

CHAPTER TWO

THE ENVIRONMENT

Regional Setting

Rappahannock County is in the northern portion of the Commonwealth of Virginia. Washington, the County seat, is about 65 miles southwest of Washington, DC, and 120 miles northwest of Richmond, the State Capitol. The County extends north and south 24 miles and east and west about 21 miles. It has an area of approximately 267 square miles. The northwestern boundary is in the Blue Ridge Mountains and separates the County from Page and Warren Counties. The Rappahannock River forms the northeastern boundary and separates the County from Fauquier County. The County is bounded on the southeast by Culpeper County and on the southwest by Madison County.

The County's residents have strong economic and social ties with jurisdictions on all sides, although the western boundary of the Blue Ridge historically has acted to lessen contacts with Page County as opposed to the more direct accessibility of Warrenton in Fauquier County, Culpeper in the County of the same name, and Front Royal in Warren County which while over the Blue Ridge, is nevertheless served by a primary road providing relatively easy access. This in turn has led to a regionalization of many trading activities by County residents, people in the northern portion of the County (Flint Hill, Chester Gap) are more apt to shop, bank and attend events in Front Royal, while persons in the south and west (Sperryville, Woodville) often patronize Culpeper establishments, and persons in the east (Amissville, Washington) tend to favor Warrenton businesses. **(See Map No. 1: County Location)**

History

In 1607, when the English first arrived in Virginia, the area now occupied by Rappahannock was an uncleared primary growth wooded territory inhabited by Native Americans. At the foot of the Blue Ridge Mountains, the Manahoacs and Iroquois hunted and fished. As more and more settlers moved into Virginia their economic and, at times, martial competition pushed the native inhabitants west.

Official colonization was possible in 1722 and this opened up the Piedmont section of Virginia. The majority of the early settlers in Rappahannock were not foreign born, but had moved down from northern ports and other regions of Virginia. Rappahannock's new inhabitants were mainly of English descent from the Tidewater region. Other settlers included Scots-Irish from west of the Blue Ridge and Germans from the north and from the Germanna Ford area in modern Spotsylvania

and Culpeper Counties. A few Welsh and French also moved into Rappahannock. The French settlers arrived from Manakin, a Huguenot Colony located on the James River. Amissville, one of the villages in Rappahannock County, was named after the Amiss family from the Colony at Manakin.

People from Rappahannock were active participants in the Revolutionary War and the War Between the States. Although during the War Between the States many small skirmishes were scattered throughout the County, the closest major battle occurred in Front Royal, north of Flint Hill. Cavalry raiding was a more typical War Between the States-era Rappahannock activity.

Taking its name from the river that has its source in the small streams in the Blue Ridge Mountains, Rappahannock became separate from Culpeper County by an Act of the General Assembly in 1833. The five villages, Amissville, Chester Gap, Flint Hill, Sperryville, Woodville, and the Town of Washington have significant historical value. Washington is the County seat. Fondly called "the first Washington", and somewhat less politely referred to as "little Washington" to distinguish it from its larger cousin, it was surveyed and plotted by George Washington in 1749 and was established as a town in 1796. The villages of Rappahannock were frontier posts or crossroads. Today, these small residential clusters represent a focal point for County residents providing retail services, meeting places, post offices, and church activities. As it was in the 1700' s, Rappahannock' s economy is still agriculturally based with the surrounding villages providing basic services for the farms.

Geology

Rappahannock County is bisected by both the Piedmont and Blue Ridge physiographic provinces. The Piedmont province includes the eastern part of the County and is typified by gently sloping to moderately steep terrain. This province, especially in the Woodville area, is occasionally broken by long, low mountains or hills. The Piedmont province is primarily underlain with granitic rock, quartzite, phyllite, and arkosic sandstone.

The Blue Ridge physiographic province is located in the County' s western section and includes the Blue Ridge Mountains and the neighboring foothills. This province is typified by steep and rugged terrain and is underlain with granitic rock, phyllite, greenstone and some sandstone. The County' s basic geologic formations are shown on **Map No. 2: Geology**.

It is important to note that the geological conditions underpinning land have impact both on water resources that may lie within such structures and the relative suitability for development of soil types that blanket the formations.

Climate

Rappahannock County enjoys a temperate, comfortable climate with generally mild winters and warm summers. Basically, the County' s climate is controlled by the Blue Ridge Mountain range to the west and the Atlantic Ocean and

Chesapeake Bay to the east. Winters in the County are rigorous but not severe and summer temperatures are moderate.

Although detailed climatological data are not available for Rappahannock County, they are for Culpeper County and the results are generally applicable. While Rappahannock County's temperature is similar to that of Culpeper County, temperatures are generally 2-3 degrees lower. During the 1951-1990 period, the mean temperature was 56 degrees. July was the warmest month with temperatures averaging 78 degrees. December was the coldest month with an average temperature of 37. The number of days with temperatures greater than 90 degrees has ranged from 16 in 1962 to 76 in 1943. The temperature falls below freezing 20-23 days a month during the winter months and reaches zero often enough to average one day per year.

Rainfall is well distributed throughout the year with the maximum in July and August and the minimum in February. Nearly 40 days each year have thunderstorm activity that is normal for the State. The average snowfall is 17 inches a year, but yearly amounts are extremely variable and range from zero to 45 inches.

South to southwest winds predominate, with secondary frequency from a northerly direction. Relative humidity varies inversely with temperatures being typically high in the mornings and low in the afternoons.

The typical growing season (from the last freeze in spring to the first freeze in autumn) is 181 days. Freezes usually do not occur between April 20 and October 18. However, freezing temperatures have occurred as late as May 17 and as early as September 25.

Topography

Rappahannock County occupies a topographic position ranging from 360 to 3,720 feet above mean sea level. The lowest point in the County is where the Rappahannock River crosses into Culpeper County. The highest point is the Pinnacle, which is located in the southwestern part of the County on the Page County boundary.

Altitudes in the Blue Ridge province primarily range from 1,000 to 3,500 feet. Most of the Blue Ridge province is well drained, but some small areas of colluvial material at the foot of the mountains are poorly drained. **Map No. 3: Topography** shows the elevations of the County.

Watershed

The Piedmont province is an old plain that is strongly dissected by many small streams that flow in narrow, winding valleys. Most of the mountains in the Piedmont province are moderately-steep to steep, ranging from 900 to 1,500 feet above sea level. The smoother part of the Piedmont is mostly sloping to gently sloping with some moderately steep areas. The altitudes range from 360 to 900 feet.

As shown in **Map No. 4: Rappahannock River Watershed**, all streams in the County eventually drain into the Rappahannock River. The Hazel, Rush, Covington, Thornton and Rappahannock Rivers have their source in springs in the Blue Ridge Mountains. Drainage in the County is well developed with numerous flood plains. Flood plain soils account for 7,518 acres of land or 4.4% of the County. Most of the small streams flow southeastward, perpendicular to the mountain ridges that divide the County into numerous watersheds (**see Map No. 5: Streams***). The Rappahannock and Jordan Rivers drain the northern part of the County; the Thornton, Rush, Covington, and Piney Rivers drain the central part; and the Hazel and Hughes Rivers drain the southern part. **Map No. 6: Sub-Watersheds** shows the seven 1995 Virginia Hydrologic Units which form the sub-watersheds within the County.

*Note: Specific flood plain boundaries can be found on Flood Insurance Rate Maps through the National Flood Insurance Program, Department of Housing and Urban Development.

Slope

Slope refers to the ratio of rise to distance. The relative steepness of land makes various uses at times problematic, and thus is an important determinant of the land use, stability and physical development potential of property.

Slope is expressed as a percent, with higher percentages indicating steeper land. The following list provides a description of various slope categories:

0-2%	--	flat land
3-7%	--	rolling, moderately sloping land
8-14%	--	hillside
15-25%	--	steep hillside
Over 26%	--	extremely steep

From a generalized perspective, most of Rappahannock County can be classified as steep hillside (**see Map No. 7: Slopes**). However, there are three areas of the County that consist of moderately sloping land. These three areas, two of which contain most of the County' s existing development, include an area in the northern portion of the County centered generally around Flint Hill and U. S. Route 522; in the center of the County between Sperryville and Washington; and in the eastern part of the County near the Madison County border along State Route 231. These areas are also highlighted as having prime soils for agricultural uses. Note: On-site evaluations should be used to determine physical characteristics of a particular parcel of land.

The classification of an area as steep hillside does not mean that building or agricultural limitations will always be great. In such an area there will always be small zones of relatively flat land that can be used.

However, this classification does mean that extensive use either for plow farming or development is typically not appropriate. Moderately sloping land can be expected to cause the same difficulties as steep areas, but to a more limited extent. Larger areas of flat land will be available for use.

Soils

Soil characteristics are a further determinant of the suitability of land for agriculture, forestry, and development. Different soils, depending upon their structure, fertility, and drainage are more suited for various land uses.

The use that generally causes the greatest stress and number of problems is development. Construction strips the soil of its vegetative cover and exposes it to the forces of erosion. The soil is often required to support pavement or building foundations without shifting appreciably. The soil, particularly in rural areas, is also frequently used for the disposal of liquid or solid waste. Thus where soils easily accept liquid waste, very few building limitations occur. Where soils do not accept such waste, development is limited unless central sewer facilities are available.

The Virginia Department of Conservation and Recreation and the Middle Peninsula Planning District provide data for the location of prime agricultural soils. **Map No. 8: Prime Agricultural Soils on Moderate Slopes** shows the prime agricultural soils for Rappahannock County that are on slopes of 15 percent or less.

As mapped and classified by the United States Department of Agriculture, Soil Conservation Service, there are thirteen soil associations in Rappahannock County. Five broad soil types comprise 75% of the land area of the County, and they are outlined below. These soil associations are landscapes that have distinctive proportional pattern of one or more major and minor soil types. These associations are briefly described below:

RAPPAHANNOCK COUNTY SOIL ASSOCIATIONS GENERAL DESCRIPTIONS

Louisburg-Albemarle-Culpeper Association:

Moderately deep and shallow, well drained and rapidly drained, sloping to steep soils on dissected Piedmont uplands. Comprises 13.9% of the County, or 23,752 acres. Most of it occurs in the eastern part of the County from the Hughes River to the Rappahannock River and some areas around Five Forks.

Brandywine-Eubanks-Lloyd-Chester Association:

Shallow and moderately deep, well-drained and somewhat rapidly drained, sloping and gently sloping soils on dissected Piedmont uplands. Comprises about 31.8% of the County or 54,340 acres. This area extends from the Hughes River on the Madison County line through the central part of the County to the Rappahannock River.

Brandywine-Rockland, Acidic, Association:

Shallow, rapidly drained, moderately steep and steep soils and rock land on low Piedmont mountains. Comprises about 11.2% of the County, or 19,139 acres. Mostly near Woodville but occur throughout the Piedmont Plateau.

Alluvial Land-Chewacla-Wehadkee Association:

Deep to moderately deep, moderately well drained to poorly drained, nearly level soils on flood bottoms. Comprises about 2.2% of the County, or 3,760 acres. Largest areas along the Hughes, Hazel, Thornton, Covington, and Jordan Rivers.

Rock Land, Acidic-Halewood-Very Rocky Land Association:

Well-drained and rapidly drained rocky soils on mountain foothills underlain mainly by granodiorite. Comprises about 5.4% of the County or 9,228 acres.

Very Rocky Land-Rockland, Acidic-Porters Association:

Rapidly drained, rocky and stony soils on mountains and underlain mainly by granodiorite. Comprises about 10.1% of the County, or 17,250 acres. Mostly in the Shenandoah National Park.

Very Rocky Land-Rockland, Basic-Myersville Association:

Rapidly drained rocky soils on mountains underlain mainly by greenstone. Comprises about 8.7% of the County, or 14,867 acres. Mostly in the Shenandoah National Park.

Water Resources

Rappahannock County lies entirely within the Rappahannock River Basin. Thus all streams in the County ultimately drain to this channel, which is a major source of drinking water supply to downstream jurisdictions including Spotsylvania and Stafford Counties and the City of Fredericksburg. Drainage in the County is well developed with most of the smaller streams draining southeasterly perpendicular to the mountains. Total river and stream surface area is estimated at 195 acres. (**See Map No. 5: Streams**)

Springs, wells, streams and ponds currently provide adequate water for the people and livestock in the County. Indeed, approximately 96% of the residences in the County depend upon private wells, springs or streams for their drinking water. Water quality in the County is generally good, although excessive hardness and acidic conditions are occasionally encountered.

A great deal of concern exists both to protect the quality of our water resources and to analyze in some detail the quantity of water available to support a growing population. To that end many efforts have been undertaken, including a well water testing program, a D.R.A.S.T.I.C. water pollution potential study and, an on-going study of groundwater resources in the Sperryville area, all of which are discussed elsewhere in this document.

Forests

Rappahannock County contains considerable forestland, most of which is hardwood of an oak and hickory type. According to the Virginia Division of Forestry, in 1981 approximately 105,795 acres or 62% of the total County land area was forestland. The figures for 1992 showed a statistically insignificant decline to 105,446 acres. Approximately 70% or 73,707 acres of this forestland was classified as commercial forestland and 31,739 acres were considered "productive reserve" or forestland sufficiently productive to qualify as commercial forestland, but withdrawn from timber utilization through statute or administrative designation. These figures are also little changed from 1981.

Map No. 9: Land Cover shows the forested areas of the County, in addition to agricultural and low-density residential land uses. According to the National Land

Cover Database, 68.0 percent of Rappahannock County land cover is deciduous (44.3%), mixed (21.2%), or evergreen (3.4%) forest. (Note: The National Land Cover Dataset was compiled from Landsat satellite TM imagery (circa 1992) with a spatial resolution of 30 meters and supplemented by various ancillary data (where available). The analysis and interpretation of the satellite imagery was conducted using very large, sometimes multi-state image mosaics (i.e. up to 18 Landsat scenes). Using a relatively small number of aerial photographs for 'ground truth', the thematic interpretations were necessarily conducted from a spatially-broad perspective.

The invasion of the Gypsy Moth caterpillar into Rappahannock commencing in 1987 has had a dramatic affect on timber resources. Rapidly established as the major cause of hardwood mortality, the pest has caused an estimated 13,000 acres of hardwood losses, primarily in white, red, chestnut, black and scarlet oak. The County elected to not pursue a cooperative cost-share spraying program to suppress the insects, but to instead support private spraying efforts. By virtue of the Shenandoah National Park's no-spray policy (except for public areas) the insect is impossible to eradicate from our area and will continue to cause hardwood losses until a new equilibrium is attained. A fire complex of over 25,000 acres in Rappahannock, Madison and Page Counties in September of 2000, while often spectacular, was contained largely within the Shenandoah National Park and has created no long-term forest management issues.

A closer look at the 73,707 acres in commercial forestland shows that 47,572 acres, or 62%, was held by farm operators while 27,184 acres or 36% was held by private landowners.

The ability of commercial forestlands in Rappahannock County to produce crops of industrial wood is limited. Based upon a classification system used by the Virginia Division of Forestry, called site class, or the capacity to grow crops of industrial wood based on fully stocked natural stands, commercial forestlands in the County are poor producers. Approximately 3,400 acres are site class three, 54,366 acres are class four and 16,990 acres are class five. Class three lands produce 85 to 120 cubic feet per acre annually, class four lands 50 to 85 feet, and class five lands below 50 feet. The County has no class one or two lands which can produce more than 165 and 120 cubic feet per acre annually.

The predominant forest types of the commercial acreage are: Loblolly-short leaf (3,398 acres), Oak-pine (3,398 acres), Oak-hickory (64,562 acres), and White Pine-Hemlock (3,398 acres). Tables 2.1 through 2.4 provide timberland data.

Table 2.1

Area of Timberland By Stand-Size Class 1992

	All Stands	Sawtimber	Poletimber	Sapling-Seedling
Acres	71,760	54,560	17,050	150

Table 2.2

Area of Timberland By Forest-Type Group 1992

	All Stands	Loblolly-Shortleaf	Oak-Pine	Oak-Hickory
Acres	71,760	150	6,820	64,790

Table 2.3

Area of Timberland By Ownership Class 1992

	All Stands	Forest Ind.	Farmer	Corp.	Individ.
Acres	71,760	150	30,690	3,410	37,510

Table 2.4

Average Annual Removals, 1986-1991 (in thousands of cubic feet)

GROWING STOCK

All Species	Pine	Hard Hardwood
1,679	933	746

SAWTIMBER

All Species	Pine	Hard Hardwood
6,713	3,320	3,393

SOURCE: VA Division of Forestry