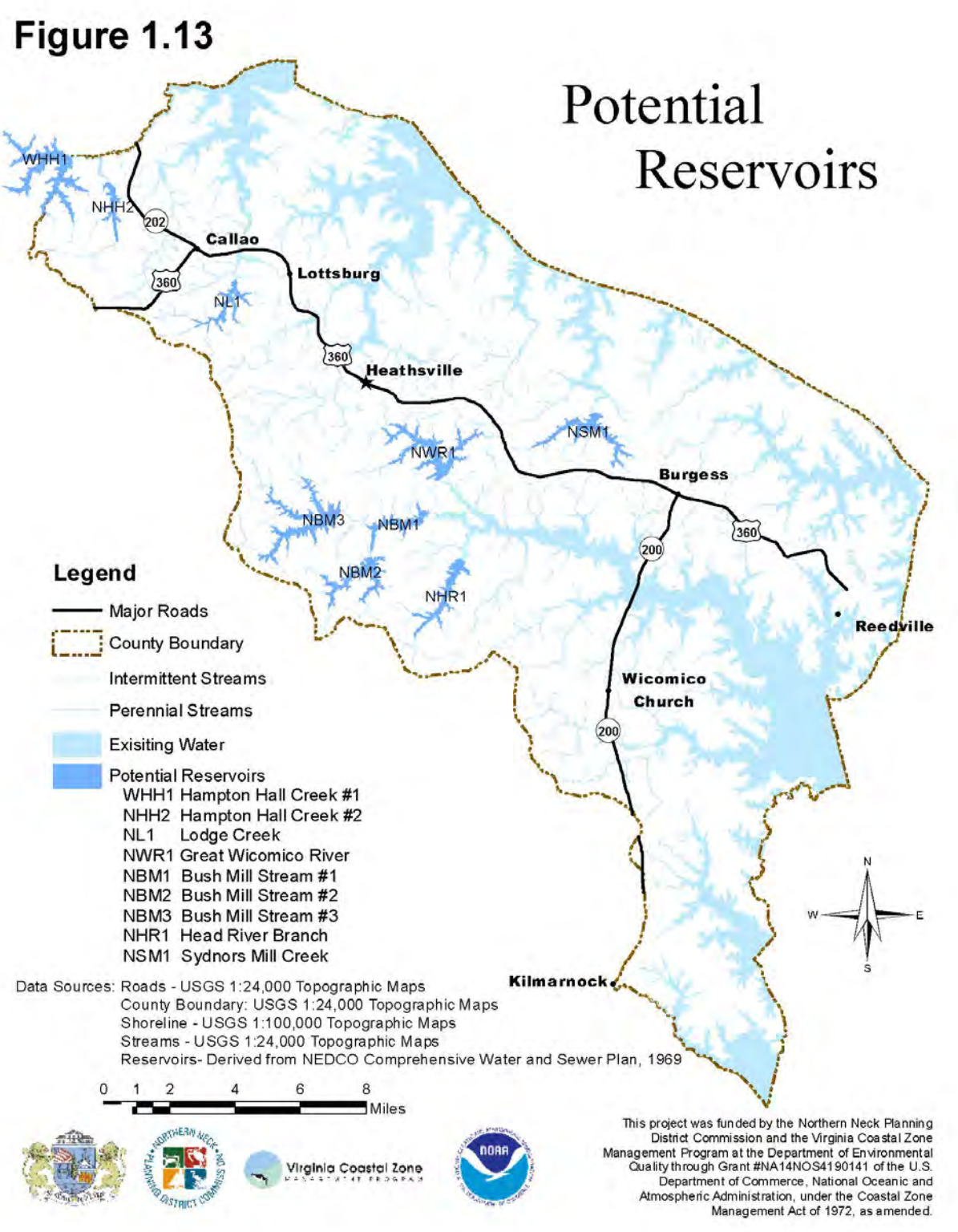
All warm-blooded creatures generate fecal coliform bacteria, so some of the bacteria levels could be from wildlife populations. TMDL took samples of the bacteria and used bacterial source tracking to determine the type of animal that deposited the bacteria. At almost all stations in both watersheds, humans accounted for the majority of the fecal coliform bacteria. All human fecal bacteria are considered "controllable" by the EPA, so the reduction in the total fecal coliform load must come by reducing the human portion of the fecal coliform load. Probable sources of the human fecal bacteria are failing septic systems, straight pipes, and pollution from boaters. There are currently no State funds available for TMDL implementation (i.e. finding the sources and fixing the problem), so the impairments will likely continue.

f. Major Planning Issue Concerning Water Supply

The major planning issue regarding potable water supply is to provide for sustainable supplies of water and to protect the groundwater sources from contamination. Expansion of the Virginia Groundwater Management Area to include the County will help with future management of groundwater resources within the region.

The County is not able to limit groundwater withdrawals under current Virginia law, so that is not an option for reducing the demand on groundwater resources. The County can, however, investigate the possibility of surface impoundments (reservoirs) within the jurisdiction. In 1969, the Northern Neck Economic Development Commission (NEDCO) prepared a report for the newly formed NNPDC, entitled Engineer's Comprehensive Plan (for) Water and Sewerage Facilities (in) Lancaster, Northumberland and Richmond counties. In the report, 43 reservoirs were located; drainage acres, total volume, and daily sustainable yields were calculated throughout the Northern Neck. Nine reservoir sites are identified in the County, with one on the border of Westmoreland and Northumberland counties (Hampton Hall Creek). At the request of the County Planning Commission in 2003, the NNPDC used GIS to digitize the flood elevation of the reservoirs and determine if the reservoirs impacted any existing structures in the County. Using E911 data of building outlines, the two data sets were overlaid. None of the reservoirs impacted any existing buildings, but two houses were within 50 feet of the inundation. Figure1.13 shows the location of the nine potential reservoir sites within the county. The County should continue to consider limiting development in the proposed reservoir footprints so that the option of constructing surface impoundments is still viable, should the demand for groundwater exceed supply.

See Chapter 3, Section B(7)(b) for a more comprehensive plan discussion of water quantity in the County.



The most vulnerable aquifer is the surficial aquifer, which is closest to the surface and the first to become affected if contaminants pass through the soil. Areas of considerable concern are where the soil is less acceptable for septic tanks and where the elevations

are lowest. The areas where most of these conditions are found are the lowlands along the shorelines which are also the area most in demand for development. Future development should be encouraged to make greater use of the lower aquifers, particularly the upper artesian aquifer for water supply. The protection of the artesian aquifers against excessive usage is a matter that should and is being given high priority in future planning. The county encourages periodic testing of individual wells to ensure that a satisfactory quality of water is maintained. To help in this effort, the County should continue to promote increased awareness of the water testing program that is presently available to county residents from the local Agricultural Extension Office.

For ways to protect wells from contamination, such as wellhead protection and other measures allowed under Virginia law, as well as Source Water Protection Program (SWAP) potential pollution data see the Northern Neck Groundwater Quality Management Plan (NNGQMP) created by the Northern Neck Planning District Commission in 2003.[12]

2. Principal Watersheds

The drainage of The County flows either to Potomac River or directly into the Chesapeake Bay through the many rivers, streams and creeks that penetrate into the County and form its impressive long shoreline. A very small portion (less than 2 acres) of the County drains into the Rappahannock River, and these areas occur along the southern border of the County, adjacent to Richmond and Lancaster Counties. Figure 1.14 Watersheds (Hydrologic Units) shows the principal watershed areas as established by the VDCR, and are referred to as hydrologic units. “Hydrologic Units” are conglomerations of smaller watersheds and are identified by significant rivers or creeks but include the lesser rivers and streams that flow into those named. Hydrologic Units are also coded with an alpha numeric coding system, “PL” is the code for the Potomac, “RA” is the code for the Rappahannock, and “CB” is the code for the Chesapeake Bay. The sequential numbers begin at the headwaters (low numbers) and increase as you go downstream. Thus, “PL72” is downstream of "PL71”.

The table below provides a brief summary of each of the watershed areas, giving the approximate land area occupied by each and highlights of events in each watershed. Some factors are common throughout the County and may not be mentioned in the summaries. For example, septic tank and underground tank failures constitute an on-going threat of pollution.

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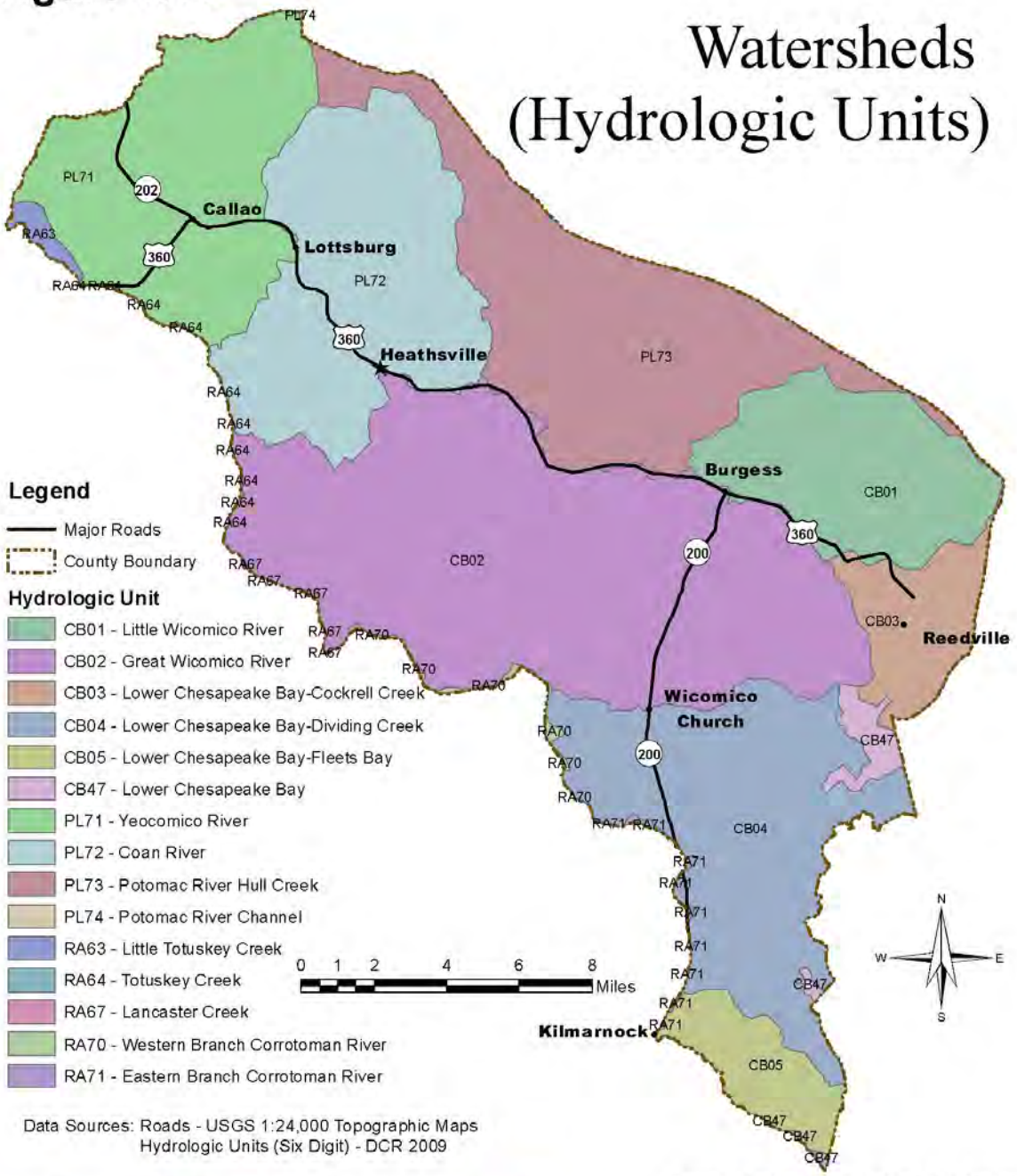
[12] The plan is available on the NNPDC website for download at: https://drive.google.com/file/d/0ByoK_yGyvdj6RVg0TjN2WUxCQVU/view?usp=sharing&resourcekey=0-NfvO6_FLHmVY_hBguBX-UQ

Figure 1.14



Data Sources: Roads - USGS 1:24,000 Topographic Maps
Hydrologic Units (Six Digit) - DCR 2009

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

PRINCIPAL WATERSHEDS NORTHUMBERLAND COUNTY		
WATERSHED IDENTITY	APPROX LAND AREA (SQ MI)	PRINCIPAL FEATURES & ISSUES
A. Yeocomico River (part of Hydrologic Unit PL71)	28	Watershed shared with Westmoreland County; includes West and South Yeocomico Rivers, and their tributaries; significant activities: agriculture, seafood industries, business activities in and near Callao, shoreline residential development. Potential pollution sources: golf courses, sewage treatment facility at Callao[13], several seafood processing plants, recreational areas and marinas, commercial uses handling oil products.
B. Coan River/The Glebe and Kingscote Creek (part of Hydrologic Unit PL72)	31	Watershed includes named bodies of water and tributaries; significant activities: agriculture, seafood industries, shoreline residential development, commercial marinas, and development in and near Lottsburg, Heathsville and Lewisetta. Potential pollution sources: failing septic systems, industrial waste sites, sewage treatment facility, commercial marinas, seafood processing plants. One site has an active VPDES permit[14].
C. Potomac River: Coan River to Ginny Beach (part of Hydrologic Unit PL73)	33	Watershed drains all streams within the named area directly into the Potomac River. Significant activities include: agriculture, shoreline residential development, seasonal dwellings and/or campsites, and shoreline residential development. Existing or potential pollution sources: activities around boat ramps and docking areas.
D. Little Wicomico River (part of Hydrologic Unit CB01)	18	Watershed includes Little Wicomico River and all tributaries. Significant activities: seafood industries and sports boating and fishing; part of Burgess commercial area; shoreline residential development; campgrounds; some agriculture. Potential pollution sources: industrial waste, private and commercial boat facilities, seafood processing, failing septic systems.
E. Cockrell Creek and Gaskins Pond (part of Hydrologic Unit CB03)	8	Watershed contains all of Cockrell Creek and tributaries, and several ponds and streams that drain directly into the Chesapeake Bay. Significant activities: Town of Reedville- residential development; a large seafood industrial complex; commercial marine facilities. Chesapeake Beach and Fleeton Beach developments – seasonal dwellings; shoreline residential development. Potential pollution sources: seafood industries, town's sewage treatment plant, public boat landings, boat facilities and usage, failing septic systems, marina pollution.
F. Great Wicomico River (part of Hydrologic Unit CB02)	63	Watershed includes Great Wicomico River basin and all tributaries. Significant activities: business areas at Burgess, Wicomico Church and Heathsville; extensive shoreline residential development; agriculture; campgrounds and agriculture. Potential pollution sources: Tri-county landfill, sewage treatment plants at schools, campgrounds, marine and boat activities.
G. Ches. Bay: Mill Creek and Dividing Creek (part of Hydrologic Unit CB04)	31	Watershed includes several creeks and streams within named area flowing into the Chesapeake Bay, Mill Creek and Dividing Creek. Significant activities: Wicomico Church business area; agriculture; seafood, shoreline residential development (Mill Creek). The least developed of the watershed areas with no major pollution threats.
H. Indian Creek (part of Hydrologic Unit CB05)	7	Watershed includes all tributaries of Indian Creek plus Henrys and Barnes Creeks. Significant activities: Kilmarnock, shoreline residential development, marinas, some agriculture, golf course. Potential pollution from Kilmarnock (Lancaster County), marina pollution

[13] The Callao sewage treatment facility was upgraded in 2005 to serve the Callao region. The Callao sewage treatment plant is an extension of the Reedville Sanitary District, operated by the county.

[14] Pollution Discharge Elimination System (VPDES) permit, issued by the Department of Environmental Quality for wastewater or industrial waste discharges, see page 1:43 for a list of VPDES dischargers in the county and the affected waterbody.

There is an intimate relationship between the land and water resources. Protecting ground water, lakes, rivers, streams, and wetlands requires wise land use. Human population growth and changes in land use increasingly impact aquatic environments. There is an inverse relationship between total impervious cover and habitat quality and species richness (fish and invertebrates). Research has shown that streams in watersheds with greater than 10 percent of their land area in impervious cover begin to show signs of ecological impairment. As the impervious cover in a watershed approaches 25 percent, streams become degraded and the water quality, habitat quality, and biological diversity occurring in watershed streams are all greatly reduced. Virginia Stormwater Regulations have integrated into the calculations incentives to reduce impervious cover, thus reducing the volume of stormwater created by new development. Adhering to the Virginia Stormwater Regulation standards should help minimize impervious cover in county watersheds, thus reducing overall impact of development on fishery resources.

Planning issues related to watersheds should continue to focus on the discharge of water that eventually finds its way into the underground water system or into one of the rivers and eventually into the Chesapeake Bay. The focus of strategy should continue to be on ways of reducing pollutants in surface runoff and groundwater as well as minimizing the amount of such water that actually reaches the Bay. One of the ways to reduce water and pollutants entering the Bay is through three-story vegetated buffers along all streams, ground cover plants, shrubs and trees, in which mature trees are the most important component.

These are the same issues that are addressed by the Chesapeake Bay Preservation Zoning Regulations of the Resource Protection and Resource Management Areas. Drainage issues are also addressed by the Best Management Practices Handbook, Planning Bulletin 522, Va. Water Control Board, 1981. [15]

3. Soil Conditions

This section discusses various qualities of the soil with emphasis on soil conditions that may affect the quality of water in the aquifers, creeks, rivers and eventually the Chesapeake Bay

a. Water Table

Figure 1.15 maps the seasonal high water table patterns in the County in terms of its depth below the surface. The seasonal high-water table occurs in late Winter, early Spring, usually around late February to early March, before deciduous trees begin to leaf out. The map uses twenty-four inches as the dividing point; therefore, the water table is shown either as being 24 inches or more from the surface or 24 inches or less. The results are not surprising in that the predominant areas of high-water table are in the lowest parts of the County near the shorelines.

The seasonal high-water pattern is quite pronounced within the area between the line previously described as the "Suffolk Scarp" (Refer to Topographic Conditions) and the shorelines of the Potomac River and Chesapeake Bay. That pattern runs from the County

[15] Now the Virginian Department of Environmental Quality.

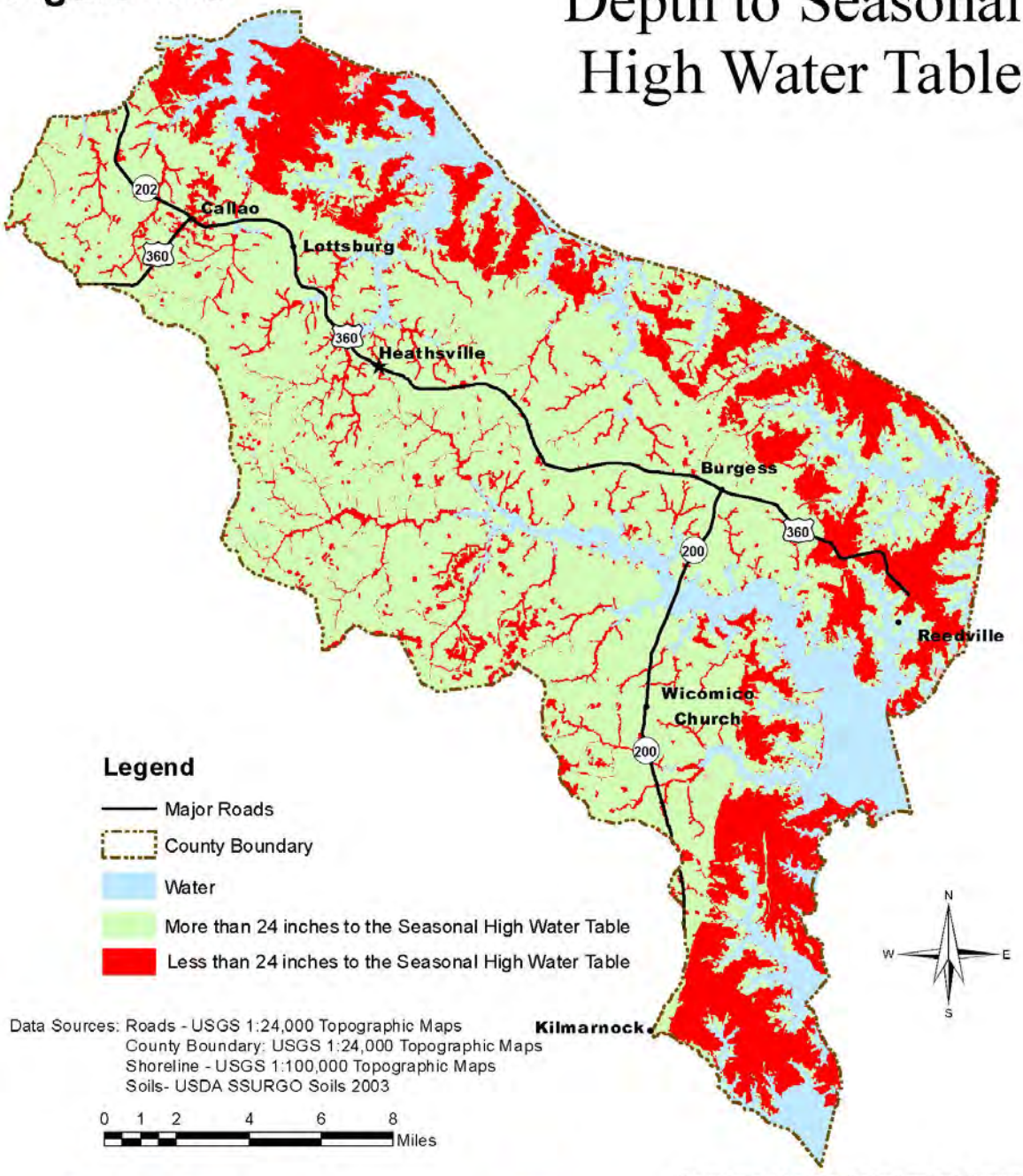
line at Kilmarnock then generally parallels Route 200 until it passes Route 360 near Burgess. From there, the escarpment runs approximately parallel to the Potomac River shoreline about two to three miles inland of that river.

One observation that can be made from this pattern is that, even though most of the seasonal high-water table may be found in these low areas, some areas nearest the shorelines appear to have a lower water table than the general pattern of the high-water table area. This has made it possible for more development to occur immediately adjacent to the shorelines while much of the higher ground nearby is unsuitable for septic tanks (Figure 1.5). Today, however, with the advent of alternative secondary treatment septic systems, the water table is less of a limiting factor than once was true. The potential for pollution from these engineered systems always exists, especially if the systems are not properly maintained by professionals, as required by Virginia law.

The seasonal high-water table is also present to a lesser degree in the portion of the County south and west of the "Suffolk Scarp" line, but in the areas south and west of Routes 360 and 200 the high-water tables are found mostly along the bottom lands and stream basins that penetrate into these otherwise higher elevations.

Figure 1.15

Depth to Seasonal High Water Table



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b. Highly Erodible Soils

Soils that are classified as "highly erodible" present a particular concern in the protection of water supply. Erodibility refers to the capacity of soils to be carried from the surface to streams with storm runoff. When this happens, surface impurities are carried into state waters increasing pollution and presenting dangers to marine life, as well as making the creeks less navigable by boats by reducing the depth of the channel.

Areas that are particularly vulnerable to erosion may be found around construction sites, tilled fields and other places where disturbed soil may be exposed to water or wind.

The Commonwealth has determined that an erosion index of 8.0 or more is high enough to warrant precautions. When such areas are combined with steep slopes, the threat of severe erosion is increased considerably. Since most of the steep slopes in the County are along streams, there is always a threat of erosion in these areas if the slopes are disturbed. In addition, erosion from cultivated farm areas and intensely developed residential areas can carry large amounts of chemicals into public waters. See Figure 1.16 for an erosion index map.

Part of the State's strategy for establishing CBRPA's and CBRMA's in the Chesapeake Bay regulation in the Zoning Ordinance is to reduce the impact of erosion on state waters. The CBRPA and its associated buffer strip functions as a strainer for water discharging into public waters. The CBRMA extends protection further by requiring performance standards to be maintained.

c. Steep Slopes

Topographic landforms and corresponding slopes are environmental features that have always required careful consideration in determining appropriate types of land development and use. This was demonstrated earlier in this Chapter by the topographic representation shown on Figure 1.3, which found that nearly all of the state highway roads are located along the tops of ridges. And for reasons of access, all development is likewise located along the roads or very close to them. Other maps illustrated that the level ridge tops also contain the best drained soil. In a cursory examination of the road pattern, one might conclude that they were located randomly, but on closer examination the rationale of their locations relative to topography is obvious. For one thing, excessive slopes seem to have been avoided.

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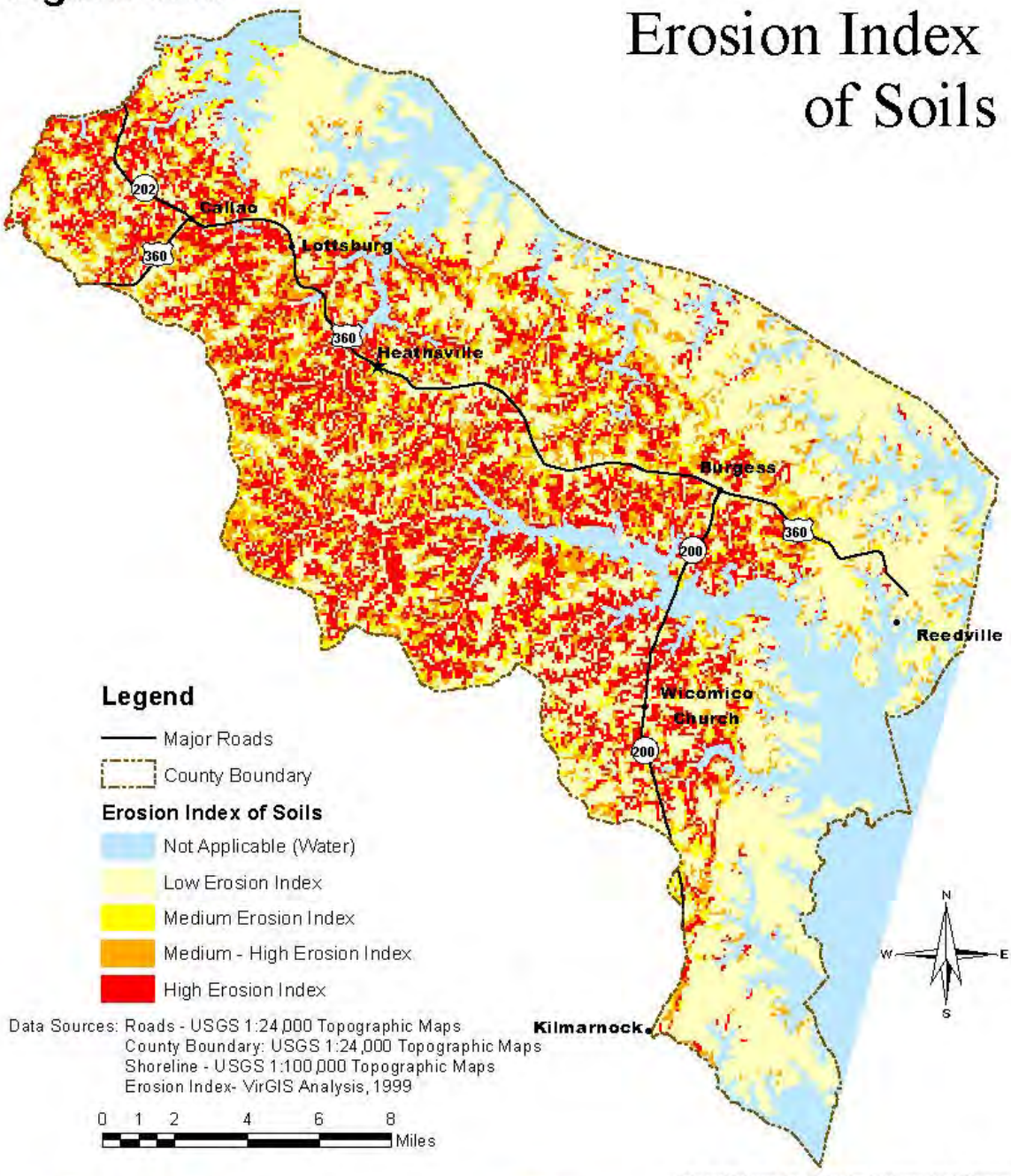
Figure 1.16



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Slopes are also a major consideration in land use planning for several reasons. The first is evident in the pattern of highways. Steep slopes present more engineering problems than moderately sloped or nearly flat land and consequently increase the cost of development. Historically, developers like highway engineers, have sought out land with the fewest construction problems for establishing subdivisions except in cases where amenities offered such significant market advantages that the higher development costs were acceptable. In the County, both types of development are present but perhaps the more dominant type are those with amenities such as water access. The profit potential of prime waterfront property is taking priority over immediate development costs.

Development on slopes can also present environmental liabilities contributing to excessive soil erosion and resulting in stream pollution. Where certain types of sandy soil which are located on a steep slope is disturbed during construction, the remaining soil can become very unstable and start to erode. Because many such conditions exist along streams and shorelines, the preferred sites for building homes, these sites are extremely vulnerable to erosion during construction. The erosion problem has been reduced considerably, with the establishment of the Chesapeake Bay RPA which in many cases includes steep slopes when they are adjacent to shorelines and adjacent wetlands. The County's erosion and sedimentation control ordinance also establishes another layer of protection by requiring erosion control mechanisms around construction sites. The establishment of VDCR's Responsible Land Disturber Program in July 2001, also helps to reduce sedimentation by minimizing excessive land disturbance.

When discussing slope three classes of slopes are included: less than six percent; between six and 15 percent; and greater than 15 percent. The steeper slopes can be seen to form a pattern along the stream beds in the upland parts of the County. Within that area there is very little development in the areas of steep slopes; it is lined along existing roads. The steep sandy land USDA soil category from the County Soil Survey occurs in these areas and is the most vulnerable land in terms of erosion potential. Once vegetation is removed, there is little to hold the soil in place, since the soil lacks organic matter. Retention of native vegetation continues to be recommended to hold this soil type in place in these areas.

In the lowland part of the County, slopes become a secondary issue because in these low-lying areas other physical conditions such as poor soils and high-water table present a greater constraint to development.

As a planning issue, land with slopes greater than 15 percent (15 feet fall per 100 feet) should continue to be avoided wherever possible and if developed at all, extensive care should be taken to ensure that the site work does not leave unstable banks. Land with slopes greater than 20 percent should continue to be avoided altogether.

d. Soil Permeability

Figure 1.7 (see Section A.4.) displays areas of the County that are unsuitable for conventional septic systems. That map is based on several factors that affect the soil's ability to be used for sewage disposal. Among these are wetness, slope, and texture of soil particles. One of the soil's principal determinants of acceptability is its permeability, an index that describes the rate at which water passes from the surface to lower layers when the soil is thoroughly wet. Soils which have a very high infiltration rate such as sandy or

gravely soils are said to have high permeability whereas those with a low infiltration rate are said to have low permeability. Figure 1.17 shows the soil permeability in the County.

The scale established by the State measures infiltration in terms of how many inches per hour will pass through the soil under thoroughly wet conditions. A permeability factor of 0.6 inches per hour or less is regarded as inadequate for conventional septic tank drain fields. In addition, because these soils have a low percolation rate, more of the surface water that falls during precipitation is carried off the site, a condition that also promotes erosion.

High permeability presents another type of problem for septic tanks and the underground water supply. In order for septic tanks to function properly, the effluent must remain in the upper soil long enough for oxidation to destroy anaerobic bacteria and inorganic substances like ammonia and hydrogen sulfide. When the effluent passes through too quickly impurities can enter and pollute the underground water supply. The state standards establish six inches per hour as the maximum acceptable permeability rate for septic tank function.

Therefore, soils with ratings outside the 0.6 through 6.0 range should continue to not normally be used for conventional septic tank fields. Today, with the advent of alternative septic systems, conditions that would previously not support septic systems are now open to development. The expense of the alternative septic systems may deter some from adopting the new technology; however, when compared to the current cost of waterfront property, the expense is negligible.

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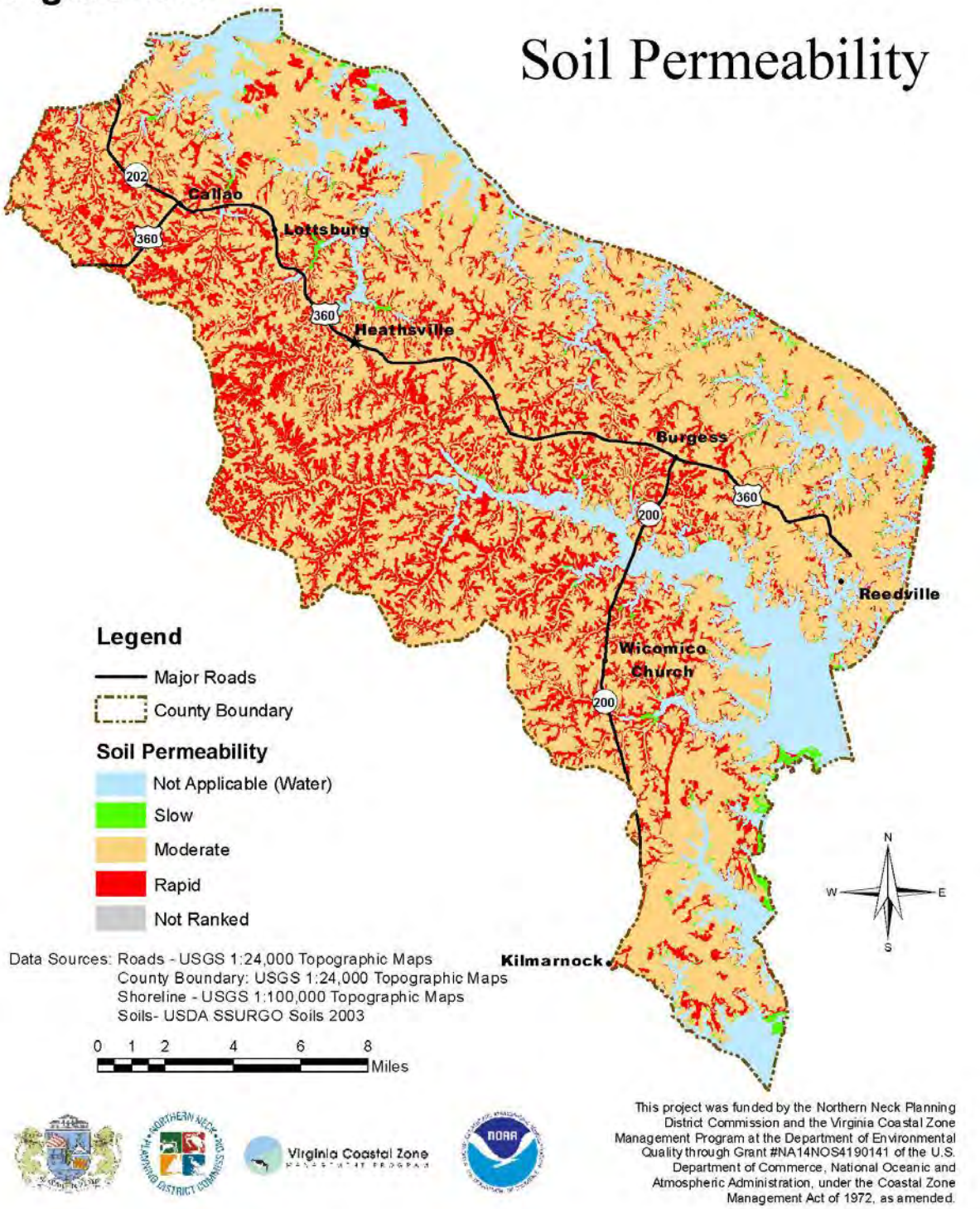
Figure 1.17



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D. ANALYSIS OF SHORELINE CONDITIONS

1. General Shoreline Conditions

A comprehensive Northumberland County Shoreline Situation Report was published in 2003 by the Center for Coastal Resources Management (CCRM), VIMS, College of William and Mary. The report is part of the Comprehensive Coastal Inventory, which was funded in part by the Virginia Coastal Program of VDEQ. The Coastal Program is funded in part by the National Oceanic and Atmospheric Administration (NOAA). This inventory contains a wealth of detailed information at an unprecedented level of detail for all of the shorelines within the County. In 2014, the VIMS's Comprehensive Coastal Inventory updated the 2003 report using onscreen digitizing over 2012 and 2013 aerial photos to create a new 2014 Digital Shoreline Situation Report. The new 2014 Digital Shoreline Situation Report can be viewed here, using the Map Viewer:

http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/virginia/northumberland/northumberland_disclaimer.htm. In addition, the map and tabular data can be downloaded for query and manipulation in a GIS

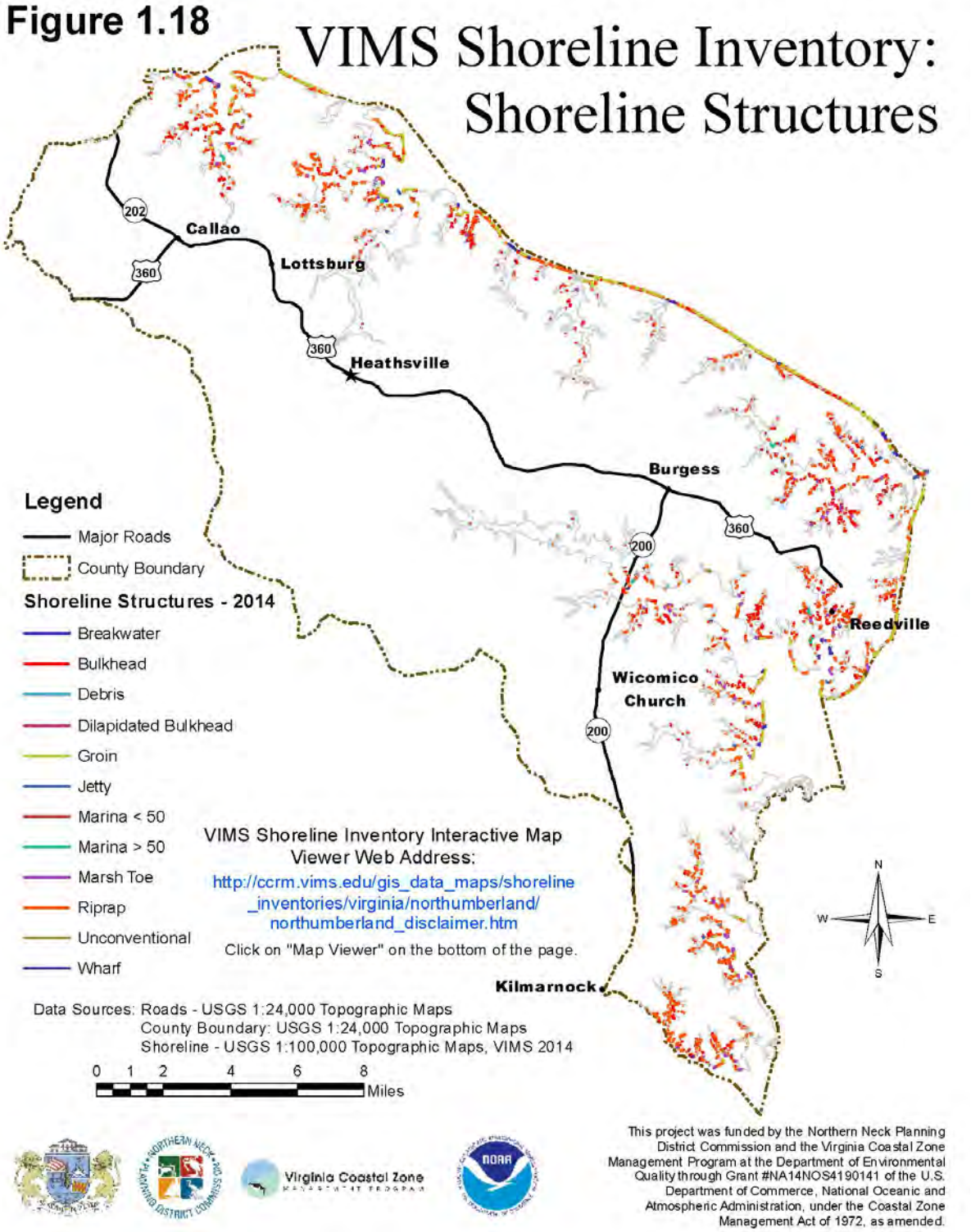
The 2014 Digital Shoreline Situation Report states that the shorelines of Northumberland County extend for 509 miles.[16] The study identified 10 separate riparian land use conditions that existed at the time of the survey (2014):

- 124 miles (24.4 %) of the area along shorelines overall is still in forests
- 245 miles have a riparian land use of Residential (48.1%)
- 19 miles in scrub-shrub riparian land use (3.7%)
- 81 miles in agricultural land use (15.9%)
- 8 miles in commercial land use (1.6%)
- 21 miles have a riparian land use of grass (4.1%)
- 3 miles were bare (0.6%)
- 7 miles were paved (1.4%)
- 1 mile was detached marsh (0.4%)
- 1 mile was marsh island (0.4%)

The VIMS Digital Shoreline Situation Report maps show three categories of data, riparian land use (tabular data shown above), the following map (Figure 1.18) shows the linear shoreline structures present, and the shoreline structures represented by points (docks, boat ramps, and boathouses) can be viewed using the map viewer available on the VIMS website address listed above.

[16] Numbers have been rounded. Summing numbers in table may not necessarily equal the exact total whole number shown.

Figure 1.18



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It is significant that 48.1 percent of shoreline is in residential land use. One gets an image of much less development by a visual inspection made only from the roads. When one visually inspects the County from the water, it seems much more developed. There is still time to preserve and protect portions of the shoreline. Conservation easements should continue to be encouraged for those landowners who want to preserve their shoreline for future generations. Roughly 28 percent of the shoreline is still in forest or grass. However, everyday more waterfront houses are being built that reduce the available natural shoreline.

The Northumberland County Shoreline Situation Report contains in addition to the riparian land use conditions, bank height and buffer condition, as well as shoreline features which include shoreline structures. Below is a summary of significant shoreline features mentioned in the report.

- There are 3,593 docks that line the shoreline. In addition, there are 400 boathouses, 151 private boat ramps, and 5 public boat ramps. In addition, the report noted 65 “dilapidated docks” along the waterfront.
- Shoreline erosion control structures were also numerous. 135 groin fields, 33 jetties, and 21 breakwaters were recorded. Traditional shoreline hardening accounts for 20.4% of the total shoreline, with 31 miles of bulkheads and 73 miles of riprap.

Several issues arise from this analysis. First, less than 30% of the shoreline still remains undeveloped as defined above, there is still an opportunity for the County to establish development policies for the shoreline which promote conservation and protection against erosion. Second, more than half of the residential units of the County are on waterfront locations. This suggests an ever-increasing demand for such properties, as both open land and forests are subject to conversion to residential development, along with the accompanying shoreline hardening measures.

In addition to shoreline characteristics, another study (April 2003) by the Center for Coastal Resource Management at VIMS, examined sand dunes in the County. The study can be found on the VIMS’s website.[17]

The study identified 59 unique dune sites in the County. The study was done in the few months prior to Hurricane Isabel, so most likely some of the dunes have been modified by that storm event. Most residents of the county are not aware that the County has any dune systems. Examination of the dune systems immediately after Isabel noted that although some dunes were reduced in size, they functioned as energy absorbing features, reducing shoreline erosion and inland flooding. Dunes are an important habitat and are protected by law.

The most serious shoreline erosion threats come from the actions of strong winds and high surf produced by "northeasters" and hurricanes. The primary targets of these winds and waves are

[17] https://scholarworks.wm.edu/reports/249/

the exposed banks of the Potomac River and the Chesapeake Bay. The next topic addresses this issue in more detail.

2. Shoreline Erosion

Figure 1.19 shows areas that have been identified by VIMS with erosion problems. Not much of the County's shoreline, particularly that exposed directly to the Potomac River and Chesapeake Bay, has escaped erosion to some extent. The protected inlets and rivers, not a small amount of the total, are relatively safe from direct erosion from northeaster storms and wave action in the Potomac River and Chesapeake Bay. It is within these protected areas that maximum results can be achieved through planning to reduce potential shoreline erosion. In 1977, the County ranked second among Tidewater counties in loss of acres of shoreline for the past one hundred years. Net loss was 3,270 acres, or an average erosion rate of 1.1 feet per year. Average shoreline erosion rates can be misleading since erosion occurs sporadically in response to storm events.

Shoreline erosion rates are determined by four principal factors: storm frequency; storm type and direction; resulting wind tides, current, and waves; and storm intensity and duration. Other forces which cause increased levels of stormwater runoff and shoreline erosion are human activity, grading, upland runoff and vegetation removal. Shoreline erosion must be considered recognizing that sea level is rising about 2mm/year and the Northern Neck of Virginia is subsiding about 2mm/year, resulting in an effective rise in sea level of 4-5 mm/year (Lewisetta is at 5.53 mm/yr) or about 1.5-2 inches per decade. Shoreline erosion has a significant impact on water quality and natural resources. Recent studies have indicated that shoreline erosion is responsible for millions of pounds of nitrogen and phosphorus entering the Chesapeake Bay each year and is also responsible for an estimated 15 to 20 percent of sediment entering the Bay.

In 1989, the County contained approximately 25 miles of artificially stabilized shoreline to combat erosion. As of 2014, that amount had increased to 104 miles of hardened shoreline. Many shoreline landowners have installed structures such as groins used in conjunction with bulkheads or riprap to reduce or prevent erosion. This technique has met with some success in combating erosion on the shorelines that are exposed to heavy wave and wind action. A shoreline protection program should continue to also contain a variety of techniques controlling erosion in addition to structures. Alternatives that have been used include:

- Living Shorelines - Protection of low energy shorelines by planting grasses, shrubs and vines, along with fiber matting or coconut logs to stabilize beaches, banks, and shorelines while the vegetation establishes itself.
- Replacement of sand on recreational beaches although this does not control shoreline erosion and at best is a temporary solution.
- Development of off-shore erosion control structures such as breakwaters and artificial islands to modify wave action, reduce deep water wave energy, and promote beach nourishment. In 2003, there were only 6 breakwaters in the County and in 2014, there are

21 breakwater structures. Breakwaters allow shorelines to rebuild themselves from sediment sources available in the coastal system, thereby creating natural shallow water and beach habitat.

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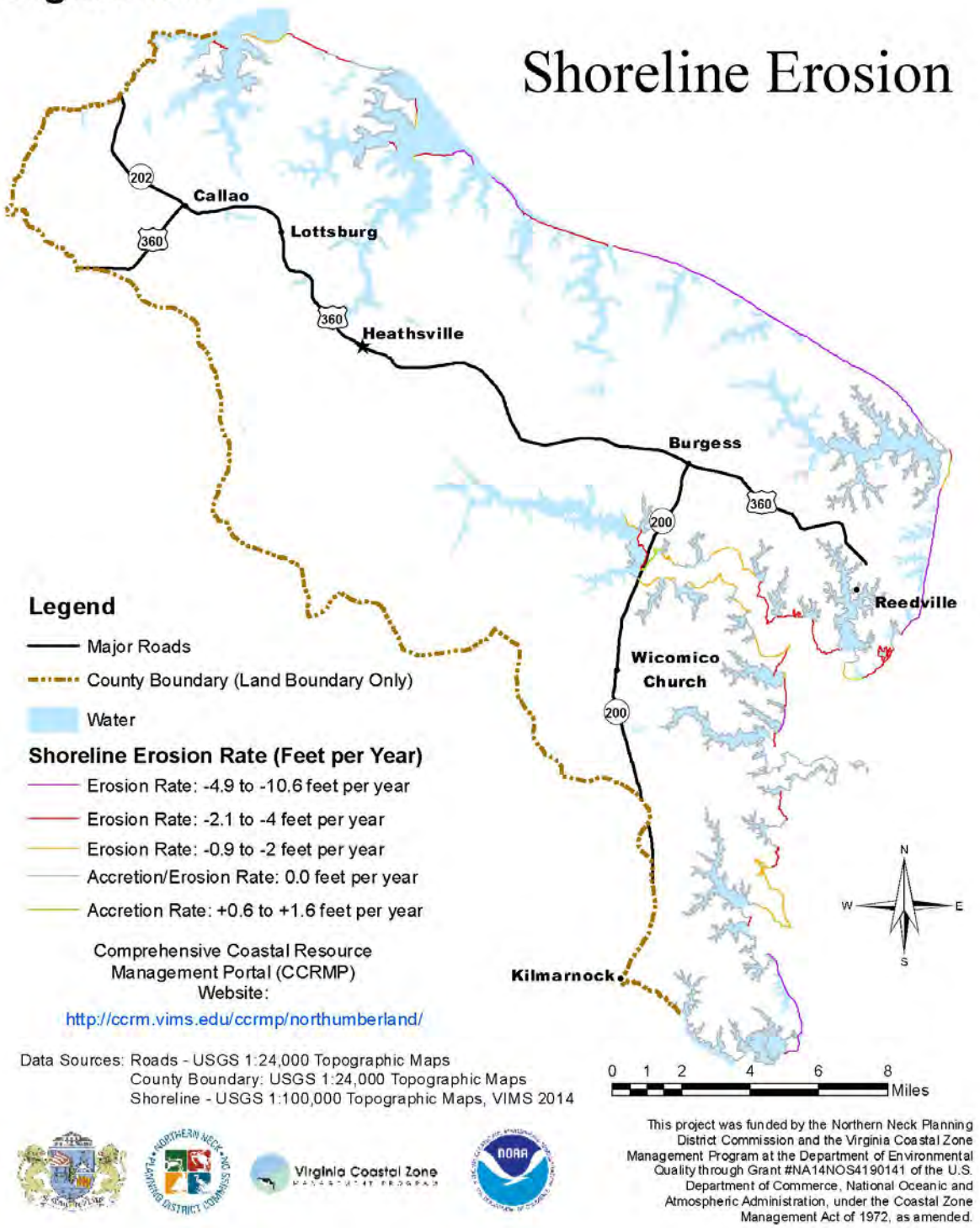
Figure 1.19



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3. Marshlands

Marshlands provide a considerable defense of the shoreline against erosion in addition to their function as a nursery ground for aquatic life. VIMS classifies marshes into three categories: fringe, extensive and embayed.

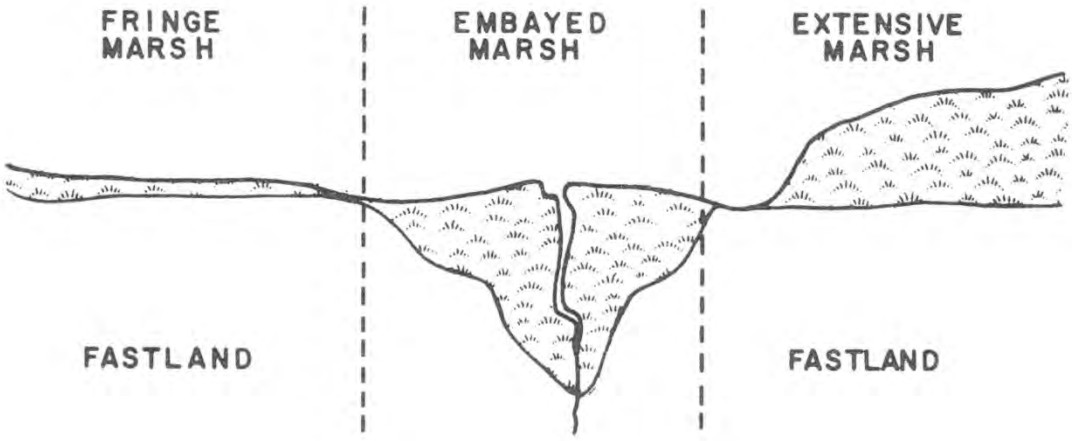
Fringe marsh is defined to be less than 400 feet in width and runs in a band parallel to the shore.

Extensive marsh is that which has extensive acreage projecting into an estuary or river. This type of marsh has the highest value for wildlife.

Embayed marsh is a marsh which occupies a reentrant or drowned creek valley.

The following sketch illustrates these three types of marshlands. The fringe marshes have maximum values as a buffer to wave erosion of the fastland. The seaward margins of most marshes are undergoing erosion as a result of rising sea level. Citizens should be encouraged to manage marshes by clearing them of debris, pruning back overhanging vegetation to provide as much sunlight as possible, and allowing the marsh to move progressively landward in response to rising sea level.

A GENERALIZED ILLUSTRATION OF THREE TYPES OF MARSH



As a component of the 2014 Shoreline Situation Report, VIMS has updated the Tidal Marsh Inventory, and it accessible through the VIMS Comprehensive Coastal Resource Management portal.[18]

E. ACCESS TO STATE WATERS

Many objectives of the Chesapeake Bay Program focus on improving the quality of potable water and preserving habitats for marine life within the Bay and its tributaries. In addition, the program also emphasizes a desire to improve public access for recreational and commercial purposes. The concept is that when people enjoy the richness and beauty of the Bay, then they will be more likely to take steps to protect it or reduce their impact on the Bay. Therefore, it may be stated that there is a dual focus of the Chesapeake Bay Program relative to access: to increase recreational opportunities while protecting the water quality and natural resources of the Bay. This section examines factors that may influence the establishment of new public or private access points to the Bay or its tributary tidal streams.

1. The Chesapeake Bay Area Public Access Plan

In 1990, the Chesapeake Executive Council published its report titled The Chesapeake Bay Area Public Access Plan which included a report for every county within Virginia and in the adjoining states that were covered by the program. That study identified major existing access facilities ranging from state-operated boat ramps to commercial marinas. Figure 1.20 depicts the general locations of existing waterfront access facilities in the County. They are grouped on this map into four categories:

- Fishing piers, Great Wicomico River Public Fishing Pier
- Boat Ramps, including state as well as private ramps. In addition to the public boat launch ramps, many, if not most, of the marinas also have boat launching ramps in addition to boat slips. However, marinas usually charge for the use of their launch facilities, whereas public ramps are free to use.
- Swimming Beaches: There is one public (free) beach (Vir-Mar Beach) identified in the inventory. Also, many of the member-only community associations have private recreational areas that include beaches.
- Natural Area Preserves, Bush Mill, Dameron Marsh and Hughlett Point.

Natural habitat areas provide limited access for purposes of observation and nature study. The State has three nature preserves, one upstream on the Great Wicomico River, Bush Mill Stream, one at the mouth of Dividing Creek, Hughlett Point, and Dameron Marsh which is located mid-point on the Chesapeake Bay shore in the County. Each of these sites has some potential for

[18] https://www.vims.edu/ccrm/advisory/ccrmp/portals/northumberland/

public access, and Dameron Marsh has installed a canoe/kayak launch and a small parking area.[19] Bird (and wildlife) watching, and hiking are passive recreation activities that are traditionally allowed at these preserves.

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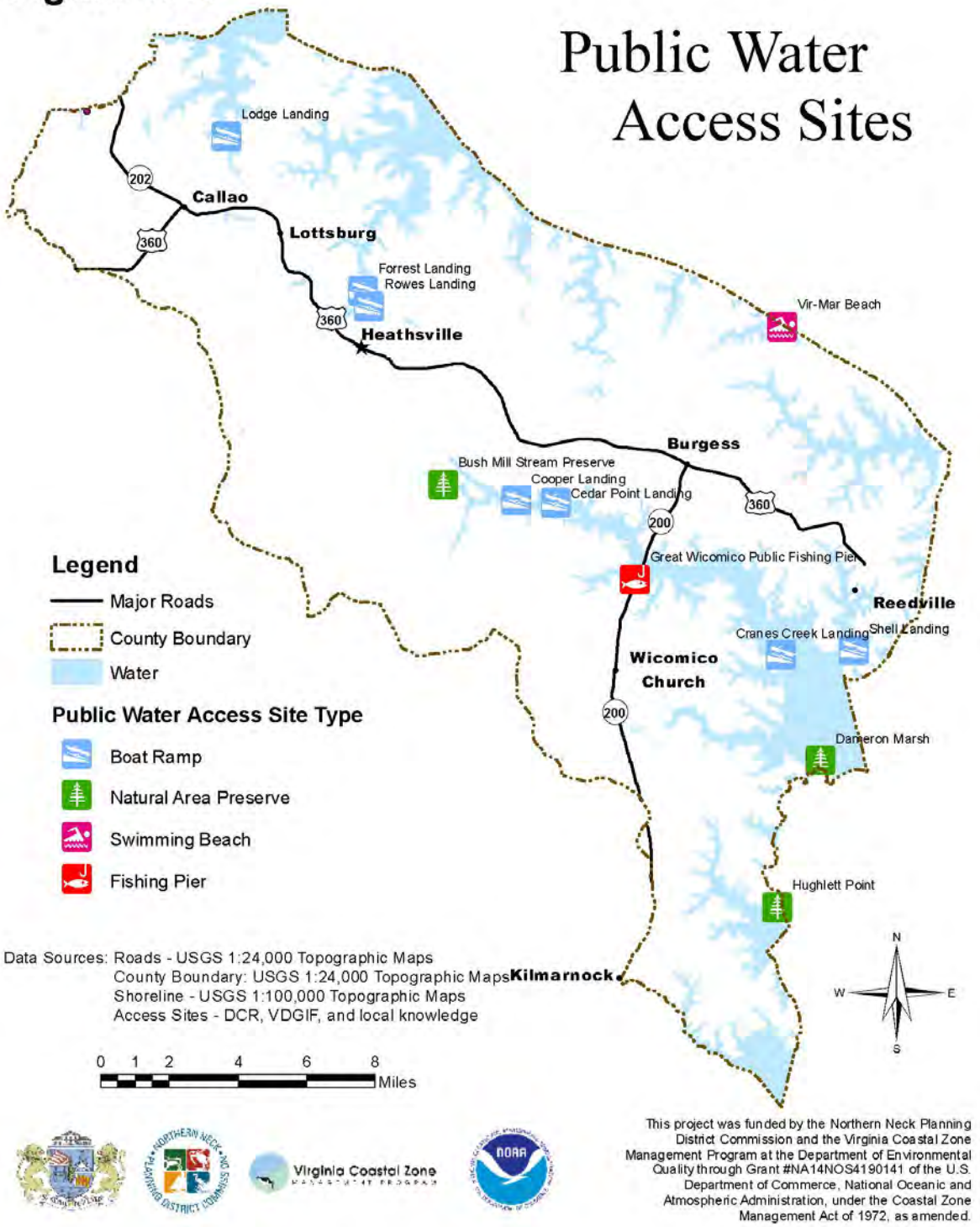
[19] More information about how to access the Dameron Marsh hand carry boat launch can be found here: http://www.dcr.virginia.gov/natural_heritage/natural_area_preserves/dameron.shtml.

Figure 1.20



This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

The Public Access Plan cites a need to increase access to public beaches and to upgrade public boat ramps. Marshes and wetlands are also suggested as resources to extend opportunities for the public to enjoy the shoreline and waterfront for both recreational and educational purposes. The concern for more and improved public access to public waters also came from community workshops. It was observed in the workshops that the present level of facilities is inadequate to serve county residents as well as summer visitors.

The previous Comprehensive Plan pointed out the lack of public water access points in the County for citizens. The County is blessed with 14 power boat ramps; however, there are very little opportunities for those citizens who want to bank fish, crab, launch canoes and/or kayaks, and most of the sites suffer from inadequate parking. The County does have VirMar Beach, a small (250 ft) long beach area on the Potomac River for fishing, crabbing, swimming and/or picnicking. The Northumberland County Planning Commission has been working for over five years towards improving public water access for Northumberland County citizens. To that end, the County, with the assistance from the NNPDC, submitted a grant application for a public fishing pier on the Great Wicomico River to VDEQ's Coastal Program (funded by the National Oceanic and Atmospheric Administration) in 1999. To secure matching funds, the County submitted another grant application to the VMRC's Recreational Saltwater Fishing Development Fund in 2000. Both grants were awarded, and the County now has a public fishing/crabbing pier to serve its citizens.

The enabling legislation to form the Northern Neck Chesapeake Bay Public Access Authority (NNCBPAA) was created by an act of the Virginia General Assembly in 2005. The Virginia State Code reference for the creation of the NNCBPAA is 15.2-6626 through 15.2-6651. the County officially joined the NNCBPAA, along with three of the other four Northern Neck Counties on September 12, 2006. While no significant on the ground projects have come to fruition for the NNCBPAA in the County as of yet, it is not for lack of effort.

In 2010, the County joined with the other NNCBPAA counties to participate in a project by the Army Corps of Engineers to create the Northern Neck Regional Shallow Draft Navigation and Sediment Management Plan. The purpose of the plan was to quantify the cost to maintain federal navigation channels in the county, and to analyze possible cost saving approaches to grouping creeks that needed dredging on a similar schedule. Since mobilization is a large portion of the cost of dredging projects, the concept of grouping creeks together to minimize the mobilization costs, thereby reducing overall dredging costs. Specific to Northumberland County, the dredging priority is for all federal channels marked with U.S. Coast Guard Aids to Navigation to be dredged, if needed, in order to maintain access to the Chesapeake Bay with the highest priority given to the Little Wicomico River and the next priority to Cranes Creek. With overall Federal budget reductions required into the future, there is likely to be less and less Federal funding for maintaining Federal navigation channels, so this study will be valuable into the future. The Northern Neck Regional Shallow Draft Navigation and Sediment Management Plan can be accessed on the Northern Neck PDC website.[20]

[20] https://drive.google.com/file/d/1Z_l7Jaa_lG4q6iZkwSSEeMbyNfM8BD15/view?usp=sharing Regional Dredging Plan – Phase One (https://drive.google.com/file/d/1yC-_jRR6a29oXrbjTfEEhoNNxhxknoKj/view?usp=sharing),

NCBPAA staff, through technical assistance funding through the Virginia Coastal Zone Management Program has created water trails for Cockrell Creek and the headwaters of the Coan River. Currently, NNPDC staff are working on two additional water trails, one on near Lewisetta on the Coan River and another one near the headwaters of the Great Wicomico River, both trails will be completed in late 2016. Once completed, these water trail guides will join the 12 other existing Northern Neck Water Trails located on the Northern Neck Tourism website. To access the Northern Neck Water Trails, click on "Visit", then click on "Parks and Nature Trails" and scroll down. The Northern Neck Tourism website is found at: http://www.northernneck.org/. With the recent economic downturn, there has been an increase in the number of people who have turned to human powered vessels to enjoy the waterways. Canoes, kayaks, paddleboats, and stand -up paddleboards are being seen more and more often in local waters.

2. Shoreline Land Use

If the water-related industries and marinas are added to the residential development discussed above, one may observe that considerable development exists along the shoreline of the County. Despite this seemingly abundance of access, there is little opportunity for citizens who do not own waterfront property or a trailered boat to access the recreational opportunities offered by the Bay and its tributaries. Plans for water access are addressed in Chapter 4 (C)(1)(d).

3. Effects of Underwater Grasses

These grasses were once abundant mostly in the shallow waters of protected coves and creeks and may hold the secret to improving the Chesapeake Bay. They are usually found in "low energy zones" of coves and creeks which are not subject to the severe tidal and wind action more prevalent in areas such as the southern shore of the Potomac River. Areas of submerged vegetation as identified by VIMS are shown on their website at:

https://www.vims.edu/research/units/programs/sav/access/maps/. To view SAV coverages,

click on the "Interactive Map" link. The most recent SAV survey is shown on the interactive map, and you can turn on an off previous year SAV surveys to see the trends in SAV coverage. Underwater grasses grow prodigiously in shallow protected waters where they become nurseries for fin and shellfish as well as habitats and refuges for waterfowl. Underwater grasses, called submerged aquatic vegetation (SAV), not only filters surface water as it enters the streams but it also acts as a buffer against tidal action. For shorelines in low energy locations, underwater grasses have been found to form a quite adequate defense against shoreline erosion. The SAV beds are truly the “nurseries of the Bay”, a place where larval

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Regional Dredging Plan – Phase Two (https://drive.google.com/file/d/1yBPSSQUbhGTaUUf3UJOhbEphSpLxKyLm/view?usp=sharing), and Selected Studies – Phase Three (https://drive.google.com/file/d/18rT3m1QsENrp67zVO4vdls4QGDnikt4N/view).

stages of shellfish and other juvenile species can find protection, and habitat. Grasses now occupy only about 10% of the area they once occupied, and until water clarity can be improved, they are unlikely to expand.

4. Factors Influencing the Establishment of New Access Points

The VMRC has established criteria for establishing new marinas. Some of the more "desirable" of these are summarized below:[21]

- Water depth must be greater than three feet from mean low water.
- Site must not interfere with shellfish production.
- Wave height and current to be very low.
- Channel does not require frequent dredging; when dredging is required, a suitable disposal site is available; marina must be within 50 feet of navigable water depth.
- The tidal exchange shall be adequate to maintain water quality.
- No encroachment upon wetlands; habitat areas (endangered species); submerged aquatic vegetation; or existing recreational use.
- Shoreline stabilization is required without use of artificial structures.

VIMS created a marina suitability model for Virginia utilizing the above criteria and created maps showing the suitability for new marinas.[22]

The VDH Division of Shellfish Sanitation is the agency responsible for approving or condemning certain water bodies for the taking of shellfish. Condemnation of oyster grounds due to unsatisfactory pollutant levels continues to render the available oyster grounds in the County off limits. Shellfish may be harvested from most condemned areas; however, they must first be relayed to approved waters for 15 days before marketing. Relaying is only allowed when the water temperature is above 50 degrees.

Rivers and creeks that do not meet shellfish harvesting water quality standards occur in the majority of the rivers in the County and are continuously changing. Creeks that currently have some section closed to shellfish harvesting include the Yeocomico and Coan Rivers, Presley, Cod, Hull, Cubbit, Hack Creeks, Little Wicomico River, Owens and Gaskins Ponds, Taskmakers and Cockrell Creeks, Great Wicomico River, Mill, Ball, Cloverdale, Dividing and Indian Creeks. VDH maintains a website showing the current extent of closures.[23]

In summary, there is a need to provide more public access to the Chesapeake Bay and its tributaries but there is also an equally important need to do so in a way that does no harm to the quality of the Chesapeake Bay. Plans for water access are addressed in Chapter 4 (C)(1)(d).

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[21] See page VI-82, Local Assistance Manual for complete list of criteria.

[22] http://ccrm.vims.edu/gis_data_maps/static_maps/marinasiting/marinasiting.html

[23] https://www.vdh.virginia.gov/environmental-health/shellfish-closure-and-shoreline-survey-documents/northumberland-county/

F. CHARACTERIZATION OF COMMERCIAL AND RECREATIONAL FISHERIES

The County is blessed with abundant aquatic resources in its streams, creeks and rivers; from oysters to crabs to finfish. Menhaden are commercially caught and rendered into fish oil and fish meal by Omega Protein, Inc., located on Cockrell's Creek in Reedville. Omega harvests menhaden mainly in the main stem of the Chesapeake Bay, but sometimes ventures into the Atlantic Ocean following the large schools of menhaden. Local watermen also catch menhaden for bait for crab pots and for chumming for gamefish. Local watermen also harvest various species of fish and shellfish, including Bluefish, Blue Crabs, Croaker, Flounder, Oysters, Sea Trout, Spot, Striped Bass as well as other species. Methods used by commercial watermen to harvest finfish include using hook and line, gill nets as well as pound nets in the Chesapeake Bay and the Potomac River. Local watermen also crab with crab pots throughout the County creeks and rivers, as well as the Potomac River and Chesapeake Bay. Charter boats are based throughout the rivers of the County and target most of the species listed above.

Recreational fishing in the County includes Striped Bass fishing in the spring, Bluefish, Flounder, Croaker in early summer and Spanish Mackerel, Spot, Trout, Red Drum and Cobia fishing in late summer, with Striped Bass fishing returning in the fall and early winter. Most of the species above are targeted in the Potomac River and Chesapeake Bay, but some such as Croaker and Spot, including juveniles of other species are found in the interior rivers and creeks at various times of the year. There are also recreational crabbers that run trotlines for crabs as well as traditional chicken necking for crabs, using collapsible traps as well as traditional crab pots. Recreational oyster harvesters occasionally hand tong on the numerous public Baylor grounds as well.

There are five state constructed oyster reef sanctuaries in the County; two in the Yeocomico River at Barn Point and Indian Bar, one in the Coan River at Island Bar, and two in the Great Wicomico River at Shell Bar and at Cranes Creek. In addition to the oyster sanctuaries, there is an oyster larvae nursery at Cowart Seafood on the Coan River, and oyster aquaculture cages placed on creek bottomland throughout the County's rivers. Local watermen lease creek bottomland in all of the County's creeks and place oyster shells to attract oyster spat as well as use the oyster aquaculture technique of spat-on-shell to place oysters in the creeks for later harvest. Most of the time, the watermen use PVC pipes to mark their oyster reefs. There are numerous citizens who practice oyster gardening along residential waterfront docks and piers that are distributed throughout the county. As one would expect water quality is of paramount importance in keeping healthy stocks of finfish and shellfish in County and adjacent waters.

Figure 1.21, the Aquatic Resources Map, shows the location of various aquatic resources in and around the County, that include private oyster gardener locations, commercial oyster aquaculture, state constructed oyster reefs, Baylor (public oyster) grounds, private oyster leases as well as anadromous fish use areas.

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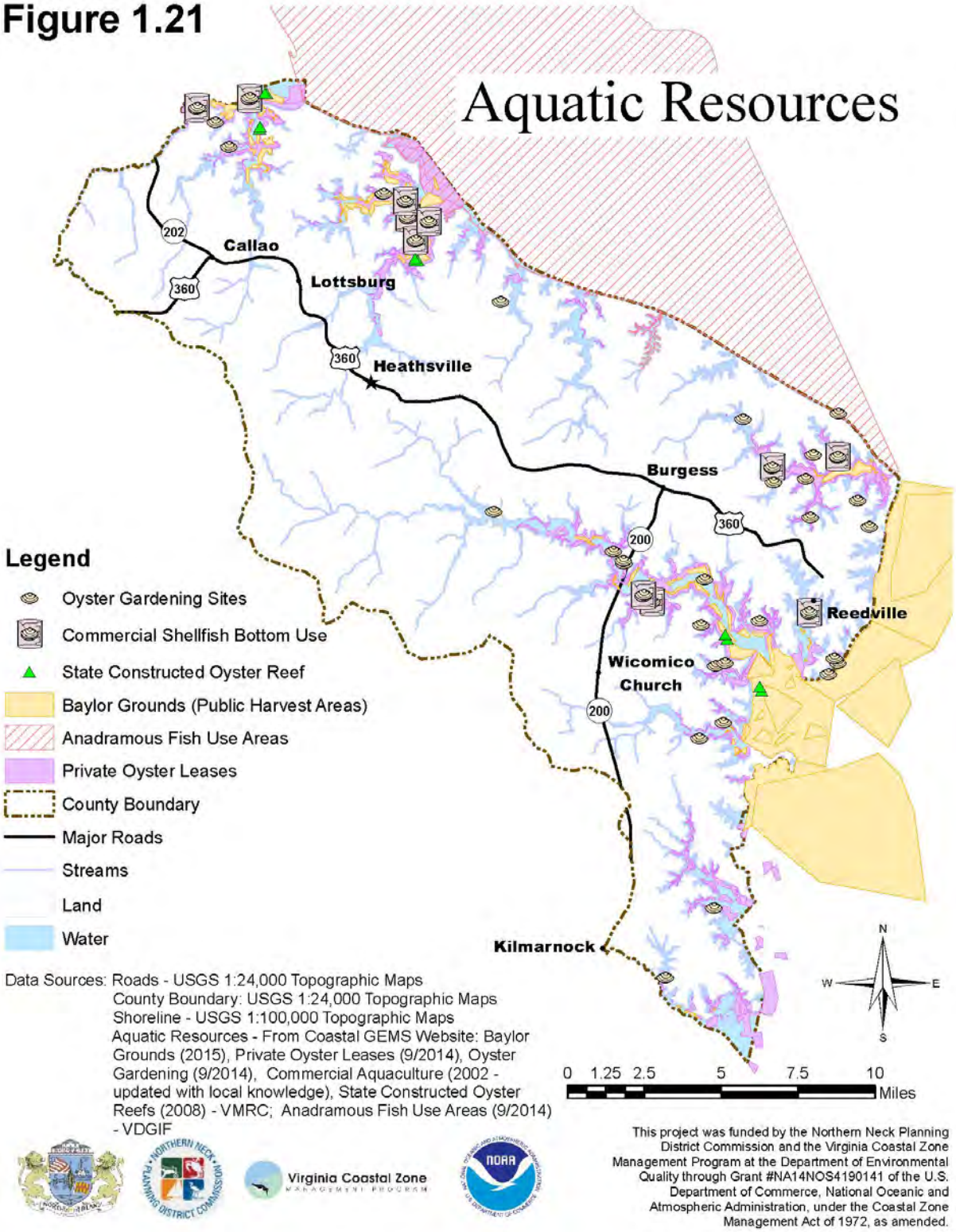
Figure 1.21



Data Sources: Roads - USGS 1:24,000 Topographic Maps
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Aquatic Resources - From Coastal GEMS Website: Baylor Grounds (2015), Private Oyster Leases (9/2014), Oyster Gardening (9/2014), Commercial Aquaculture (2002 - updated with local knowledge), State Constructed Oyster Reefs (2008) - VMRC; Anadramous Fish Use Areas (9/2014) - VDGIF

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

G. FORESTRY

As part of the update to the Comprehensive Plan for 2026, the County did not focus on the current state of forestry within the County or were unaware of any issues to be addressed. However, upon completion of the final draft, the Comprehensive Plan was submitted to various state agencies for review. The Virginia Department of Forestry recommended the inclusion of the following data about forest land within the County, which follows.

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Figure 1.22

Forestry Statistics for Northumberland County

Source: FIA & Forest Products Tax

Forest & Non-forest Area

Northumberland (acres)	Forest	Non-forest	Water
2015	63,292	59,022	72,782
2024	61,198	67,056	67,222
Change	**-2,094**	**8,034**	**-5,560**

Northern Neck (acres)	Forest	Non-forest	Water
2015	280,197	212,395	141,798
2024	275,279	226,718	134,339
Change	**-4,918**	**14,323**	**-7,459**

Forest Type Area

Northumberland (acres)	Total Forest Acres	Pine	Hardwood	Mixed
2015	63,292	14,666	36,331	12,295
2024	61,198	17,264	30,511	13,423
Change	**-2,094**	**2,598**	**-5,820**	**1,128**

Northern Neck (acres)	Total Forest Acres	Pine	Hardwood	Mixed
2015	280,197	68,482	175,081	36,634
2024	275,279	76,765	155,982	42,532
Change	**-4,918**	**8,283**	**-19,099**	**5,898**

Size Class

Northumberland (acres)	Total Forest Acres	Sawtimber	Pulpwood	Sapling/Seedling	Non-stocked (recent cutover)
2015	63,291	37,843	11,138	14,310	0
2024	61,198	48,179	13,019	0	0
Change	**-2,093**	**10,336**	**1,881**	**-14,310**	**0**

Northern Neck (acres)	Total Forest Acres	Sawtimber	Pulpwood	Sapling/Seedling	Non-stocked (recent cutover)
2015	280,197	153,551	73,674	47,238	5,734
2024	275,279	185,243	68,304	21,732	0
Change	**-4,918**	**31,692**	**-5,370**	**-25,506**	**-5,734**

Total Volume

Northumberland (cubic feet)	Total Volume	Softwood Volume	Hardwood Volume
2015	166,321,288	38,044,368	128,276,920
2024	224,361,802	64,112,747	160,249,055
Change	**58,040,514**	**26,068,379**	**31,972,135**

Northern Neck (cubic feet)	Total Volume	Softwood Volume	Hardwood Volume
2015	703,761,180	191,716,715	512,044,465
2024	880,952,499	263,691,054	617,261,445
Change	**177,191,319**	**71,974,339**	**105,216,980**

Harvested Volumes from Forest Products Tax (1000 Tons)			
County	2019	2024	change
LANCASTER	25	32	7
NORTHUMBERLAND	**34**	**67**	**33**
RICHMOND	97	61	-36
WESTMORELAND	323	296	-27
TOTAL	**479**	**456**	**-23**

This harvest information is from the Forest Products Tax (not FIA).

Top 5 species **2024**

Northumberland

Species	Volume (cubic Feet)
yellow-poplar	61,848,757
loblolly pine	54,052,722
sweetgum	16,087,942
chestnut oak	15,923,612
black oak	13,806,761

Top 5 species **2024**

Northern Neck

Species	Volume (cubic Feet)
loblolly pine	245,794,048
yellow-poplar	231,242,188
sweetgum	77,556,629
red maple	62,081,530
white oak	38,679,210

CHAPTER 2
LAND USE PLAN

A. PURPOSE OF THE LAND USE PLAN

The Land Use Plan is that component of the Comprehensive Plan that establishes policies on the future use of land. The beauty, heritage, and rural character that have attracted hundreds of people and their families to the County in recent decades will continue to draw hundreds more in the future. It is therefore crucial that the County use this plan to establish policies and ordinances that will determine the future landscape and character of this County.

After the Land Use Plan has been adopted by the Board of Supervisors, it has the following clearly defined functions:

1. It represents the vision community leaders have for future use and development of land within the County.
2. The Land Use Plan serves as a guide to any change in character of individual properties as they change from one use to another over time.
3. It provides a rational basis for establishing and modifying zoning and other land use and development regulations.
4. It provides a broad set of policies for making public and private decisions on projects that come before the government.
5. It becomes a valuable tool of communication between citizens and the local government on matters concerning land use and development.

B. HOW TO USE THE LAND USE PLAN

Although the Land Use Plan is only one component of the Comprehensive Plan, it is very important because of its long-range influence on the use and development of both privately and publicly owned land. Its impact is greatest on privately-owned land because almost all of the County's area is in that category. The land use plan is also an important document with respect to the environment, particularly when read in context with the Water Quality Protection Plan which is the subject of Chapter 3. Functions of the Land Use Plan and general guidelines for its use are summarized in the following comments.

1. The first reason for the Land Use Plan's importance is that it establishes official long-range policies for the use and development of land for the entire County. According to Virginia statutes (Va. Code Section 15.2-2223) which authorizes counties to do planning, the Comprehensive Plan focuses on the physical development of the territory, and it is for the purpose of:

> " ...guiding and accomplishing a coordinated, adjusted and harmonious development of the [County] which will, in accordance with present and probable future needs and resources best promote the health, safety, morals, order, convenience, prosperity and general welfare of the inhabitants including the elderly and persons with disabilities"

Among the specific components of the comprehensive plan authorizes under this section is the following specific authority for a land use plan:

> "The designation of areas for various types of public and private development and use, such as different kinds of residential, including age-restricted, housing; business; industrial; agricultural; mineral resources; conservation, recreation, public service, floodplain and drainage, and other areas."

The Code requires that each community have a comprehensive plan, that it be reviewed every five years and updated as found necessary.

2. The Land Use Plan serves as a framework for establishing land use regulations which are the local laws that govern the use and development of land. The Land Use Plan and associated policies provide guidelines for preparing or updating Zoning and Subdivision Ordinances. The Zoning Ordinance establishes how land may legally be used and the Subdivision Ordinance establishes requirements for subdividing land into lots and recording them in appropriate places. Both the land use plan and land use regulations should be reviewed together periodically and updated as appropriate.

3. The Land Use Plan is used in making decisions on requests by property owners for a change in use of their properties. In many cases, a change in use requires a policy change (rezoning) by the governing body. The Land Use Plan should be one of the standard sources used during a rezoning process. Another option for a change in use is a Conditional Use Permit, which may have multiple conditions placed on the permit by the Board of Supervisors in order to be approved.

4. The process for updating the existing zoning to incorporate the village/support area concept is as follows: first for each request to be reviewed to determine if the parcel is located in a village or support area. If so, the requested uses should be compared to the permitted or conditional uses in the village or support area and if affirmative, the re-zoning would normally be approved or conditioned. By this process, as development proceeds, it will be in accordance with the Land Use Plan. If the proposal is for rezoning a parcel not in a village or support area, then the Planning Commission and Board of Supervisors should follow the appropriate policies for the various areas of this Land Use Plan.

5. After the Land Use Plan has been adopted by the Board of Supervisors it gains legal status according to Section 15.2-2232 of the Code. This Section provides that after the Board adopts a comprehensive plan, or part thereof, unless a feature is shown on the adopted plan, it must be reviewed by the Planning Commission. The Commission then determines whether that feature is substantially in accord with the adopted plan.

6. As a final item, the Land Use Plan should be interpreted to include a Water Quality Protection Plan (see Chapter 5) which is designed to address issues of the Chesapeake Bay preservation.

This element of the plan is required by the Chesapeake Bay Preservation Act as established in the Regulations of the Chesapeake Bay Local Assistance Board.

C. PLANNING AREAS

The land use plan for the County is based upon a set of components that can be used as building blocks to define the fundamental structure of the plan. Each component has these qualities - it identifies special areas that can be delineated on the land use map, and it establishes one or more general development or use policies for each designated area. This section establishes five building blocks of the general Land Use Plan as follows[1]:

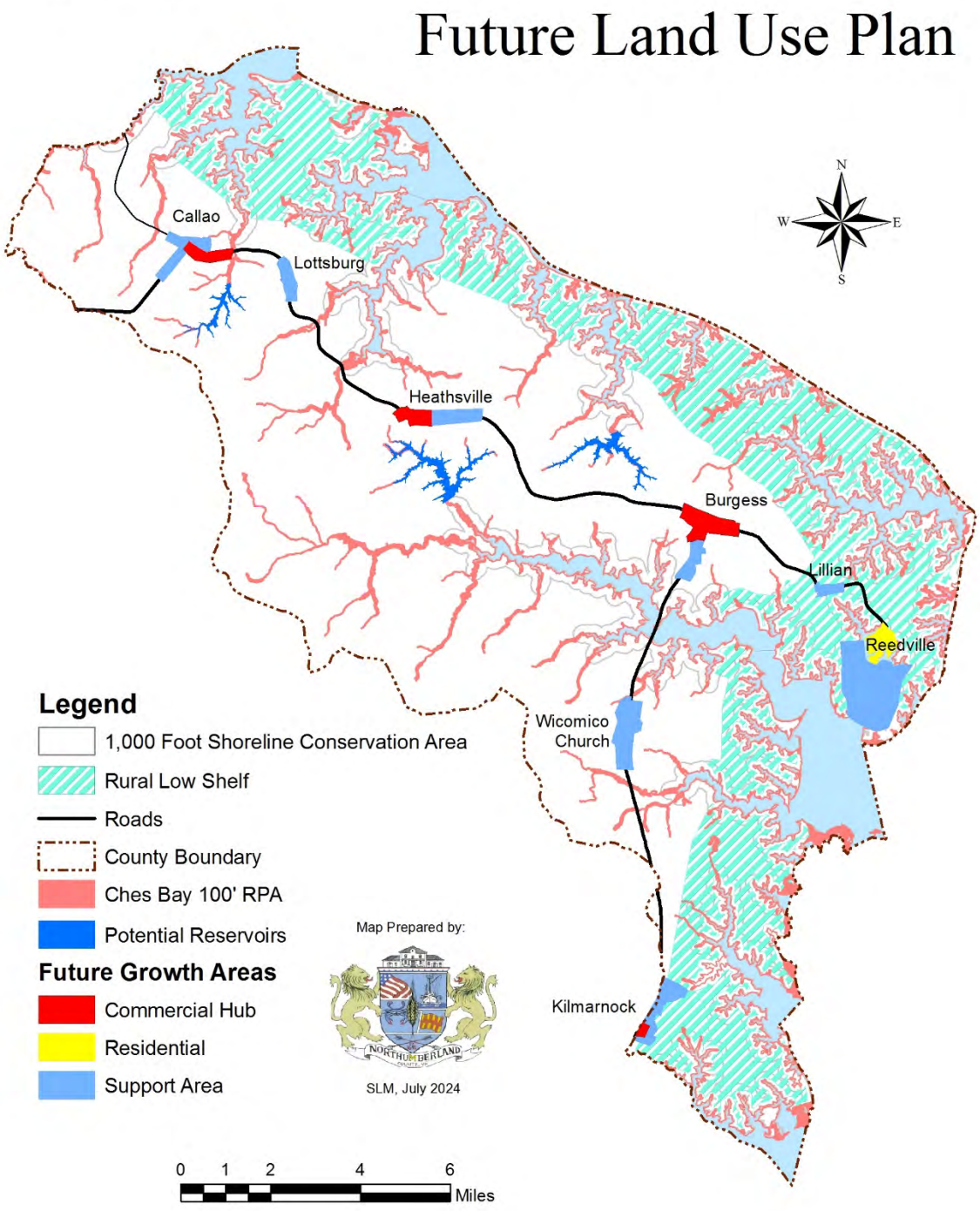
1. **Rural Uplands**: that area of the county that lies landward from the topographic feature known as the "Suffolk Scarp" (see Figure 1.3) and which generally is above 50 feet in elevation above sea level.
2. **Rural Low Shelf**: the remainder of the County lies seaward from the Suffolk Scarp and generally lies between zero and 50 feet above sea level.
3. **Shoreline Conservation Area**: an area extending from the edge of tidal waters 1,000 feet inland. This area overlaps both the Rural Low Shelf and the Rural Uplands in many places.
4. **Villages**: areas of concentrated development that have become commercial hubs or areas of distinctive community identity.
5. **Policies for Special Areas**: policies for historical and archeological areas, highway corridors, potential reservoirs and Patuxent NAS JLUS agreement.

The remainder of this section suggests general development policies that would be appropriate for each of these five areas. In addition to the specific policies stated below, all policies applicable to a CBRPA or CBRMA under the Chesapeake Bay Act and its implementing ordinances apply.

Figure 3.1 presents these Land Use Planning Areas that are each discussed in the subsequent sections.

[1] The protection of the Chesapeake Bay and other water quality issues are addressed in Chapter 5.

Figure 2.1


Future Land Use Plan
N
W
E
S
Callao
Lottsburg
Heathsville
Burgess
Lillian
Reedville
Wicomico Church
Kilmarnock
Legend
1,000 Foot Shoreline Conservation Area
Rural Low Shelf
Roads
County Boundary
Ches Bay 100' RPA
Potential Reservoirs
Future Growth Areas
Commercial Hub
Residential
Support Area
Map Prepared by:
SLM, July 2024
0 1 2 4 6
Miles

1. Policies for the Rural Uplands

Rural Uplands are that area of the county that lies landward from the topographic feature known as the "Suffolk Scarp" (see Figure 1.3) and which generally is above 50 feet in elevation above sea level.

a. Agricultural and Forested Areas

Rural uplands are the portion of the County occupied by various open uses, such as forests, parks or farms. All but one village is located in the rural uplands. Much of the area is zoned for the specific purpose of facilitating existing and future farming operations, conservation of water and other natural resources, reducing soil erosion, protecting watersheds and reducing hazards from flood and fire. To ensure the success of such goals, it is necessary to maintain as low a density of development as possible. The character of this area should remain agricultural in nature, with industry or commercial business allowed in it when it will benefit the area without degrading the environment. Industry and commercial business should be focused in and around the villages and their support areas.

Agricultural areas are areas that are cultivated for crops or cleared for that purpose. Agricultural lands occupy about a third of the total area of the County - more than 60 square miles. **Forested lands** include land used for growing timber commercially and woodlands that are part of family farms or other acreage. Forested lands comprise over half of the acreage of the County, nearly 101 square miles.

Recommended policies for agriculture and forested land continue to be as follows:

(1) Agricultural and forested land should be managed and conserved to preserve the quality of these resources. The potential degradation of water quality through improper operation should be minimized. Agriculture and farming operations are to be conducted under a program designed to minimize water pollution. This policy may be implemented through:

(a) Best Management Practices: that promote an effective method of controlling point and non-point pollutant levels consistent with the State's environmental quality goals.

(b) Nutrient Management Practices: that provides optimum nutrient application rates, timing and methods based on soil analysis results and expected crop yields.

(c) Soil and Water Conservation Plans: designed to reduce soil erosion and to prevent excessive levels of nutrients and pesticides from entering the groundwater and Chesapeake Bay.

(2) Conservation Easements should be encouraged to protect farmland, forests, riparian zones, natural areas and historic sites. These easements ensure current owners that usage of their property according to their wishes is guaranteed into perpetuity and

provide financial benefits to landowners who protect their land. Protected lands are lands placed under conservation easements.

(3) The County will cooperate with VDEQ in the monitoring and enforcement of "Pollution Abatement Permits" including the 100-foot buffer for large animal- raising operations.

(4) Land used for the commercial raising of animals on a large scale should be in accordance with prevailing County policies and regulations and should be prohibited where adjacent to streams.

(5) Conversion of forest lands into non-forest uses should be minimized. Commercial and industrial sites should be selected in areas most compatible with these policies such as village commercial hubs and support areas and areas identified for industrial parks.

(6) Where commercial forests are cut for sale, timber clear-cutting is the preferred method of forest management. Clear-cutting provides a healthy regeneration of the forest.

(7) New incentive programs should be developed and existing incentive programs utilized to assist property owners in retaining farmland and forests and in some situations in returning farmlands to forests.

(8) In addition to conservation and preservation measures, Agritourism should be promoted and encouraged across all agricultural activities within the County.

b. Residential

Residential development in the Rural Uplands is a mixture of farm dwellings, random lots along public roads, and small subdivisions. Permanent dwelling types include both conventionally built single-family units and manufactured housing units established as permanent housing. In addition, there are a large number of "single-wide" mobile homes. While most of the latter are located on individual lots, some are in mobile-home parks.

Recommended policies for residential development in Rural Uplands continue to be as follows:

(1) Subdivisions known as "family subdivisions" should conform to the requirements of Va. Code Section 15.2-2241.

(2) Protecting Agricultural and Forested Land.

Residential subdivisions should be allowed with the goals of protecting agricultural and forested lands and maintaining as low overall density of development as possible.

In order to protect existing farmland and forests while permitting desirable development, there should be a requirement that the property owner place a significant portion of the original parcel into open space. (Open space is land that is not developed, and has any vegetative cover, e.g. grass, crops, shrubs, or forests.) This standard should apply for all parcels or collections of parcels above some minimum value.

The location of the parcel(s) identified as the protected space should preserve core operating farms when feasible. The subdivision lots and road(s) should not divide, segregate or restrict the existing or future agriculture or forestry or related uses and activities within the preserved parcel(s).

A preferred minimum residential lot size should be established that is consistent with preserving open space in an agricultural and forested environment, and it is recommended that Open Space Site Design principles[2] be followed for the residential parcels.

(3) Providing Open Space for Residential Subdivisions

For subdivisions below the minimum established above for agricultural and forested lands, the protected space should be a significant portion of the original subdivision open space and treated as common property. Open Space Site Design principles using clustering should be followed, allowing the same number of houses to be built in a less land-consumptive manner in a density-neutral approach. Lot sizes should remain as required for A-1 zoning.

Protected land for multiple family dwellings and condominiums should be based on the total number of units and the A-1 zoning minimum as if the units were individual houses, when clustering residences or in planned unit developments.

(4) Large residential subdivisions should be planned to the extent possible so new lots front on new streets. Cul-de-sac streets and reverse-frontage lots should be required as alternatives to using a major highway for access to residential lots. This policy would reduce the number of new subdivision lots established along public roads and result in safer access to the residential units and a reduction in driveway cuts into major roads.

(5) New residential subdivisions established on existing secondary roads should provide more than the minimum frontage and additional area if necessary to minimize traffic hazards resulting from direct access of driveways to heavily traveled roads

(6) Subdivisions developed along the banks or shores of non-tidal streams that empty into tidal streams should be developed under the same performance standards as those that apply to the Resource Protection Area including application of Low Impact Development (LID)[3], principles for water run-off where feasible.

c. Commercial/Industrial

Industrial sites are best located in areas which have facilities that are designed to serve industry and where they do not cause adverse impact to adjoining uses. Industrial sites must have access to good public roads; have an adequate water supply and wastewater disposal capability. At present, the only areas equipped with both utilities are the Callao and

[2] Randall G. Arendt, Rural by Design, Planning for Town and Country, Routledge, 2015

[3] Prince Georges County, MD, *Low Impact Development Design Strategies*, Department of Environmental Resources, June 1999, 150 pages; also U.S. Department of Defense, *Design: Low Impact Development Manual*, United Facilities Criteria UFC 3-210-10, 25 October 2004, 105 pages.

Reedville areas although Burgess should also be considered a candidate for industrial sites or parks.

Recommended policies for development in Commercial/Industrial areas continue to be as follows:

(1) Industrial sites should be located in the Enterprise Zones or industrial parks near villages.

(2) Smaller industries and "cottage industries" should locate in village commercial hubs in the County and where soils and water supply are favorable.

(3) Heavy water users should be discouraged unless they are associated with a reservoir or other renewable resource for their water supply.

The designated location for retail and service businesses that are intended to serve a large sector of the County's population, and which are likely to generate considerable traffic is in the areas designated as village commercial hubs and, if permitted, in their support areas.

Country and convenience stores intended to serve only a local community within the County are expected to be located at random locations throughout the Rural Uplands and preferably near intersections of feeder roads to the residential communities to be served.

2. Policies for the Rural Low Shelf

This area lies seaward of the Suffolk Scarp but overlaps the Shoreline Conservation Area, the next classification. The official name of this type of area is "the low marine terrace." It ranges generally from 10 to 15 feet above sea level but may extend in places up to 50 feet. Development in the area is now and is expected in the future to be similar to that in the Rural Uplands described above. A few waterfront subdivisions have streets and lots that extend into this area but most of the waterfront development falls within the Shoreline Conservation Area.

This shelf has extensive areas where the soil is unsuited for conventional septic systems (Figure 1.7); has a high shrink-swell ratio (Figure 1.8); and a high-water table (Figure 1.15). As was the case with the Rural Uplands, agricultural and forested lands should be protected and open green space provided within residential subdivisions. Because of the high-water table, streams and the underground water supply are more vulnerable to pollutants than in the higher lands. Development should be done carefully in areas with poor soils as well as areas with steeper slopes.

Most policies for development and use of land on the rural low shelf are the same as those described for the rural uplands.

Additional policies or exceptions for the Rural Low Shelf continue to be as follows:

(a) Land usage is intended to be a general mix of low-density residential and agricultural. Residential development should be dispersed or arranged in clusters to avoid excessive linear development along existing road frontage.

(b) Development near streams should avoid steep slopes, avoid excessive removal of natural vegetation and maintain riparian buffers as required by the Chesapeake Bay Act.

(c) Lot sizes should reflect the need to provide both primary and reserve septic fields and engineered systems.

(d) High volume water users should follow the guidelines set forth under the Eastern Virginia Ground Water Management Area criteria.

(e) Large scale commercial raising of animals should be prohibited in residential areas of the Rural Low Shelf due to the risk of pollution.

(f) Except for country stores and convenience stores, commercial and industrial sites unrelated to marine activities should not be established in this area.

(g) Large subdivisions should be served by a public water system supplied from deep wells and a community sewage system.

3. Policies for the Shoreline Conservation Area

The Shoreline Conservation Area extends approximately 1,000 feet from the sea level waterline and stretches the full distance of the County's shoreline. This strip contains an area of approximately 100 square miles and contains nearly all of the subdivisions previously identified as "shoreline subdivisions" (Figure 1.2). Not all of this strip is developable because it contains much of the CBRPA, including dunes, as well as significant areas subject to tidal flooding.

Use of the County shoreline of 509 miles must be planned and used judiciously. Currently about 28% (143 miles) is forest and shrub/scrub, 48 % (245 miles) is residential, 20% (102 miles) is agriculture and grass, and a little over 1.5% (8 miles) is commercial/industrial. The remaining 2.5% is various small uses.[4]

This area is host to most of the planning issues the County will face during the coming decade and beyond. First, it is the area where the most demand for upscale single-family housing has occurred and is likely to occur. Second, it is the area where demand for condominiums and other multi-family housing and supporting commercial establishments is likely to occur. Third, there are physical conditions in some areas (high water table, poor percolation, shrink-swell soils, gradually rising water levels, storm surge, and shoreline erosion) that present serious constraints to subdivision development and increasing population density. Planning policies must therefore focus on how desirable new development can be accommodated while avoiding serious problem areas and protecting environmentally sensitive areas.

Policies for development and use of land within the Shoreline Conservation Area are consistent with those described for the Rural Uplands and Rural Low Shelf.

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[4] VIMS 2014 Shoreline Inventory (https://scholarworks.wm.edu/reports/785/)

Recommended policies within the Shoreline Conservation Area continue to be as follows:

(a) Residential subdivisions should be allowed with the goals of protecting agricultural and forested lands, preserving the natural beauty, wetlands, dunes, beaches and other natural resources along the shoreline and adjacent lands and maintaining as low a density of development as possible.

(b) Minimum lot sizes and maximum density of single-family homes, of multifamily buildings and condominiums, should be established as should the minimum spacing of condominium buildings.

(c) New subdivisions should be planned to minimize shoreline erosion resulting from construction and use of property. Shoreline erosion reduction measures that employ vegetation (living shorelines) are preferred over structural features (rip-rap or bulkhead). Subdivisions should utilize principles of LID for controlling storm water runoff where feasible, by minimizing impervious-surface area and returning natural vegetation.[5]

(d) New subdivisions should be planned, whenever feasible, to provide public access to the Chesapeake Bay including beaches, boat ramps, fishing points and other water-oriented recreational activities. The establishment of community facilities on the water for the common use of the residents within subdivisions should be encouraged as a means to reduce the number of individual boat houses and piers. Voluntary partnerships with private developers with the NNCPBAA should be encouraged to provide access to the public.

(e) In order to protect existing farmland and forests while permitting desirable development, there should be a requirement that the property owner place a significant portion of the original parcel acreage into open space or forest. This standard should apply for all parcels or collections of parcels above some minimum value of acreage.

The location of the parcel(s) identified as the protected space should preserve core operating farms and forestland where possible. The subdivision lots and road(s) should not divide, segregate or restrict the existing or future agriculture or forestry or related uses and activities within the preserved parcel(s).

(f) Providing Open Space for Residential Subdivisions

For subdivisions below the minimum acreage or value established in paragraph (e) above for agricultural and forested lands, the protected space should be a significant portion of the original subdivision open space and treated as common property. Open Space Site Design principles using clustering should be followed which allow the same number of houses to be built in a less land and shoreline-consumptive manner in a density-neutral approach. Lot sizes should remain consistent with the respective zoning classification and consider potential long-term septic system problems.

[5] See Coastal Resource Management in Chapter 3.

Open space and protected land for multiple family dwellings and condominiums should be based on the total number of units and the respective zoning classification minimum as if the units were individual houses.

Condominium building sizes should be constrained to structures that architecturally fit with their surroundings and do not exceed county height restrictions.

(g) Performance standards of the Chesapeake Bay RPA should be enforced without exception and continue to apply to all subdivisions developed in the Shoreline Conservation Area and adjacent to all flooded land associated with proposed reservoirs.

(h) New water-oriented enterprises that help the economic development of the County and support tourism, sports fishing, commercial fisheries, boat-building, aquaculture, or other water-related activities are encouraged to be established at sites where they can be accommodated by deep water and appropriate access.

(i) Future development should include private and public sewage and water systems rather than individual septic systems and wells.

4. Policies for Villages

Villages are the key locations along major highways where commercial, public and residential uses are concentrated. Nine locations are identified for recognition in the Land Use Plan as villages: Village, Callao, Lottsburg, Heathsville, Lilian, Burgess, Wicomico Church, Reedville and North Kilmarnock. All are on the primary transportation corridor.

Each village has a different makeup and arrangement of uses but most of them have features in common. Six are located at major crossroads; Reedville is at the intersection of highway and water commerce; North Kilmarnock is an extension of the Town of Kilmarnock and a portion of Village located in the County.

Villages serve as focal points in the County where both commercial and public services are grouped. Three villages, Callao, Heathsville and Burgess, are more strategically located to play a dominant role for business and institutional service centers. These three are identified as being the primary commercial hubs in the County. Callao and Burgess are dominant because they are at major road intersections along the County's primary commercial corridor (Route 360). Heathsville is important because it is the county seat and the location of the public library, a major supermarket, and the YMCA.

Village, Lottsburg, Lilian and Wicomico Church are located at less dominant intersections and their roles are to serve a more local community-related purpose. Village is a community located in both Richmond and Northumberland Counties that sits astride Route U.S. 360. North Kilmarnock (that portion of the County along Route 200 that lies outside the corporate boundary of Kilmarnock) is simply a planned extension of the town into the County. This village has the potential for becoming a retail hub because of the large market within Kilmarnock and vicinity.

Reedville has unique characteristics that set it apart from the other village centers. It is located at another type of crossroad, one where water and land commerce meet. While this is a classic location for a town with a full mix of commercial, industrial and residential development,

Reedville has developed primarily as a residential community with some small supporting businesses. It is located near the largest commercial employer in the County: Omega Protein.

a. Framework of Village Policies

As a first step in identifying policies for villages, it is important to recognize some features that all have in common and the direction in which growth should be channeled.

(1) Villages are more intensely-developed areas than the remainder of the County and each one has the potential of serving as a "town center" for a part of the County. Three of the villages: Callao, Heathsville and Burgess are planned to be the primary commercial hubs of the County. The other villages are designated as support areas for the surrounding residential communities and servicing some through traffic on the main transportation corridor.

(2) A "commercial hub" marks the primary identity of Callao, Heathsville and Burgess and most of the commercial and governmental services are currently found within these hubs. It is planned to continue this arrangement. The commercial hubs are intended to be zoned for general business purposes.

(3) The County has designated certain areas adjacent to commercial hubs as “support areas”. In the three principal villages these are located immediately beyond the commercial hubs and are mixed business and residential. In the smaller villages, these are considered residential support areas since they focus on providing services to the immediate surrounding areas and some through traffic on Route 360 and Route 200. The Support Area is intended to be zoned to permit the location of small general businesses in areas now zoned agricultural or residential- general. Support Areas on the water are intended to permit the location of small businesses in areas on tidal waters currently zoned agricultural or residential- waterfront. Beyond the support areas, the land use is a mixture of farms, forests and occasional residential development. The areas surrounding the villages have the potential for development as extensions of the villages. Residential uses are also part of the village structure but they currently consist mostly of older homes and are located in support areas or outside the village proper. Most of the new residential development of the County has been established outside the villages in waterfront communities.

(4) In addition to and frequently overlapping both the commercial hubs and the support areas are “Enterprise Zones” which are part of an economic development program established by the Commonwealth of Virginia. Various economic incentives are provided to prospective businesses bringing new employment to the County and to locate in these Enterprise Zones. These Enterprise Zones and parcels should be reviewed and changed as necessary each time the Land Use Plan is revised. The purpose is to make the planned Enterprise Zones and parcels consistent with and compatible with the Land Use Plan. One important principle is that they do not contribute to sprawl along the main transportation arteries and that a clear edge be maintained between the village support areas in this plan and the countryside.

At present the existing Enterprise Zones are not relevant to County land use planning and should not drive the planning, but the program can be used as a tool to assist in directing development into areas consistent with the Plan. Applications for Enterprise Zone grants, when received, should be reviewed for consistency with the approved Land Use Plan. To view the Enterprise Zones in the County, go to the Northern Neck-Chesapeake Bay Region Partnership website.[6]

(5) One of the important reasons to identify villages and their support areas is to control sprawl along the primary highway corridors in order to retain the rural character of the County. A clear edge should be maintained between the villages and the countryside. Growth should be channeled into the existing village areas.

(6) A limiting factor to future growth of the commercial hubs in Heathsville and Burgess is the absence of public sewerage systems. Individual septic systems offer only limited capacity for major commercial development or expansion of existing development. At this time, the population density is too sparse to support the financing for public sewerage systems in Heathsville and Burgess. In the future, however, this could change.

(7) Areas designated as "commercial hubs" and "support areas" for villages are intended as a guideline to future development within the village areas. The areas so designated are intended to be interpreted as planned zoning districts, subject to further analysis and review and the normal zoning change process of the County.

(8) Residential subdivisions located within village support areas, and any redevelopment should be designed using the concepts of Traditional Neighborhood Development, where applicable, which include the following features:[7]

- Compact form that encourages walking
- Streetscape designed for pedestrians
- Buildings set close to the sidewalk
- Narrow connected streets
- Neighborhood parks and open spaces
- Mix of housing types and price ranges
- Architecture that reflects the nature of the County and/or village
- Compatible non-residential uses, including neighborhood retail.

(9) A goal of this Land Use Plan is to nurture small businesses and focus them in commercial hubs and support areas where a critical mass can develop to support a multi-functional community.

(10) The villages should also be the focal points for identifying areas suitable for industrial parks. The County should investigate whether or not a specific area or areas should be so designated and if so, what should be the approximate boundaries. Locations adjacent

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[6] http://www.northernneck.us/enterprise-zones/.

[7] Edward T. McMahon, *Better Models for Development in Virginia*, (Arlington, VA The Conservation Fund, September 2001) pg.51

to the villages of Callao and Burgess appear to be the most promising and to be consistent with the planned and expected growth patterns.

The remainder of this section addresses each village in turn. Each village plan should place emphasis on improved village infrastructure. Each village plan includes the need for improved traffic flow, parking, inter-village bus transportation, roads, walkways, bike paths, parks, community recreation facilities, sewage, public restrooms, fire protection, internet availability, and other infrastructure in order to encourage long term village development. Cross streets with trees and sidewalks and pathways are also part of the desired infrastructure. Local civic organizations and citizens should plan and sponsor this local development.

b. Callao:

Callao is a commercial area located at the intersection of U.S. Route 360 and VA Route 202. It is the commercial gateway to the County from the north and west. The area contains a number of businesses and shows a mix that is common to the downtown areas of many small communities. This village contains more business than that of other villages and includes both retail and service businesses. Residential development extends along all four legs of the streets that intersect at Callao. The village is served by a private central water system and a central sewerage system.

As a gateway village to the County, Callao should become the dominant business center for the north and western part of the County.

Specific Goals for development continue to be as follows: CALLAO

(1) Callao should be designated as the "north and western gateway" to the County.

(2) Parking arrangement and traffic flow within the commercial hub is to be improved to minimize conflict between through traffic and parked traffic. Traditional head-in parking should be removed and discouraged in the future.

(3) Take advantage of Enterprise Zone status of parcels in this area.

(4) A robust, status review and planning activity focused on existing infrastructure should be ongoing.

As more land is needed for development, there is an abundant supply all around the town center and the area designated in Figure 3.2 as the commercial hub. The commercial hub contains the areas served by the new sewage system.

Figure 3.2 presents the Future Land Use Plan for Callao and vicinity.

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Figure 2.2

Future Land Use Plan
Callao and Vicinity

Map Prepared by:

SLM, June 2024

0 1,200 2,400 4,800 7,200 Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Comp Plan

c. Lottsburg

Lottsburg is located about three miles east of Callao on U.S. Route 360. While there is no strong retail core in Lottsburg, this village contains a number of uses that serve the surrounding area. The main focus of the village lies between where Route 614 enters from the north and exits to the south. Several business establishments consisting of a hardware store, a restaurant, convenience store, office and automobile shop are found in Lottsburg. A group of public uses, including a post office, solid waste facility, VDOT service facility and a church, are also located within the area of the village. In addition, the Holly Graded School is a significant historic site that is listed in the National and State Registers of Historic Places.

Lottsburg has only limited potential for growth as a major commercial area because of its close proximity to Callao and Heathsville, both of which have stronger commercial bases. The support area around Lottsburg has demonstrated potential for development with selective facilities that serve countywide markets. A hardware store and two restaurants provide a core employment base that could be expanded by other major employers. Lottsburg is not designated as a commercial hub but as a significant support area. Growth is planned to occur within the support area to limit sprawl along Rt. 360

Specific Goals for development continue to be as follows: LOTTSBURG

(1) Promote the village as an employment center with emphasis on businesses and services that serve county-wide markets or public services.

(2) Utilize historic Holly Graded School to promote the village as part of a county-wide historic tour.

(3) Promote the addition of more service businesses such as those serving the agricultural and building industries of the County.

(4) Take advantage of Enterprise Zone status of parcels in this area.

(5) Promote the addition of more light industry/manufacturing.

Figure 3.3 presents the future land use plan for Lottsburg and vicinity.

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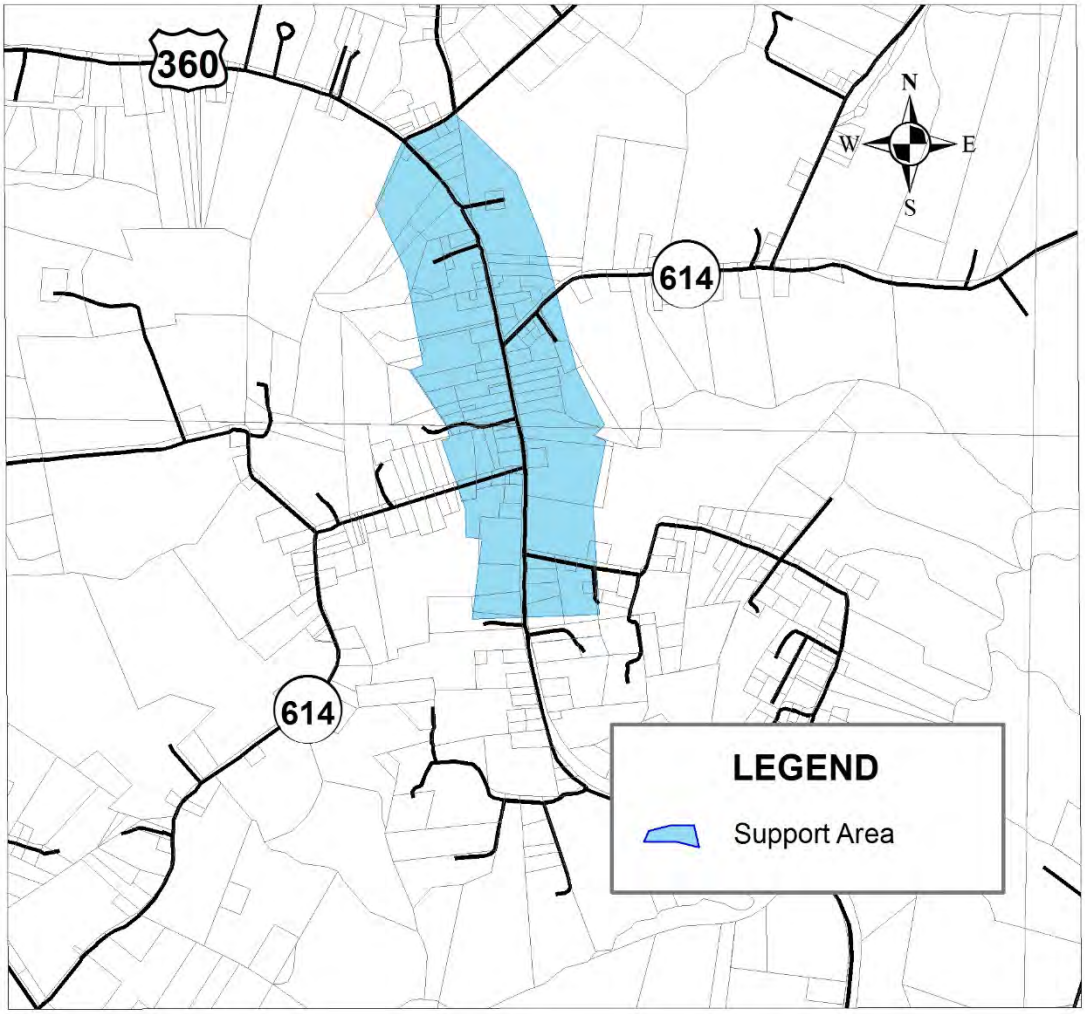
Figure 2.3

Future Land Use Plan
Lottsburg and Vicinity



Map Prepared by:

SLM, June 2024

0 900 1,800 3,600 5,400
Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Co

d. Heathsville

Heathsville is the county seat and primary center of governmental services for the County. The "commercial hub" contains many businesses and public offices and the Northumberland Public Library and the Extension Service. Businesses range from small shops, banks, food stores, offices, used cars, architects, computer services, to contractor's offices. The Old and New Courthouse and Sheriff's office are the predominant public offices located within this hub. Social Services and Health offices are located within the support area. Other commercial development within this village includes a grocery store, a dollar store, a gas station with a convenience store, secondhand store, consignment store, bank, a restaurant, veterinarian and the YMCA. These developments, together with existing commercial development to the east of Heathsville, enhance the county seat as a major commercial growth site.

Heathsville has many older buildings of historical significance including the Rice's Hotel and Hughlett Tavern that have undergone restoration and renovation. The Heathsville Forge Blacksmith Shop is located behind the Rice's Hotel and Hughlett Tavern. Other historic landmarks that are on the historic registers include St. Stephen's Church and Springfield (Figure 1.11). An historic district has been established and approved for the federal register for the Heathsville area.

A private water system serves Heathsville but there is no central sewer system in the area. Although soils are reasonably satisfactory for septic tanks, the development of the village into a larger commercial complex is limited until a public sewerage system is established.

Specific Goals for development continue to be as follows: HEATHSVILLE

(1) Designate Heathsville as a major village center with a commercial hub.

(2) Seek funding for a public sewerage system to serve the central commercial hub.

(3) Utilize historic Rice's Hotel and Hughlett Tavern, the old jail, and the Blacksmith Shop to promote Heathsville as part of a county-wide historic tour.

(4) Provide for residential growth within the proximity of the village as well as beyond the commercial hub and support area.

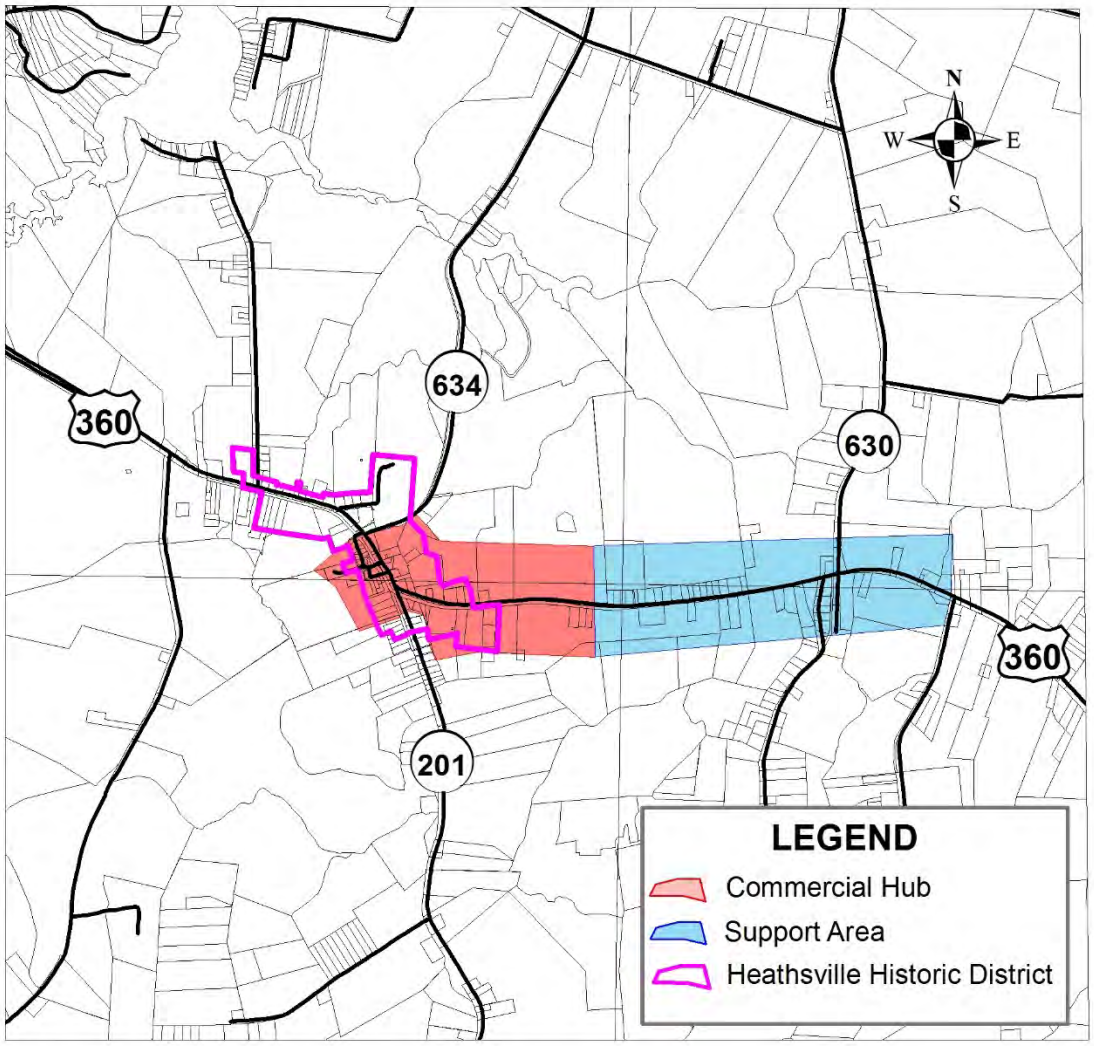
(5) Promote the Enterprise Zone parcels first.

(6) Promote "Main Street" projects and activities.

Figure 3.4 presents the Future Land Use Plan for Heathsville and vicinity. The area along Rt. 360 west of the commercial hub is all residential and the plan is to keep it that way. Most commercial growth and the primary support area growth are planned to occur east of the Rt. 201 intersection between the large grocery store and Academic Lane.

Figure 2.4

Future Land Use Plan Heathsville and Vicinity



Map Prepared by:

SLM, June 2024

0 900 1,800 3,600 5,400 7,200
Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Comp Plan

e. Burgess

Burgess is to the east of the County what Callao is to the west: the major commercial hub. It is a commercial village located at the intersection of U.S. Route 360 and VA Route 200. The area contains a number of retail and service businesses. The mix of uses is as varied as might be found along the main street of any small town.

There is also a post office, a community center affiliated with one of several churches within the village area. Unlike Callao, Burgess lacks pedestrian sidewalks.

Burgess is more spread out than the other villages. Its core "commercial hub" is located at the intersection of U.S. 360 and VA 200 and includes relatively intensive commercial development near that intersection. But strip development along Route 200 is also quite extensive and for that reason has been added to the support area of this village.

The absence of public sewers is a limiting factor on the growth of this area at this time. That is perhaps owed to the existence of better soils in this area plus the fact that development extends along both sides of more than a mile of primary highway frontage in addition to its Route 360 frontage. If public sewers were available a more focused commercial development within the commercial hub near the 360/200 intersection would be possible.

Specific Goals for development continue to be as follows: BURGESS

(1) Designate Burgess as the eastern commercial hub in Northumberland County

(2) Promote a public sewerage system to serve the central commercial hub.

(3) Provide for residential growth within the proximity of the village beyond the commercial hub.

(4) Develop plans for a sustainable water supply that includes a reservoir developed on Sydnors Mill Creek.

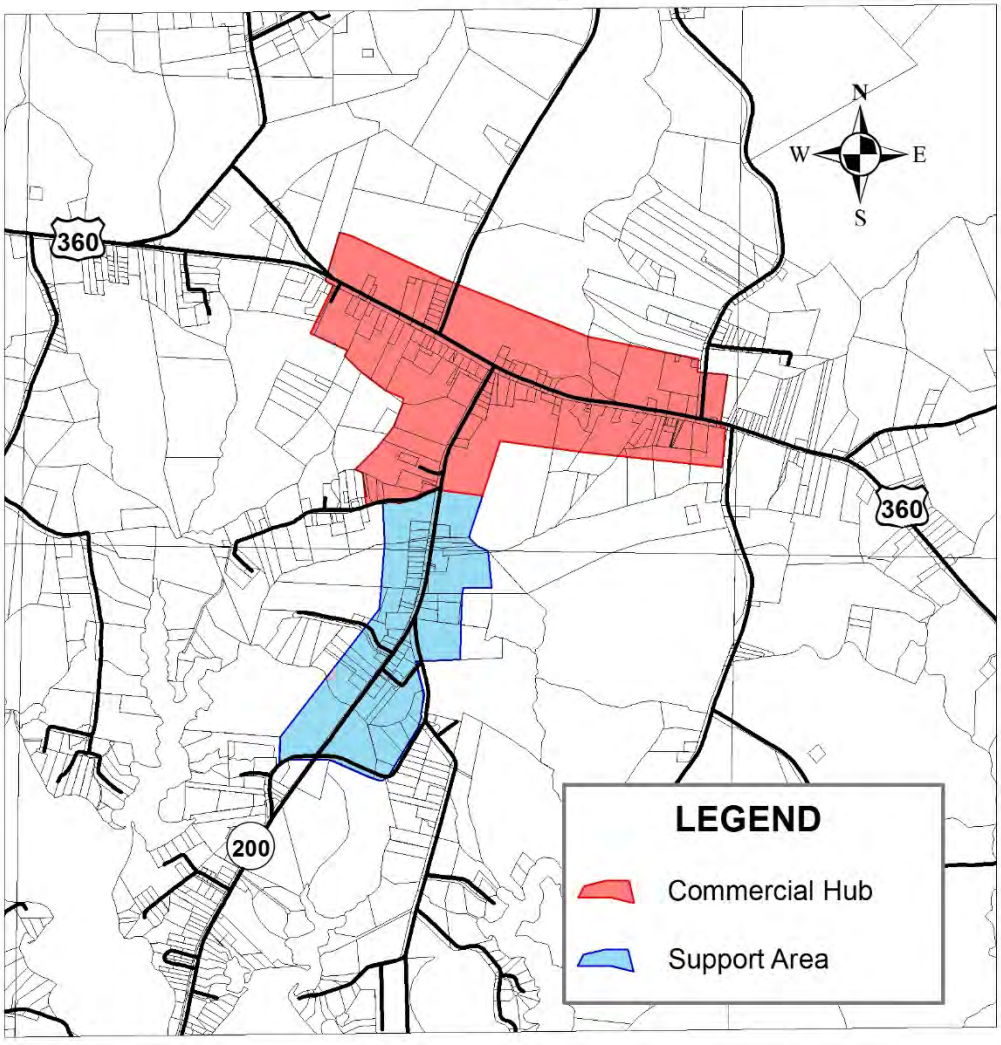
(5) Maintain a sharp boundary between the support area down Rt. 200 and the residential areas south of the support area.

(6) Evaluate the area around Burgess north of Rt. 360 as a candidate for an industrial park.

Figure 3.5 presents the Future Land Use Plan for Burgess and its vicinity. The commercial hub area represents the areas of considerable commercial development and the support area is a mixed commercial and residential area.

Figure 2.5

Future Land Use Plan
Burgess and Vicinity



Map Prepared by:

SLM, June 2024

0 1,200 2,400 4,800 7,200 Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Comp Plan

f. Wicomico Church

Wicomico Church is located about five miles south of Burgess on VA Route 200. Located about halfway between Kilmarnock and Burgess, the main focus of the village is on community service to the area lying south of the Great Wicomico River and north of Kilmarnock. The area contains a number of retail and service businesses. Public uses include three churches.

Because of its location between two strong commercial areas (Kilmarnock and Burgess), Wicomico Church has not developed as a strong business center and is therefore not planned for commercial hub development. The village serves mostly a neighborhood function. But the existence of several established churches makes the village a popular place of assembly for community activities.

Specific Goals for development continue to be as follows: WICOMICO CHURCH

(1) Promote the village as the primary supply and service center for the area south of the Great Wicomico River. The potential for additional growth is linked to the rate of development on several of the creeks extending into the County's shoreline from the Chesapeake Bay and the Great Wicomico River.

(2) With the cooperation of the churches that are located within the village, Wicomico Church can function as a "community center" for the southern portion of the County.

(3) Add other public community services as they can be provided (i.e., branch library or bookmobile, fire/rescue facilities, etc.)

(4) Promote Enterprise Zone parcels first

Figure 3.6 presents the Future Land Use Plan for Wicomico Church and vicinity. It is designated solely as a residential support area.

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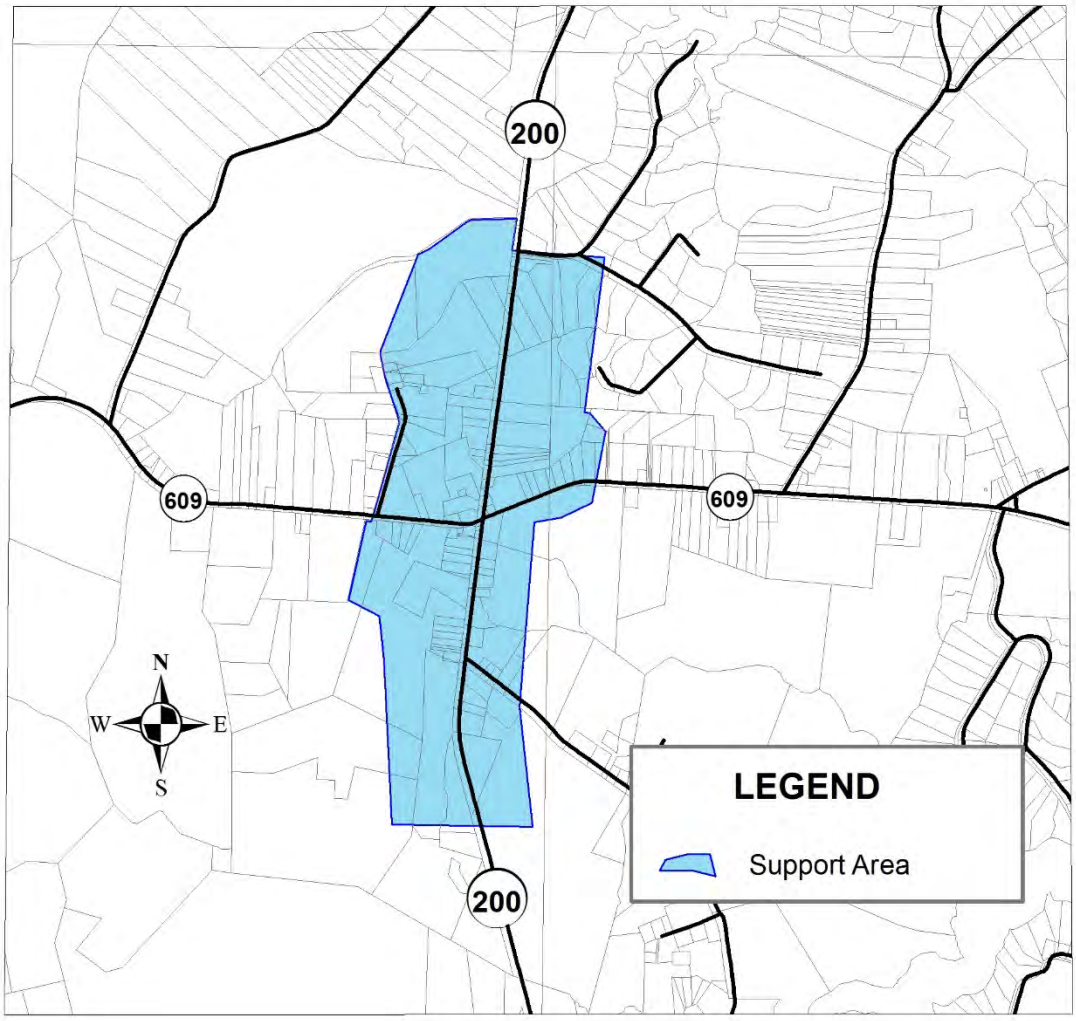
Figure 2.6

Future Land Use Plan
Wicomico Church and Vicinity



Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Comp Plan

Map Prepared by:

0 900 1,800 3,600 5,400 7,200 Feet

SLM, June 2024

g. Reedville

It has been mentioned that Reedville is a different kind of community than the other eight villages. This is an old village which was built around water-related and fishing industries and marine operations. The land use is mostly residential, but many private homes have been converted into bed and breakfast establishments that are very popular during the summer months.

The main peninsula that first established Reedville is designated as a Historic Area and is registered on the National Register of Historic Places. The historic district starts at Crowder Street and runs to the water containing lots on both sides of Route 644. In the Historic Area, state historic preservation rules apply.

The area covered by the Reedville Future Land Use Plan contains all lots between Highway 360/Route 657 and the branches of Cockrell Creek that border on each side of Reedville. The tax map of this area shows 248 lots. The area covered by these lots is 218 acres. The average density is 1.14 lots per acre. The highest density found in any one block was four lots per acre.[8]

Reedville is planned to remain primarily residential including the small businesses that are permissible in residential zoning. No commercial hub is planned.

Cockrell's Creek

The areas on both sides of Cockrell's Creek are planned to become a mixed waterfront business-residential support area as shown in Figure 3.7. Arguably the county's most valuable resource is the harbor represented by Cockrell's Creek. Few counties in the country, much less the commonwealth, have a deep-water harbor with the potential of the Reedville area. Development of this resource must consider value to the County and its citizens. The part of the Cockrell's Creek area shown on the map needs re-development to support its Bay heritage as well as support the existing water-related activities of the area. It also should complement and enhance the village of Reedville and the communities of Fairport and Fleeton. The area is expected to be amenable to residential re-development combined with marinas and other water-related businesses such as boatbuilding and aquaculture. It is also near the location of the County's largest commercial employer: Omega Protein.

Specific Goals for development continue to be as follows: REEDVILLE

(1) Within the Historic District establish guidelines for retaining the original "town character" in buildings as they are modified, constructed or reconstructed., after a local historic district board is established.

[8] Northumberland County does not have any Intensively Developed Areas as defined by the Chesapeake Bay Act.

(2) Promote the area on Cockrell's Creek as a specially-zoned working waterfront with mixed business and residential support area.

Figure 3.7 presents the Future Land Use Plan for Reedville and vicinity. Both sides of Cockrell's Creek as well as the tip of Reedville are planned as Waterfront Support Areas.

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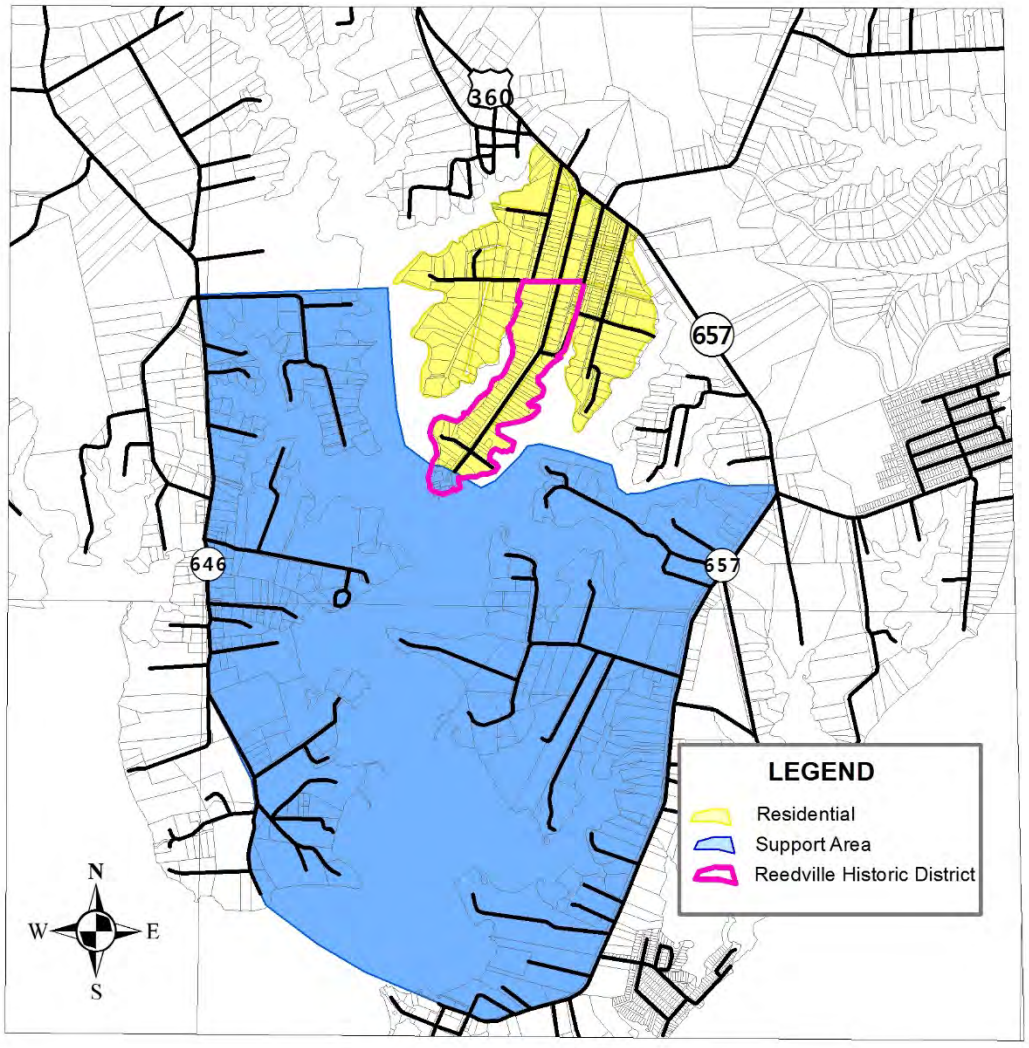
Figure 2.7

Future Land Use Plan Reedville and Vicinity



Map Prepared by:

0 1,200 2,400 4,800 7,200 Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's. Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Co

SLM, June 2024

h. North Kilmarnock

The village of North Kilmarnock is on the border with Lancaster County to the south. Because of its proximity to a substantial market area, both resident and tourist, the potential exists for the establishment of a major village in this area and the long-term plan is for North Kilmarnock to develop around a small commercial hub. Subject to the availability and agreement of the Town, the area has perhaps the earliest potential to be served by public sewer which is very important, almost essential, to the development of a substantial business complex.

In addition to its commercial potential, the North Kilmarnock Village also could be developed as a planned residential community. It offers perhaps the best opportunity in the County for the development of a modern planned unit development mixed with residential, recreational and commercial facilities.

Specific Goals for development continue to be as follows: NORTH KILMARNOCK

(1) Development within the area is to be guided by a comprehensive land development plan and economic plan consistent with present day trends for planned communities.

(2) Such development should be undertaken in coordination with the Town of Kilmarnock.

(3) The primary focus of development should be in two areas: (i) to establish a substantial job base within the County within the framework of the goals and policies of the Comprehensive Plan and (ii) to expand residential opportunities for both existing and new residents.

(4) The concept of such a planned community is not limited to a single site development; a comprehensive approach might consider various groupings of uses such as focusing the more intensive uses along the major highway while locating residential components in more remote rural or waterfront areas.

(5) Promote Enterprise Zone parcels first.

Figure 3.8 presents the Future Land Use Plan for North Kilmarnock and vicinity.

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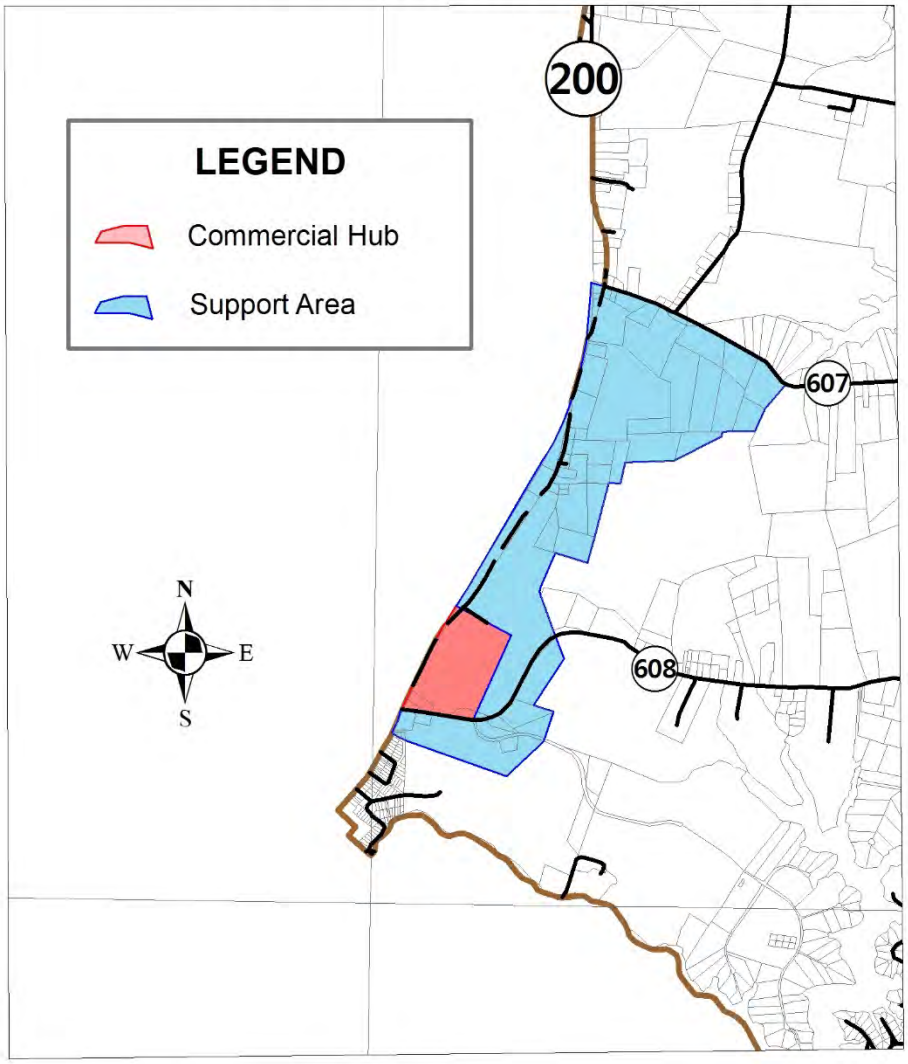
Figure 2.8

Future Land Use Plan
North Kilmarnock and Vicinity



Map Prepared by:

SLM, June 2024

0 1,200 2,400 4,800 7,200 Feet

Data Sources: Hydrography, County Boundary:
USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas:
Modified from the 1996
Northumberland Comp Plan

i. Lilian

Lilian is located about 4 miles from Reedville on US Route 360 at the intersection of VA Route 646. Located between Reedville and Burgess, the focus of this village is on community service to the local area, to traffic on Route 360 and traffic to Lilian Lumber 2 miles down Route 646. Because Burgess is planned for a major commercial hub, Lilian is planned to remain a support area for the local community.

Specific Goals for development continue to be as follows: LILIAN

(1) Continue to act as the primary supply and service center for the neighboring community.

(2) Encourage small businesses to locate in the support area.

(3) Maintain a clear edge of businesses in the support area of Lilian and prevent sprawl along Route U.S. 360.

(4) Promote Enterprise Zone parcels first**.**

(5) Promote residential development along Waverly Road between 360 and Whay's Creek Rd.

Figure 3.9 presents the Future Land Use Plan for Lilian and vicinity.

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Figure 2.9

Future Land Use Plan
Lilian and Vicinity

Map Prepared by:

SLM, June 2024

0 625 1,250 2,500 3,750 5,000 Feet

Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Co

j. Village

Village is located on Route U.S. 360 at the Richmond County line and State Route 600. The focus of the village is on the local community, serving traffic on Route 360 and also as a commercial hub near the geographic center of the Northern Neck. The area contains a number of retail and service businesses.

Village does not have a clearly defined area for a Commercial Hub within Northumberland County. Therefore, the commercial area of Village is identified as a support area only.

Specific Goals for development continue to be as follows: VILLAGE

(1) Work with Richmond County to coordinate development within the village.

(2) Continue to act as the primary supply and service center for the neighboring community.

(3) Encourage small businesses to locate within the support area.

(4) Promote Enterprise Zone parcels first.

(5) Establish an as-is infrastructure profile supporting longer term plan for growth.

Figure 3.10 presents the Future Land Use Plan for Village and vicinity.

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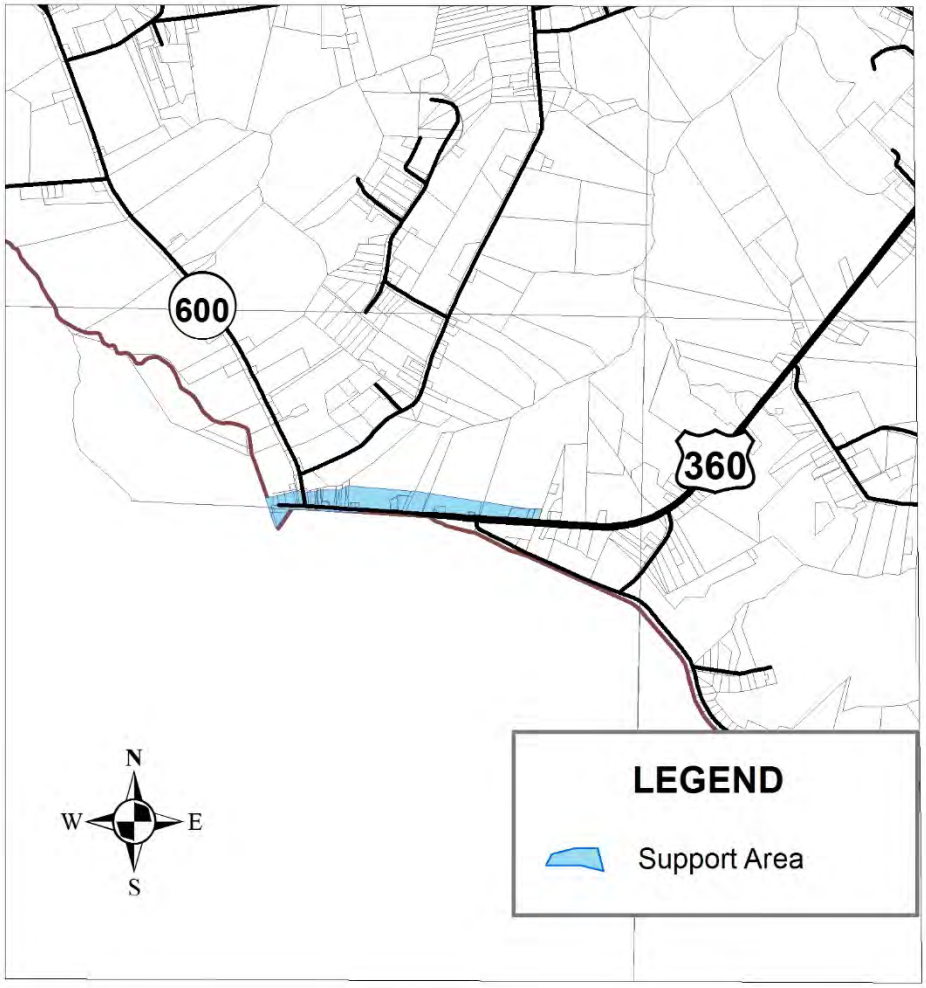
Figure 2.10

Future Land Use Plan Village and Vicinity



Map Prepared by:

SLM, June 2024

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Data Sources: Hydrography, County Boundary: USGS 1:100,000 DLG's.
Commercial Hubs & Support Areas: Modified from the 1996 Northumberland Comp Plan

5. Policies for Special Areas

In addition to environmentally sensitive areas, there are three categories of elements of the County that require special attention for land use planning:

(a) The Historical and Archeological Areas;
(b) The Areas identified for Reservoirs
(c) Patuxent Naval Air Station Joint Land Use Study.
(d) Solar Energy Facilities

a. Historic and Archeological Resources (See also Appendix B)

There are sites within Northumberland County designated as "Historic Landmarks" and are listed in the Virginia Landmarks Register and the National Register of Historic Places. Two of these sites, Heathsville and Reedville, have been designated as "Historic Areas." These sites are identified in Figure 1.11 and listed and further discussed in Section 8 of Chapter 1.

RECOMMENDATION

- Task the EDC with developing a plan to further incorporate historic sites into the tourism plan for the county.
- Determine if further development of the survey of historic sites is warranted.

No development should be permitted that would result in the removal or modification of an established historic landmark or building within a historic district except within the policies established in Section 15.2-2306 of the Virginia Code.

As noted, in Chapter 1, the County may wish to continue the development of its historic resources through a comprehensive survey available through VDHR although the local government is usually required to provide matching funds for the survey. With a complete survey of historic sites, the County would be in a position to prepare a Historic Preservation Plan as a future addendum to the Comprehensive Plan.

b. Reservoir Areas

In Chapter 1, Physical Conditions, Section C.1.f there is a brief discussion of the Engineering study of reservoirs in the County accompanied by Figure 1.13 identifying the potential reservoirs.

In Chapter 4, Public Facilities and Services, Section E.1 there is a further discussion of the water supply and identification of specific potential reservoirs in the context of the County's responsibility to assure an adequate fresh water supply.

In Chapter 3, Water Quality and Shoreline Protection Plan, Section 7.b.3 there is a discussion of the overall situation regarding availability of fresh water and the recognition that reservoirs are a necessary source of fresh water and a recommendation regarding the importance of starting to bring the reservoirs on-line.

There are at least five important points to be recognized:

1. Artesian aquifer groundwater is a finite resource. The continued reliance of groundwater drawn from the artesian aquifers will lead to the impairment of the aquifer

system by mid-century and to the eventual loss of the aquifers as a productive source of water. The County falls under the Eastern Virginia Ground Water Management Area regulated by the VDEQ.

2. Reservoirs are one of the important potential sustainable sources of water and a desirable source of water for centers of population and for industry when the aquifer becomes impaired. Shallow wells will continue to provide another sustainable source for citizens not within economic distance of a reservoir. Desalinization systems may be necessary for many citizens with waterfront property not near reservoirs and unable to utilize shallow wells.
3. Land prices will likely increase and the cost of land acquisition for reservoir sites will become increasingly expensive with the passage of time.
4. Development will continue, and the choice of reservoir sites will become more limited and more difficult to sequester or reserve with the passage of time. Creation of reservoirs may impact wetlands, and wetland-mitigation costs are likely to increase in the future.
5. Reservoirs would be economic engines today even if not used immediately for water supply. Shorelines of reservoirs would increase in value significantly and provide jobs and economic opportunities for recreation facilities and fishing, restaurants, and inns.

As discussed in Chapter 3, the most promising sites are as follows:

Site	Serving	Acres	Millions gallons/day
Lodge Creek	Callao	118	1.05
Sydnor's Mill	Burgess and points east	328	0.48
Crabbe Mill	Heathsville	310	0.56

As a minimum, the area identified for these three sites, plus an area of 800 feet landward of these sites when the reservoirs are full may be considered. Large local ponds may also be considered as potential reservoir sites.

Reservoir sites and adjacent property should be permitted to develop only as consistent with maintaining a future public water supply

If reservoirs are to be considered, the policies for building near reservoir sites should be as follows:

RECOMMENDATIONS

1. No construction to be allowed in the areas designated for the reservoirs including supporting infrastructure such as spillways.
2. Construction in the 800-foot area around the reservoirs should follow the Chesapeake Bay Act restrictions without exceptions.

c. Patuxent Naval Air Station Joint Land Use Study

The County, in conjunction with the NNPDC, participated in the Patuxent Naval Air Station Joint Land Use Study (JLUS). The JLUS was undertaken in an effort to develop a set of recommendations that would prevent or mitigate encroachment in the areas surrounding the NAS PAX complex including the Atlantic Test Range Inner Test Range. A majority of the County is located within the Inner Test Range. The JLUS recommendations are an effort to help protect the installations' military missions, and the public's health, safety, welfare, quality of life, and economic stability of the communities. Northumberland County has agreed to cooperate as much as possible with Patuxent Naval Air Station in implementing the JLUS into the future.

d. Solar Energy Facilities

The County understands that clean, renewable energy sources are the future of energy in the Commonwealth. Solar energy facilities are one type of renewable energy that will likely play a large role in powering the county and state into the future. However, the County is a unique county and endeavors to protect its viewsheds, farms and forests, ability to grow, as well as its local water quality.

SUGGESTED GUIDELINES FOR SOLAR ENERGY FACILITY DEVELOPMENT:

1. Solar energy facilities should be located at least 1,000 feet from any village growth or support area, to allow for possible future growth in the county.
2. Solar energy facilities should be located to minimize the impact on prime agricultural soils. Siting Solar Energy Facilities on marginal soils that have low agricultural production rates would be preferred.
3. Solar energy Facilities should be located to minimize the impact to forest resources, and to the maximum extent possible, concentrate solar energy facility development on open land.
4. Solar energy facilities should leave existing vegetation on the borders of the site in place (if present) for natural vegetative visual buffers, as opposed to clearing all vegetation and establishing new vegetative visual buffers. Following this recommendation should reduce costs for the developer, while, at the same time, preserving more robust and dense visual vegetative buffers.

CHAPTER 3

WATER QUALITY AND SHORELINE PROTECTION PLAN

A. INTRODUCTION

Water quality in both saltwater estuaries and in our sources of drinking water is of paramount importance to our future here in Northumberland County. Bay, river and stream water quality will determine the fecundity of our shores for gamefish, menhaden, crabs and oysters – and the health of our fishing industry. Both the shallow and deep aquifers, that currently supply primary sources of drinking and household water, are being threatened by over-use and contamination. Protecting shorelines through our riparian buffers is also an issue in an environment where tremendous quantities of various harmful chemicals are being released via ground water into the bay daily and large expanses of shoreline are being eaten away by erosion. Our waterfront is a very real economic advantage for our County. Both our fishing industry and our tourist industry are absolutely dependent on a healthy water-related environment. In fact, our basic quality of life depends on careful stewardship of our once-abundant water resources, and we must actively protect them for future generations.

The purpose of this Chapter is to define a broad set of policies for the County which promote the objectives of the County and the Commonwealth of Virginia to preserve the quality of waters of the Chesapeake Bay and related state waters within the County. Referred to here as the **Water Quality and Shoreline Protection Plan**, this Chapter has been prepared to comply with Section 62.1-44.15:67 of the Virginia Code which in part states:

> *Counties, cities and towns in Tidewater Virginia shall incorporate protection of the quality of state waters into each locality's comprehensive plan consistent with the provisions of this chapter.*

Under the powers of that code section, the Chesapeake Bay Local Assistance Board (CBLAB), was authorized to prepare regulations which provided guidelines to localities for preparing plans for the protection of the quality of state waters. While the CBLAB no longer exists, all oversight of local programs is conducted by the State Water Control Board under VDEQ. Among the provisions of those guidelines which are published in the Local Assistance Manual are five objectives of such plans.

They state that *in conjunction with other state water quality programs, local programs shall encourage and promote:*

1. *protection of existing high quality state waters and restoration of all other state waters to a condition or quality that will permit all reasonable public uses and will support the propagation and growth of all aquatic life, including game fish, which might reasonably be*

expected to inhabit them

2. *safeguarding the clean waters of the Commonwealth from pollution;*
3. *prevention of any increase in pollution;*
4. *reduction of existing pollution; and*
5. *promotion of water resource conservation in order to provide for the health, safety and welfare of the present and future citizens of the Commonwealth.*

In addition to supporting the water quality objectives presented above, the County supports additional objectives to ensure that sufficient quantities of water remain available to meet the future needs of the County and also that our shorelines are protected. This chapter is designed to further these objectives within the framework of the physical conditions identified in Chapter 1 and goals and strategies in Appendix 1. The County Board of Supervisors recognizes that there may be situations where the requirements of one element of the Comprehensive Plan appear to duplicate, overlap or even supersede another plan element. When addressing a specific planning issue, the Board of Supervisors and the Planning Commission will give appropriate consideration to all applicable elements of the Comprehensive Plan.

Policies are organized below around the following topics related to developing and using land:

- Development within or Near Existing Development;
- Development within Areas with Topographic Constraints;
- Development within Areas where Soils will not Support Conventional On-Site Sewage Disposal
- Development within Areas where Soils have Poor Structural Qualities;
- Flood prone Areas, Wetlands and Natural Habitat Areas;
- Chesapeake Bay Act Protected Areas;
- Protection of the County's Groundwater Supply;
- Watershed Protection;
- Shoreline Preservation;
- Use of Waterfront Areas while Preserving Sensitive Environmental Areas;
- Intensively Developed Areas;
- Managing Potential Conflicts between Land Use and Water Quality Protection; and
- Soil and Water Conservation Policies.

Through the following policies, the Board of Supervisors of the County will promote the laws, policies and regulations promulgated by the state and federal governments which are designed to enhance the quality of water entering the Chesapeake Bay through tributaries located within the County.

B. MAJOR REGULATORY ELEMENTS OF THE WATER QUALITY PROTECTION PLAN

1. **Chesapeake Bay Preservation Act - The Resource Protection Area Regulations (CBRMA):** These regulations provide immediate protection to all tidal wetlands along the shores of streams and to known non-tidal wetlands adjacent to tidal wetlands. As a practical

matter, the protected areas extend to most of the major and minor creeks and branches that run throughout the County. This protection area includes a buffer area around all previously defined wetlands which acts as a vegetative *strainer* to pollutants that may otherwise be carried to streams and wetlands by surface runoff and groundwater discharge.

2. **Chesapeake Bay Act - The Resource Management Area Regulations (CBRMA):** The strategy in the CBRMA (all areas not in the CBRPA which includes the remainder of Northumberland County) is to allow development but under a set of performance standards which are designed to reduce the quantity of potential pollutants that reach the CBRPA. This is done by application of Best Management Practices of the State Water Control Board and more intensive review of all building applications.

3. **Subdivision Ordinance**: provides the requirements that must be met by developers for establishing a subdivision. This ordinance references and incorporates sections of the Chesapeake Bay Preservation Act.

4. **The Zoning Ordinance**: offers another tool which will enhance the County's capability of managing development. In addition to the CBRPA and CBRMA, the overall zoning ordinance strengthens the ability of the County to manage development. A separate ordinance contains floodplain regulations.

5. **County-wide Land Use Policies**: proposed to upgrade over a period of time specific point sources of pollution that either contribute or could contribute to further degradations of the Chesapeake Bay.

The general policies are as follows as regards water quality:

(a) Public and private sewage treatment plants shall be located, constructed and operated in a manner so as to ensure against possible contamination of the Bay through operational error or natural disaster. State-of-the-art nutrient removal should be installed in all facilities and upgraded as better technology becomes available.

(b) Solid waste landfills, public or private, must comply with the strictest safety and health requirements and include all state and federal standards.

(c) Underground tanks used for storage of chemicals or petroleum products should be monitored according to state requirements. Replacement of faulty tanks with approved materials shall be done within a reasonable time.

(d) Land development in areas that are sensitive to erosion and land developed along shorelines or in any other environmentally sensitive area should be monitored carefully through the administration of site plan review and enforcement of CBRPA/CBRMA regulations.

(e) Land development for subdivisions is to be encouraged to be designed to preserve open space using innovative land development techniques which promote the preservation goals of this plan.

C. POLICIES RELATIVE TO DEVELOPING AND USING LAND WITHIN PHYSICAL CONSTRAINTS

1. Development within or Near Existing Development

Existing development presents both constraints to and opportunities for further development. Constraints come from the fact that once a major use is established for a property, as a practical matter that use is permanent. There is a very low probability that the facilities erected will be removed and replaced by other uses. The opportunity for development comes from the fact that after an area is partially developed it sets community characteristics which in turn often attract additional development.

Policies for development in areas within or near existing development are:

(a) Villages with greater potential for growth may be considered for installation of public sewerage systems and water supply as development reaches a point where the services are financially feasible.

(b) New residential development is to be directed to areas where soils and topography are acceptable for development.

(c) Development should be done in such a way as to preserve farmlands, working waterfronts, forests, natural resources, historic features and other environmentally sensitive areas.

(d) Residential development should be planned using conservation techniques where lot size reductions are permitted if the reductions are compensated by open space, riparian buffers or other amenities.

(e) Large residential developments should be dispersed throughout the County in order to avoid creating intensively-developed concentrations of development which could eventually require public utilities or other services. This strategy also promotes the preservation of agricultural and forest lands and reduces the threat of making excessive demands on state waters at any given point.

2. Development within Areas with Topographic Constraints

Land which has slopes in excess of 15 percent (15 feet drop per 100 feet horizontal) is generally classified as having steep slopes for planning purposes. Land in this category are generally regarded as a deterrent to development but the extent that steep slopes have this effect depends upon the market demand within each community. Normally, developers will avoid steep land because it presents more problems and usually leads to higher costs than development on flatter land. Adding to the difficulty of development, when steep land is combined with soils that are highly erodible, the probability of erosion and costs of erosion control are increased significantly. If the land is located near tidal waters or potential reservoir sites, the resulting erosion can be a serious threat to water quality as well as to the stability of the shoreline.

Policies concerning the development of steep slopes are:

(a) Development of land with slopes greater than 15 percent but less than 20 percent may be permitted provided the proposed development shall have met strict site plan review requirements, and appropriate soil erosion protection and BMPs[1] are observed. This policy is for the purpose of reducing the potential for erosion or other damage to the underground water supply, to streams, shorelines or sensitive- environmental areas.

(b) Development of land within the range of 20-25 percent will have the same requirements as slopes of 15-20 percent, and in addition the developer will be required to provide appropriate engineering features necessary to assure that these slopes will be permanently stabilized. It is preferred that lands with slopes of more than 25 percent shall remain undisturbed, however if they must be disturbed, then they should be stabilized. Subdivisions may be laid out so as to arrange lots in a manner that avoids these slopes. Cluster development and open space planning are tools for accomplishing this objective.

(c) When development is planned on steep slopes, additional land area over the minimum required by regulations may be required in order to: (i) avoid conflict between water supply and sewage disposal locations; (ii) avert infiltration into the water-table aquifer; or (iii) minimize shoreline erosion.

3. Development within Areas where Soils will not Support Conventional On-Site Sewage Disposal

The research data in Chapter One identifies general soil conditions which are known to have characteristics unfavorable to on-site sewage disposal. (Figure 1.5). The most critical criteria for this determination are:

RECOMMENDATION

Since engineered systems are used in areas that are often low and naturally wet and environmentally sensitive, the rules and requirements of the County and VDH regarding acceptable installation and maintenance should be reviewed to establish appropriate policies that will protect the environment from catastrophic failures.

- The percolation capabilities of the soil, which should be neither too slow nor too fast. If percolation is too slow the system will not function properly, and if it is too fast the effluent may enter the groundwater without being properly treated; and

- A high-water table which determines the suitability for a conventional septic system drain field. In areas where the water table is less than 36 inches, drain fields could actually be below the water table and ineffective during periods when the water table saturates the soil where the drain field is located. If the water table does come in contact with the drain field, pathogens and other pollutants could be directly discharged into the groundwater, possibly entering nearby residents' shallow wells. This situation also arises when the seasonal water table rises closer to the ground surface during the increased rainfall of winter months.

[1] Best Management Practices as defined by the Virginia Department of Environmental Quality.

Policies for areas that do not support conventional on-site sewage disposal are:

(a) Major subdivisions or other large-scale developments are not be permitted in areas where soils are known to be unsuitable for on-site sewage disposal unless the development is connected to a public or private sewerage system or an acceptable engineered system is provided. These systems shall be inspected regularly by a Certified Inspector in accordance with the frequency and procedures in the manufacturer's specifications and the reports provided to the VDH.

(b) In subdivisions or other large-scale developments with mass remote drain fields, VDH may require a dilution area adjacent to the drain field to reduce nitrate loading.

(c) In cases where VDH has issued an operation permit, these systems, whether residential or non-residential, shall include a water conservation plan that includes water-saving devices such as low volume toilets and water-saver shower heads. In addition to reducing the hydraulic load that needs to be treated by the sewage disposal system, this also reduces the demand on groundwater resources in the County, preserving potable groundwater for future uses. To reduce the amount of solids that enter the sewage system the use of garbage disposals is discouraged.

As a general policy, it is desirable to require a 100-foot riparian buffer consisting of mature trees with a ground cover of shrubs and grasses between drain fields and the nearest water taking into consideration the use of the property, as recommended by the VDEQ and the Chesapeake Bay Act.

4. Development within Areas where Soils have Poor Structural Qualities

The primary structural quality of soil is its potential for volume change when subjected to a loss or gain of moisture. This is called "shrink-swell" characteristics. Volume changes occur mainly because of the interaction of clay minerals with water, and the amount of change varies with the amount and type of clay minerals in the soil.

The County's soils generally do not have serious problems with shrink-swell but there are some locations on the low rural shelf (Figure 1-8) with "moderate to high" characteristics. Moderate identifies soils with shrink-swell in the range of 3 to 6 percent while "high" is in the 6 to 9 percent range.

Policies for areas with moderate to high shrink-swell characteristics are as follows:

(a) County officials will advise builders of the need to have the soils examined and require engineering reports to demonstrate that soils under building foundations will support the intended load.

(b) The Subdivision Ordinance should continue to include requirements that the shrink-swell, soil permeability, water table and other factors be evaluated as part of the plat review process.

(c) Approvals of site plans, subdivision plats or other documents proposing the use of land where soil characteristics are unfavorable for development will be withheld where soils are unsuitable for development and where no compensating actions are proposed to compensate for the condition(s).

5. Flood Prone Areas, Wetlands, and Natural Habitat Areas

Flood prone areas addressed in this Plan have a probability of flooding once every 100 years. Such areas are referred to as the 100-year flood plain. This floodplain overlaps the CBRPA and is subject to a separate set of regulations. Development in floodplains is not as restricted as it is in the CBRPA, but floodplains are highly sensitive areas and their development should be avoided.

Tidal wetlands and natural habitat sites lie along the shoreline or at the headwaters of various rivers and streams although some are found on the tributary streams (Figure 1-10). Both wetlands and habitat sites provide a natural resource for certain rare, threatened or endangered species. These areas are protected by federal laws and may not be disturbed or altered to accommodate man-made activities.

Policies for flood prone areas, wetlands, and natural habitat areas are as follows:

(a) Residential subdivisions or other developments involving buildings designed for human occupancy must meet County requirements establishing that the required height of any occupied floor area of a building shall be above the 100-year floodplain level. Other uses not covered by CBRPA and County regulations that may be permitted within the floodplain shall be guided by the performance standards of FEMA.

(b) Point sources of pollution are not to be established in or designed so that they discharge waste into flood prone areas.

(c) New lands that may from time to time be delineated as "wetlands" or "habitat sites" are subject to the same conditions as land that currently lies within the CBRPA.

(d) Public access areas developed to increase the recreational use of public waters and other natural resources of the State are to be planned within the framework of the performance standards of the CBRMA and/or the CBRPA, as the case may be.

(e) The 100-year flood zone, wetlands and habitat sites shall be identified on proposed plats or development plans.

6. Chesapeake Bay Protected Areas

The overlap between the Chesapeake Bay Act Protected areas and wetlands, habitat areas and 100-year flood zones has been noted. In most cases all of these conditions are contained within the CBRPA and its 100-foot buffer strip. As an overlay zone in the County's zoning regulations, the CBRPA places restrictions on the use of affected lands within the RPA. These regulations offer considerable protection from uses that would be harmful to the natural habitat of aquatic

life and waterfowl in addition to protecting the waters of the Chesapeake Bay and its tributaries.

Policies for the Chesapeake Bay Protected Areas are:

(a) Continue to identify the CBRPA on individual development plans and subdivision plans submitted to the County for review and approval with specific CBRPA boundaries defined by engineering studies or surveys.

(b) Continue to administer the performance standards of the Chesapeake Bay Ordinance.

7. Protection of the County's Groundwater Supply

The residents of the County obtain their drinking water chiefly from three sources: (from shallowest to deepest) the surficial (water table) aquifer, the Chickahominy-Piney Point artesian aquifer, and the Rappahannock artesian aquifer system (made up of the Aquia, Brightseat, and Upper Potomac aquifers)[2]. The surficial aquifer serves as a water supply for domestic water users who utilize shallow, large-bore wells. This aquifer is the one most vulnerable to pollutants from failed septic tanks, leaking storage tanks, agriculture runoff, agriculture pollution by infiltration and a variety of other point and non-point sources of pollution.

The deeper, artesian aquifers increasingly provide water for domestic, commercial, and public water systems. These aquifers are less vulnerable to pollution from surface sources than the surficial aquifer; however, hydraulic fracturing (also known as fracking, hydrofracking, or hydrofracturing) is becoming a major concern. Fracking is an oil and gas well process involving injecting under high pressure water, sand, and chemicals into bedrock to create fractures in order to increase capturing the amount of oil and/or gas flow from petroleum-bearing rock.[3] While there appears to be no specific oil/gas deposits in Northumberland County, the concern is that of the Taylorsville Basin in the northern part of the Northern Neck, and what impacts fracking may have on the County's water supply being downstream from those locations. The deeper artesian aquifers are limited ultimately in the quantity of water available for withdrawal.

In 2003, the Virginia General Assembly identified the need for a regulation for the comprehensive water supply planning to protect water supplies for the future economic vitality and public health of the Commonwealth. The Virginia State Water Control Board responded to this mandate and adopted regulations on June 28, 2005, requiring all local government and regional entities to prepare local and/or regional water supply plans. The NNPDC met this legislative and regulatory requirement by developing a regional plan.

On July 14, 2011, the County approved the Northern Neck Regional Water Supply Plan (a copy can be reviewed in the Office of Building & Zoning) which includes a description of existing water sources, existing water uses, and existing water resource conditions; an assessment of projected water demand; a description of water management actions including drought response, contingency plans, and other water demand management information; a statement of need and an analysis that identifies alternatives to address projected water supply deficits; and maps identifying important elements of the plan such as existing water resources, proposed new sources, and significant existing water uses. Due to large withdrawals from the aquifers of the

[2] Reference USGS Professional Paper 1404-C
[3] Reference USGS http://energy.usgs.gov/OilGas/UnconventionalOilGas/HydraulicFracturing.aspx

Coastal Plain of Virginia, cones of depression are being created ultimately interfering with other wells. Along with these cones of depression, there have also been observations of declining water supply.

The County Board of Supervisors also supported efforts to extend the Eastern Virginia Groundwater Management Area to the Northern Neck. Under VA Code § 62.1-254, VDEQ is required by the Groundwater Management Act of 1992 "to conserve, protect and beneficially utilize the groundwater of this Commonwealth and to ensure the public welfare, safety and health." The State Water Control Board expanded the Groundwater Management Area to the Northern Neck region in an effort to assure that: 1) existing groundwater users were protected from new or expanding withdrawals, 2) resource viability continues into the future, and 3) the resource is managed comprehensively.[4] Any person or entity within the Groundwater Management Area must obtain a permit from VDEQ to withdraw 300,000 gallons or more of groundwater in any one month.

The water-supply management strategy of the County has two goals:

1) Protect the surficial and artesian aquifers from pollution; and

2) Ensure the long-term availability of potable water from the diverse sources of surficial and artesian aquifers, desalinization, and reservoirs.

The first goal secures safe and sanitary water for the residents of the County, and the second goal provides for an adequate supply of water.

a. Protection of Water Quality

The County recognizes that the VDEQ and VDH monitor the installation of systems for withdrawals of groundwater. The monitoring of water quality, especially nitrate concentrations in shallow wells and sodium and chloride concentrations, as well as water levels in artesian wells should be increased. The County intends to continue to liaison with and cooperate with these agencies to identify potential groundwater pollution problems.

Policies for the protection of water quality are:

(1) Surficial Aquifer (Conventional Shallow Wells)

Individual wells in this aquifer are subject to many types of contamination problems, some of which are addressed below. Current problems and concerns such as contamination, capping, testing and education are addressed on a regional basis.

(a) Buffers should be required around shallow wells to avoid contamination.

(b) In cooperation with the VDEQ, VDH and VDCR, the application of agricultural chemicals shall be monitored to ensure that they follow an approved nutrient management plan and Best Management Practices.

(c) Malfunctioning sewage disposal systems present a health hazard to the water supply; appropriate action should be initiated to remedy the problem.

[4] Reference Status of Virginia's Water Resources. A Report on Virginia's Water Resources Management Activities. - October, 2014.

(d) Proper capping of a conventional well is essential to preserve the safety of drinking water. It is also necessary to secure the safety of our children. The County recommends the sealing of all well caps to prevent intrusion of contaminants. For shallow bored wells this can be done with methods that allow for access to service the plumbing. Although more a safety issue than a water quality issue, the County should continue to actively publicize and enforce the requirement that all abandoned wells be capped.

(e) The policy which requires each residential development site to provide an adequate septic tank drain field, plus a reserve drain field, both acceptable to VDH, shall be continued. However, the County should discourage the identification of reserve drain fields that are smaller than required for conventional systems unless an engineered system is initially installed.

(f) The County will cooperate with the VDEQ in locating and causing the replacement of defective underground storage tanks.

(g) Areas around wellheads used for public and private water supplies shall be protected from land uses that could contribute to the pollution of the aquifers.

(h) The County will consult with the VDH regarding its requirement to abandon shallow wells when an artesian well is dug. This county has special needs. First, artesian water is high in sodium and may one day be unavailable. Second, water can be obtained from a shallow well manually; during power outages, but not from an artesian well.

(i) Point sources of pollution are to be addressed by upgrading existing point sources of pollution to ameliorate threats to the water systems and by imposing strict controls on the establishment of new point sources. Specific policies for point sources are:

(i) Existing underground fuel-storage tanks made of unprotected steel are to be replaced immediately after any finding that they have been or are leaking. As these and other tanks intended for storage of hazardous or polluting materials are added or replaced, the new or replacement tanks and piping shall be constructed of non-corrodible materials sufficient to protect against future leakage.

(ii) When major public facilities such as wastewater disposal facilities, landfills or sewage treatment plants are constructed, they shall be designed and constructed with appropriate protective devices to assure that they will not create a hazard to the underground water supply, watersheds or other environmentally sensitive areas.

(iii) Known sources of pollution with emissions in excess of what is permitted by applicable state and local regulations are to be upgraded or replaced to bring any point source pollution deficiencies into compliance.

(iv) New commercial and/or industrial uses to be established within the County shall be constructed so as to produce no net increase in: pollutants to water or air;

storm water discharge; chemical contaminants of any type; or any other condition that will be detrimental to state waters.

(v) Increase the knowledge of citizens concerning the advisability of testing individual wells on a regular basis.

(vi) Establish specific policies for the handling and disposal of hazardous materials and for seepage from large trash piles.

(vii) The County shall cooperate with the VDH's program to provide reimbursement for a monitor and water testing relative to biosolids/sewage sludge land applications.

(2) Artesian Aquifer

Policies regarding the quality of the water from the deep artesian aquifer are as follows:

(a) The high sodium content in our artesian aquifers can exacerbate health conditions and damage household plants and flowers. The County, in cooperation with the NNPDC, should continue to develop ways of making this information widely available to county residents. (*Sodium levels range from 110 to 185 milligrams per liter in the county. The United States Environmental Protection Agency recommends no more than 20 mg/l for persons whose health requires the limitation of sodium intake.)*

(b) All artesian wells should be capped with a secure seal to prevent contamination. The County in cooperation with VDH should initiate a program to ensure this occurs.

(c) Subdivisions may have either a single public water supply or multiple wells with 14 or less connections on each, subject to VDH approval. VDH regulates community wells with 15 connections or more.

(3) Other Water Quality Policies

(a) Continue to work with VDH's Division of Shellfish Sanitation and the VDEQ to survey and monitor the health of shellfish growing areas in County waters and take necessary actions to support this industry.

(b) Continue to monitor the technological progress in the development of desalinization systems as a future economically viable source of potable water.

(c) Residents should be encouraged to notify the County if they know the location of abandoned wells such as those used by former sawmills, former owners or land users.

b. Water Quantity: Protection of Supply Availability

There is much that consumers can do to conserve water including the use of low flow plumbing, minimizing lawn watering, and being certain no plumbing leaks exist. For tips on how to reduce the amount of water used in everyday activities go to:

http://wateruseitwisely.com/100-ways-to-conserve/

The basic water-supply policy of the County is to stress a diversity of public and private water sources including the surficial aquifer, the artesian aquifer and reservoirs.

Specific policies for providing an adequate supply of potable water from each of these sources are:

(1) Surficial Aquifer

Because conventional wells are supplied by the infiltration of rain and snow melt, they are a renewable source of water. Protection and preservation of these wells is an important part of ensuring that water will be available to future generations in the County.

There are many older wells remaining in the county which were hand dug. During times of drought these wells may run dry whereas wells dug by machine have proven to be successful even during drought.

To this end the County prohibits the installation of hand dug wells and requires well drillers to provide enough depth in a well to allow an adequate water supply when the water table drops, and to inform the owner and VDH of the amount of water in a newly dug well.

(2) Artesian Aquifer

Because our artesian aquifers are rapidly being drawn down by industry and suburban development outside our region, particularly the Middle Peninsula and Southern Maryland, it is imperative that the County provide a well-researched and coordinated effort to ensure that drinking water will be available to future generations. Two members of the Rappahannock Aquifer System - the Bright Seat and the Upper Potomac aquifers - do not have a land surface source for recharge. Excessive draw down of these aquifers can have catastrophic effects for Northumberland County. The United States Geological Survey (USGS) and VDEQ published a report in 2006 of the aquifer system.[5] With better data, this report depicts maps showing the approximate depth for each aquifer. The Virginia Coastal Plain Hydrogeological Framework. This data dramatically changes much of our understanding of groundwater sources. Artesian aquifers do not have significant recharge sources that can keep up with our current use.

(a) NNPDC in cooperation with the County Planning Commission shall work to identify solutions to the decline in groundwater levels in the artesian aquifers and present them in the State mandated water supply plan. They shall identify potential partners in implementing those solutions and recommend structured liaison with partners including the VDEQ and VDH and Maryland organizations as applicable.

(b) For large water users, a groundwater withdrawal plan shall be required as part of the documentation for new subdivisions and commercial places, and such plans shall continue to require the approval of appropriate state agencies including any

[5] USGS Professional Paper 1731

guidelines as set forth in the Eastern Virginia Groundwater Management Area. Major water withdrawals shall continue to be made from the lower aquifers or from reservoirs.

Additional research data is being gathered at the state monitoring well station built in the County at Surprise Hill with information transmitted to USGS computers for each of the five aquifers.[6]

(3) Reservoirs

As mentioned previously in Chapter 2, at this time, designing, building a reservoir, a water treatment system and a pipeline network to deliver water throughout the county is not economically feasible at this time. However, in the future, with further declining groundwater levels, reservoirs may become more feasible.

(4) Other Water Supply Sources

Other sources such as rainwater harvesting should continue to be considered and promoted as the available technology exists to make this a sanitary source of drinking water.

8. Watershed Protection for the Bay

The protection of the watersheds involves groundwater protection (discussed in the preceding item) and prevention of pollution in the Chesapeake Bay. The protection of the Bay is served by reducing the amount of runoff and groundwater discharge. Less runoff means less soil erosion and consequently fewer pollutants entering the Bay by maintaining a 100-foot RPA. Clearly, the preferred land use practices are those that reduce the amount of surface water reaching the major rivers and Chesapeake Bay.

Policies for the protection of watersheds include:

(a) Any development or use of land shall be done in such a way as to preserve the integrity of the existing watershed, maintain natural hydrology whenever possible and in general, drainage facilities may not be designed to change the course of water from one watershed to another.

(b) Sites intended for new development shall be designed in such a way that their post-development performance meets the criteria set forth by CBLAB and other state agencies in the following areas:

(1) soil erosion and sedimentation
(2) rainwater infiltration (stormwater)
(3) nutrients used
(4) indigenous vegetation

(c) Enforcement of CBRPA and CBRMA regulations designed to filter runoff through buffers

[6] This data can be obtained at: http://waterdata.usgs.gov/va/nwis/current/?type=gw&group_key=county_cd

and to manage development so as to minimize storm water runoff is to be continued. The use of riparian buffers bordering waterways so as to intercept groundwater discharge should be encouraged as a minimum. However, the preferred method is to use principles of Low Impact Development, LID[7], to reduce storm water runoff in the first place, and to promote infiltration of storm water into the ground instead of conveying it off site.

9. Tidal Shoreline Preservation

Shoreline erosion documented by VIMS in its 2014 Shoreline Situation report[8] is significant within the County. Particularly affected are the shorelines exposed to the Chesapeake Bay (Figure 1-19). Greater rates of erosion have occurred as a direct result of northeaster storms and hurricanes.

In April 2003 VIMS published a Northumberland County Dune Inventory. Approximately 6.3 miles of dune shore consisting of 59 separate dunes were identified in the County. These are on the Chesapeake side and the Potomac River side of Smith Point. Dunes reside in areas of sand accretion and stability, such as around tidal creek mouths, embayed shorelines, in front of older dune features, as wash overs, as spits and against man-made structures like channel jetties or groin fields. The Northumberland County Dune Inventory created by VIMS is hosted here: https://scholarworks.wm.edu/reports/249/

Dunes act as a reservoir of sand which can buffer inland areas from the effects of storm waves and, in the process, act as natural levees against coastal flooding. Dunes are protected under the Coastal Primary Sand Dune Protection Act of 1980 and, where they occur, are valuable assets in shoreline preservation.

While shoreline erosion of exposed shorelines is almost entirely a result of natural events such as waves, rising sea level and land subsidence, there are some actions that can be taken both by individuals and through County policies that can mitigate or delay the adverse effect of shoreline erosion.

Dunes also are an important habitat for many species and should continue to be preserved in their natural state. Secondary dunes are also important, in case of depletion of the primary dunes; they become the first line of defense from erosive storm surge. Secondary dunes should also continue to be preserved intact as much as possible.

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 their comprehensive plans, as this plan does, beginning in 2013, guidance prepared by the 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

[7] Op. Cit. Chapter 4

[8] http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/virginia/northumberland/northumberland_disclaimer.htm

shorelines.

This guidance has been prepared by VIMS for localities within the Tidewater region of Virginia. It explicitly outlines where and what new shoreline best management practices should continue to be considered where coastal modifications are necessary to reduce shoreline erosion and protect our fragile coastal ecosystems. This guidance includes 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.

The Comprehensive Coastal Resource Management Portal provides information for citizens and Wetlands Boards showing preferred shoreline management practices. The weblink to the Comprehensive Coastal Resource Management Portal for the County is: https://www.vims.edu/ccrm/advisory/ccrmp/portals/northumberland/

10. Policies Concerning the Use of Tidal Waterfront Areas while Preserving Sensitive Environmental Areas

State and County policies regarding use of waterfront areas favor additional use of the Chesapeake Bay and its major tributary rivers for recreational use. A study of shoreline access is presented in the Chesapeake Bay Area Public Access Plan which covers all of the states which border on the Chesapeake Bay and its major river tributaries. While it is one policy of the Commonwealth to encourage responsible additional recreational use of the rivers and the bay, it has other policies which are designed to protect the shorelines from harmful erosion together with the sensitive marshes and wetlands which border tidal waters.

The following policies have been established to promote the use of selected waterfront areas for additional public recreation:

(a) The County plan for water access outlined in Chapter 4 shall be implemented.

(b) Alternate techniques to the use of bulkheads and rip-rap for protecting shorelines such as living shorelines have been offered through the use of vegetation and other natural devices.

(c) Restroom facilities should be considered for busy public water access locations during boating season at Shell Landing and Lodge Creek.

11. Intensively-Developed Shoreline Areas

The County does not have an area that would be classified as intensively developed. The most intensively-developed area within the County is in Reedville which has a residential density that averages 1.14 lots per acre. This is considerably less dense than the criterion of four dwellings per acre that is required to qualify as an intensively-developed area by CBLAB's criteria.

The following policies continue to be for the purpose of providing guidelines for development within the village areas:

(a) All development within the villages will be subject to review and approval on an individual project basis. This review shall include the proposed site plan and the use of property to assure that new development, including redevelopment of existing uses, is consistent with policies established to protect state waters as well as to promote the goals of the County for economic development and to serve the public health, safety and general welfare of the County.

RECOMMENDATION

It is important for the County to provide information to the residents about various means to protect water quality and how each property owner can contribute. Each of these four areas should be addressed at a minimum and could be distributed in conjunction with approval of building or land disturbance permits.

(b) Management of storm or other water discharged from each site shall be performed in a manner that the run-off meets the requirements as to quantity and nutrients of the CBRMA of the Zoning Ordinance.

(c) Public sewerage facilities installed in the villages or in major new developments shall be designed and constructed consistently with the State's and County's objectives to protect state waters.

12. Managing Potential Conflicts between Land Use and Water Quality Protection

The major focus of potential conflicts between land use and water quality quite naturally lies in those areas where the population is concentrated but also occur on agricultural lands. Among the specific areas more subject to potential conflicts and the possible causes of such conflict are the following:

(a) Chemicals and other nutrients used on agricultural lands can percolate into the groundwater of the surficial aquifer and be carried into creeks by groundwater discharge and runoff. These contribute to reduction in water clarity and reduction in important underwater grasses. It has been known for over 30 years, since the first Army Corps of Engineers study of Chesapeake Bay, that agricultural practices are the major source of pollution of the Bay. In our setting, with little or no urban runoff and effective wastewater treatment plants, agricultural runoff constitutes most of the nitrate and phosphate pollution of our local waterways. Future adverse uses can be reduced through the use of erosion control plans, nutrient management plans and integrated pest management. Best Management Practices and the establishment of permanent forested buffers in the Bay Act are programs designed to reduce the adverse impact on water quality as a result of agricultural operations.

(b) On-site sewage disposal for residential and limited commercial use, if not properly installed and maintained, can result in both contamination of ground water and in case of extreme failure of raw effluent being carried via runoff to creeks which flow to the Chesapeake Bay. The Bay Act requirement to inspect septic systems and to pump septic tanks every five years, if necessary, will help improve groundwater quality. The VDH issues all sewage disposal system construction permits and inspects them. This, in general, is focused on new construction, which along with the time of property transfer is the best time to initiate new requirements.

(c) Development of land which abuts tidal waters increases the probability of shoreline erosion

as well as diminishing the amount of protective marshlands and wetlands. This potential conflict is addressed by a strategy that discourages the use of property in a way that is potentially detrimental to water quality both in open streams and in the aquifers. The strategy includes installation of erosion control structures or plantings that have a demonstrated ability to decrease shoreline erosion; and septic tank and underground fuel storage tank monitoring and/or replacement as necessary to prevent pollution of state waters and related actions.

(d) Use of modern land planning techniques as a means of preserving open space, including agricultural lands and forests, will minimize the impact of residential development on the environment and on state waters. Such techniques may include planned unit development, cluster subdivisions with open space preservation, historic landmarks preservation, density zoning and the like. The objective in using these techniques is to permit a similar level of development as would normally be permitted but to improve the efficiency of land utilization.

13. Soil and Tidal Water Conservation Policies

The Chesapeake Watershed Agreement was re-affirmed and signed on June 16, 2014, and this was the first agreement that included signatories from the entire watershed. The agreement includes 10 goals to restore the health of the Chesapeake Bay.[9] Unlike point sources, where treatment technologies can achieve specified nutrient reductions, non-point source controls are much more difficult to implement and maintain. These non-point source pollution controls encompass multiple strategies and must be placed on land by thousands of landowners, land managers, local governments, and others.

The non-point source pollution reduction approach under the coordination of VDEQ is to refocus available tools, to steer new resources to Virginia's strongest non-point control programs, and to push them to maximize reductions across the landscape. These efforts will focus on seven programmatic areas:

1. Agricultural Best Management Practices (BMP) acceleration;
2. Expansion of Nutrient Management Planning and implementation efforts to include urban and mixed open lands;
3. Consolidation and strengthening of the Virginia Storm Water Management Program;
4. Enhanced implementation of the Virginia Erosion and Sediment Control Program;
5. Strengthen implementation of the Chesapeake Bay Preservation Act;
6. Enhancement of NPS Implementation Database Tracking Systems; and
7. Enhance outreach, media, and education efforts to reduce pollution producing behaviors.

The policy and plan of the County is to support the NNSWCD in the implementation of these

[9] To learn more about the goals and the Chesapeake Bay Program visit their website at https://www.chesapeakebay.net/what/what-guides-us/watershed-agreement

programmatic areas and to work jointly to develop specific strategies and plans to address these issues.

D. WATER QUALITY RESEARCH

The County is the home to the largest shoreline in Virginia. Its diverse water includes the Chesapeake Bay, brackish as well as freshwater rivers and tributaries, important aquifers, and industries such as oystering, crabbing, fishing, tourism and land agriculture that depend on that water. The County's single largest employer (Omega) has extensive fishing and processing operations in the county.

The Commonwealth of Virginia has many policies to protect the water as well as to regulate what is done on it and in it. Yet, no one is closer to home than the people who depend on that water for their livelihood and their way of life. VMRC, VDEQ and other public sector agencies at the state and federal level provide invaluable assistance in measuring changes in water quality and ideas for improving it. But perhaps there can be a better local resource.

As said, many people in the County are employed directly or indirectly in jobs that involve the water. But, for our youngest citizens, getting an academic background that would enable them to provide for the betterment of the County, they must leave to be educated elsewhere – with a relatively high likelihood of not being able to find suitable employment in the County when they complete their academic work.

To create a win-win for the County, its current residents, and its future employers and wage earners, the County should work with academic institutions such as Rappahannock Community College, Virginia Tech, Virginia Commonwealth University and others to develop research facilities in Northumberland County. This could provide direct benefit for those who make a living on and in the water, but also potential career direction for our youth as well as internships for local students.

CHAPTER 4
PUBLIC FACILITIES AND SERVICES

A. INTRODUCTION

This chapter focuses on public investment, in particular the provision of public facilities and services. In combination, the Land Use Plan and the Public Facilities and Services elements comprise the nucleus of the Comprehensive Plan for Northumberland County as envisaged by the Virginia statutes. Public services covered in this chapter are provided by a combination of Commonwealth, county and private agencies. The level of detail for any one subject area is general because of a requirement of the Virginia law which stipulates that the Comprehensive Plan

> "... shall be general in nature, in that it shall designate the general or approximate location, character and extent of each feature shown on the plan ..."

The Public Facilities and Services Plan is intended to provide guidance to the County by enabling it to anticipate additional public services that will be needed in future years. To private as well as public agencies that operate separately from the County government, the plan will provide policies and guidance concerning the County's intent to provide services of a particular type.

B. PUBLIC ROADS

The County is served by a network of primary and secondary public roads that are maintained by VDOT. Route U.S. 360 is a federal primary road while all other public roads, primary and secondary, are state roads. Although there are a few residential streets that are privately owned, the State's policy is to operate and maintain the public road system within counties. This policy applies throughout the Commonwealth. New secondary roads may be built as part of a private development and brought into the state system if they are planned and constructed to VDOT standards and meet the service requirements for state-maintained roads.

While the Commonwealth gives high priority to traffic considerations when planning improvements to existing public roads, the County may influence the timing of improvements. Road widening, bridge replacements and other major improvements to the existing system may be offered as priorities of the County during periods when VDOT is preparing its plans for highway improvements.

The Board of Supervisors would like VDOT to complete bringing Route U.S. 360 up to four lanes but that does not seem likely in the near future. There are two state plans for roads, one for the primary system (VTRANS) and one for the secondary system (Six Year Improvement Plan). Each system has its own planning cycle and in order for the County to introduce its planning priorities it must do so at the proper time within each planning cycle, as described below.

VTRANS is Virginia's statewide transportation plan. It is prepared for the Commonwealth Transportation Board (CTB) by the Office of Intermodal Planning and Investment (OIPI). VTRANS lays out the overarching vision and goals for transportation in the Commonwealth and plans to achieve those goals. There are four focus areas, which include:

1) The CTB's vision, goals and objectives that inform and then prioritize transportation needs.

2) The CTB's identified Mid-term Needs (0-10 years) are used to screen funding application from the Smart Scale program and prioritizes funding requests received for VODT's Revenue Sharing Program. The CTB has established prioritized locations based on the identified Mid-term Needs. OIPI, VDOT, and The Department of Rail and Public Transportation (DRPT), in collaboration with local and regional partners, develop solutions for Priority 1 and 2 locations.

3) The CTB policy to develop and monitor a Long-term Risk & Opportunity Register which identifies uncertainties facing the transportation system into the future (20+ years) based on a trends analysis. The 2021 VTRANS Risk & Opportunity Register has 19 items that require monitoring.

4) The CTB's strategic actions inform business plans that are developed by OIPI, VDOT, and DRPT. OIPI monitors and provides annual updates on the identified actions.[1]

The Smart Scale Program is a is a process that helps Virginia meet its most critical transportation needs using limited tax dollars. It evaluates potential transportation projects based on key factors such as how they improve safety, reduce congestion, increase accessibility, contribute to economic development, promote efficient land use, and affect the environment. The anticipated benefits are calculated and the projects are scored and ranked. This information is used by the Commonwealth Transportation Board to help guide and inform their project selection decisions. VDOT Smart Scale applications are usually due in late Spring of the year, and VDOT encourages pre-application consultation and review of Smart Scale projects before submitting any applications.

Improvements to secondary roads are handled by VDOT through a Six-Year Plan with local planning being coordinated through the Resident Engineer. The opportunity also exists for the County to make its priorities known when the Resident Engineer discusses planned secondary road improvements with the Board of Supervisors at a yearly public hearing.

The Current VDOT Six Year Improvement Plan is shown in the chart below:

VDOT Six Year Improvement Plan Northumberland County (FY26)

Description	Route	District	Road System	Jurisdiction	Estimate	Previous	FY26	FY27-31	Balance
					(Values in Thousands of Dollars)				
#SGR24VB - RTE 611 OVER SWAMP (FED ID 12780) BRIDGE REPLACE (Gilliams Rd)	611	Fredericksburg	Secondary	Northumberland County	$2,733	$950	$465	$1,318	$0
FOREST GREEN RD		Fredericksburg	Secondary	Northumberland County	TBD	TBD	$0	$0	$0
COUNTYWIDE ENGINEERING & SURVEY	4005	Fredericksburg	Secondary	Northumberland County	$250	$120	$27	$130	($28)

This section of the comprehensive plan focuses on the potential need for improving a network of roads that best meets the circulation needs of different areas of the County.

[1] To learn more about the VTRANS planning process, visit https://vtrans.virginia.gov/

1. Major Roads Identified

The clearest picture of which roads carry the predominant traffic in Northumberland County comes from an inspection of Annual Average Daily Traffic volumes. VDOT prepares traffic counts on most state roads on a continuing basis. Figure 4.1 illustrates graphically the amount of traffic currently (2024) on specific roads. The color of the line depicting the road indicates the Annual Average Daily Traffic (AADT) as determined by VDOT 2024 road count data.

- Primary routes U.S. 360 and 200, both of which carry more than 5,000 vehicles per day (VPD) form the central corridor of the County. Route 202 is also an important primary that connects Northumberland to Westmoreland County. These three primary roads not only provide primary circulation within the County's economic corridor, but they also connect the County with Westmoreland, Richmond and Lancaster Counties.

- Secondary roads, shown on the map with traffic flow above 500 VPD, extend traffic service from the primary routes to areas with concentrations of residential development, farm or marine activities. Some observations are appropriate for specific roads.

- Route 201 has traffic volumes that are below normally expected on a Primary Road but instead carries traffic at about the same level as a secondary road. This is a reflection of its physical condition because the distance from Heathsville to Kilmarnock over the 201/3 combination is about the same as it is over U.S. 360 and 200. Traffic naturally follows the routes of better roads; therefore, the 360/200 combination from the central part of the County south to Kilmarnock is the preferred route.

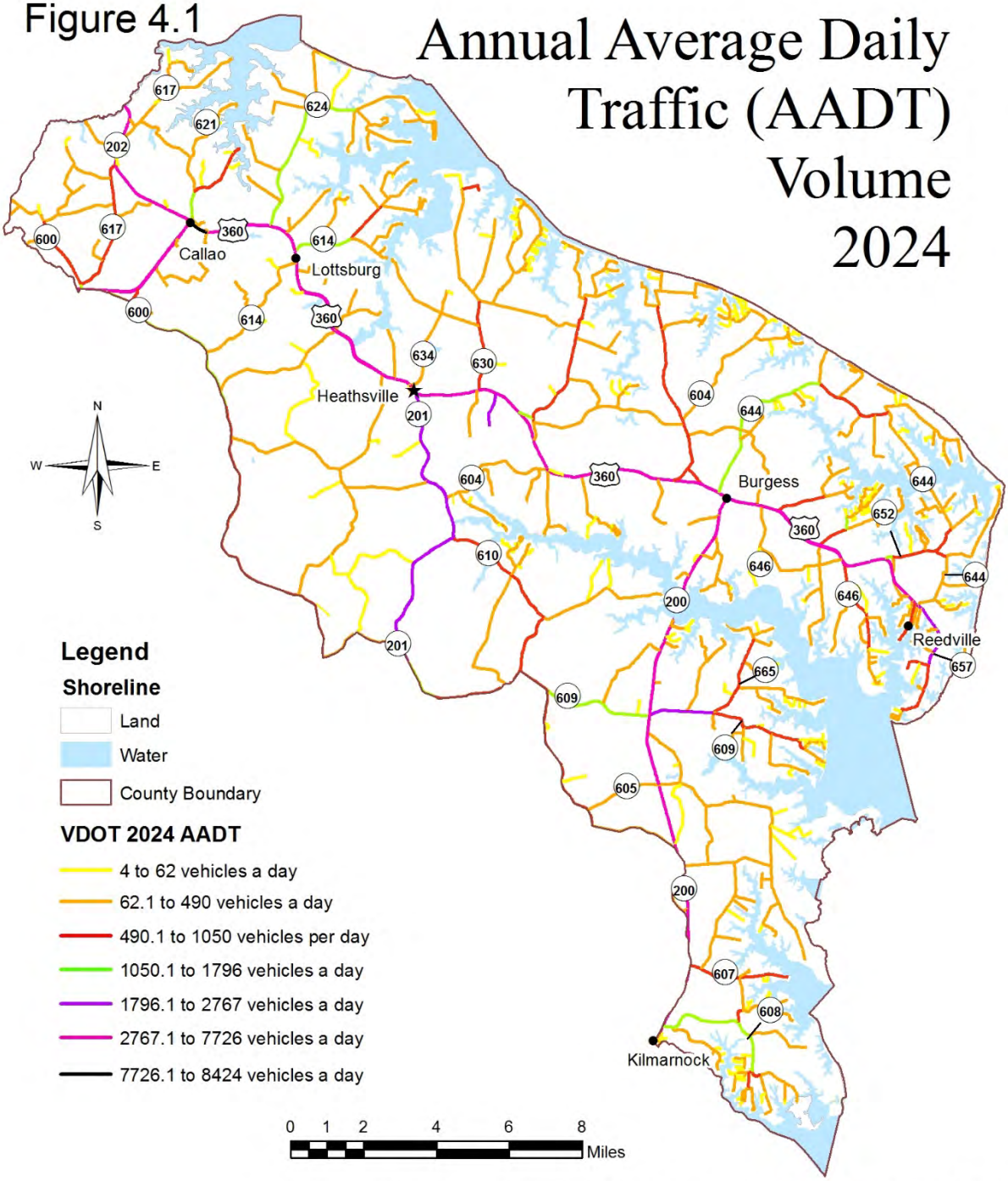
- Route 617 from Hyacinth to Village appears to be a "shortcut" from Route 202 to 360. Drivers often select roads of lesser quality if they can gain a substantial distance saving. That seems to be the case with this route.

- Most of the other roads with traffic above 500 VPD serve major areas of development or serve as corridors through rural areas. In general, these are the roads that are likely to continue to serve as feeder roads to developing areas and will warrant a higher priority for improvements.

- There are no Corridors of Statewide Significance within the County.

Figure 4.1

Annual Average Daily Traffic (AADT) Volume 2024



Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
VDOT Northumberland County Planning Data, September 1, 2024

2. General Road Plan

This plan serves as a guide to the County for purposes of identifying the County's own priorities for road improvements in future years. The plan includes identification of currently planned improvements by VDOT discussed below and recommendations from County residents.

There is a hierarchy of highways which VDOT refers to as the functional classification of roads. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Planners and engineers use this hierarchy of roadways to properly channel transportation movements through a highway network efficiently and cost effectively. The functional classification starts with high-volume, long-distance roads (Interstates) to lower volume shorter travel distance roads (local roads).

FUNCTIONAL CLASSIFICATION OF ROADS:

A. Principal Arterial
- *i. Interstate*
- *ii. Other Freeways & Expressways*
- *iii. Other*

B. Minor Arterial

C. Collector
- *i. Major Collector*
- *ii. Minor Collector*

D. Local

The General Road Plan for the County is presented in Figure 4.2. The public roads in the County are classified and identified as follows:

a. Four-lane Primary (Other Principal Arterial)

U.S. Highway 360: This is the central traffic corridor of the County which serves nearly all traffic moving into, through and out of the County. It now has four lanes except for the segments through, Callao, Lottsburg, between Heathsville and Burgess and between Lilian and Reedville. The County's primary long-term strategy for this road includes completion as a four-lane road in order to establish a safe and efficient traffic corridor through the entire County. The County plans to continue to request 4-laning in the Pre-allocation funding of VDOT.

Where 360 passes through villages, it is necessary to coordinate improvements with the local need for traffic management in order to minimize interference between local and through traffic. This is especially a factor in Callao, Lottsburg and Heathsville where local traffic competes with through traffic. In the villages of Callao and Lottsburg, VDOT is implementing a “road diet” which entails reducing the lanes to a three-lane thoroughfare with the third (center) lane of Rt. 360 acting as a turn lane. VDOT rationale for creating three lanes is to reduce side and rear collisions when vehicles cross highway lanes to turn left within Callao and Lottsburg. VDOT hopes the center turn lane will help alleviate conflicts between local and through traffic.

Further improvement in the function and safety of this road may be accomplished by reducing the number of access points.

One significant intersection of concern is at Academic Lane and Rt 360. All of the County’s schools are located here and, at the beginning and end of each school day, traffic congestion is quite significant and potentially dangerous. The county currently relies on traffic support from the County Sheriff, but this is not always available. Consideration needs to be given

to adding a traffic light at this intersection which would be operational only during two hours each day.

RECOMMENDATION

The County needs to work with VDOT to install a traffic light at the intersection of Rt 360 and Academic Lane which would be operational for one-hour each day prior to the beginning of the school day and at the end of the school day.

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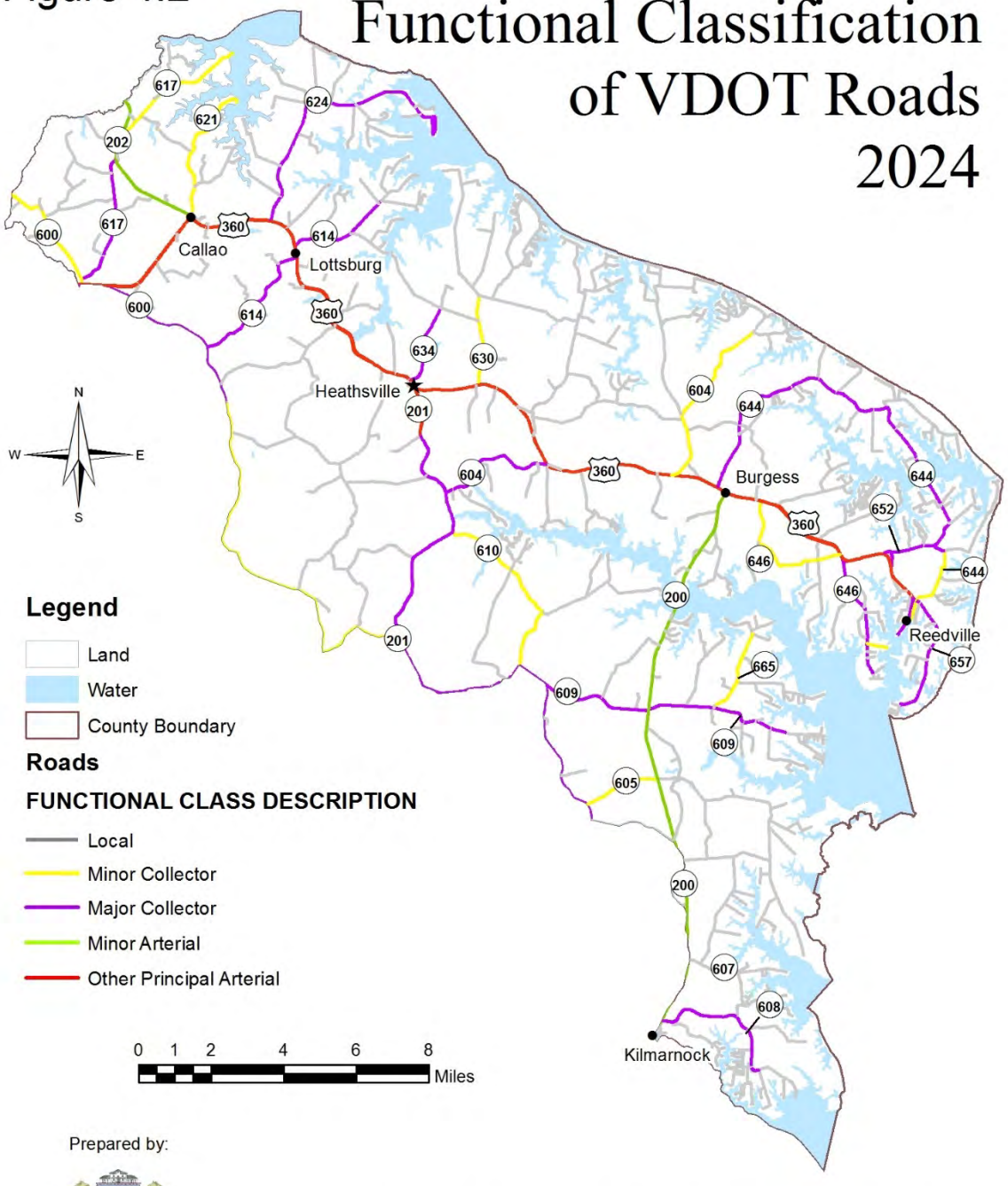
Figure 4.2

Functional Classification of VDOT Roads 2024



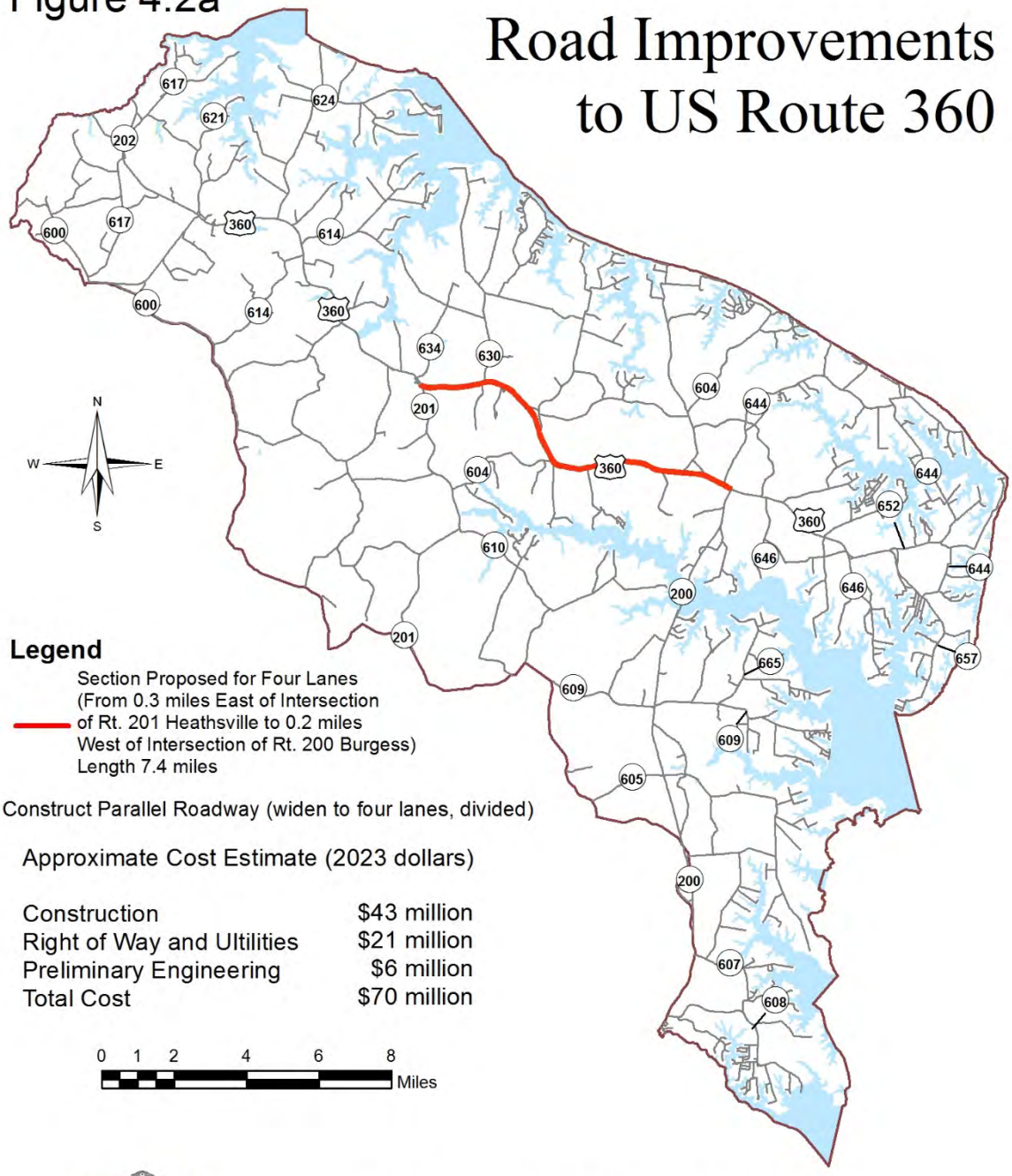
Prepared by:

SLM, 10.15.24

Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
VDOT Northumberland County Planning Data, September 27, 2024

Figure 4.2a

Road Improvements to US Route 360



Legend

Section Proposed for Four Lanes
(From 0.3 miles East of Intersection of Rt. 201 Heathsville to 0.2 miles West of Intersection of Rt. 200 Burgess)
Length 7.4 miles

Construct Parallel Roadway (widen to four lanes, divided)

Approximate Cost Estimate (2023 dollars)

Construction	$43 million
Right of Way and Ultilities	$21 million
Preliminary Engineering	$6 million
Total Cost	$70 million

0 1 2 4 6 8 Miles

Data Sources: Shoreline - USGS 1:100,000 Topographic Maps
VDOT Northumberland County Planning Data, September 1, 2015
VDOT Cost Estimate - VDOT Fredericksburg District Planning Manager, October 7, 2016

b. Two-lane Primaries

VA 200 (minor arterial): This route links U.S. 360 at Burgess to Kilmarnock and from there via Route 3 to locations south of the Rappahannock River. It carries just slightly less traffic than U.S. 360 and serves as an extension of the central corridor that runs through the County. The 360/200 corridor serves all villages and constitutes an "economic corridor" within the County and also links the County with outside markets. Past improvements such as the improved bridge over the Great Wicomico River are consistent with the economic importance of Route 200. Accordingly, it warrants a major position in the comprehensive plan.

VA 202 (minor arterial): This primary links Route U.S. 360 at Callao to Route 3 at Templeman. It is a more direct route to the County from the north and west than Route 3 via Warsaw and Kilmarnock. Yet it has been reported that traffic to Northumberland County from the west often uses the longer Route 3 via Warsaw rather than VA 202.

VA 201 (major collector): This road, although classified as a primary, provides a much lower level of service than Routes 200 and 202. Based on traffic volume and location, 201 is more like a secondary road than a primary. Unless it is improved to standards similar to 200 or 202, the road will likely continue to serve at the level of a secondary feeder road. This plan continues to designate 201 as a primary, although the major priorities of the County may be better served by continuing to upgrade the primary corridor roads.

c. Feeder Secondary Roads (other collector):

These are secondary roads that serve as feeder roads to developed areas and primary circulation throughout rural areas of the County. They are identified on the Highway Plan as feeder secondary roads and should continue to be high on the VDOT list for maintenance and improvement.

3. Planned Highway Improvements by VDOT

The planned highway improvements are based on a six-year plan presented and updated annually by VDOT to the Board of Supervisors in November of each year. Public input has been invited by VDOT at that time.

4. Public Transportation

At present Bay Transit is the only local public transit provider, other than contract medical transportation providers. Bay Transit provides an “on-demand” service throughout the County, hours of operation are from 6 AM to 6 PM Monday through Friday.[2]

[2] Users must call at least 24 hours before your scheduled appointment. The Bay Transit Ride Line phone number is (877) 869-6046 and is open between 6 AM and 6 PM Monday through Friday when you can speak directly with a ride scheduler. For more information, visit the Bay Transit website at: http://baytransit.org/

5. Railroads

There are no rail lines in the County, nor the entire Northern Neck peninsula. However, AMTRAK terminals are located in Fredericksburg, Ashland, Richmond, Williamsburg and Newport News.

6. Airports

There are no public airports in the County, however, there are numerous private airstrips. Two small regional airports close to Northumberland County are Hummel Field in Topping, and the Tappahannock – Essex County Airport, west of Tappahannock. Major airlines serve Richmond and Newport News/Williamsburg's International Airports.

7. Northumberland County Bicycle Facilities Plan

Non-roadway improvements such as bike lanes, sidewalks and greenways perform a vital community function by linking residential areas with non-residential areas such as businesses, schools, and historic or scenic sites. Links between residential areas may also be beneficial. In some instances, bikers, walkers and joggers may need to share the same facilities. However, the potential for user conflicts can be great in certain areas and in those instances, it is preferable to create separate bikeways and sidewalks. If necessary, a wider joint use facility may be constructed with a narrow grass median or pavement striping to separate users.

Bikeways are generally at least five (5) feet wide and are developed in three configurations:

Separate (Class I) - Separate and distinct from roadways. This configuration is generally the safest and most desirable but also the most expensive.

Separate Lanes (Paved Shoulders or Class II) - Paved shoulder adjacent to roadways. Pavement is marked with bicycle symbols and/or text. Roadway signs may also be provided for additional notice where warranted. This configuration is safe and convenient for most cyclists. Added benefit is recovery room for drivers that may need to swerve to avoid obstacles and prevention of road edge deterioration caused by vehicles leaving the roadway temporarily.

Shared Roadway (Class III) - Roadway signs only to alert motorists of designated bikeway routes and remind them to share the roadway as legally required. This configuration is the cheapest and easiest option to establish bikeways, but their use is only recommended for experienced cyclists or average to below average cyclists on roads with good sight distances and low traffic volumes.

While some people may believe bicycle use is just for children, safer facilities could encourage more people to use this form of transportation. In addition, people would be able to safely ride a bike to work or other destinations near or far because they like to or they have to due to income limitations or license loss.

The following recommendations should be considered:

RECOMMENDATIONS

Bike paths and sidewalks should be considered in the design of improved and new road projects and the overall design should utilize the right Class of trail for the right segment.

Bicycle facilities should be promoted in subdivisions, on the county-designated Bicycle Trails (the Potomac Heritage National Scenic Trail) and especially in more developed areas such as Reedville, Heathsville and the other villages.

Priorities should be the construction of bicycle facilities within developed areas prior to their extension outside of such areas unless a compelling connection to a recreation area or other public facility is deemed more important.

When considering off road trail design, EMS and law enforcement access should be considered, particularly where the path takes cyclists away from more heavily traveled roads into more wooded areas.

Bikeways and sidewalks provide room for vehicles and people to safely coexist along heavily traveled roads. Construction of sidewalks and bikeways concurrent with road improvements is much easier and cheaper than retrofitting an existing road. Small projects such as painting bike lane stripes on existing roadways with sufficient pavement width could provide a useful start in providing facilities and getting motorists accustomed to dealing with bicycles in a more formal fashion. Additional smaller projects include the identification of existing and potential edge of pavement and sight distance problems that could be corrected through relatively minimal work such as asphalt patching, compacted gravel, minor grading or vegetation trimming.

The bicycle transportation goal of the County is to have an efficient transportation network that reinforces the goals of the Comprehensive Plan and offers alternatives to automobile dependency in selected areas. Since the County has been designated a National Heritage Area by the United States Congress in December 2022, bicycle tourism has been increasing in the area.

This goal should be implemented through a regional approach, using the Potomac Heritage National Scenic Trail with suitable segments for use by bicyclists and pedestrians. The County should continue to participate in this strategy by working with the Northern Neck Planning District Commission as the transportation planning body for the region.

In addition, the strategy should include identification of bikeways and/or pedestrian facilities within major developments and encourage or require the construction of sidewalks and\or bike lanes as part of new subdivisions or commercial developments.

The strategy also includes the following:

- Emphasize primary highways and portions of roadways on the Potomac Heritage National Scenic Trail in establishing priorities for funding the provision of bicycle facilities throughout the County.
- Pursue the identification and correction of existing and potential edge of pavement and

sight distance problems along bike routes designated as Signs Only.

- Pursue the installation of Share the Road signs along the designated Bicycle Trails to remind motorists of Virginia traffic laws and encourage safe habits where automobiles, trucks and bicycles utilize the same roadways.

Figure 4.3 on the following page identifies the designated Bicycle Trails.

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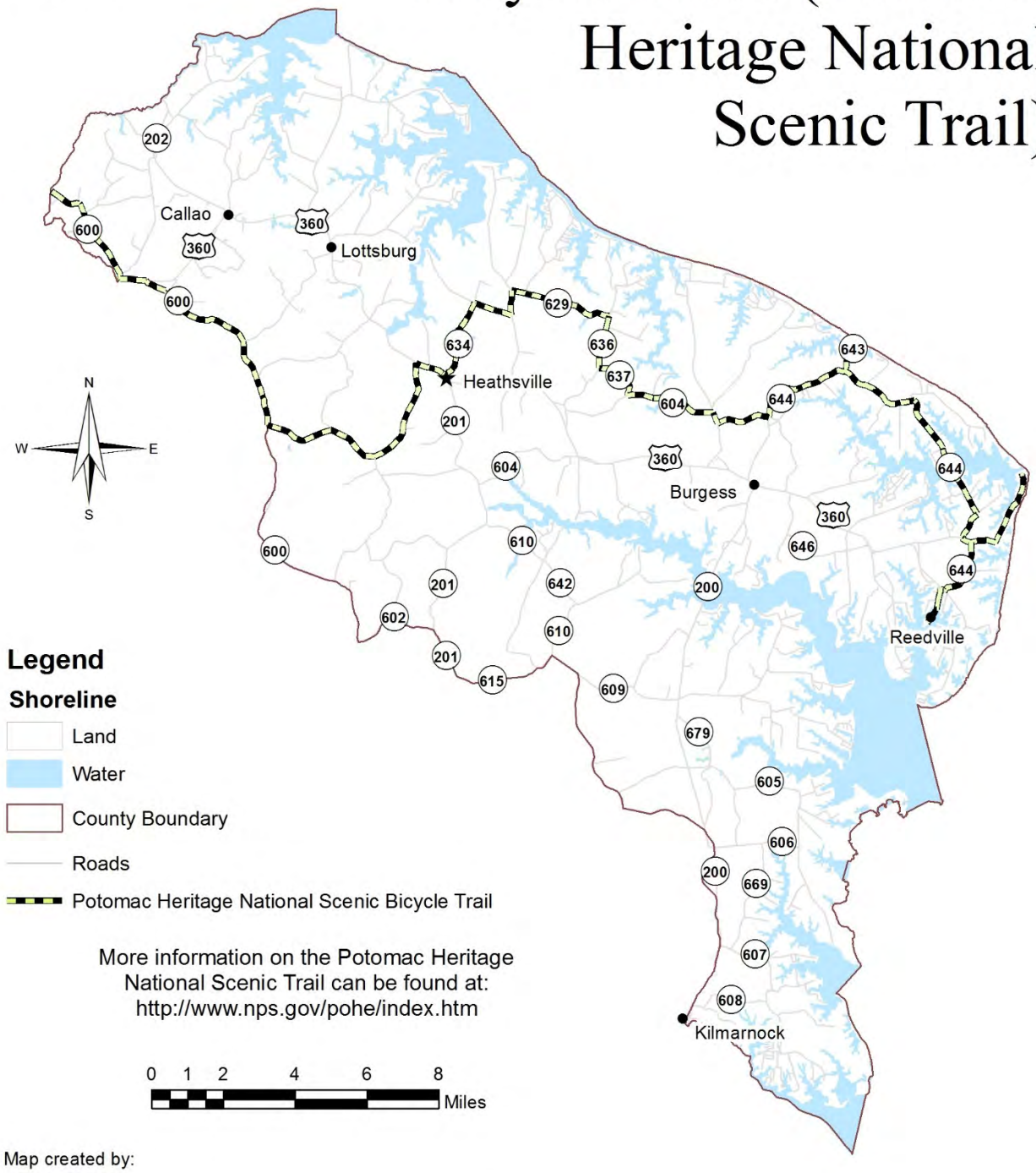
Figure 4.3

Bicycle Trails (Potomac Heritage National Scenic Trail)



Map created by:

SLM, 01.13.26

Data Sources: Roads - VDOT Planning Data
County Boundary: USGS 1:24,000 Topographic Maps
Shoreline - USGS 1:100,000 Topographic Maps
Potomac Heritage National Scenic Trail - National Park Service, 2025

C. RECREATIONAL AREAS AND FACILITIES

1. Existing Recreational Sites and Opportunities

Recreational opportunities in Northumberland County consist of a mixture of public and private facilities and programs, both land and water oriented. Some of the more significant facilities are illustrated in Figure 4.4 and identified below.

a. Athletic Fields.

The only operational athletic park is located adjacent to the Northumberland Elementary School on Academic Lane. It offers four ball fields at the present time. The area between Rt. 360 and the Middle/High School complex contains soccer fields which are available for public use when not being utilized by the school.

b. State Facilities.

State facilities include three large conservation areas. The Hughlett Point Natural Area Preserve contains about 204 acres and includes parking, trails, a woodland boardwalk, wildlife viewing platforms, and interpretive signs. A second state-owned site, Bush Mill Stream Natural Area Preserve, containing 103 acres, is located near Howland off Route 624. The VDCR Division of Natural Resources has developed the Bush Mill site with a small parking area, scenic trails and overlooks and interpretive signs. The third site is Dameron Marsh Natural Area Preserve on VA 605 which extends into Chesapeake Bay. It is the largest wetland on the western side of Chesapeake Bay. Facilities include a walking trail and boardwalk, a wildlife viewing platform, a small parking area, and a canoe/kayak launch site. These were established as conservation areas under the control of VDCR.

To see the latest planning for recreational activity at the State level, please see the Virginia Outdoors Plan by VDCR.[3]

c. Chesapeake Bay Access.

In the Chesapeake Bay Area Access Plan (1990) both public and private areas for accessing public waters in the County were identified. Thirty access points were examined, of which 14 are publicly owned and the remaining 16 are private. The private facilities include both commercial marinas and membership associations. The two tables on the following pages identify the major features of each of these sites.

Table 4.1 gives a listing of public sites together with the specific recreational opportunities available at each site. The most dominant activities are (i) fishing that is available at all but three of the sites and (ii) trailer boat launching facilities available at about half of the facilities. Beach access by the public is available at Vir-Mar Beach, Hughlett Point Nature Preserve and Kohl's Island. Kohl's Island incorporates Smith Point itself and a beach to the west of where the Potomac River empties into the Chesapeake Bay and is owned by the Virginia Outdoors Foundation. No public access via land exists or is planned and access can only be gained by boat. One of the concerns continually expressed by citizens is the need for more access to beaches. Greater beach access would also support the tourist business of the County as well as serve the needs of county residents. While it is true that

[3] http://www.dcr.virginia.gov/recreational_planning/vop.shtml

many residents have access to the beach from waterfront homes or from membership associations, other residents of the County do not have the same access to the waterfront. A related concern is access to public picnic tables and restrooms.

The Chesapeake Bay Access Plan indicated that "*numerous beaches exist along protected shorelines. These beaches are often informal access areas, located on private property. Many receive heavy use by those familiar with the area and can be reached only by boat. They should be evaluated to determine suitability for future development for public use*". According to that plan, another resource for access to the Bay are tour boats and charter fishing boats, the latter being available from numerous private sources in the County and throughout the Northern Neck.

The County would also like to have public water access, particularly for inland residents, to take the pressure off shoreline development and encourage attractive, affordable housing inland.

Table 4.1
PUBLICLY-OPERATED PUBLIC ACCESS FACILITIES TO THE CHESAPEAKE BAY
Northumberland County

SITE IDENTIFICATION	Trailer Boat Landing	Car Top/Canoe /Kayak Launch	Fishing (Pier or Bank)	Beach (Swimming)	Nature Study Area	Picnic Area	Camping Area
Hampton Hall Creek Landing (in development)							
Lodge Landing, Lodge Creek	X	X	X				
Forrest Landing, Coan River	X	X	X				
Rowes Landing, Coan River	X	X	X				
Vir-Mar Beach, Potomac River				X	X	X	
Shell Landing, Cockrell Cr.	X	X	X				
Cranes Creek Ldg., Cranes Cr.	X	X	X				
Cedar Point Ldg., Great Wicomico River.		X	X				
Coopers Ldg.,Gr.Wicomico R.	X	X	X				
Sampsons Wharf		X	X				
Great Wicomico Fishing Pier, Wicomico River.		X	X			X	
Hughlett Point Natural Area Preserve, Chesapeake Bay					X		
Bush Mill Stream Natural Area Preserve, Bush Mill Stream					X		
Dameron Marsh Natural Area Preserve, Chesapeake Bay					X		

Source: Modified from Chesapeake Bay Area Public Access Plan; and Planning Commission Members.

d. Northumberland County Public Water Access

The 1996 Northumberland County Comprehensive Plan pointed out the lack of public water access points in the county for citizens. The County has 14 power boat ramps; however, there are few opportunities for those citizens, who want to bank-fish, crab, launch canoes and/or kayaks. The county does have Vir-Mar Beach, a small (250 ft) long beach area on the Potomac River for fishing, crabbing, swimming and/or picnicking.

The Northumberland County Planning Commission has been working for many years towards improving public water access for Northumberland County citizens. To that end,

the County, with assistance from NNPDC submitted a grant application for a public fishing pier on the Great Wicomico River to the VDEQ's Coastal Program (funded by NOAA - the National Oceanic and Atmospheric Administration) in 1999. To secure matching funds, the County submitted another grant application to the VMRC's Recreational Saltwater Fishing Fund in 2000. Both grants were awarded, and the County now has a public fishing/crabbing pier to serve its citizens on the south side of the Great Wicomico River Bridge. Continuing work on providing county citizens public water access, the Planning Commission, with assistance of county staff, worked with VDOT to obtain a VDOT land use permit to allow a rudimentary canoe/kayak launch to be constructed under the Rt. 200 bridge adjacent to the Great Wicomico Fishing Pier in 2023. Currently, the Planning Commission is exploring public water access options at Hampton Hall Landing on Hampton Hall Creek near the county boundary with Westmoreland County.

However, there are still many opportunities to increase access to state waters within the County, especially to increase handicap accessibility, and to provide adequate parking for cars and trailers. This plan addresses some of those opportunities.

CANOE/KAYAK WATER TRAILS:

- Cockrell's Creek
- Coan River
- Lower Coan River
- Great Wicomico

One goal that might help increase tourism and recreational opportunities would be to establish a sufficient number of canoe/kayak launching facilities so that a "trail" would be created, allowing individuals not only to launch and return to a variety of sites, but to "tour" the County by water. The Northumberland Association for Progressive Stewardship (NAPS) has developed a series of canoe/kayak trails and identified launching sites. The map is available on the web site https://www.napsva.org/paddlers-guide. In addition to the NAPS map, the NNPDC in conjunction with NNCBAA and the Northern Neck Tourism Commission has created four canoe/kayak water trails in the County. There are guides to the water trails in the County, as well as other Northern Neck county water trails.[4] In addition, there is a water trails website that covers the entire coastal area of the state that includes the County water trails.[5]

RECOMMENDATION

Work with the EDC and various tourism organizations in the county to establish and promote canoe/kayak launching facilities to enable County "tours" by water.

The NCPBAA is currently assisting the County to increase public access opportunities.[6]

Two planned improvements to public water access sites will fulfill some of these needs for individual natural, water dependent, recreational opportunities, while emphasizing handicap accessibility. One site is an existing powerboat launching ramp (Rowes Landing), the other site is a new water access point (Hampton Hall Creek).

- Rowes Landing

[4] http://www.northernneck.org/parks-nature-trails/
[5] Virginia Water Trails website: https://virginiawatertrails.org/northern-neck/
[6] For more information, please visit: https://www.northernneck.us/public-access-authority/

Rowes Landing is an existing powerboat launch ramp, at the end of State Route 601 in Heathsville, with a gravel turnaround, concrete boat ramp, and small fixed boat launching pier, owned by the County. The proposed improvements are to add a floating canoe/kayak launch platform, on the opposite side of the pier from the boat launch ramp so as not to interfere with the powerboat launching function of the site, as funding allows. A preliminary design for a floating dock attachment to the pier was created in 2024, but funding is still needed to complete the improvement.

- Hampton Hall Creek

  The Hampton Hall Creek site is a former public water access site on Route 202 adjacent to the border of Westmoreland and Northumberland County. This public water access site was abandoned many years ago. Vegetation has overtaken the site and will need to be cleared. The plan is to reinstate this site as a public water access point and construct a waterfront park and possibly a canoe/kayak/car top boat launch facility. Vegetation around the kayak launch will need to be cleared to afford bank-fishing opportunities for land-based anglers.

  The County owns the land, and the old roadbed is still intact that terminates at the edge of Hampton Hall Creek. The County plans to apply to various grant programs to help fund the design and construction of the entrance to Rt 202 and to design and build the access road to the waterfront park.

Table 4.2 lists 16 marinas that provided 838 boat slips in 2015. These are commercial marinas available to the public offering not only boat storage but fuel, food sales, restrooms, and boat repairs. There are many additional “membership” marinas available that provide access to a limited clientele. Many of these are controlled by Homeowners Associations. The County's unique location at the mouth of the Potomac River near the middle of the Chesapeake Bay makes this one of the more popular destinations for recreational boating and fishing.

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Table 4.2
PRIVATELY OPERATED ACCESS FACILITIES TO THE CHESAPEAKE BAY
Northumberland County

SITE IDENTIFICATION	Trailer Boat Landing	Marina (No. of Slips)	Fishing (Pier or Bank)	Beach (Swim-ming)	Nature Study Area	Picnic Area	Camping Area
Coan River Marina, Coan R.	X	60					
Lake Francis Marina, Kingscote Cr.	X	28					
Olversons Marina, Lodge Cr.	X	189					
Lewisetta Marina	X	28					
Krentz Marina,	X	35					
Cockrell's Marina	X	70					
Smith Pt. Marina/Campground, Slough Cr.	X	113					X
Gaps Marina, Slough Cr.		26					
Buzzards Point Marina, Cockrell Cr.		56					
Horn Harbor Marina, Campground & Restaurant, Gr. Wicomico R.	X	30					X
Ingram Bay Marina	X	49					
Glebe Point Campground		18					X
Reedville Marina		20					
Fairport Marina		48					
Jennings Marina		48					

Source: Modified from the Chesapeake Bay Public Access Plan, 1990 and Northumberland County staff marina survey, 12/8/2015.

e. The Northumberland Family YMCA

The Northumberland Family YMCA is a program-based YMCA currently operating from a new facility on the old high school property. They operate several programs through a partnership with the Northumberland County Public Schools (NCPS). These include After School Care, Summer Day Camp, and various sports activities at the three schools in the County. This facility houses a full health and wellness center, group exercise center, childcare center, and an outdoor pool. The YMCA is currently raising funds to construct an all weather dome over the outdoor pool to extend the use of the pool for the entire year, instead of only in the summer months.

f. Golf Courses

Two privately owned golf courses are located within the County. Indian Creek golf course is part of a group of recreational facilities offered by the Indian Creek Yacht and Country Club and is member only. Quinton Oaks golf course is also located within the County and is a public golf course.

2. Conclusions Regarding Recreational Facilities

The County's major recreational offering is its access to 509 miles of shoreline of the Chesapeake Bay and its tributary rivers and creeks. Sport fishing, recreational boating and sailing also provide a stimulus for summer tourism thereby contributing greatly to the economy of the County through marine sales and operation of marinas, including repairs and fuel sales. In addition, the boats that are based permanently in the County provide a significant contribution to the tax base. It should continue to be a major policy of the County to promote the development of quality boating facilities for both public and commercial use. In the same sense, public beaches may also contribute to the economy of the County while providing a major recreational service for local citizens. One needs only to look at the growth of other communities along the US East Coast to see that public beaches attract significant investment that satisfies a market for recreation. The growth of sport and recreational boating, combined with expanded beaches and controlled beach front development, offers a substantial opportunity for the growth of the County's economy.

RECOMMENDATIONS

The County should consider ways to expand the number of public beaches through use of surplus land, acquisitions, and/or conservancy grants.

Vir-Mar Beach facilities were removed in the mid-1990s due to misuse and the difficulty in providing security. The County reopened Vir-Mar Beach in 2000, and the park is currently available for swimming and sunbathing, although there are no amenities at the site other than parking and a walkway with stairs to the beach. The County is currently exploring the re-establishment of picnic facilities at Vir-Mar Beach.

RECOMMENDATIONS

The County should plan to have a public park oriented towards children and young adults. The neighborhood-type park should have tennis courts, a jungle gym, basketball court and other amenities and be located off the water.

Consideration should also be given for a comparable public facility oriented towards the retired community.

Callao Hometown Community Association (CHCA), starting in 2023, is working on fundraising to build a public park in the village of Callao, across from Movie Hall Lane, named Hometown Community Park. More than 2 acres of land was donated by a local businessman to the association for the park. The County Board of Supervisors, at their February 2023 Meeting, voted to exempt the CHCA's park property in Callao from county real estate and personal property taxes, as a show of support for the park project. Plans include restrooms, an accessible playground, a walking trail around the perimeter, and picnic areas. After those features have been constructed the CHCA hopes to fundraise and build a game area, a covered pavilion and an amphitheater. The CHCA hopes to host concerts, other outdoor entertainment, and serve as a gathering place for farmers' markets and events.

The Northumberland Public Library has hired a contractor and has begun construction on a "pocket park" behind the library building in Heathsville. The park consists of a winding trail, flower gardens, and benches for citizens to exercise and relax, possibly by reading a book checked out of the library, on one of the park's benches.

In the area of public recreation, the focus of recreational planning should be on services that serve the local population of all ages. At present the public recreation that is offered is limited by the amount of land available, but park space is an important part of the quality of life in all communities.

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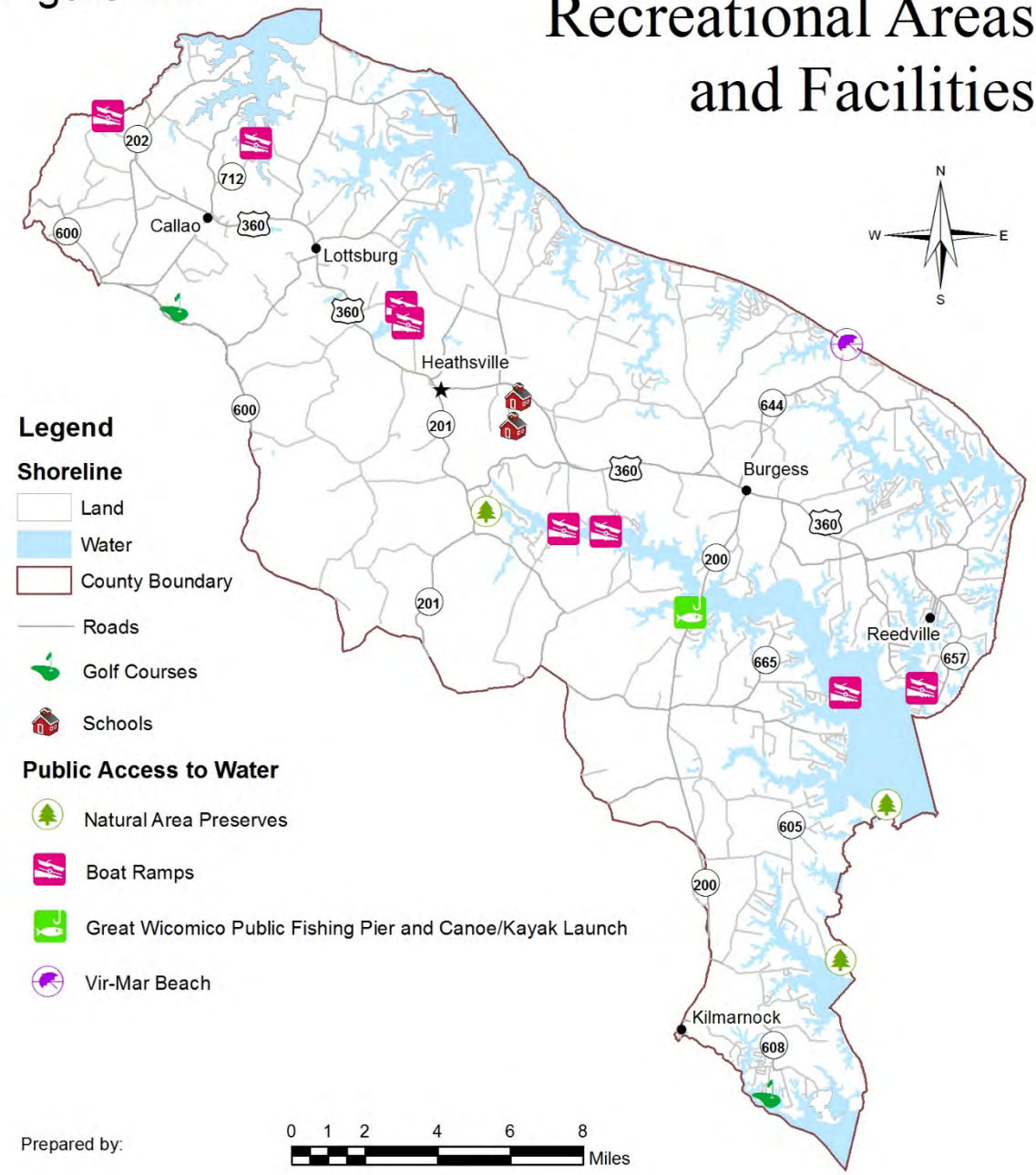
Figure 4.4

Recreational Areas and Facilities



Prepared by:

Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
Northumberland County E911 Data, December 12, 2024

SLM, 12.12.24

As future plans are made for recreational facility development, the following general standards that have been used in other parts of Virginia as well as nationally may be helpful. These standards have been found to provide a satisfactory number and distribution of recreational facilities in typical communities.

a. Baseball and softball fields: Baseball is played in almost all communities and by nearly all ages. Fields that are designed for youth baseball can also be used for adult softball since both use the same base spacing. The major difference is that baseball requires a little longer pitching distance and longer outfield. There is a backstop and rudimentary ball field located at Shell Landing in Fleeton, and this facility should be investigated to determine if there is community interest in improving this ballfield for future use. A rule of thumb for ball fields in a community is at least one ball field for every 6,000 people. Considering the demographics, two should be sufficient for the County, but because of the distance between upper and lower parts of the County others may be required in order to provide service to all parts of the County.

b. Basketball: Basketball is played in almost all communities and by nearly all ages. Schools may provide enough basketball courts to meet this need if they are spaced throughout the community appropriately. Other than in the high school, currently there are no publicly owned basketball courts in the county, although there are several located in private subdivisions. The general standard for basketball courts is one court for every 500-1,000 people.

RECOMMENDATION

Future efforts to provide opportunities for recreation in the County should be focused on establishing a basic infrastructure of facilities similar to and in the amounts suggested.

The next step is to secure sites for the facilities with the facilities themselves being added as funds are available.

c. Tennis: The demand for tennis depends upon the importance of this game to each locality. There are no publicly owned tennis courts in the county. There is a state standard that suggests one tennis court for every 2,000 people. The closest public tennis courts are located at the Rappahannock Community College in the town of Warsaw.

d. Swimming Pools: The state standard suggests a swimming pool for every 10,000 people. At present a public swimming pool is not available in the County for swimming lessons and competitive activities and adult recreation. The recent renovations at the Northumberland YMCA include an outdoor pool. The Northumberland YMCA has been working with NCPS offering swimming lessons to second graders. As mentioned earlier, the YMCA is working towards installing a dome over the outdoor pool to extend its use into the winter months.

D. PUBLIC BUILDINGS AND SCHOOL FACILITIES

1. Administrative Offices

County administrative offices, courts facilities, sheriff's office and other government functions are centrally located in Heathsville in or near the courthouse. With the completion of the new courts facility for the General District Court, the Circuit Court, Clerks of both courts, and the Juvenile and Domestic Court Services units, their space and facility requirements outlined in

the last version of this Comprehensive Plan have been met for the foreseeable future.[7] These are located in a separate building behind the existing courthouse.

The Commissioner of the Revenues and the Treasurer's requirements for additional office space were met when the court clerk relocated from the first floor of the courthouse to the newer facility. Social Services, Health, and the Cooperative Extension Service have sufficient space in their existing locations and should not likely experience significant growth in the foreseeable future.

Due to deteriorated conditions in the Sheriff's building and the need for additional space, a new Sheriff's Office was completed in 2015.

Participation in the Regional Jail has eliminated the requirement to accommodate inmates in the Sheriff's building. The location of public buildings is noted in figure 4.5.

2. Other Public and Quasi-Public Facilities

The Northumberland Public Library located on U.S. Route 360 in Heathsville is available to the public and is a valuable resource. The library is open 54 hours per week, including Saturdays and some evenings.

The library is an important aspect of life in the County. Library attendance in 2023 was approximately 27,822. 47% of the County population holds library cards. The card catalog is also available online.

The collection consists of approximately 35,000 books and materials and provides free internet broadband access through the library computer center and also offers high speed wireless WiFi service to patrons with laptops.

There is a planned balance in the collection between the user demographics and the classes of items. Additional emphasis has been given to audio books and videos to meet the needs of the older population and those with mobility issues. A Children and Youth Services Coordinator focuses on school-age appropriate programs to include partnerships with the county schools, Boys and Girls Club and the YMCA.

The Mobile Library on the Go participates in county-wide events, local farmers markets and travels to county daycares, schools and clubs as requested. This free service is available to everyone in the County. The Mobile Library on the Go also provides home delivery of books and materials for those who cannot come to the library.

Additional books drops are located in Callao, Wicomico Church and Burgess for those who wish to return their materials and cannot get to the library proper.

Free technology support is provided daily as is a weekly technology class at the library. The library is a very busy place and lack of additional space is a constant challenge. The Library

[7] Information on the County administrative office needs was obtained through discussions with County officials and department heads.

Long Range Plan and the Expansion Plan both address the needs of the future and expected growth in the County.

Additionally, the Fisherman's Museum located in Reedville, the Northern Neck Farm Museum located between Burgess and Heathsville, and the Rice's Inn Hughlett's Tavern Foundation located in Heathsville are quasi-public facilities supporting tourism in the County,

3 School Facilities

Schools are provided in the County school system by a School Board which oversees the office of the Superintendent of Schools. The Board, together with its administrative staff, is responsible for providing a system of public-school facilities and an educational program of high quality. The population range from which most of the school enrollment has decreased from 2020 and state estimates suggest the trend will slightly decrease for the next 5 years. Following are the estimates of population for the age group 0 to 19 for the last three decennial censuses and projections by the Weldon Cooper Center for Demographics for the next three census years.

YEAR	1990	2000	2010	2020	2030	2040	2050
Population	2305	2491	2266	2120	1368	1834	1838

Demographic trends show that although slow population growth has been occurring in the County, most of the growth is occurring in the adult population. The analysis referred to above reports that the age group from 20 to 44, customarily referred to as the "childbearing age" is projected by the Commonwealth to remain constant at approximately 2000 people through 2050. In addition, the older population is growing not only demographically but by the attraction of the County as a place for retirement. These forecasts point to an era of little growth potential for school enrollment.

The County opened Northumberland Elementary School in 1996. This facility replaced the elementary schools at Fairfield and Callao. Northumberland Middle School and Northumberland High School continue to serve the upper grades. The school system projects that school membership in the next five to ten years should remain fairly steady. The schools are identified in Figure 4.5 and described in the following paragraphs:

- Northumberland Elementary School

  This elementary school is designed for an enrollment of 750 students from preschool to kindergarten through the fifth grade. School system projections indicate that the elementary school enrollment should remain steady or gradually increase in the future; therefore, it should have sufficient capacity until growth patterns in young families increase. Current enrollment is approximately 525 students.

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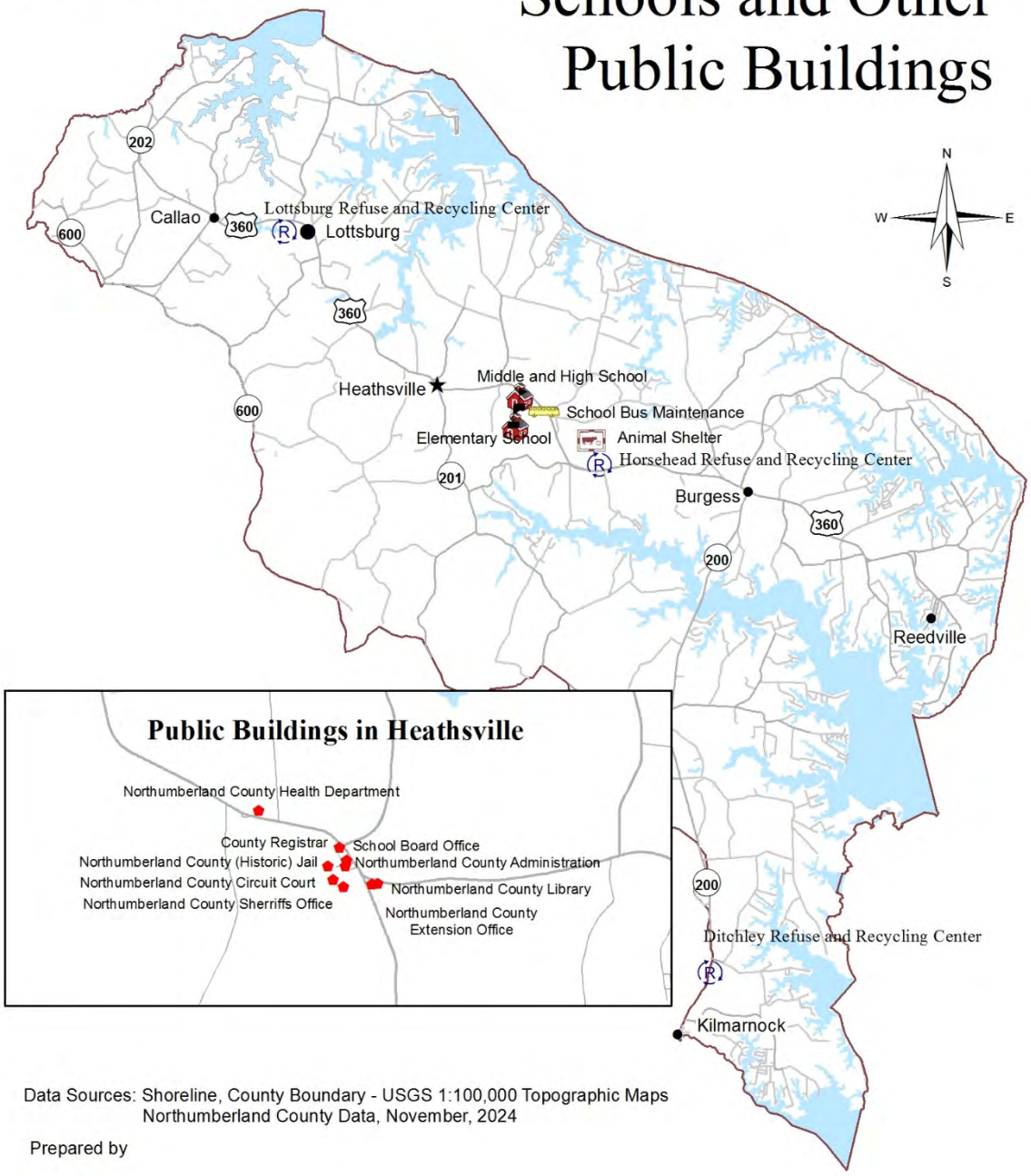
Figure 4.5

Schools and Other Public Buildings



Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
Northumberland County Data, November, 2024

Prepared by

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Miles

SLM, 11.19.24

- Northumberland Middle/High School Complex

  This combined facility was completed in 2009. The Middle/High school accommodates 750 students from sixth grade through twelfth grade. The current enrollment for the Middle/High School is approximately 650 students.

Overall, the present school system's capacity appears to be fairly evenly matched with the number of students. With little growth foreseen in enrollment, future school planning can focus on matching the facilities with the educational needs of the community.

An analysis of recreational space suggests that the playfields could increase the opportunities for full-time recreation. The buildings present other opportunities such as the current use of offices for the School Board.

E. WATER SUPPLY AND SEWAGE DISPOSAL

1. Water Supply

An examination of water sources is presented in Chapter 1 as part of the analysis of environmental conditions. That chapter identified groundwater as the present source of potable water supply for Northumberland County. In an effort to protect potable water supply for the County, the Board of Supervisors has supported the adoption of the Northern Neck Regional Water Supply Plan as well as encouraging the incorporation of the County into the expanded Eastern Virginia Groundwater Management Area. Both of these items are discussed in more detail in chapter 3 of this plan.

State surveys have indicated that the aquifers should provide an adequate supply of potable water to the County well into the 21st century. However, it appears certain that continued withdrawal of artesian water at current rates, causing water level declines of 1.1 feet/year, are ultimately not sustainable. Currently, declining water levels in the artesian aquifers of the County are caused predominantly by ground water withdrawals by large water users in Southern Maryland and the West Point (King William County) region. In the future, increasing economic and residential development in the County will place additional stress on the ability of the artesian aquifers and accelerate water level decline.

The VDH classifies water systems as community, transient or non-transient water systems. A community water system is one that serves 14 or more houses or 25 or more people for at least six months per year. A transient public water system is a class that is used by motels, restaurants and similar uses. A non-transient system is the same as a community water system but is used less than six months per year.

The Three Rivers Health District listed 62 public water systems in the County in 2024 (See Chapter 1). These were distributed among the above three classes as follows: 38 community water systems; 20 transient systems; and 4 non-transient systems.

Figure 4.6 illustrates the locations of 62 of the major public water systems currently in service within the County.

Future needs over the next 20 years and beyond for potable water are a significant planning issue for the County as discussed in Chapter 1. There appears to be sufficient groundwater in the deeper aquifers for the next several decades. Eventually, the artesian aquifers will cease to supply an adequate quantity of potable water and alternative supplies will be required.

If large-scale development of the type that is developing in many communities along the Mid-Atlantic States comes to the County, or to nearby communities using the same aquifers (as is already happening in Maryland to the detriment of both artesian aquifers) the water supply will become a more immediate problem.

Such development, however, may be regulated and required to provide its own water system to scale with need. It would be prudent on the County's part, however, to have an alternative source of potable water supply. This is particularly true because of the County's proximity to sea water. Major withdrawals even in the upper reaches of the lower aquifers combined with pressure from sea water would adversely modify the quality of water available in the aquifers.

Potential for Future Freshwater Reservoirs

The 1969 report prepared for the NNPDC by Martin, Clifford and Associates identified nine (9) reservoir sites in the County. The sites of greatest potential include:

Site	Serving	Acres	Millions gallons/day
Lodge Creek	Callao	118	1.05
Sydnor’s Mill	Burgess and points east	328	0.48
Crabbe Mill	Heathsville	310	0.56

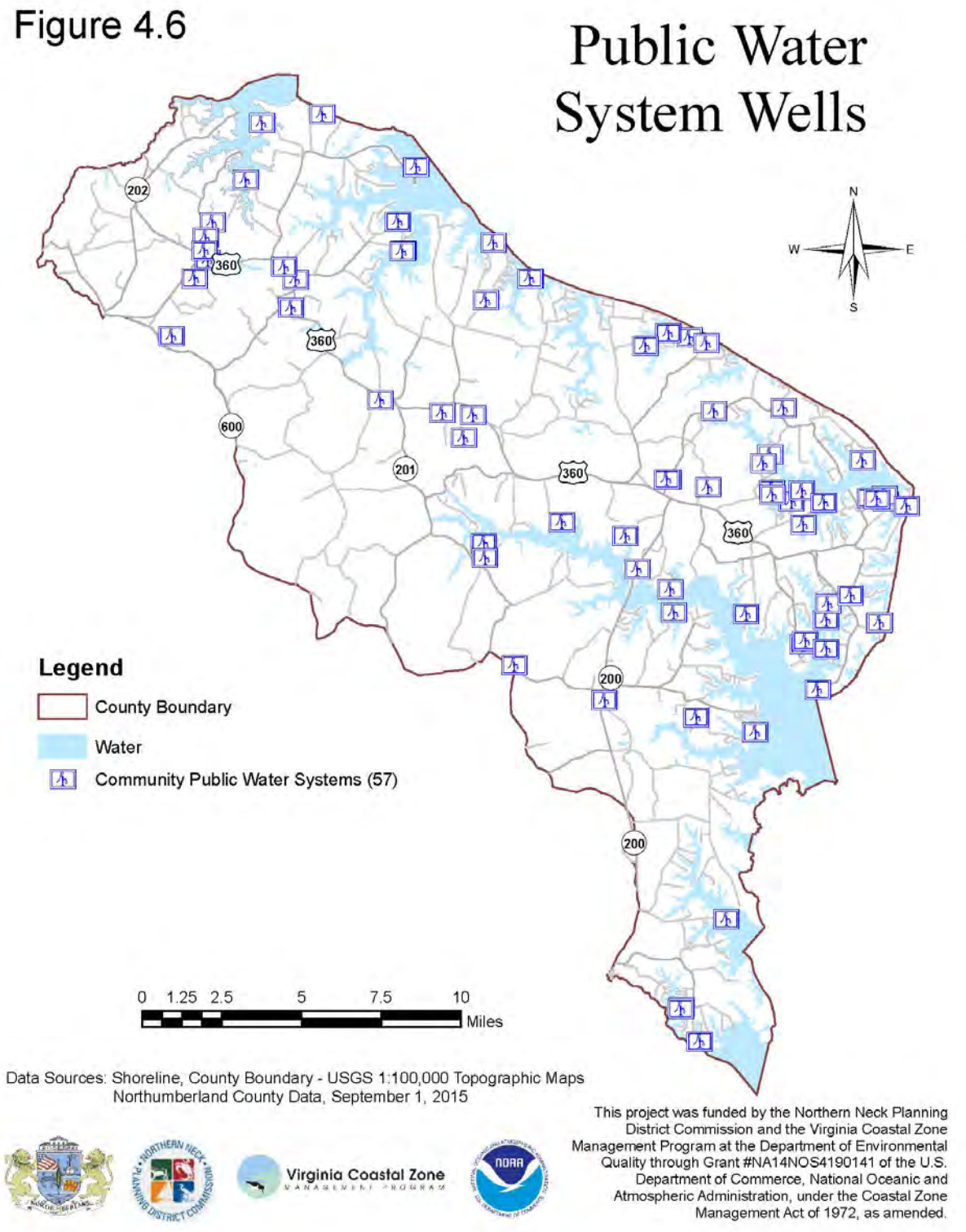
These three reservoirs could provide 2.09 million gallons/day, enough to serve 20,900 people assuming typical water usage of 100 gallons/day/person. These three reservoirs should provide abundant water for the foreseeable future recognizing, however, that some citizens not easily served by a public supply will remain on either artesian or shallow wells. Because most of the population of the county is in the northeast, and that is where growth is likely to be highest, it will ultimately be necessary to connect the reservoirs.

The aforementioned study was completed before Congress passed the Clean Water Act, and other environmental protection laws, and as such, lacks any kind of review of the environmental impacts of constructing new drinking water reservoirs. Due to current costs of environmental permitting, easement procurement, land purchase price, impoundment construction, water treatment plant construction costs, and last but not least the water distribution pipeline network, reservoirs are not a financially viable option for the county at this time. In the future, if groundwater supply decreases drastically, then reservoirs may be an option, however, advancements in desalination techniques may be a more cost-effective option in order to supply potable water to the citizens of the county. However, desalination technology will still require a treatment plant site, pump station site(s) buildings and equipment to be constructed as well as a network of easements through private property to be purchased for pipelines that will be needed to distribute the potable water throughout the county. Both alternatives are currently not feasible due to financial considerations, but that may change in the future.

The County has never owned or operated a public water utility, as the county long ago decided to allow private utility companies the opportunity to serve potable water to the constituents of

the County. It is unknown if the County wants to enter into the water supply public utility business in the future, that will be up to a future Board of Supervisors to decide.

Figure 4.6



This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

2. Sewage Disposal

The general mode of sewage disposal in the County is the septic tank; the exceptions are at Reedville, Callao and Kilmarnock where public sewage systems have been established. The systems above, with the exception of the Kilmarnock Sewer, are operated by the Reedville Sanitary District which is governed by the County Board of Supervisors. The Sanitary District was originally designed to serve the town of Reedville, but it was expanded in order to extend coverage to the Blackberry Community Development Project Area, Fleeton and Callao.

Figure 4.7 shows sanitary sewage facilities in the Reedville and Callao areas. Also shown on this map are the general locations of the pumping stations and the treatment plants. The Reedville plant is located across Cockrell Creek near the Omega Protein Facilities, which is also served by the Reedville system.

With the addition of the Fleeton community, the Reedville sewer system is presently operating at 1/3 capacity, except for weekends and holidays, when seasonal residents occupy their second homes which causes flows to reach 50% of the treatment plant's total capacity at those times. The Callao sewer is presently operating at ¾ capacity and does not see the same weekend and holiday peaks that the Reedville system experiences. The Reedville treatment plant is designed to treat 200,000 gallons per day and the Callao plant 40,000 gallons per day.

Other areas of the County shows signs of developing into active commercial areas even without sewers. There are signs of growth at Burgess and at Heathsville, and in the long-range these areas would likely experience more development if sewer systems were available.

But there are significant issues with economic and financial feasibility. The Fleeton expansion at Reedville and the Callao sewer system received grants of 75% of the construction costs leaving the remainder to be borrowed by the County and the debt serviced by the monthly fees. In general, future expansions of the existing systems are encouraged where there is no financial impact on current patrons caused by the expansion.

In the lower end of the County, the Indian Creek community has soil problems and other constraints that limit the use of septic systems, which has led the County in the past to apply for a grant to install a community sewer system similar to Callao. The grant application was not economically feasible at that time.

None of the other villages of the County meet the current requirements for similar grants because of the low population densities. The monthly rates would have to be too high even with a comparable percentage of the funding in grants. Nevertheless, the potential exists in these areas for commercial development and the establishment of new jobs. This is sufficient reason to continually monitor and examine the feasibility of establishing sewer systems at each location, and when determined to be feasible and cost-effective, to actively pursue them.

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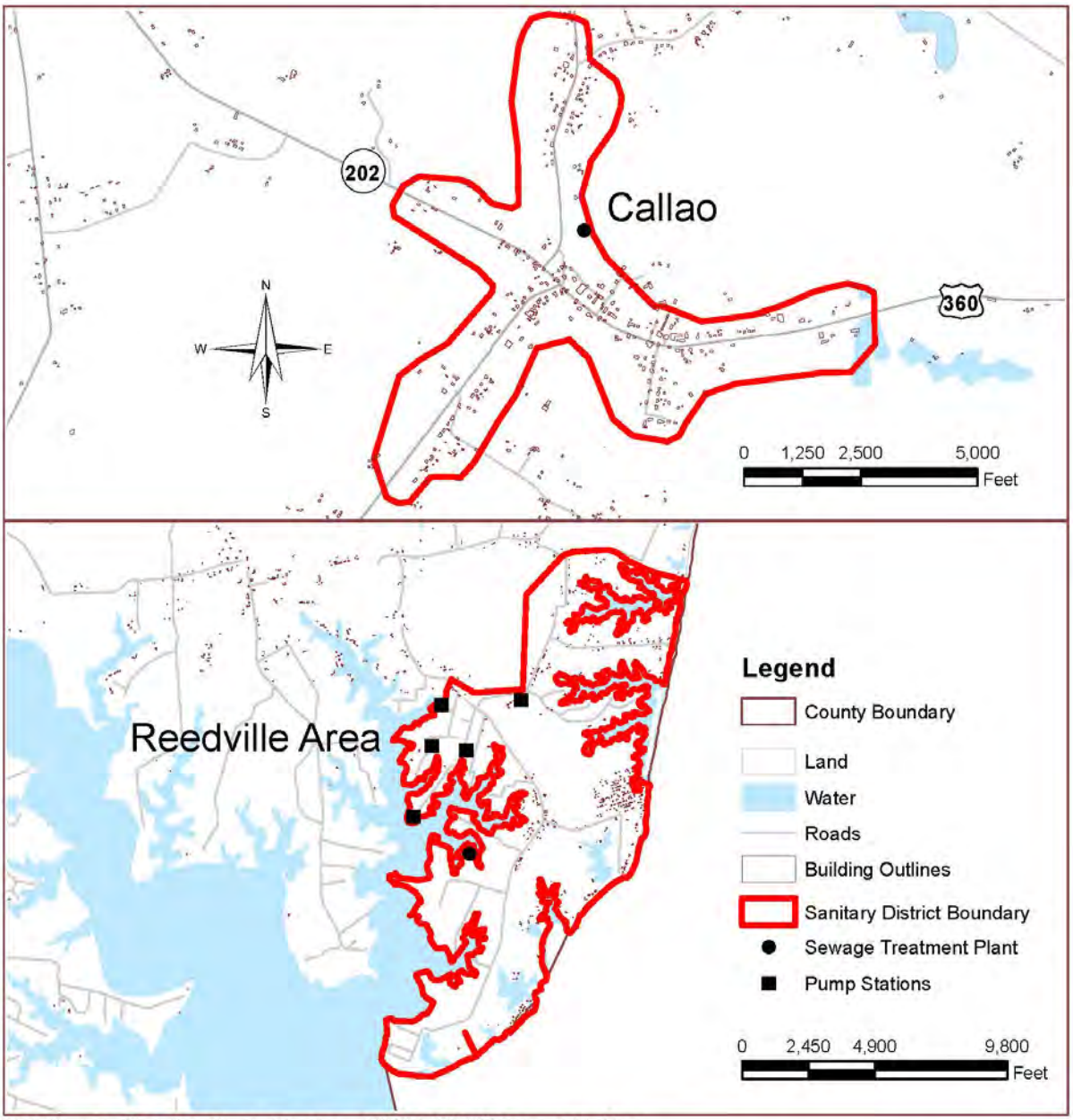
Figure 4.7 Sanitary Sewerage Facilities



Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
Northumberland County Data

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

New facilities should be designed with state-of-the-art nutrient reduction technology. Upgrading the Reedville plant to reduce nutrient discharge and to accept septic pump-out should proceed simultaneously in order to realize cost savings. At least one of the current sewage systems should be adapted to accept septic system pump-out.

F. OTHER PUBLIC AND QUASI-PUBLIC SERVICES

1. Emergency Services

Emergency services are available in the County through volunteer fire departments and paid rescue squads as well as volunteer rescue squads. Communications are coordinated through the Sheriff's office. Figures 4.8 and 4.9 identify the locations of fire and rescue facilities within the County and the area served by each facility.

Fire departments serving the County include the following fire stations:

- The Callao Volunteer Fire Department: serves the northern part of the County to Horsehead.
- The Fairfield Volunteer Fire Department: serves the eastern portion of the County approximately from Horsehead to the Chesapeake Bay and the southern portion to about one mile below Wicomico Church. This fire company's main station is in Reedville with a sub-station located on Route 200 between Burgess and Glebe Point.
- The Kilmarnock Volunteer Fire Department: serves the remainder of the County from the point served by the Fairfield Company to the county line (blue outlined area on Figure 4.8).
- The Upper Lancaster County Volunteer Fire Department serves a small portion of Northumberland County between Mill Creek and Route 615 (county line).

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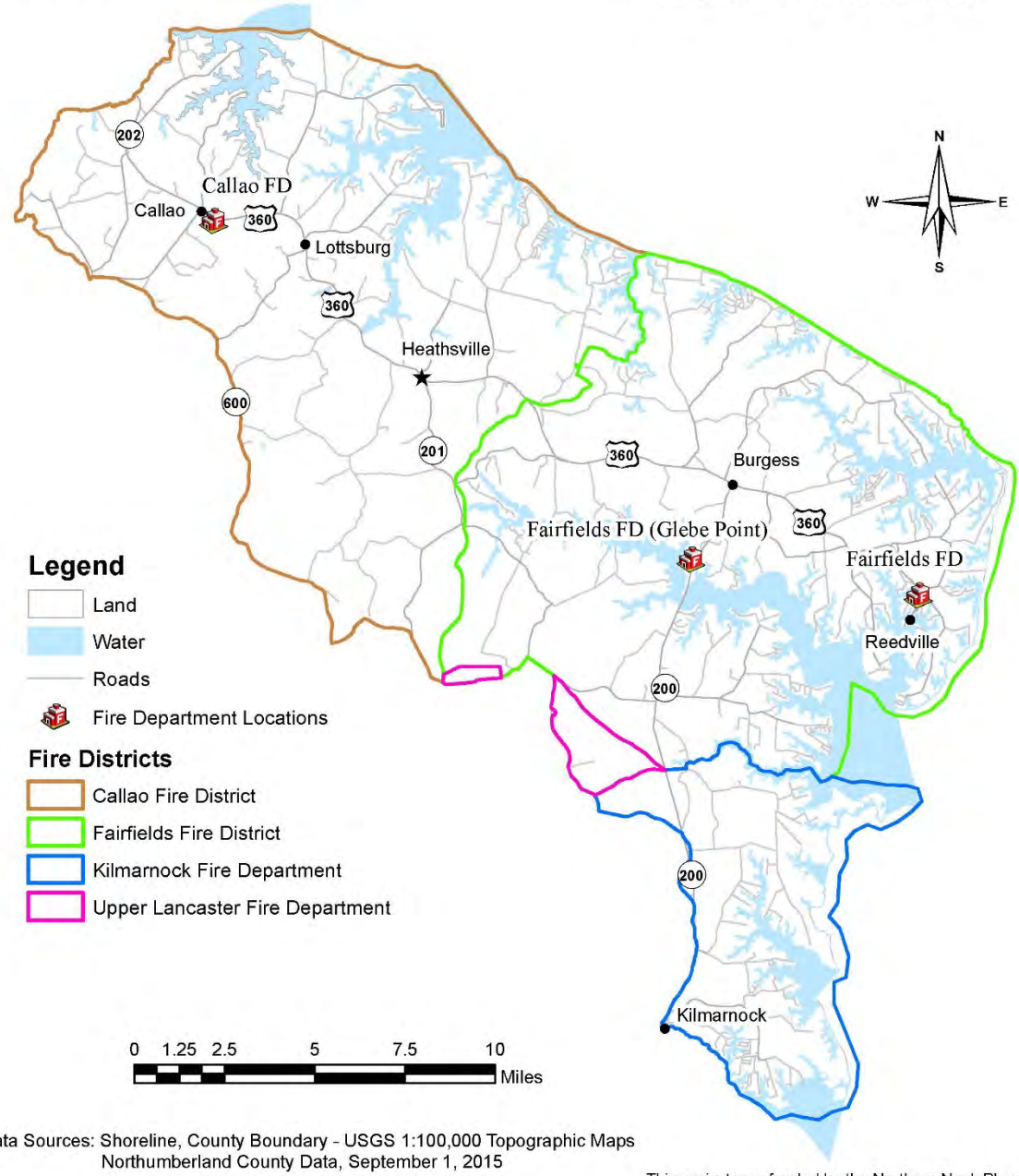
Figure 4.8

Fire Districts

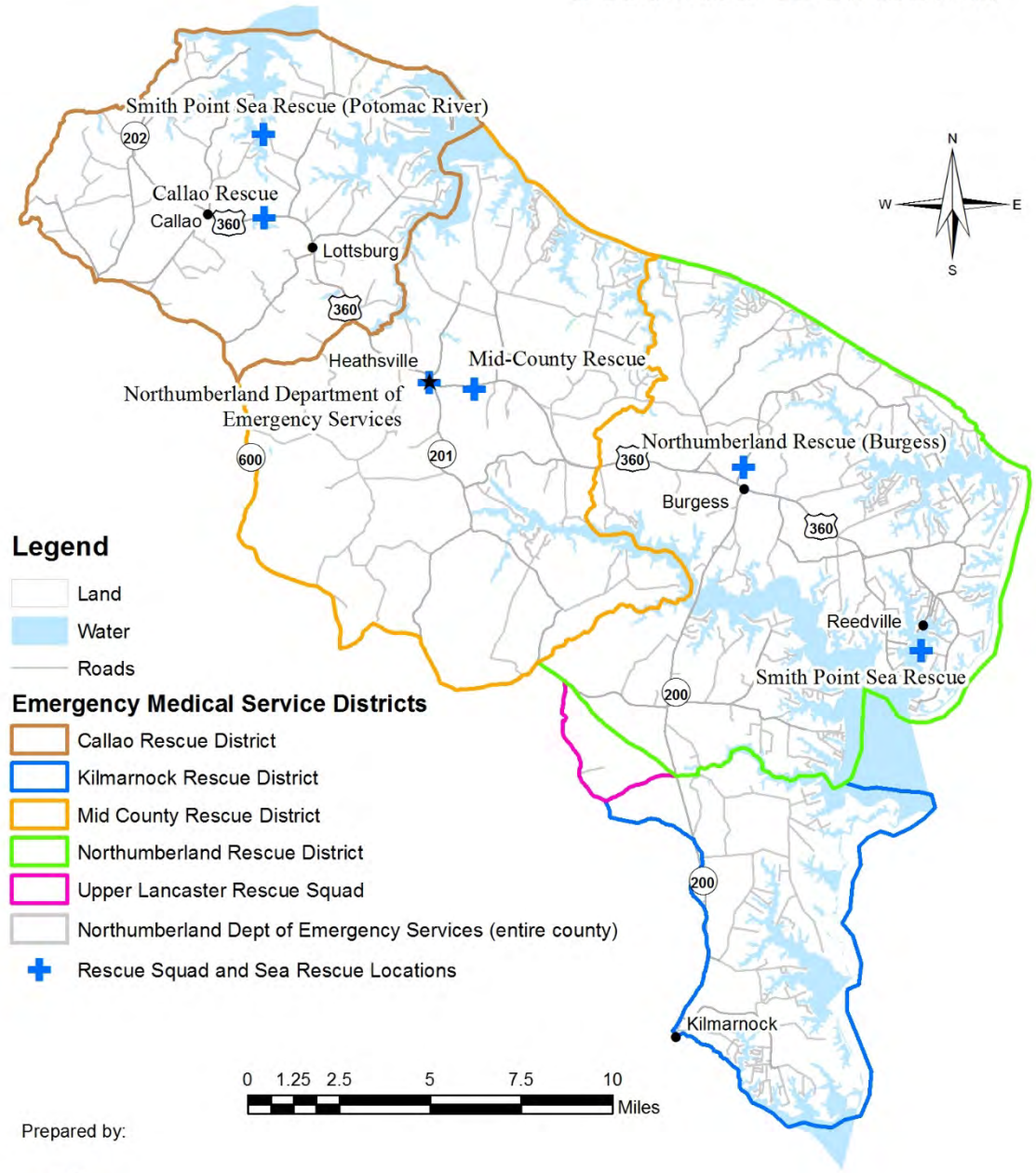


Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
Northumberland County Data, September 1, 2015

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

Figure 4.9

Rescue Districts



Prepared by:

SLM, 12.19.2024

Data Sources: Shoreline, County Boundary - USGS 1:100,000 Topographic Maps
Northumberland County Data

Rescue squads serving Northumberland County are:

- The Callao Volunteer Rescue Squad serves the western part of the County from the county line to the Coan River.
- The Mid-County Volunteer Rescue Squad located just east of Heathsville serves the area from the Coan River to an area marked approximately by Horse Head, Hull Creek, Great Wicomico River and Browns Store.
- The Northumberland Volunteer Rescue Squad serves approximately the same area as the Fairfield Fire Department and operates through a station at Burgess.
- The Northumberland Department of Emergency Services is a paid rescue squad located in Heathsville, across from the old Courthouse. This rescue squad covers the entire county, when volunteer rescue squads are unavailable or busy.
- The Kilmarnock Volunteer Rescue Squad serves the southern tip of the county from just below Wicomico Church, the same area served by the Kilmarnock Fire Department. The portion of the County served by the Lancaster Volunteer Fire Department is provided with Rescue Service by the Kilmarnock Rescue Squad.
- Smith Point Sea Rescue, operated by volunteers, provides a search and rescue service in the Lower Potomac River and Mid-Chesapeake Bay Area.

As indicated in the demographics, the County contains an aging population and it is to be expected that an increasing number of calls will be for rescue squad services to transport persons to hospitals. This will place further strain on personnel, especially if the volunteers are drawn away from their places of employment. The County needs to encourage and continue its support of the recruitment of volunteers.

2. Solid Waste Services

The solid waste system serving the County consists of three solid-waste collection stations which provide facilities for citizens to dispose of their refuse and recyclables into appropriate bins. The bins are then transported to a landfill in another jurisdiction by a private contractor. The locations of the collection stations (Refuse and Recycling Centers) are shown on Figure 4.5. They are located as follows:

- Lottsburg on land which was part of an old school site.
- East of Horse Head on U.S. 360.
- On Route 200 between Wicomico Church and the County line.

A typical solid waste collection site occupies about an acre and contains the following:

- Container with compactor that can be transported by truck
- Spare container
- Recycle box (1 or 2)
- An attendant is stationed at each site.

While the present sites offer a solid waste disposal system, including recycling, in different parts of the County, concern was expressed in meetings of a need to have a more visible program for disposing of household wastes which are classified as hazardous. The Northern Neck Soil and Water Conservation District (NNSWCD) has been conducting semi-annual hazardous waste and electronic waste collections paid for by the county in the Spring and Fall, and these collections have been successful and well received by the community.

3. Animal Shelter

A fenced animal shelter is located on the property currently used for solid waste disposal on U.S. 360 near Horsehead. This facility can house 36 dogs and 14 cats. It is operated by volunteers and managed by the Shelter Manager who is supervised by the Sheriff. The Friends of the Northumberland County Animal Shelter (FNCAS) have recently suggested the current facility is in poor condition and lacks space to meet demand. They have proposed constructing a new facility, at their expense, if the county will provide sufficient land for a new facility. At the request of the Board of Supervisors, the Planning Commission is currently working with FNCAS to develop a plan and recommendations for consideration by the Board of Supervisors.

4. Emergency Preparedness

Hurricane Isabel hit the County on Thursday September 18, 2003 and caused extensive damage to trees and the power grid and also caused water damage from storm surge along the rivers. For many reasons, a combination of preparedness, effective support systems, strong community support and good fortune, there were no deaths attributed to the storm and minimal injuries.

The State and Federal policy is that a disaster is a local event and each jurisdiction must take care of itself for at least 72 hours and not rely on the State or Federal organizations. When all local resources have been expended to resolve a particular problem, then localities may look to the State for assistance. When all State resources are expended, then the Federal government will provide assistance.

The County performed a "Lessons Learned" analysis and developed and adopted a set of recommendations after Hurricane Isabel and has initiated a program to increase preparedness and response in several key areas:[8]

G. HEALTH, HOUSING AND HUMAN SERVICES

This Health, Housing and Human Services section of the Comprehensive Plan describes the needs and available services.

Services are currently available in the following areas:

1. Health Services;
2. Provisions for the Elderly and Persons with Disabilities;

[8] Kenneth D. Eades and Gregory T. Haugan, *Lessons Learned – Hurricane Isabel*, December 17, 2003

3. Other Social Services Programs; and
4. Housing.

Each of these services is described in more detail below. While the list appears extensive, it is not clear that the funding and other resources match the needs.

1. Health Services

The County has a number of residents who are at or below federal poverty levels and/or unemployed and a disproportionate number of the population who are over sixty-five and are a burden on the local health care system. Currently approximately 37.5% of the population is over 65 years of age and by 2030 the number is expected to be 42%.

RECOMMENDATION

The County Board of Supervisors should work with Virginia Commonwealth University and other Virginia-based health care providers to expand the availability of urgent care facilities in the County.

The County has no public medical facilities other than the services of the Northumberland County Health Department, which is a component of the ten-county Three Rivers Health District. These limited services are available to the citizens of the County, with fees on a sliding scale based on income. The County is one of nine counties in the District that is designated as "Medically Under-Served". There are several private doctor and dentist offices and clinics in the County.

Services outside the County are provided by Rappahannock General Hospital (RGH) in Lancaster County which provides significant health care to the county and is part of the Bon Secours Virginia Health System. Riverside Tappahannock Hospital, in Essex County, also provides health care to the County and is linked to Virginia Commonwealth University Health. Because of high medical liability costs and a relatively small number of patients, RGH has discontinued its maternity ward activities.

The Northern Neck Free Health Clinic in Kilmarnock provides health care to people in the Northern Neck and Middlesex County who cannot reasonably be expected to pay for such care.

RECOMMENDATIONS:

- Management and Organization – formalize several informal working relationships to ensure all relevant personnel understand their roles in the process;
- Facilities – provide necessary emergency facilities and logistic support to the County Administrator in his role of Emergency Coordinator;
- Communications – improve communications between all emergency service organizations and between governmental entities; improve communications with the public;
- Shelters – ensure that existing shelters in the schools and other facilities are staffed and equipped to accommodate expected demand, investigate the possibility of adding additional shelter space; and
- Power – ensure that emergency generators are available and operational to support the shelters and communications needs.

2. Provisions for the Elderly and Persons with Disabilities

The County has an aging population, and it is expected to continue as more retired people move into the area. This section describes the services available.

a. Auxiliary Grant Program

Financial assistance is available for certain needy aged, blind or disabled persons who reside in adult care residences or adult family care homes. The money received, plus other income, is used by the person to pay for care provided by the home. Individuals who get money from the Auxiliary Grant Program also get a Medicaid card to use for medical bills.

b. Adult Services of the Northumberland Department of Social Services

(1) Adult Protective Services

This program receives and investigates complaints and reports concerning the abuse, neglect, or exploitation of those over age 60, incapacitated individuals over age 18, and their families, when necessary. Intervention may involve in-home services, counseling, transportation, day care, sheltered employment, legal proceedings, and meal provision.

(2) Home-Based Services

The Home-Based Service provides home-based services for those over age 60, incapacitated individuals over age 18, and their families when necessary. The goals include the maximization of self-sufficiency, the prevention of abuse and neglect, a reduction and delay in premature or unnecessary institutionalization, and aid (when such a placement is appropriate).

(3) Screenings

This service provides screenings for nursing home and adult home residential placements and for community-based home care.

c. Bay Aging

Bay Aging is a non-profit organization that works at the community level to ensure the delivery of efficient and appropriate services to older people. Bay Aging's goal is to provide support to help older citizens remain as independent as possible -- for as long as possible. The organization serves 10 counties in the area including the Northern Neck and Middle Peninsula. It is funded by a combination of Federal, State, and Local governments and by donations.

Bay Aging provides primary services: Adult Day Services at Senior Activity Centers; Meals on Wheels; Bay Transit and a Housing Program.

- *The Senior Activity Center* for the County is located in the Old Fairfields Elementary School in Burgess. The Senior Center is a community focal point which offers the opportunity for socialization through supportive and challenging group programs. It is available to individuals aged 60 and over who function independently.
- *Adult Day Care Program* is located at Bethany United Methodist Church in Reedville. The Northumberland program is licensed by the Department of Social Services and is an approved Virginia Medicaid provider. The Center provides various activities, opportunities to socialize, a change of scenery, physical and mental exercises and health monitoring. The

latter involves the use of trained nurses to help families understand health care needs and identify conditions that need medical attention. Meals and transportation are provided.

- *Meals on Wheels* uses dedicated volunteers to deliver hot lunches to individuals aged 60 and over who are homebound due to illness or disability and are unable to prepare nutritious meals.
- *Bay Transit* is a public transportation system for all people of all ages that serves the entire Northern Neck and Middle Peninsula. It is a "dial-a-ride" system that operates from 6 am to 6 pm Monday through Friday. There is also a fixed route system that operates from Heathsville to Lottsburg, Callao and Warsaw four times each weekday.
- *The Housing Program* works through the Department of Social Services who provides space one day per week for a representative of Bay Aging to meet with applicants from the County for their housing assistance services. Primary assistance is through the Indoor Plumbing and Rehabilitation Program, the Virginia Water Project and the emergency Home Repair Project. This complements the Section 8 housing assistance offered through the Northumberland Department of Social Services.

d. Northern Neck Disabilities Services Board (NOA)

Formed on September 21, 1999, NNDSB is a partnership of disabled consumers, local governments and businesses working to extend existing services and create new services for individuals of the Northern Neck with physical and/or sensory disabilities through administration of the Rehabilitative Services Incentive Fund.

The NNDSB provides disabled consumers with increased transportation, education and employment opportunities, accessible and affordable housing and medical services. The NNDSB also continues to improve awareness of existing and new programs through quarterly meetings, local media, related organizations and direct contact with individuals in need.

Duties of the NNDSB:

- Develop and make available for public comment an assessment of local needs and priorities of people with physical and/or sensory disabilities, updated every three years;
- Provide information and resource referral to local governments regarding the Americans with Disabilities Act;
- Administer the Rehabilitative Services Incentive Fund and serve as a catalyst for the development of public and private funding sources;
- Exchange information with other local boards regarding services to persons with physical and/or sensory disabilities and best practices in the delivery of services; and,
- Provide such other assistance and advice to local governments as may be requested.

The NNDSB administers the Rehabilitative Services Incentive Fund (RSIF) which is a grant allocated by the Department of Rehabilitative Services to promote investment in meeting the needs of individuals with physical and/or sensory disabilities. The RSIF grant is used to increase service capacity through expanding existing services or creating new services.

Through the NNDSB and the County match, local service providers (Bay Aging) have provided home repairs and modifications for accessible housing, emergency services,

education on disability issues and increased awareness of existing and new programs for disabled consumers.

The NNDSB performed a Triennial Needs Assessment in 2003 for the Northern Neck, however it was not sufficiently definitive to provide a basis for firm action.

The NNDSB shall support the needs assessment described in Section 5 below by providing input on needs and priorities of people with physical and/or sensory disabilities in the County. This data should be a comprehensive update of the Triennial Needs Assessment performed in 2003.

e. Emergency Services

With an aging population it will be increasingly difficult for the volunteer emergency services to meet the needs of the citizens of the County. See Section F.1 for a discussion of this issue.

3. Other Social Services Programs

The Commonwealth of Virginia, through the Northumberland County Department of Social Services, administers a number of federal and state programs including: TANF, AFDC (Foster Care), General Relief, State and Local Hospitalization, Medicaid, Family Access to Medical Security, Food Stamps (SNAP), Fuel/Cooling Assistance, Child Protective Services, Foster Care Services for Children, Employment Services, Child Day Care, and others. More information about these programs can be obtained from the State DSS website (https://dss.virginia.gov/) or by visiting the office of Northumberland County Department of Social Services.

(a) Child Abuse and Sexual Assault Investigation Team

A unique program in Northumberland County is the Child Abuse and Sexual Assault Investigation Team that consists of the Office of the Sheriff, the Office of the Commonwealth Attorney and the Department of Social Services. These three organizations have put together a team of trained investigators and social workers that work together to investigate and resolve claims of child abuse.

(b) Community Support

The County is very fortunate to have a strong network of support for a variety of emergency services and human services from non-profit organizations and volunteers. Some of the support comes from individuals and small informal groups, some is from individual churches or other structured community organizations, and some is from networks of churches, such as the Interfaith Service Council (https://interfaithservicecouncil.org/).

Some of the emergency services provide individuals in crisis in the community assistance with utility bills, food, clothing, or rent. The Department of Social Services relies heavily on collaboration with community organizations to assist with these services when the individuals do not qualify for government funded programs for such assistance.

Some groups provide summer or after school programs for youth while they are not in school and have no other structured supervised settings. Some provide organized recreational

activities available on a county-wide basis. Some work to improve housing, water and sanitary systems or other conditions that affect quality of life.

The County is, also, very fortunate to have a very active and capable chapter of the American Red Cross, managed and operated entirely with volunteers, who operate emergency shelters for the County in addition to other types of disaster assistance.

4. Housing

Affordable housing is a major issue in the County. There is a shortage of safe, healthy living places for low-income people in our area. There are still a large number of homes in the County without indoor plumbing and a number of homes where the houses are literally falling down around the people living in them. While not all are in poor repair, over a third of the 8,000 houses in the County are over 40 years old.

Currently there are limited resources available to assist low-income people with housing problems. There are various volunteer groups that help with repairs, Bay Aging Agency provides an indoor plumbing program, Habitat for Humanity helps build new homes and the Northumberland Department of Social Services provides "Section 8" housing assistance.

The Section 8 program consists of two elements: rental housing subsidies for eligible low-income families within the allotment of vouchers provided to the locality by the Virginia Housing Development Authority (VHDA); and self-sufficiency services which provide assistance in developing and achieving plans of self-sufficiency that include goals of transitioning from subsidy assistance to financially independent housing. While the Board of Supervisors has worked to keep property taxes in the county relatively low, as a further element of assistance, the County should provide some property tax relief for low-income households.

The County will work with the NNPDC to seek future Virginia Community Development Block Grants (VCDBG) for housing rehabilitation. Housing activities are eligible for VCDBG assistance to improve the living conditions of low- to moderate-income (LMI) people. VCDBG funding may be used to rehabilitate LMI-occupied housing units or in support of the development of new housing units which will be occupied by LMI persons. In addition, once the housing needs analysis is complete, the Board of Supervisors should consider the following recommendations:

"Affordable Housing" in general terms means safe, decent housing where housing costs do not exceed 30% of the gross household income. In addition, affordable housing is defined, for purposes

RECOMMMENDATIONS

To establish an affordable housing policy, strategies and implementation program. The objectives should be to support affordable housing for those who live and/or work in the County.

In particular, the County should provide guidance, resources and incentives to the nonprofit and for-profit development and financing communities to increase the supply of affordable housing (both rental and homeownership) for households with incomes below the median income of the County.

of the proposed policy, as those houses affordable to the forty percent of the County population that have household incomes at or below 80% of the County median income.

This policy and related strategies and recommendations should be developed by a proposed Northumberland County Housing Committee or equivalent organization to be established after completion of a needs assessment.

H. STRATEGY FOR DEVELOPING PUBLIC SERVICES

The following table provides a quick reference to the public services covered in this Chapter of the Comprehensive Plan. Because services are provided by a combination of different public and private sources, planning for their development must be done in coordination with several other agencies.

The County is directly responsible for providing resources for construction of schools, county offices, sewage disposal facilities, solid waste stations, reservoirs and public recreational sites. The State provides highways and support services through the Health Department and Virginia Co-Operative Extension. Still other services (emergency services and recreation are in this category) are provided by private enterprises or not-for-profit organizations. The strategy for implementing the public elements of the Comprehensive Plan involves coordinating County projects with those provided by the State and other groups, private or public.

SUMMARY - PROVIDERS OF SERVICES	
Type of Facility	**Agency or Level of Government Responsible for Providing Service**
Highways, Public	Primary Highways: VDOT[9], District Engineer's Office, Fredericksburg
	Secondary Roads: VDOT, County Resident Engineer's Office
	Bus Service: Bay Transit
Recreational Facilities	Recreational Programs: Northumberland YMCA
	State: Construction and operation of public boat ramps, maintain Natural Area Preserves
	Commercial marinas; charter fishing boats; campgrounds; community associations
Water Supply	Community water systems: public and privately owned and operated
Sewage Disposal	Private septic tank except in Reedville, Callao and Kilmarnock where public sewerage systems are operated
County Office and Operational Buildings	County: Administrator's office
Schools	Northumberland County School Board
Social Services	Northumberland Department of Social Services
Health Services, Septic Systems	Health Department of Northumberland County
Emergency Services	Volunteer Rescue Squads, Paid EMS, Fire Companies, County Officials, Sheriff
Solid Waste Services	Private Contractor

[9] Virginia Department of Transportation

I. SURPLUS PROPERTY

At the request of the Board of Supervisors, in 2023 the Planning Commission reviewed all surplus property owned by the County. This is property that is owned by the county but not currently in active use. Twenty-seven parcels were identified and evaluated. While the Planning Commission did not recommend that the Board of Supervisors immediately sell off any of the properties, it identified four parcels that were worth further evaluation.

RECOMMENDATION

The County Economic Development Commission should evaluate the former "poor farm" property to determine if its historical or potential recreational value is sufficient to justify further development as a tourism asset to the County.

As of this writing, one of those four parcels in North Kilmarnock is in the process of being sold and another, Hampton Hall, is being evaluated to be made into a kayak/canoe launch site (see section C(1)(d) in this chapter). One other larger parcel in the interior of the county used to house the "poor farm" the County maintained to house indigent residents during the early 20th century. Part of that parcel is being farmed, generating lease revenue for the county. However, the parcel may have value for its historic purpose as well as a site for hiking, camping or as a park if properly developed. Interested parties can get additional information about this and all of the other parcels from the office of the County Administrator.

CHAPTER 5

SUMMARY OF ISSUES, GOALS AND STRATEGIES

Community planning uses such terms as issues, goals, strategies, plans, and policies. Each of these has a specific meaning within the framework of the Comprehensive Plan.

- An **issue** is defined as a matter of concern to the community. It may be based on a community need that is not being met, a specific problem that needs to be addressed, or a new opportunity for improving the community.
- A **goal** is a broad statement indicating the general direction the community would like to move in order to deal with a specific issue. Goals become informal policy of the local government once they are adopted.
- A **strategy** deals with how the community plans to proceed in pursuing each goal.

This Comprehensive Plan for Northumberland County also contains a Land Use Plan, a Water Quality and Shoreline Protection Plan, and a Public Facilities and Services Plan. The Virginia statutes establish the broad requirements of a comprehensive plan, that it:

(1) be general in nature;

(2) relate to physical development or potential for such development; and

(3) address the broad (comprehensive) needs of the community.

This section focuses on defining issues upon which the Comprehensive Plan for Northumberland County is based. The issues came from a combination of several areas of analysis, including:

1. General issues deriving from the Land Use Plan, the Water Quality and Shoreline Protection Plan and the Public Facilities and Services Plan that may not have been specifically addressed in those chapters.

2. Physical and environmental issues from Chapter 1 Physical and Environmental Conditions.

3. Issues contained in the 2016 Plan which are still relevant today.

The organization and structure of this Chapter is the same as for Chapter 2 of the 2016 Comprehensive Plan in that it follows the outline of Chapter 1 through page A:15 and summarizes in general terms the issues addressed in Chapters 2-4 in the context of Community Development in the remaining pages of the Appendix.

PHYSICAL AND ENVIRONMENTAL ISSUES
1. Use and Development of Land
See also Chapter 2 (part C) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Existing development, the locations of roads and development along shorelines establish the general land use patterns of Northumberland County. • Residential development appears along both primary and secondary roads. • Commercial development is focused mostly along primary highways but also clustered around several villages. These hubs must continue to define the future business centers of the County. • Newer upscale residential development is located near and on the shorelines while more modest residential developments, including mobile and manufactured units, are found throughout the other rural areas of the County. • Industrial development, mostly marine and seafood-related, is located along the waterfront. Future development will likely continue to follow these same patterns as growth simply extends itself from patterns already established. This presents an opportunity to focus planning strategy on managing development to achieve a balanced community while preserving the rural and environmentally sensitive qualities of the County.	A. To provide a framework for managing future development of the County in a way that promotes opportunities for its citizens while directing growth to areas best able to accommodate growth. B. To provide a framework to manage growth along major highways and along the waterfront that considers the environmental and social constraints.	1. Build on the "Village Concept" in the land use plan to encourage clustering of higher intensity land uses, including small businesses and industries, to provide public services and utilities more efficiently, to retain the rural nature of the County and better meet the needs of the citizens of the County. 2. Maintain development guidelines designed to direct growth to areas with few or no physical constraints while promoting the preservation of croplands, forests and sensitive environmental areas. 3. Maintain guidelines to manage the growth along the shoreline to balance the shoreline development and the environmental considerations. See Chapter 2 (C4) for a more in-depth discussion of each of these strategies.	Short Term Short Term Short Term
Many forests and croplands located near shorelines are expected to eventually be converted to subdivision development as market demand for more waterfront lots drives prices of land upward. Some farmland has been preserved by using areas immediately next to the shoreline for dwellings while leaving cropland in service. This open space technique is a creative method of continuing the use of productive croplands and forests while making use of the shorelines for residences and water-based activities.	C. To preserve the agricultural and rural characteristics of the County. D. To reduce the adverse impact of development on shorelines and sensitive environmental areas.	1. Maintain guidelines that promote land use and development practices designed to preserve the rural character and qualities of the County. 2. Maintain site planning guidelines for subdivisions along shorelines including how they interface with agricultural and forestry lands. See Chapter 2 (C3) for a more in-depth discussion of each of these strategies.	Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
2. Topographic Conditions that Limit Development
See also Chapter 2 (part C) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Topography becomes a planning issue when steep slopes and unstable soils occur together. Steep slopes in and of themselves impact on development costs and for that reason developers are likely to avoid them where possible. Because water runs off steep slopes more rapidly than it does on level land, excessive slopes can increase the erosion rate. In combination with unstable soils, steep slopes cause serious soil erosion. If not mitigated, an increase in sediment and other pollutants may enter public waters. Steep slopes in the County occur mostly along stream banks where the impact of erosion is of greatest concern. Stormwater run-off can cause erosion and contaminate the County's waterways and the Bay. Methods applicable to other parts of Virginia for stormwater management are not effective.	A. To reduce soil erosion on steep slopes particularly along creek and stream banks. B. Establish a system of storm water control that mimics the pre-development hydrology.	1. Apply land use policies with incentives and restrictions that encourage developers to avoid building sites located on steep slopes. Through techniques such as cluster development, protective easements or other arrangements, the policies should provide incentives and a mechanism for preserving forests, agricultural activities, dunes and other environmental features. 2. Where development on slopes cannot be avoided, policies may require that mitigating engineering solutions be installed to reduce disturbance of the slopes. The Erosion and Sediment Control Ordinance and Chesapeake Bay Preservation Act Regulations are major tools in implementing this strategy. 3. Use site design techniques that store, infiltrate, evaporate, and detain runoff such as Low Impact Development, LID (where applicable). Retention of natural vegetation on slopes is critical, as the root structures hold the soil in place, thus minimizing land disturbance is recommended.	Short Term Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
3. Agricultural Soils
See also Chapter 2 (part C) for a more in-depth discussion of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Prime agricultural soils have the best combination of physical and chemical characteristics for producing crops. The County's farmland generates income for local farmers as well as the County. Current tax policy encourages keeping farmed land for that purpose. But farmland is often also ideal locations for development.	A. To strike a balance between sustainable farming as a viable industry in the County and the development of farmland for other purposes which may also be beneficial to the County and its citizens.	1. Continue to be very careful and contemplative in requests to re-zone Agricultural land or to change its use through conditional use permits. 2. Weigh the long-term benefits of land used for farming purposes as well as for other purposes, but do not focus on a simple cost-benefit analysis and fail to consider the cultural and aesthetic benefits of preservation of farmland. 3. Steer development of farmland in the County to areas with less productive soils, if possible.	Short Term Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
4. Soil Suitability for Septic Tanks
See also Chapter 3 (part B) for a more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
The suitability of the soil for septic tank drain fields is essential to development in most of the County. There is a public sewerage system serving the Reedville, North Kilmarnock, and Callao areas. Several other high-impact users (schools, for example) have on-site wastewater disposal systems. But the ability to develop residential and other less intensive land uses depends upon the ability of the soil to percolate satisfactorily and the adequacy of engineered systems. There is a high concentration of soils of poor quality for septic tanks located in the low-lying area seaward of the Suffolk Scarp (see Figures 1.3 and 1.7). Some poor soils are found in the upland regions of the County, but these are mostly along stream beds and banks. Such areas are generally restricted from development by CBRPA regulations. The County contains a combination of large low-lying areas that have soils unsuited for septic tank fields, and as much, or more, area with acceptable soils for that purpose. While potential future growth should be the primary target for development strategies, much of the existing development in the County occurred before the Chesapeake Bay regulations took effect. Because of this, lots that existed prior to those regulations may not have adequate space for an alternate septic tank field.	A. To guide development so that it avoids the problems of building on soils unsuitable for septic tank drain fields.	1. Within areas not served by public sewers, use innovative land planning techniques as incentives to encourage preservation of areas that are otherwise unsuited for development.	Short Term
	B. To avoid building beyond the capacity of good soils to the detriment of the shallow underground water supply.	1. Maintain through zoning, appropriate density regulations and other planning requirements to ensure that development does not exceed the capacity of the land. 2. To prevent contamination of the shallow aquifers and the ground water, continue to require (subdivision regulations) that each lot be tested for percolation as well as require adequate separation between the disposal field and the water table.	Short Term Short Term
	C. To expand opportunities for sewage disposal for owners of residences and small commercial places in cases where inadequate back-up drain fields are unavailable.	1. Continue the policy of providing/expanding public sanitary sewers services to the villages with higher concentrations of residential and business uses where economically viable. 2. Educate citizens to maintain septic systems by reducing water usage, minimizing the use of garbage disposals and pumping the septic tank every five years.	Long Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
5. Structural Qualities of Soils
See also Chapter 3 (part B) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Shrink-swell defines a soil's potential for volume change when subjected to a loss or gain in moisture. Volume changes occur mainly because of the interaction of clay minerals with water. The amount of change varies with the amount and type of clay minerals in the soil. The size of the load and the amount of change in soil moisture content may affect the amount of swelling of soils in place. Overall, most of the County's soils have shrink-swell qualities that are acceptable for most likely building purposes. A few areas have moderate to high shrink-swell characteristics that may require special engineering attention. In the uplands there should be few limitations to building because of shrink-swell although marginal conditions are likely to be present in the drainage valleys and near creek beds.	A. To inform the community of the potential problems that may result from building on certain soils. B. Limit development in areas subject to shrink-swell conditions	1. Advise builders and developers of the need to examine shrink-swell qualities of soils before committing to buildings or roads on a specific site. Make information that is available to the County, such as soil surveys, available to individuals and developers. 2. Include requirements for evaluating shrink-swell soil qualities; water table; soil permeability and other factors in the plan review process. 3. Because most of the areas with shrink-swell problems are in the same area as soils with poor septic tank qualities, additional restrictions should be considered when locating buildings within the sensitive area seaward of the Suffolk Scarp.	Short Term Short Term Mid Term

PHYSICAL AND ENVIRONMENTAL ISSUES
6. Flood-Prone Areas
See also Chapter 3 (part B5) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Floodplains are low-lying land areas adjacent to rivers, streams, creeks, and other water bodies that are subject to periodic flooding. The County has experienced major storms and flooding since early settlement of the area. A major storm occurred in November, 1985, when tides five feet above normal destroyed bulkheads, boathouses, and other waterfront structures. Through the National Flood Insurance Program, property owners may purchase federally-backed flood insurance. Flood Insurance Rate maps define areas subject to inundation at 100-year and 500-year intervals. The County has considerable development located within the 100-year floodplain (Figure 1.9). It includes full-time and seasonal dwellings, as well as businesses and industries. Most of this development within the floodplain occurred before the flood zone maps were first prepared. An owner still has the option of building within a floodplain although most owners who finance or refinance must purchase flood insurance. The County's present regulations require that any building constructed within the floodplain has a finished floor elevation two feet above the base flood elevation. Pressure for future development in the County's floodplains is expected to continue as long as undeveloped areas along the shorelines exist. The planning issue that arises is how far should the County try to go in regulating development in these vulnerable areas?	A. To promote maximum safety and to protect life and property from potential storm and flood damage. B. To meet the requirements as well as the intent of the Chesapeake Bay act to prevent contamination of the Bay	1. Provide awareness and instructions to citizens advising them of the potential dangers of establishing new buildings within flood-prone areas. 2. In cases where the use of flood-prone areas is acceptable, establish performance guidelines for new development within identified floodplains that limit the types of land uses that may be established in floodplains. 3. Continue to administer the County's Floodplain Management Ordinance and review it from time to time to ensure that it is in conformity with the latest FEMA guidelines. 4. Continue to administer the County's Subdivision Ordinance and Soil and Erosion Control Ordinance to provide, where needed, flood control devices and other improvements necessary to protect property from flooding. 5. Restrict establishing wastewater disposal systems and utilities in or adjacent to areas subject to frequent flooding.	Short Term Short Term Short Term Short Term Long Term

PHYSICAL AND ENVIRONMENTAL ISSUES
7. Wetlands and Natural Habitat Areas
See also Chapter 3 (part B5) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Wetlands are transitional areas between dry uplands and bodies of water. They serve as: (1) a natural water filter for wastes and sediments; (2) a barrier and absorber of floodwaters; (3) a buffer and stabilizer of shoreline from coastal erosion; (4) a recharge area for groundwater; and (5) a breeding and nesting ground for many species of fish, birds and plants. Wetlands may be either tidal or nontidal. Tidal wetlands consist of vegetated marshes, non-vegetated beaches, sandflats, mudflats and the like that are regularly flooded with tidal waters. Nontidal wetlands may be adjacent to, or located beyond, tidal influences. They are classified as "wetlands" because they are saturated with freshwater continually or seasonally. There are 1,640 acres of tidal wetlands in the County located primarily at the heads of streams (Figure 1.10). In addition, there are about 400 miles of streams above the tidal flow that have contiguous wetlands. Wetlands of both types are protected by federal, state and local laws. Natural Habitat Sites are habitat areas for rare, threatened or endangered species inventoried as part of a natural heritage program. Eighteen sites have been identified, most of which are also in marsh or wetland areas. These areas are also protected by federal laws. The planning issue related to both wetlands and habitat areas concerns identification of the areas and coordination of projects to avoid development within them. Site-specific planning should provide data on any protected areas and during reviews the County should determine that approvals of other agencies having jurisdiction are obtained before development plan approvals.	A. To protect official wetlands, natural habitat areas and other sensitive environmental areas and natural resources from loss or degradation by development. B. To meet the requirements as well as the intent of the Chesapeake Bay act to prevent contamination of the Bay.	1. Maintain a current inventory of all Natural Heritage Sites for Zoning Department review when processing development plans. As part of the process, the County should require developers to obtain assurances from other agencies having jurisdiction to the effect that habitat sites will not be disturbed. 2. Continue to administer the Chesapeake Bay Act regulations. Require developers to delineate and protect wetlands and natural habitat areas as part of the submission requirements of development or subdivision plans. 3. Establish incentives to encourage individuals to participate in the preservation of natural habitat areas, the scenic values of the County's shoreline and other environmentally sensitive areas. 4. Continue to administer the wetlands regulations through the local Wetlands Board. 5. Educate citizens about the importance of maintaining tidal marshes by pruning back overhanging limbs and removing debris so as to maximize light penetration, and remove invasive *Phragmites australis*.	Long Term Short Term Mid Term Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
8. Historic and Archeological Resources
See also Chapter 2 (part C5) for a more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
With its history dating back to the 17th century, Northumberland County has many buildings and sites that are historically significant (see Appendix B). Twenty-six sites are on the National Register of Historic Places (Figure 1.11). The VDHR has identified about 120 other sites that have some historic significance according to their criteria. No comprehensive survey to identify all of the historic resources has been performed by VDHR. For this reason, sites carried in their current inventory are incomplete. A complete survey of the County would likely include all buildings more than 50 years old. Also, there could be several hundred additional sites added to the inventory. Two historic districts have been established: at Reedville and at Heathsville. With two historic districts in place and twenty-six places on the National Register, the County has the basics to establishing an impressive program of historic preservation. To take this program further the County could sponsor a county-wide survey in order to establish a complete inventory of historic resources.	A. To acknowledge the importance of preserving places of known historical and archeological significance by establishing county policies designed to protect designated places from loss or degradation by development. B. To be able to emphasize Historical Resources as a tourist and resident attraction.	1. Identify additional sites that may be eligible for the Federal and State Registers and prepare documentation for nominating them to the registers. 2. Perform a county-wide inventory of historic and archeological sites. A resource for both technical and financial assistance is administered by the VDHR. 3. Identify an appropriate organization as responsible for County-wide historical preservation and planning. 4. Integrate the strategy of historic preservation as well as the recent National Heritage Area Designation of the Northern Neck to increase tourism. 5. Take advantage of these resources by further promoting them as part of the County's tourism strategy.	Long Term Long Term Long Term Long Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
9. Chesapeake Bay Protected Areas
See also Chapter 3 (part B6) for a more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
The County was among the first counties to adopt the model Chesapeake Bay Preservation Ordinance provided by the VDEQ. That ordinance established a Resource Protection Area (RPA) to include: tidal wetlands; nontidal wetlands connected by surface flow and contiguous to tidal wetlands; tidal shores; and a 100-foot vegetated buffer. The ordinance also established an RMA covering all remaining territory within the County's jurisdiction. Development is allowed in the RMA after meeting performance standards set out in the ordinance. The ordinance was recently updated to reflect recent changes to the Chesapeake Bay.	A. To protect the natural resources of the Chesapeake Bay and its tributary streams by managing development and use of the watersheds and shorelines to reduce the quantity of pollutants entering state waters. B. To meet the requirements as well as the intent of the Chesapeake Bay act to prevent contamination of the Bay.	1. Continue to administer the performance standards and regulations of the zoning ordinance in the RPA and RMA. 2. Continue to coordinate the efforts of the County with those of DEQ and other State agencies concerned with water quality protection. 3. Continue to monitor and enforce the requirements of the County ordinance related to the Bay Act.	Short Term Short Term Short Term

10. Groundwater Supply			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
Groundwater is available from three aquifers. The "surface water aquifer" can provide from five to 20 gallons per minute (7,200 - 28,800 gallons per 24-hour day) from shallow wells. It is a marginally satisfactory source of water for residential and most small business uses. Most water users can obtain good-quality water from deep wells extended into the artesian aquifers located 300 to 900 feet below the surface. However, in the southeastern area of the County, near seawater, the deep aquifer has high sodium content. The increased amount of sodium in the water can also result from the pressure drop caused by very large water withdrawals at a single point. Reduced pressure in the aquifers permit the mixing of sea water with that in the aquifers. Large water users outside the County significantly affect the long term (50 – 70 year) water supply available and are monitored by VDEQ. The deep artesian water supplies may be unsustainable in the long run and the surficial water aquifer cannot by itself supply sufficient water for the villages and industrial users. Shallow (surficial aquifer) wells also have a higher potential to be contaminated by agricultural and residential herbicides and fertilizers than deep water wells. Other well water contaminants of concern are the so-called "forever chemicals", PFO's and PFA's that have been identified elsewhere in the U.S. Reservoirs can provide a sustainable public water supply for part of the County as well as create waterfront property, enhance recreation in the form of kayaking, canoeing and freshwater fishing, and provide water for irrigation of vegetables, vineyards, nurseries, etc. Changes in environmental permitting, especially wetland mitigation costs, in addition to reservoir construction costs, water treatment plant costs, as well as easement and construction cost for the many miles of pipeline infrastructure that would be need to be installed to distribute potable water make reservoirs financially unfeasible at this time, given the County's current funding resources. Desalination technology is advancing considerably and should also be considered as a potential source of future potable water supplies. In the future, municipal water supply from desalination may be more affordable to the county than permitting and constructing freshwater reservoirs.	A. To protect the water supply in the surficial water aquifer from pollution originating in surface uses of the property. B. To assure a sustainable long-term freshwater supply for the County. C. To protect the potential reservoir sites from development that would preclude their availability when needed. D. To protect aquifers from hydraulic fracturing (fracking) and its potential impact on the fresh water supply. E. Support regional water supply planning. Also see the Northern Neck Regional Water Supply Plan (July 2010). F. Educate and help protect citizens from potentially contaminated shallow well water	1. Cooperate with the VDEQ to locate defective underground storage tanks, replacing them with tanks of approved materials. 2. Monitor the financial feasibility for a long-term program to provide reservoirs and other sources of fresh water to reduce dependency upon the existing deep aquifers. Continue to monitor advances in desalination technology as it applies to municipal water systems. 3. Ensure that no development takes place in valleys that may be flooded for reservoirs, or that inappropriate development takes place on property that may become reservoir waterfront. 4. Monitor and make comments on fracking requests in the region. 5. Support annual household shallow and deep well testing via the local Virginia Cooperative Extension Department.	Short Term Long Term Long Term Long Term Short Term

Several County water systems have been developed using the deeper aquifers, the largest of which is at Reedville. Public water systems that serve 25 or more people and have 15 connections for 60 or more days per year are regulated by the VDH. Currently, there are 62 public water systems in the County.	A. To discourage extremely large withdrawals from the lower aquifers in such amounts as to cause a pressure drop thus allowing sea water to infiltrate into the aquifer. B. To prevent pollution of surface aquifers and public water supply sources through a program of wellhead protection.	1. Delineate wellhead protection areas for active public water supply wells. Maintain limitations on the types of land uses allowed within the protected area and the contingency plan for dealing with accidents.	Long Term

PHYSICAL AND ENVIRONMENTAL ISSUES 11. Water Pollution Sources See also Chapter 3 for more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
Potential sources of pollution include the following: underground storage tanks, landfills, lagoons and holding ponds, sludge application, septic systems, pesticides and fertilizers and hazardous wastes. The VDEQ monitors point and non-point pollution sources through two programs. "Pollution Discharge Elimination System (VPDES) Permits" are required for any "point source" of pollution discharging into state waters. "Point sources" are sources that can be traced to a single point such as an industrial waste or sewage discharge pipe. In 2015, VDEQ reported two active industrial VPDES permits and four public permits. In addition, other land uses that do not discharge directly into state waters can contaminate both surface and ground water and are monitored through the "pollution abatement permit program." This program is focused on large operations such as commercial livestock raising, sewage treatment plants, sludge disposal sites, lagoons and the like. One (1) pollution abatement permit was active in the Summer of 2024. Mining is another source of potential pollution. In 2024, there were nine active mining permits for sand and/or gravel in the County. Mining has the potential to penetrate the water table and thereby disrupt the surficial aquifers. Methods and requirements for reclamation of a site upon completion of a mining operation are issues.	A. To protect the underground water, surface water, and runoff from pollution resulting from all sources of pollution. B. To protect surface and underground water from pollution by large commercial or institutional operations.	1. Monitor the application of pesticides and agricultural chemicals through a "nutrient management plan"[1] and Best Management Practices. 2. Continue the County process for handling, storage, transporting and siting of hazardous materials and wastes. This process also provides for disposal of mattresses, refrigerators and other bulk wastes. The County should continue to support the semi-annual hazardous and electronic waste collection events 3. Maintain County policies governing the location, installation and operation of large commercial activities including: animal raising, sludge disposal, lagoons, landfills, and similar activities through zoning permits and other local regulations. 4. Coordinate and cooperate with the VDEQ in the administration of pollution abatement permits.	Short Term Short Term Short Term Long Term
Non-point sources of pollution or those that cannot be traced to a single source or point are always threats to both ground and surface water. Non-point pollution may come from a variety of sources such as: agriculture, forestry, and developed areas.	A. See watershed goals (#12 below)	1. See watershed policies. (#12 below)	

[1] Oversight by the U. S. Soil Conservation Service.

PHYSICAL AND ENVIRONMENTAL ISSUES
12. Watersheds
See also Chapter 3 (part B8) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
Watersheds determine how stormwater (any precipitation) moves on the surface, at what rate it is absorbed into the ground, where the runoff enters major rivers and, eventually, the Chesapeake Bay. Along with surface water, pollutants may be infiltrated into the groundwater supply while excess runoff carries them to the rivers and Bay. While many specific points of pollution can be identified and regulated (previous topic), there are numerous sources of pollution which cannot be identified by specific sites. It comes from roads, croplands, construction sites, overflowing septic tanks and, in short, any locations used by people. These "non-point" sources are of major concern in the protection of both ground water and the Chesapeake Bay. Consequently, the management of watersheds is an important element in the protection of the water supply and also the Bay. In Chapter 1, eight major watersheds were identified which range in area from seven to 63 square miles. All but two (which drain directly into the Chesapeake Bay) define the drainage area of major rivers or creeks. Within each watershed numerous smaller watersheds may be defined. The planning issues related to watersheds concern the level of pollutants that could enter the water supply or the Bay with surface water as their carrier. The focus of issues and the strategy for dealing with them must therefore address methods of reducing not only the amount of runoff but its quality as well. Because all of the County's territory has been included in either the CBRPA or CBRMA, the approach to managing the watersheds can be linked to the same performance standards used in the Resource Management Area. Timber cutting, particularly clear cutting, and reforestation has an impact on erosion because of the large amount of land that is disturbed during cutting and removal. Silvicultural activities are exempt from the Chesapeake Bay Preservation regulations, provided that silvicultural operations adhere to water quality protection procedures prescribed by the Virginia Department of Forestry in the Fifth Edition (March 2011) of "Virginia's Forestry Best Management Practices for Water Quality Technical Manual."	A. Achieve a significant reduction in the number of impurities reaching the County's underground water supply from surface water. B. Achieve a reduction in the amount of runoff from stormwater and a significant reduction in the impurities that the stormwater carries to state waters. C. To eliminate soil erosion and incremental runoff resulting from silvicultural activities. D. Achieve a reduction in the amounts of nutrients, nitrate and phosphate that discharge into waterways via the groundwater by increasing the number of deep-rooted trees in the RPA.	1. Apply performance standards of the RMA and strengthen them for individual watersheds if necessary to deal with special conditions in more intensely-developed areas. 2. Support the State Water Control Board in their efforts to improve the quality of waters of the Bay. 3. Require the use of Low Impact Development techniques where applicable to control the runoff from storm water. 4. Make use of the Best Management Practices as established by the VDEQ. 5. Maintain review standards and requirements for all major developments, including activities which require state-issued Pollution Abatement Permits, for eliminating the impact of such uses on water quality. 6. Coordinate County policies with the VDACS's Nutrient Management Program to encourage NMPs to be established on all farms. 7. Encourage the use of Forestry Best Management Practices for Water Quality Technical Manual (Va. Dept of Forestry, 2011) in connection with timber harvesting and removal from forest stands within the County. 8. Ensure compliance with the CBRPA requirements of the Chesapeake Bay Act.	Long Term Short Term Short Term Short Term Long Term Mid-Term Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES 13 Soil Conditions See also Chapter 3 (part B3 & 4) for more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
The water table in the areas of the County lying seaward of the "Suffolk Scarp" is quite close to the surface (Figures 1.3 and 1.15). In these areas the water table is less than 24 inches from the surface. In the remainder of the County, the water table should not present a limitation to development because the areas affected are mostly along stream beds and banks. A high water table exposes the surficial aquifer to potential pollution from surface seepage, failing septic tanks and other pollutants that enter the soil. When combined with soils that have a high permeability there is a particular problem with undigested sewage entering the underground water system even when septic tanks are working normally. The increasing use of engineered systems in areas otherwise unsuitable for normal drain fields creates additional problems when the systems are not properly maintained. Soils with high erodibility also contribute to river and bay pollution when soil particles containing impurities are carried by stormwater runoff into public waters. Construction sites are the source of potential soil erosion but any activity that disturbs the natural surface vegetation, including farming, is a potential source of soil erosion. Erosion is particularly a problem when slopes are steep where the soil is unstable. A simple break in the natural vegetation or dune may initiate erosion that continues indefinitely. The planning issues regarding soils cover a wide range of space, but generally the issues are focused on the need to avoid extensive ground disturbance and poorly designed structures in areas where soils are extremely sensitive to erosion. And when such soils are disturbed, there is a great need to protect the site with erosion and sedimentation prevention devices.	A. To protect the underground water quality through the management of development. B. To protect state waters from pollution resulting from avoidable soil erosion. C. To reduce the amount of development on highly erodible soils, particularly where slopes are excessive.	1. Maintain development policies that discourage development on slopes greater than 15 percent and prevent development where slopes are 20 percent or greater. 2. Maintain zoning and subdivision policies to provide incentives that encourage the use of innovative land planning techniques. The incentives should be designed to discourage the development of areas with poor soils, high water tables, steep slopes or areas with other environmental constraints. 3. Require erosion and sedimentation prevention devices where river or bay pollution from development are likely	Short Term Short Term Short Term

PHYSICAL AND ENVIRONMENTAL ISSUES
14. Shoreline Conditions
See also Chapter 3 (part B9-11) for more in-depth discussion of each of these issues.

ISSUES	GOALS	STRATEGIES	TIMEFRAME
The shoreline conditions report (Northumberland County, VIMS, 2014) identified 509 miles of shoreline[2] in the County which were distributed as follows: • Agriculture 81 miles • Bare 3 miles • Commercial 8 miles • Forest 124 miles • Grass 21 miles • Industrial 0 miles • Paved 7 miles • Residential 245 miles • Scrub-shrub 19 miles Shoreline erosion is evident along the entire (exposed) portion of the shoreline (Figure 1.19) where VIMS reported erosion was occurring at rates of two feet per year or more. Erosion is unquestionably greater in the shorelines exposed directly to northeaster storms. The major issue raised by shoreline erosion and alterations of shorelines is that these actions increase the amount of sediment being deposited into the Chesapeake Bay. Little can be done to change the natural storm patterns and to a large extent the community must live with this natural change in its boundaries over time. Conservation measures, however, may help delay the damage from natural causes and County intervention should prevent damage from non-natural causes. A major defense to slow the rate of shoreline erosion is actions that protect existing marshes and promote their extension.	A. To reduce the causes of shoreline erosion. B. To promote the growth of marshes and other natural barriers to erosion. C. To protect the shorelines which are vulnerable to extensive erosion from future buildings and construction. D. Verify the VIMS shoreline data and determine the likely impact of further possible development.	1. Preparation of guidelines or restrictions in the Subdivision Ordinance to improve the shoreline resistance to erosion. 2. Review existing shoreline conditions and potential protection measures. One source to check is the VIMS Comprehensive Coastal Resource Management Portal (CCRMP)[3]. 3. Reinforce standards for construction which modifies the shoreline, such as bulkheads, piers and boat houses. 4. Continue to administer and improve enforcement of requirements of the CBRPA regulations to preserve marshlands, wetlands and other sensitive environmental features from erosion or destruction. \ 5. Educate citizens about the importance of maintaining tidal marshes by pruning back overhanging limbs and removing debris so as to maximize light penetration and remove invasive *Phragmites australis*.	Short Term Short Term Short Term Short Term Short Term

[2] This figure is derived from summing individual page totals of the Shoreline Inventory report.
[3] See Chapter 3 for more information on CCRMP.

PHYSICAL AND ENVIRONMENTAL ISSUES 15. Access to Public Waters See also Chapter 4 (part C) for more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
Access to the Chesapeake Bay and to the numerous rivers and creeks that form the 509-mile shoreline of Northumberland County is one of the County's major resources for both residents and visitors. Existing access is provided from the major rivers (see Figure 1.20) and includes: bank and pier fishing, boat launching ramps, commercial marinas, private community marinas and public beaches. The need to improve public access to state waters is one of the major goals of the Chesapeake Bay Program. That program emphasizes the desire to improve access for boat-related activities, swimming, crabbing and fishing and access to natural wildlife areas. The Public Access Plan (Chesapeake Bay Program) emphasizes the need to increase public access and to upgrade public boat ramps. Marshes and wetlands are resources to extend opportunities for the public to enjoy the shorelines and waterfront areas. There is an ongoing desire for improved access to the waterfront for local citizens as well as for extended facilities to support tourism.	A. Improve existing public boat ramps and increase the number of access points for general public and visitor use. B. Increase the use of shorelines to promote the growth of compatible economic development and tourism. C. Increase public water access to take the pressure off shoreline development and encourage attractive, affordable housing inland. D. Improve water access by adding or upgrading appropriate facilities	1. Continue the County program to develop additional public boat ramps and more fishing piers. Existing facilities should also be upgraded with better boat-handling facilities, piers and ample boat trailer parking. 2. Identify areas and appropriate zoning where the shoreline could be developed with facilities for economic use and tourism, including resort motels/boatels and similar enterprises. 3. Identify places where visitors may access public waters for swimming, fishing and boating. Improve beach facilities. 4. Establish waterfront "parks" with picnic tables, sanitary facilities and boat ramps and piers. Land conservation organizations should be encouraged to actively pursue this strategy through conservation easements and other tax incentives. 5. Establish a sufficient number of canoe/kayak launching facilities so that a "trail" would be created, allowing individuals not only to launch and return to a variety of sites, but to "tour" the County by water." 6. Continue to work with and support goals of the NCBPAA.	Short Term Mid Term Short Term Short Term Short Term Short Term

COMMUNITY DEVELOPMENT ISSUES 1. Job Growth, Housing and Education See also Chapter 4 for a more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
JOB GROWTH The year-round population of the County increased slightly (about 90 people) between 2000 and 2010 with the dominant increase in the 65 plus age group. Between 2010 and 2020, it fell by 532. Since the 2020 census, it has fallen a further 26 people. The County's young population is leaving the County while the older, retired population as a percentage is growing. There are limited provisions and services for the truly elderly and people with disabilities, including health services. There are no hospitals or nursing homes in the County and few clinics. During the summer months, the population peaks as seasonal residents and week-end visitors come to the County. There has been an increase in short term rentals in the County which adds to the summertime population peaks. These tourists add to the economy as well as increase the services required of local government. Among the issues that relate to the demographic trends are the types of jobs available to residents. Seasonal jobs no longer dominate the local economy although some employment peaks during the summer and fall and then slacks off during winter and spring. Many workers commute to surrounding counties. The economy could be improved by the addition of more year-round jobs. There is an apparent market for more retail establishments, since the County is lagging other counties significantly in retail sales. The demand is even greater during the peak tourist days and months. The County has many natural recreational and cultural assets that can be used to improve the job market and reverse or reduce the out-migration of workers. Many of these are addressed in materials published by the County EDC and the web page of the Northern Neck Tourism Council. The County has a number of sites included in the state-designated Enterprise Zones. This inclusion affords certain tax and other incentives to eligible businesses.	A. Provide necessary health and social services for the elderly and disabled persons with those with special needs B. To increase efforts to promote economic development to bring new businesses and jobs to the County C. To increase tourism and thereby increase jobs and income to the County D. For statement on villages, see Issue No. 1 under Physical and Environmental Issues.	1. Promote provision of transportation, education, recreation, and medical services by both public and private sources. Continue expansion of public library services. 2. Recognize that the primary population growth and source of income to the County is from the retired community and emphasize growth and support to reflect this demographic component. 3. Evaluate the locations of Enterprise Zones to be compatible with the “Village” strategy. Focus on Callao with the new sewer system. 4. Promote and attract jobs in occupations that are active during the winter and spring to increase year-round employment, especially jobs related to tourism, and to support the retired community in order to retain the workforce in the County. 5. Support the efforts of the EDC and the NNTC to bring business and tourists to the County.	Short Term Mid Term Mid Term Short Term Short Term

GROWTH & HOUSING Some small growth is being experienced in and near the villages, particularly at Callao, Heathsville and Burgess. But there are limitations to the type of business or industry that can be accommodated in Heathsville or Burgess because neither of these villages has a sewer system. There is additional sewer capacity at Reedville, but there is little indication that new businesses are attracted to that area. The Callao sewer project has been completed, and may assist in attracting businesses to that area The major growth has been in waterfront property. The attractiveness of the County's shoreline property has resulted in a surge of shoreline subdivision development since 1995 and in new homes along the waterways of the County. Because of this development, higher property values may influence the conversion of farms and forests to waterfront subdivisions. This is likely to increase the cost of housing county-wide as demand for construction services increases. In other matters related to housing, there are very few affordable rental housing units for full-time residents and new housing is oriented toward waterfront communities. Some housing units still lack complete plumbing and other basic equipment and are marginally acceptable as shelter. Approximately a third of the housing units in the County are over 40 years old.	A. To ensure that older housing units and mobile units comply with modern health and safety standards. B. To provide affordable housing for the younger aged families.	1. Continue the enforcement of building and safety codes. 2. Pursue programs through the NNPDC to provide plumbing for housing units without this service. 3. Investigate programs to aid in providing multi-family affordable housing.	Short Term Short Term Short Term
EDUCATION Education quality and access remain important issues in most communities. The challenges in the County include declining test scores and lack of adequate preparation for the jobs that need to be done locally. School enrollment continues to shrink. Many students who do well leave the county not only for higher education but also for future employment. This leaves potentially a bleak future where the County is increasingly inhabited by retirees, and they are dependent on trades people to help them maintain their ability to live here.	A. To increase the quality of educational institutions in the County, including post-secondary education focused on trades.	1. Encourage the School Board to focus greater attention on test scores and preparation for post-secondary education and training. 2. Work with Rappahannock Community College and local employers to improve access to post-secondary training for local jobs in the trades,	Short Term Short Term

COMMUNITY DEVELOPMENT ISSUES 2. Transportation and Recreation See also Chapter 4 (parts B and C) for a more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
<u>HIGHWAYS:</u> Except for a few roads that are in private ownership, highways in Virginia counties are owned and maintained by the State. The amount of traffic on any given road determines the priority given by VDOT for improving the road, whether primary or secondary. Primary roads are planned and funded through a VDOT Division while secondary roads (those numbered 600 or higher) are handled within a Region. Primaries serving the County include U.S. 360, and State Routes 200, 201 and 202. Of these U.S. 360 provides circulation through a central corridor running the entire distance of the County. Route 200 extends this corridor south from Burgess to Kilmarnock and Route 202 extends it to the northwest from Callao. Transportation issues focus on: a need to continue the improvement of U.S. 360 to four-lane status for its entire distance through the County; maintain the quality of Routes 200, 201 and 202; and to establish a network of feeder roads sufficient to provide good circulation throughout all parts of the County.	A. Maintain a network of public roads consisting of corridor routes which carry most of the traffic; feeder (secondary) roads which move traffic from the corridors to different parts of the County and; service (secondary) roads to provide access to subdivisions and individual properties; and bikeways. B. Develop and implement a process whereby the County is proactive in defining secondary road improvements	1. Designate U.S. 360; and VA Route 200 as the primary corridor routes. 2. Improve U.S. 360 to four lanes from Heathsville to Burgess and from Lilian to Reedville. 3. Support the Potomac Heritage National Scenic Trail as the designated system of regional bike trails to support this mode of transportation and recreation. 4. Ensure subdivision roads are built to VDOT standards.	Short Term Long Term Short Term Short Term
<u>RECREATIONAL AREAS AND FACILITIES</u> Recreation in Northumberland County comes from a combination of natural, public and private sources. Water, as was noted in Chapter 1, offers a primary source of recreation. Along more structured lines, a mixture of recreational opportunities is offered through County and private resources. Major facilities include recreational sites at all of the public schools, water-related activities including marinas, boat launching areas, swimming and fishing areas, charter boat operators and ferry operators to areas in the Bay and tributaries. There are three major conservation areas owned by the State which have potential for development for limited recreational use (see Table 4.2 and associated discussion). There is a need for more public access to the recreational opportunities offered by the Chesapeake Bay and its tributary rivers and streams. This observation comes from studies of the Chesapeake Bay access resources and from comments of community leaders and citizens. Access for fishing - both for	A. Expand the opportunities for active and passive recreation throughout the County. B. Expand public access to the Chesapeake Bay, to tidal waters and to non-tidal waters.	1. Establish an ongoing program for the identification, acquisition, and implementation of existing and potential recreational areas and facilities. 2. Work with local organizations and developers to construct public facilities including parks, tennis and basketball courts, and ball fields. 3. Provide additional boat ramps and piers including upgrading of some existing ramps and piers to improve access the Chesapeake Bay for fishing and other water sports. .4. Expand fresh and tidal water fishing opportunities; including those freshwater fishing opportunities associated with the development of reservoirs for potable/irrigation water.	Short Term Short Term Mid Term Long Term

boat launching and pier/bank fishing - and beaches for swimming are cited as major needs.		5. Encourage and support charter boat operators, ferries and other users of the Bay in the attraction of visitors to the County. 6. Continue working with the Northern Neck Chesapeake Bay Public Access Authority to maintain and expand recreational areas. 7. Identify surplus county property that can be put to use as or for a recreational facility or tourist attraction.	Short Term Short Term Short Term

COMMUNITY DEVELOPMENT ISSUES 3. Public Facilities See also Chapter 4 (part D,E,F,G) for a more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
<u>WATER AND SEWER</u> The potable water supply for the County is provided by wells, both the shallow and deep aquifers, and there does not appear to be any shortages projected for the next decade or two, although a problem exists in later decades. (This is addressed in Chapters 1, and 3). Areas where development activity is expected to be concentrated should generally be considered for a community water system. This applies particularly to large-scale residential developments and major business or industrial uses. The public sewerage system located in Reedville was expanded to include Fleeton. A sewer system has been installed in Callao to solve the problems of poor soils which limited future development and was causing problems with existing systems. There is also a sewer system in Kilmarnock that serves a portion of the County residents. New development during recent years has clustered either near the villages or along the shorelines. When public sewers can be shown to be financially feasible, commercial development of Heathsville, Burgess and other villages would be greatly assisted by their addition.	A. To assure an adequate long-term water supply for all County users including large-scale developments, sites for economic development, and existing villages. B. To safeguard against over-use of water supply in the aquifers by any one user. C. To provide sewer facilities to villages and areas where economically feasible.	1. Avoid the establishment of industries that use such large quantities of water that the loss of pressure in the aquifer threatens salt infiltration or other contaminants unless those industries can be sustainably supplied with water from other sources. 2. Continue to evaluate the feasibility of providing sewer to villages with greatest growth potential. Continue to monitor availability of grants from state and/or federal sources for projects that meet their criteria.	Long Term Short Term
<u>HEALTH, HOUSING AND SOCIAL SERVICES</u> The County has unmet needs in the area of health, housing and social services: • The County has a number of residents who are at or below federal poverty levels and/or unemployed, are disabled and a disproportionate number of the population who are over sixty-five and are a burden on the local health care system. Currently approximately 37.5% of the population is over 65 years of age and by 2030 the number is expected to be close to 42%. • Housing is a major issue in the County. There is a shortage of safe, healthy living places for low income people in our area. There are still a large number of homes in the County without indoor plumbing and a number of homes where the houses are literally falling down around the people living in them. While not all are in poor repair, over a third of the 8,000 houses in the County are over 40 years old.	A. Identify resources, services, and gaps in services. to determine the community's relative health and welfare. Identify what additional or reinforced services are needed, what should be the priorities and a plan of action to improve the situation. B. Community health, housing and social services should be planned and implemented in a manner that reflects a community-based, comprehensive approach that best meets the needs of citizens.	1. Plan and implement a comprehensive planning process which represents a collaborative approach involving people from all sectors of the community. All forms of diversity should be represented and the process should be a very public, deliberative one. 2. Collaborate with institutional health care systems such as VCU and Bon Secours to establish local urgent care or other facilities.	Long Term Short Term

COMMUNITY DEVELOPMENT ISSUES 3. Public Facilities See also Chapter 4 (part D,E,F,G) for a more in-depth discussion of each of these issues.			
ISSUES	GOALS	STRATEGIES	TIMEFRAME
• The County has a large number of under-funded social programs supported by a combination of paid and volunteer staff.			
<u>OTHER SERVICES</u> Emergency services are provided by volunteer agencies. Over the last couple of years, it has become increasingly difficult to recruit and retain volunteer rescue squad members. Rescue Squads recognized this fact and asked the Board of Supervisors for help. In 2014, the County hired a Chief of Emergency Services to support the volunteer squads. In 2015, the county hired career full time rescue squad staff, and now have coverage 24 hours a day, 7 days a week. Refuse disposal is provided under contract and the level of resources required may need to be increased as the population continues to increase. It is important that the County has the communications and Internet services comparable to that available elsewhere in Virginia. This is essential to attract and retain business and to provide essential personal emergency services. At present some areas of the County are without Internet broadband due to the lack of infrastructure and have marginal cell phone services.	A. Assure the present level and quality of services is maintained as the County grows and the demographics change B. Provide 100% coverage of the County area for reliable cell phone service. C. Enable access to high speed broadband internet service to all residents of the County	1. Evaluate the ability of the volunteer organizations to maintain their current level of service over the next 5-10 years. 2. Continue to support the improvement of the Emergency Response capability of the County. 3. Encourage and facilitate increases in cell phone coverage. 4. Encourage and facilitate fiber optic and wireless broadband systems throughout the County.	Short Term Short Term Short Term Short Term

APPENDIX A

Historic Places

2025

Appendix B contains a list of the historic places in Northumberland County that are on the National List of Historic Places. The following list is more comprehensive and includes the places in the historic districts in Heathsville and Reedville.

LIST OF HISTORIC PLACES IN NORTHUMBERLAND COUNTY (Established Prior to 1915)[1]

Anchorage House, 1750-1775
Arcadia (Blundon House), 1890 (Incorporates original 1783 house)
Ball Cemetery, 1694 (site of Cress Field, part of original Bay View)
Bay View Plantation, home site, 1830
Bruington, house, c 1700
Burnt Chimneys, house, c 1816
Camp Kittamaquand (Girl Scout Camp)
Christmas Cove, house, c 1780
Clark's Mill, c 1840
Clifton, house, pre-1790
Cloverdale, house, pre-1790
Coan Hall (John Mottrom plantation site, c 1640; Victorian cottage, c 1870s
Cobb's Hall Burying Ground, 1664 (wall 1720); grave of Richard Lee I, the immigrant
Cobb's Hall, house, 1853; dependency building, 1732
Cottage, The c 1840
Cowart family cemetery, 1840
Cypress Farm, early 1800s
Cypress Swamp (Bald Cypress trees)

[1] List provided by Jan Beckett

Ditchley, house, c 1752
Edgehill, house, c 1830
Fairfields Methodist Church, original site, 1789
Fish Factory Chimney (restored), c 1913
Gardy Millpond
Gascony, house, 1848
Glebe Point Campground
Guarding Point, house, c 1838
Great Blue Heron Rookery
Hancok Lee's House Site (old Ditchley) and Cemetery, 1694
Hard Bargain, house, c 1780
Heathsville Historic District
- The Academy, house, 1830-1845
- Basye Cemetery, 1841
- Basye/Snow/Tringle House, 1830-1845
- Betts/Anderson/Lawson House, pre-1848
- Belleville, house, c 1725
- Chicacoan Cottage, c 1800
- Chicacoan Oak, site
- Confederate Monument, 1873
- Constitution Oak, planted 1902
- Eichelberger/Hall House, 1892-1893
- Harding/Elmore House, 1825-1850
- Haynie Cemetery, 1697
- Heathsville Methodist Protestant Church, 1855-1860
- Heathsville United Methodist Church, 1894
- Juliana Gordon Hayes Monument, 1895 (At Heathsville UMC)
- Lawson/Headley House, 1820-1860
- Masonic Lodge, 1894
- Middleton/Rowe House, 1851
- Moss Cottage, c 1845
- Northumberland County Courthouse, 1851
- Oakley, house, c 1794-1810
- Old Northumberland County Jail, 1844
- Patrick A. Jones House, 1839-1845 and Anderson Cemetery
- Rice's Hotel/Hughlett's Tavern, c 1795
- Rice/Richardson/Robertson House, 1890-1910
- Springfield, house, 1828
- St. Stephen's Episcopal Church, 1881
- Sunnyside, house, c 1820 and cemetery
- Wall/Lackey/Rowe House, 1832

Holley Graded School, site 1869, bldg. 1920s
Hope Union (Shiloh) Cemetery, c 1912-1915
Howland School, 1867
Hurstville, house, c 1750
Indian Creek Yacht and Country Club (former plantation)

Indian Settlements:
- Cekacawan (Chicacoan)
- Machoatick (Lower Matchotic)
- Wicocomoco
- Cinquack
- Later Wicocomoco (combined Chicacoan and Wicocomoco)

Keen/Opie Cemetery, 1684
Kirkland Grove, Baptist Campground, 1892
Lindsey (Cox) Cemetery, 1667
Locksley Hall, house, 1865-1870
Mantua, house, 1785, and cemetery
Marvin Grove Camp (site), Methodist Episcopal Church, South, founded 1878, burned 1930
Morris and Fisher Fish Factory Stock, 1910
Mount Pisgah, house, c 1850
Mount Zio, house and school, c 1851
Northumberland Heritage Trail (Heathsville to Reedville)
Northumberland House Cemetery, Grave of Col. John Moore (Revolutionary War Officer) 1813
Palmer Hall Chapel, 1885
Reedville Historic District
- Bethany United Methodist Church, 1899-1901
- Blunden & Hinton Store (Reedville Market), c 1890
- Butler's Boat Yard (Reedville Marine Railway), 1906
- Crowther Meat Shop (Booth/McKenney), house, c 1890
- Dey (pre-fab Sears, Roebuck house, brought by steamboat), c 1920
- James C. Fisher House (The Gables), 1909; carriage house, c 1880
- Garrison House, former boarding house, c 1890
- Megil's Bakery & Ice Cream Parlor, 1912
- Millionaires Row (stately homes), c 1900
- Albert Morris House (Elizabeth House), 1900
- Muir House (former hotel), c 1900
- Peoples Bank of Reedville (not current name), 1910
- Elijah W. Reed, monument (marble obelisk), 1888
- George Reed House (Slaughter), 1897-1899
- Reed & Rice Store, 1913
- Reedville House (former hotel), 1885
- Reedville Masonic Hall, c 1910
- G.T. Robinson (Miriam Haynie), house, c 1875
- William Walker House, (Reedville Fishermen's Museum), 1875
- Weaver House, c 1880

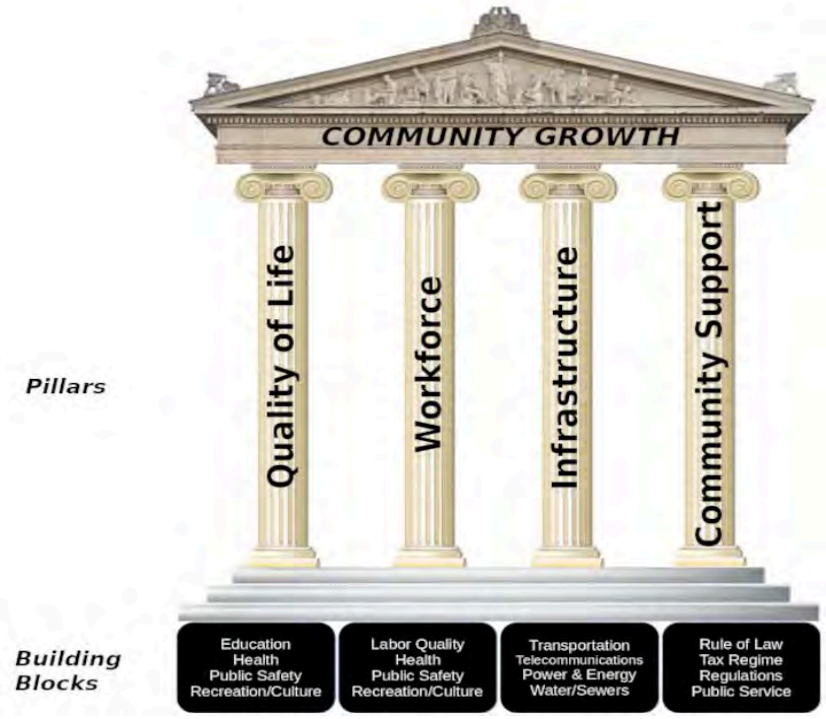
Sunnybank Ferry, 1906
Sydnor's Millpond, spillway and millrace, pre-1700
Versailles, house, 1853
Virginia Byway (Avalon to Reedville)
Virginia Byway (Wicomico Church to Indian Creek)
Waterloo House, c 1858

West End, house, c 1790
Wheatland, house, 1849
Wicomico View, house and cemetery, 1834

APPENDIX B

COMMUNITY GROWTH SELF ASSESSMENT TOOL

In the Preamble, the following graphic was provided. Appendix B offers a tool that citizens and community leaders can use to begin a discussion about the strengths and weaknesses of Northumberland County and what, if anything, to do about them.



See the scoresheet on the following page. For each row in the grid, either individually or in groups, assess where on the scale you believe Northumberland County lies (0-10 with 0 as worst and 10 as best possible). This is entirely subjective based on observation and personal experience. Enter your score in the column on the right. Community leaders should use this tool in as many gatherings as possible. Community leaders should collect these score sheets.

The score sheets collected should be tallied from time to time and shared with the public. This can generate public discussion about community goals and help guide our elected officials in determining what to invest in financially or assess how quality can be improved in any particular building block.

The Pillars of Community Growth Questionnaire

For each line, CIRCLE the number for your score OR simply write the number in the right column.

#	Building Block	Worst Case (0)		Best Case (10)	Score (0-10)
Pillar 1: Quality of Life					
1	K-12 Quality	Poor	0 1 2 3 4 5 6 7 8 9 10	Outstanding	
2	Post-Secondary Access	Distant	0 1 2 3 4 5 6 7 8 9 10	In County	
3	Health Care Quality	Poor	0 1 2 3 4 5 6 7 8 9 10	Outstanding	
4	Health Care Access	Distant	0 1 2 3 4 5 6 7 8 9 10	Plenty nearby	
5	Law Enforcement	Limited	0 1 2 3 4 5 6 7 8 9 10	Well-resourced and professional	
6	Fire Service	Non-Existent	0 1 2 3 4 5 6 7 8 9 10	Well-resourced and professional	
7	Emergency Medical Services	Non-Existent	0 1 2 3 4 5 6 7 8 9 10	Well-resourced and professional	
8	Shopping	Very little	0 1 2 3 4 5 6 7 8 9 10	All needs met locally	
9	Theater & Sports	Nothing nearby	0 1 2 3 4 5 6 7 8 9 10	Plentiful for all ages	
10	Recreation	Nothing nearby	0 1 2 3 4 5 6 7 8 9 10	Plentiful for all ages	
11	Tranquility	Chaotic and loud	0 1 2 3 4 5 6 7 8 9 10	Peaceful and scenic	
Pillar 2: Workforce					
12	Labor Quality	Poorly trained	0 1 2 3 4 5 6 7 8 9 10	Highly trained and motivated	
13	Labor Quantity	Very difficult to fill positions locally	0 1 2 3 4 5 6 7 8 9 10	Well-staffed labor force	
14	Training Access	No local training	0 1 2 3 4 5 6 7 8 9 10	Relevant and local	
15	Local need Relevant Training	Poorly trained/ unskilled	0 1 2 3 4 5 6 7 8 9 10	Well-trained to do the work needed	
Pillar 3: Infrastructure					
16	Adequate Road capacity	Constant heavy traffic	0 1 2 3 4 5 6 7 8 9 10	No congestion or delays	
17	Adequate Road quality	Surfaces causing vehicular damage	0 1 2 3 4 5 6 7 8 9 10	Smooth roads	
18	Access to Air/Rail	Inaccessible	0 1 2 3 4 5 6 7 8 9 10	Nearby & adequate	
19	Power/Energy	Unreliable and Very Expensive	0 1 2 3 4 5 6 7 8 9 10	Sufficient capacity and reliability	
20	Potable Water & Sewerage	Non-existent	0 1 2 3 4 5 6 7 8 9 10	Plenty of both at fair cost	
21	Internet Availability	Unavailable	0 1 2 3 4 5 6 7 8 9 10	Easily accessible, affordable	
Pillar 4: Community Support					
22	Rule of Law	Corruption and opaqueness	0 1 2 3 4 5 6 7 8 9 10	Fair and Transparent	
23	Tax Regime	Confiscatory taxes	0 1 2 3 4 5 6 7 8 9 10	Fair & easy compliance	
24	Regulatory Climate	Punitive & inflexible	0 1 2 3 4 5 6 7 8 9 10	Supportive, fair and transparent	
25	Public Services	Non-existent	0 1 2 3 4 5 6 7 8 9 10	Supportive but not excessive	