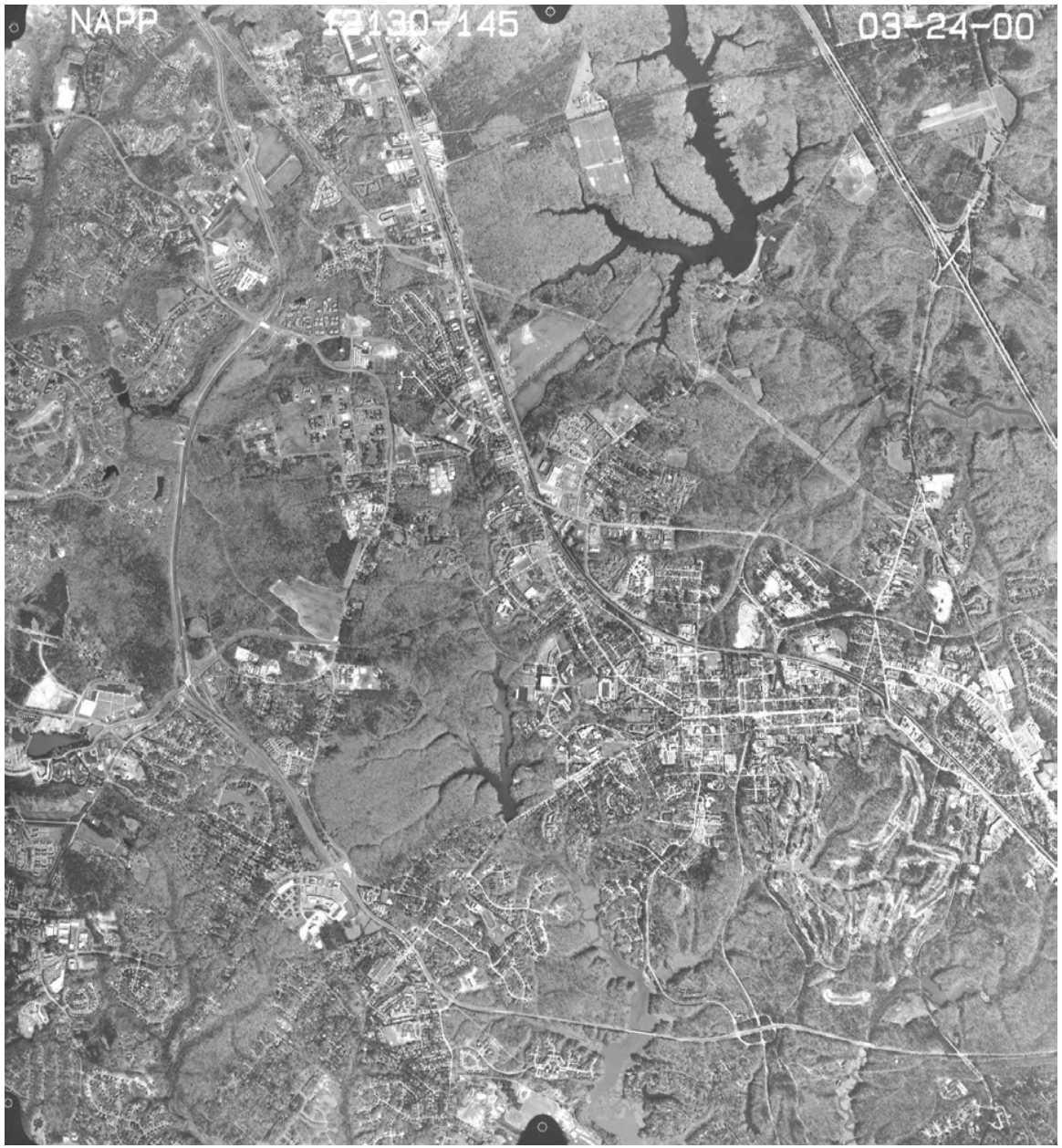

Development and Watersheds in Greater Williamsburg: A Guide For Citizens and Students

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1. Introduction:

The ecological and social systems of the Virginia Peninsula are changing rapidly: commercial, industrial and tourist development is combining with extensive housing subdivisions to alter the land where we live, study and work. Decisions made each day in cities, counties, developers' offices, and even one's own home, yard or driveway are shaping the future of the land and the health of the Chesapeake Bay rivers that surround the Peninsula. The quality of the water in the Chesapeake Bay is dependent on the water flowing into it, which is in turn dependent on the behaviors of the 15 million people who live in and around its tributaries.

What will the Williamsburg Area look like in five or twenty-five years? To understand the direction of the changes and to predict what our area will look like in the near and longer-term future requires analysis of the demographic trends, political structures, and economic factors shaping development in the region.

With matching support from the Virginia Environmental Endowment and Board of Visitors member L. Clifford Schroeder, four faculty and eight undergraduate students from the College of William and Mary's Environmental Studies program have set out in the summer of 2002 to bring together a new interdisciplinary approach to the issue of development and watersheds.

This study uses the place we know best, the area that drains into Lake Matoaka through College Creek and other tributaries, as a laboratory or model of the changes that occur as development encroaches on natural systems. Lake Matoaka is one of the oldest man-made lakes in the New World, and this 1400 acre "watershed"--or the total area that drains into one river, creek, lake or bay--has seen a long history of shifting land use and pressures on its ecological viability. Aside from its old age, however, the lake is similar in many respects to the thousands of impoundments that are found on the coastal plain and throughout Virginia.

The surrounding College Creek watershed has experienced a long and well-documented history of land use since colonial times, so that the current status of the watershed and lake as measured by environmental monitoring can be placed in archeological and historical contexts. Current land use in the College Creek watershed includes land developed for the College of William and Mary, for the community hospital, and for retail and residential use. A majority of the watershed, however, is second-growth forest owned by the college (the College Woods), so that students have ready access to the forests, streams and wetlands that dominate the watershed. In 1996, the Board of Visitors of the College of William and Mary designated approximately 300 acres of the College Woods as a Nature Preserve for recreation and research.

From an ecosystem perspective, the College Woods includes habitat for two federally-listed threatened plant species (whorled pogonia and swamp pink) plus a number of "disjunct" species whose geographic distribution includes the Blue Ridge Mountains and isolated locations on the coastal plain. Further, the lake is fed by five small tributary streams that are essentially pristine, allowing their current status to be monitored and compared to future development and to more "disturbed" stream systems nearby watersheds. For example, Lake Matoaka contains small populations of least brook lamprey eels—know from only 15 streams in the state of Virginia—and large populations of a potentially new species of invertebrate amphipod. In short, the college campus includes

a diverse assemblage of natural resources available for academic study.

Adjacent to College Creek is the Powhatan Creek watershed, a larger watershed at 23 square miles and ranked number one in biodiversity for the Lower Peninsula. [1] Although 10.7% (2.4 sq. mi.) of the watershed is area protected by the Chesapeake Bay Protection Act, approximately 40% of the land area within the watershed is developed and substantial portions of the watershed are zoned for future development. The Powhatan Creek watershed has been the focus of extensive research and debate as environmentalists seek to protect it from excess development.

The changes occurring around Matoaka cannot be understood without putting them in the larger context of change in the region, and so after describing changes occurring here we move to compare and apply them at larger scales. We will review patterns of urban growth that have occurred in the region and what has been done about them. In addition we will look at proposals on practical alternatives to current approaches to development, reviewing "best practices" utilized in other development around the Chesapeake Bay and other sensitive watersheds.

2. What's at Stake? : What Happens to Our Land, Water and Biological Communities with Development?

"Dispersed development outside of compact urban and village centers along highways and in rural countryside" describes much of the expansion of Williamsburg, James City County and York County.[2] It is also a definition of suburban sprawl. As with many communities around the country today, development is occurring at a rapid pace.[3]

A growing number of people are concerned about the effects of this sprawling development on our communities and environment. The reasons are:

- *Sprawl increases the risk of flooding* by paving and covering forests and fields that used to absorb rainwater.
- *Sprawl increases traffic* on neighborhood streets and highways. Studies show that adding more roads to connect together dispersed communities results in more traffic and sprawl.
- *Sprawl results in the loss of parks, farms and other open spaces*.
- *Sprawl increases air and water pollution* by increasing automobile usage and developing over wetlands. Wetlands act as water filters, so destroying wetlands leads to more water pollution.
- *Sprawl can increase taxes* by forcing cities and counties to develop new water and sewer lines, new schools, police and fire protection.
- *Sprawl can result in more crowded schools* since residential taxes often do not provide sufficient funds for new schools.
- *Sprawl results in the decline of existing urban centers and older developments*. As more people leave cities for new developments on the fringes, the burden of maintaining their services fall on fewer residents and businesses. Downtowns suffer as shoppers travel out to larger malls instead of local stores and restaurants. Overall, cities that lose people to sprawl will have increased unemployment rates, lowered property values, and fewer investment opportunities.

However, sprawl is not inevitable. Some communities are turning to "smart growth" to plan for development in a way that allows minimal environmental impact while promoting community, safety, and non-automobile forms of transportation.

Development and Watersheds

Development alters the natural surface cover of our land and the native vegetation by replacing it with "impervious cover," hard surfaces such as roads, sidewalks, driveways, parking lots and rooftops that are impermeable to rainfall.[4] As rain flows off impervious surfaces, rainwater, sediments, pollutants, and other materials flow into our watersheds dramatically altering the land, water and biological communities. Impacts include decreased water supply and water quality; soil erosion; stormwater runoff; loss of scenic vistas and historic sites; destruction of wildlife habitats, deforestation, air pollution and loss of agricultural lands.

The Center for Watershed Protection in Maryland has developed a simple Impervious Cover Model to classify watershed and subwatershed health with impervious cover as the major determining factor. [5] The Center has determined that there is a 10% impervious cover threshold at which many of the most sensitive aquatic species in watershed streams show signs of severe impairment. A second threshold occurs around 25-30% where most indicators of stream quality consistently shift to a poor condition (diminished aquatic diversity, water quality and habitat). For the Powhatan Creek watershed as a whole, impervious cover was estimated at 3% in 1970, but grew to 8% in 1998, 9.8% in 2000 and is projected to reach a maximum of 15.5% in the near future. [6]

As land is developed and impervious cover increases, our land, water and biological

communities all suffer. The impacts of development are intricately connected and a small change in the land, water or a biological community will inevitably impact the other two. For example, altering the land will have an impact on water quality, which in turn may damage aquatic life and other surrounding wildlife habitats.

Land and Water

An increase in impervious cover as a result of development causes changes in streams, wetlands and floodplains.[7] Headwater streams, major streams flowing directly into the watershed, are especially important in protecting watersheds and water quality. However, they often experience erosion as a result of upstream development and are often the major source of sediment deposition to downstream wetlands. Increased sedimentation is a major source of pollution affecting water quality and biological communities. It is one of the largest contributing factors to the decline of Lake Matoaka and the College Creek watershed as well as the entire Chesapeake Bay watershed.

Additional effects of runoff from increasing impervious cover include:

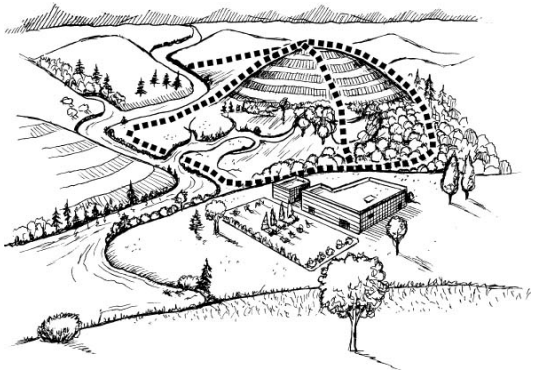
- Higher peak rates of water flow and increased flooding.
- Greater stream bank erosion.
- Reduced groundwater recharge and lower stream flow during dry weather.
- Decline in stream bed quality and fewer species.
- Alteration of wetlands downstream.[8]

Biological Communities

Poor land management and development practices can lead to increased storm water runoff that picks up pollutants as it flows into bodies of water such as Lake Matoaka and then eventually the Chesapeake Bay.[9] These pollutants include: 1) sediment, 2) nutrients from various sources such as lawn and agricultural fertilizers, septic stystems, 3) toxic substances including heavy metals and household chemicals, and 4) pathogens from human and animal waste. All of these pollutants can have dramatic effects on biological communities within watersheds.[10] Increased nutrient loading causes algal blooms and areas of inadequate oxygen supply.

Increased sediment loading as a result of runoff clouds waters, which suffocates organisms such as larval fish and invertebrates and prevents submerged aquatic vegetation (SAV) from growing. Other pollutants may result in a lower diversity of plant, aquatic insects and native fish species, loss of sensitive fish species, and lower spawning success of fish. Development can also cause stream temperatures to warm. Some aquatic species are particularly sensitive to temperature and may be harmed by this increase.

Invasive plant species that thrive in



disturbed areas may take over in such degraded communities, which hurts native plants.[11] Humans serve as both agents of introduction and expansion of these invasive species. Examples of such invasive plant species include kudzu and wisteria. Within the Lake Matoaka watershed an invasive species known as Phragmites commonly takes over wetland areas.

Deforestation accompanying development may be extremely damaging.[12] Deforestation harms not only the tree population, but may wipe out many mature forest species including plants, birds, and other wildlife. Deforestation also results in the loss of tree roots that are necessary for holding stream side soil in place. These forested "riparian buffers," or areas adjacent to waterways, help improve water quality by filtering runoff before it enters the waterway and provide wildlife habitats that preserve biological diversity. Fragmentation of forests and loss of wildlife corridors has dramatic effects on biological communities, primarily birdlife. Two key species that have suffered in the region and within the College Woods as a result of such fragmentation are ovenbirds and scarlet tanangers.[13]

3. How Is the Greater Williamsburg Area Changing?

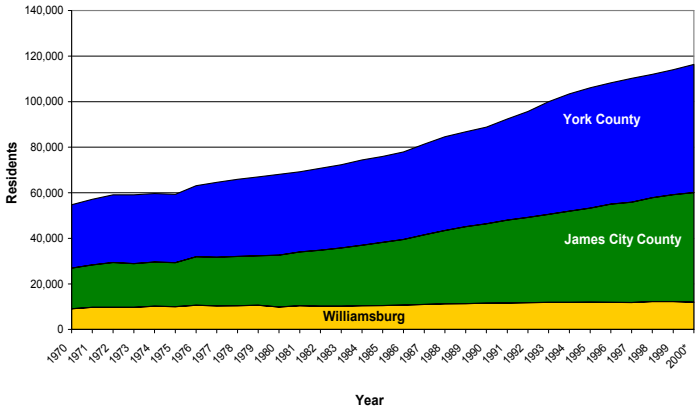
Many years of growth and change in the region have caused Williamsburg, James City and York Counties to evolve into the bustling area we see today. The period between 1930-1950 was pivotal, when a series of decisions influenced the direction of the area through the rest of the twentieth century.[14] During this time national interest grew in historic preservation, and the area became a bustling tourist destination, designed to be accessed by automobile.

Federal government and philanthropists were supportive in transforming the former capitol of Williamsburg and the first English settlement at Jamestown into historic sites available to the public. The area also experienced growth with the increased military presence such as the Naval

Weapons Station in York County and Camp Peary in 1942. Demand for local services and housing continually increased. The region's workforce changed profoundly from agricultural production to one dominated by "professional services" employees.

The economic and development momentum continued in the Post-World War II era from 1950-1970.[15] During this period new, light industries emerged. The Colonial Parkway was completed in 1957 linking the attractions of Yorktown, Jamestown and Williamsburg. The workforce continued to shift from laborers to service workers; population grew 183% in these twenty years. The number of housing units grew 229%. Expanding residential growth resulted in

Population Growth 1970-2000



a 65% decline in the number of farms.

Between 1970 and 1990 large industry increased as did the construction of new roads. The Anheuser-Busch plant opened in 1971 a period of industrial growth. Retail businesses multiplied sixfold, increasing 590% between 1970 and 1990. In 1972, the completion of Interstate 64 and the four-lane expansion of Route 60 accommodated industrial, commercial and residential growth.

Population grew 95%: this is rapid growth for any region to handle but in fact it marked a slowing, being only half of the preceding twenty-year period. The continued population growth and increase in housing units contributed to an additional 24% decline in the number of farms. By this point in time property values had increased dramatically. Farm acreage valued at $190/acre in 1959 was valued at $3,100/acre in 1989.

Population in the region has continued to increase over the last decade. Between 1990-2000, James City County increased 38%, York 34% and Williamsburg 4%.[16] From a longer time scale perspective, between 1980-2000, the population in James City County grew an astonishing 111%, York County 59%, and the City of Williamsburg 22%.[17] Overall, the 68,000 people living in the region in 1980 has become 116,000.[18] Looking just ten years down the road using their comprehensive plans, the region will have 155,000 inhabitants in 2010.

The composition of residents in the area has also been changing: current data shows that 42% of Virginia residents were born in other states. [19]

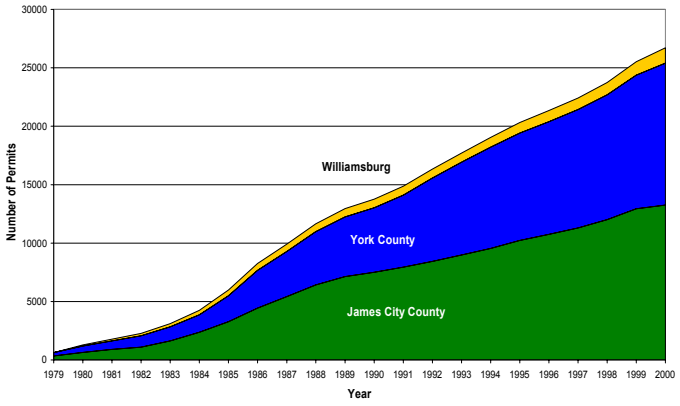
Source for figures: Hampton Roads Planning District Commission. 2001. "Hampton Roads Population Growth." "HRPDC Economic Outlook"

Population estimates predict that population growth will continue in the coming years. Williamsburg's 1998 Comprehensive Plan estimates that the City's population will increase to 12,813 in 2010 and 15,020 in 2020.[20] Population in York County is projected to increase from approximately 56,650 in 1999 to 67,600 in 2005, 74,500 in 2010 and 77,500 in 2015. James City County's population is projected to increase from 41,900 in 1995 to 57,359 in 2005 and 67,947 in 2010.[21]

Building Permits and Planned Developments

New construction has occurred at a rapid pace in James City, York County and the City of Williamsburg in the last two decades. Residential growth has been especially high in the past decade.
James City County was recently ranked first for the most homes built since 1995 (20.7%) in the Hampton Roads region.[22]

Cumulative Building Permits Since 1979



The James City County Planning Division estimated in 1996 that there are over 17,000 approved residential lots that are still vacant within the area served by water and sewage pipes. A 2002 study is underway whose first draft figures are that 19,000 approved lots are vacant in that area. Based on the number of

approved and available home sites, or the "build out potential," and an average absorption rate of 650 dwelling units a year, the County has enough approved lots to last over 20 years.[23]

Housing construction began to increase rapidly in York County in the mid-1980s and has continued since.[24] During the 1990's, the housing supply increased by over a third, growing an average of 3.3% a year. In 1983, the York County Comprehensive Plan stated a build-out potential of 135,000.[25] In 1999, however, the Comprehensive Plan maintained and reaffirmed the wishes of the people and the Board of Supervisors by reducing the build-out target to 80,000.

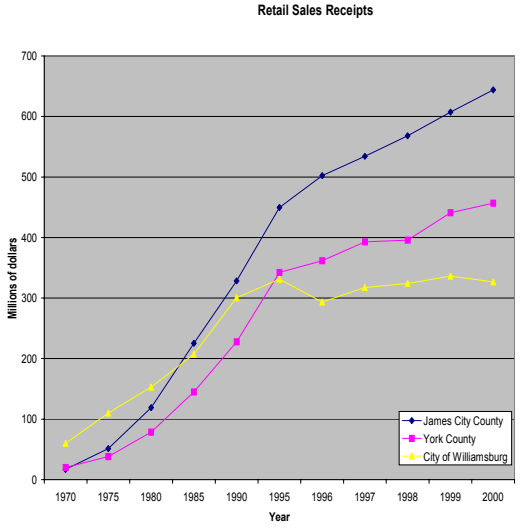
Confined to its nine square miles, Williamsburg's population has remained far more stable than York or James City counties. However, its 1998 Comprehensive Plan describes a series of possible areas for residential and commercial development.

New Developments Affecting the College Creek/Lake Matoaka Watershed

Although the land along Monticello Road remains relatively undeveloped, the current construction of New Town in James City County as well as road widenings and extensions will affect the future of development along Monticello Avenue.[26] The issue of development along Monticello Avenue is one small part of continuing "conflict between environmental protection and economic growth."

The New Town development, on the Casey family property, broke ground in late June, 2002.[27] It is a joint venture between the Endowment Association of William and Mary, the CC Casey LLC Co., and the Staubach Co. Only a small portion of the development is within in the College Creek Watershed and Lake Matoaka, however it will directly affect the Powhatan Creek watershed. Current plans for the 300-acre mixed use development include a SunTrust, Discovery Building, Incogen Inc., a United Methodist Church, as well as a workforce development center for W&M and Thomas Nelson Community College.

The proposed High Street Williamsburg on the Torsion property lies within the College Creek watershed and will inevitably effect the watershed environment.



In March 2002, the Williamsburg City Council entered into an agreement with Lerner Corporation for the purchase and sale of the Torsion property, an area extending from Richmond and Ironbound Road.[28] When the City first bought the property from Life Savings Bank in 1996, the intention was to "return the property to the private sector through resale." After a Crossroads study in which two outside consultants were hired to determine market potential for the property, it was determined that the land had potential as a "mixed-use commercial area with an entertainment district." Finally, in 2000 a new City Council decided that land would be best utilized as a shopping center as the Crossroads study and the 1998 Comprehensive Plan had recommended.

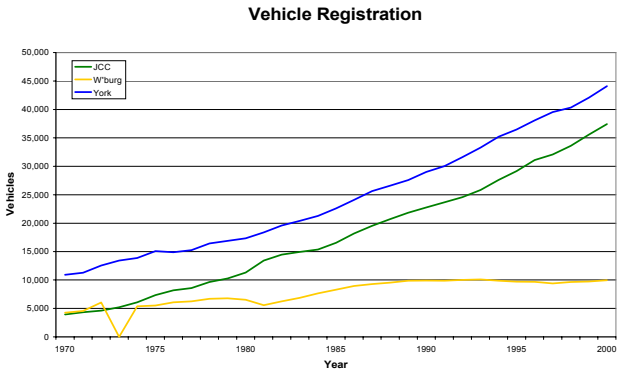
"High Street" will be the name of the new city street between Richmond Road and an extended Treyburn Drive.[29] Along the street will be the mixed commercial, entertainment, dining and residential paths. Some residents have voiced concerns in prior focus group sessions that they did not want another shopping center. Residents in the neighboring retirement community, Chambrel, are also concerned that the development will result in increased noise and traffic.

However Virginia's system of government does not allow for the sharing of revenue between cities and counties.[30] This has created a competition between Williamsburg, James City County and York County for their share of sales tax revenues. Monticello Marketplace (often called the "Target shopping center" is in James City County, and has been pulling sales tax revenue from the older Monticello Shopping Center in Williamsburg, which wishes to recover and maintain its market share. York County has also sought to increase its retail tax revenues by developing land around Williamsburg and James City County, such as development along Bypass Road, the Lowes and Wal-Mart in Lightfoot.

Traffic

Since 1970 the number of registered motor vehicles in James City County and York County has increased over four fold.

The increase in motor vehicles is an indication of the enormous population growth that has occurred in the region over the past few decades.



Vehicle registration and vehicle miles traveled have risen faster than population growth meaning, a greater number of individuals own vehicles and drive more miles overall. These increases in vehicular use have environmental impacts from new roads being built, increased exhaust, heavy metal deposition and oil, and other fluid leakage.

Water

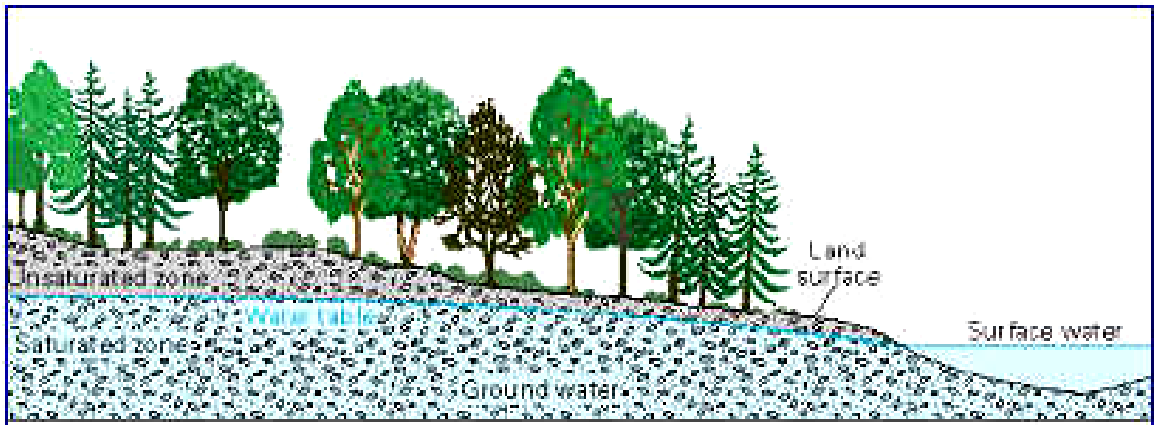
Another indicator of growth is the demand for public water and sewer service. In 1987, the Regional Raw Water Study Group (RRWSG) was formed to identify a long-term water source for the region. All the Peninsula localities participate in the Regional Raw Water Study Group searching for solutions to the regional water supply issues. The group performed a study that estimated the amount of water demanded by the City of Williamsburg residents will increase by sixty-three percent from 1990 levels by the year 2040.[31] The consumer growth rate for sewer connections in James City County rose 25% between 1990 and 1995.[32] Between 1990 and 1995 the water customer growth rate was 30%, increasing from 6,600 connections to 8,600.

Neither James City, York nor Williamsburg is self-sufficient in meeting its water needs. James City County is served by both the James City Service Authority (JCSA) and Newport News Waterworks. The JCSA is the largest public water system in Virginia relying solely on groundwater.[33] The City of Williamsburg's primary raw water source is the Waller Mill Reservoir.[34] The City also has a well adjacent to the reservoir. Williamsburg supplements its water with up to 2-3 million gallons a day from the City of Newport News reservoir system. York County water supply and service comes from many providers including the Newport News Waterworks, JCSA, and the City of Williamsburg as well as individual wells and the County.[35]

Current water shortages and restrictions on water use illustrate how precarious the regional water supply is at this time. The York County Comprehensive Plan states that the county is concerned with the acquisition and development of a long term supply of raw water.[36] It would like to extend public water service to existing residential areas served by private wells or private water suppliers, but must first deal with the crucial water supply issues. James City County has also been working to ensure an adequate water supply for the future. The EPA refused James City County's initial proposal a reservoir on the Ware Creek. The region looked at a larger "King William Reservoir" on the Mattaponi River as a potential source of water as it attempts to address shortages and to shift away from its dependence on ground water. There is, however, significant opposition to this King William Reservoir project from the Mattaponi Indians and environmentalists. James City County is in the final stages of gaining environmental permits for the siting of a desalinization plant which will draw and treat five million gallons of groundwater a day from a brackish aquifer under its proposed location at Ironbound and John Tyler Highway.

4. Citizen Concern about Growth

The increasing population growth and development in the region has not gone unnoticed. Surveys previously conducted in James City County and Williamsburg reveal that citizens oppose more development and desire more land preserved as open space, historic sites, farmlands and forests.



2001 James City County Citizen Survey:

From October 14, 2001 through November 29, 2001 the Virginia Tech Center for Survey Research (CSR) contracted with the James City County Planning office to conduct a survey of 1,204 residents throughout the County.[37] The survey was developed pending an update of the city's 1997 Comprehensive Plan.[38]

The survey overwhelmingly reflected that residents are concerned about growth and development in the County. 78% agreed that development of land in the County is happening too quickly and 80% of residents agreed that there should be restrictions on the amount of land that can be sold for residential and commercial development.[39] Survey results also show the majority, 63%, wished to slow development in the County even if it means increasing taxes. 64% agreed that developers who build businesses or residences should be required to pay a fee to the County to offset public costs. 57% agree it is better to have more homes on smaller lots and to set aside areas for open space in order to permanently preserve land and maintain the character of the community.

2000 Williamsburg Annual Survey:

The City of Williamsburg conducts an annual survey to gauge resident's opinions on the "quality and value of local government services."[40] Residents were extremely concerned with the direction of commercial development. Many citizens felt the city was not responding to local input or consulting residents before planning.

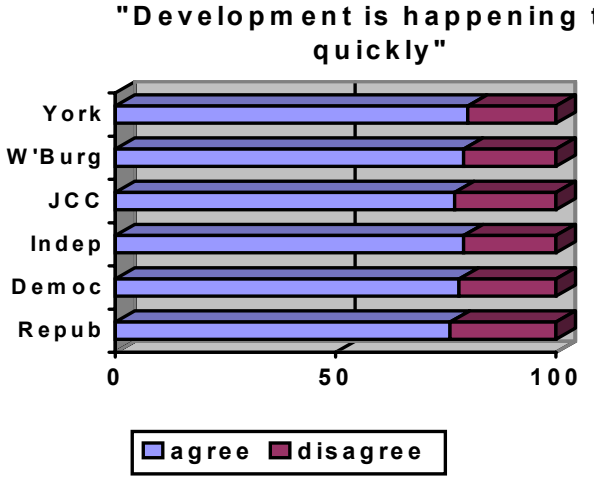
William & Mary Environmental Science and Policy Research Group Survey:

Some responses from citizens on development:
"This place will end up looking like Newport News and Hampton one day," said one James City resident.
"Look north, watch out for the megalopolis," said one York county teacher.
"Look towards the future long-term, not like the developers, who look short-term."
"Reuse land that's already been cleared," said a York county resident.
One developer said to his colleagues, "Be more ethical."
A York County carpenter expressed frustration at the changes for different reasons: "Land needs to be preserved so hunting can continue. Wildlife is important for maintaining the character of our communities and too much of it has been depleted by developers."

We conducted a scientific phone survey of adults in Williamsburg, York and James City Counties July 10-14, 2002. The survey measured respondent's beliefs concerning water and development, solutions to drinking water shortages, runoff and watershed protection, and land-use.

The major finding from the survey was that most local residents were worried about development and water in the Williamsburg area. Four in five residents believed that development of land in Greater Williamsburg is happening too quickly (79%).

There were no statistical differences between counties on these questions. York county respondents were slightly more likely to express concern about excessive development. Residents in all jurisdictions showed strong majorities favoring greater controls on growth (77% JCC; 79% Williamsburg; 80% York: This confirmed the 2001 survey in James City County.



Strong majorities of Republicans (76%), Democrats (78%) and Independents (79%) agreed that development is occurring too quickly.

Nearly three quarters of the respondents (72.3%) believed it is important to slow development even if it means increasing taxes, nearly three times the number who disagreed (27.7%). Interestingly, lower income households were more likely to support slowing development even if it means more taxes. 76% of households under $60,000 felt this way, but less than seventy percent of those over $60,000 did.
Only 18.4% believed that more housing and shopping centers will make the Williamsburg area a better place to live. 82% Disagreed.

When water was added to the question, residents had strong opinions. Four in five believed that "new developments should be stopped until issues of drinking water supplies are resolved." (80% agreed, while only 20% disagreed.)

- 76% of Republicans, 79% of Democrats, and 86% of Independents agreed.
- There was some variation among income levels, only 53 % of

respondents in households with the highest incomes (over $150,000) agreed, while 75% or more of the respondents at every other income level agreed with the need to secure water before approving more developments.

- There were significant gender differences on the issue of water and growth. 71% of men and 86% of women believed that "new development should be stopped until issues of drinking water supplies are resolved." (chi-squared 12.1; p<.001). [Women were also more likely to support tight watering guidelines.] In particular, 90% of men with high school or less felt development should be stopped, but only 65% of men with college or graduate training felt this way. Women's levels of agreement stayed steady regardless of their education: 86% for high school or less, 86% of college women, and 84% of those with graduate school.

On watering restrictions, 91.6% agreed that "residents and businesses should follow tight guidelines for watering plants, washing cars…" Only 8.4% disagreed. The ratio was also nearly 9 to 1 of those saying that "developers and homeowners should be required to do landscaping that requires little or no watering." (89.5% vs. 10.5%). "Really encourage residents to use water conservation practices. Individual decisions are important," said a speech pathologist in York County.

When asked about the 100-foot buffers to protect streams under the Chesapeake Bay Protection Act, strong majorities of residents in each county believed that protecting the watershed should come before the rights of individual landowners: 84% in James City County, 90% in Williamsburg, and 79% of York county respondents chose protection over individual rights. The overall trend is 7 to 1.

More than half of the residents in each county believed that real estate developers have more influence in determining land-use in their county than citizens or even local government officials. When told about a recent Virginia Pilot study which found that the largest contributors to local political campaigns in the Tidewater were from real estate developers, eighty-two percent of the respondents were concerned that these contributions allow developers to have an unfair influence on land-use decisions. A resident of James City County expressed concern that "citizens have little voice," when it comes to issues of land-use in the county. One Williamsburg resident said, "Listen to people, stop listening to developers. I know developers have more money than us but we care more." On the other hand, a resident of James City County felt that "People don't take any responsibility and point too many fingers…people blame the government too much." A resident of York County also remarked that "citizens need to get more involved."

Ninety percent of residents in Williamsburg and 84% of residents in James City County and York County support the idea of a regional planning committee that would focus on land use issues in Williamsburg, James City County and York combined.

When asked what they would like to say to decision makers about the issues of development and/or the environment in their city, respondents expressed significant frustration. "Slow down" was a very common response. "Slow down, it's aggravating that we have to cut down on our water usage when they are developing like crazy," said one retired resident in York County. "We need to do something soon or it will only get worse." "Just stop I've lived here all my life!"

Comments on property rights and watersheds: A York County Cosmetician said that protecting the watershed was simply "common sense." Those who chose individual rights were adamant about their family's long-time use of the land or waterfronts. One said "Half and half: people shouldn't be told by government what to do…there are too many restrictions. We can't do what we want on our land and we pay taxes." "I'm pro-property rights but I love the environment. Once you start regulating individual rights, you lose your rights." Another stated, "It's my property and I do what I want." On the other side, those favoring restrictions to protect watershed said that "The boundary should stay there-- [people] knew what they were buying." Another stated, "If you regulate with no exemptions then watershed protection should come first. You can educate the old guys."

Citizen comments on water and development: A James City manufacturer said "We shouldn't do any more development until the water situation is restored." Many James City retirees agreed, including some who had lived here for decades: "The best thing they can do is to hold off on developments until they can decide what to do about the water" said one. "Just stop developing for awhile," said another. A York County security officer reflected "Decisions made today will impact us in 25 years." "What happened in Florida could happen here, before we know it we could be in a real bind," said a James City sales consultant. "I think we're flying by the seat of our pants," said one James City retiree. On the other side, one James City resident said "There are plenty of places to get water if we worked harder at it. There's a lot of water flowing through that's not being used for drinking, which could provide a lot more water if more dams were built and if we purified the water."

5. What Has Been Done About Lessening the Effects of Development?

Federal, state and local governments have taken various initiatives aiming to curb development, stop encroaching sprawl and prevent further environmental damage. The Chesapeake Bay Preservation Act is one such initiative focused specifically on protecting the Bay and its tributaries. Also, within each local government a planning commission develops a Comprehensive Plan that acts as guide for future growth in the area and helps determine how environmental issues will be handled. Local efforts to lessen the effects of development include the Primary Service Area in James City County, stormwater management and BMP's throughout the region, Greenways Initiatives and different efforts to preserve open space such as the Purchase of Development Rights program in James City County and designation of conservation easements.

The Chesapeake Bay Preservation Act

The Virginia General Assembly adopted the Chesapeake Bay Preservation Act (CBPA) in 1988.[41] The Act was established as a cooperative program between state and local governments aimed at reducing nonpoint source pollution. Nonpoint source pollution includes pollution from septic tank effluent, runoff from agricultural activities and stormwater runoff from developed areas.[42]

The Act recognizes local governments as having primary responsibility for land use decisions. It therefore established the Chesapeake Bay Local Assistance Department (CBLAD) to aid localities by providing financial and technical assistance in the implementation of the program.

CBLAD regulations require localities to include Chesapeake Bay Ordinances in their Comprehensive Planning. Local governments are allowed flexibility in the development of programs and may amend Bay Act programs to meet unique local characteristics and needs.[43]

Under the CBPA land is either classified as a ***Resource Protection Area (RPA)*** or a ***Resource Management Area (RMA)***.

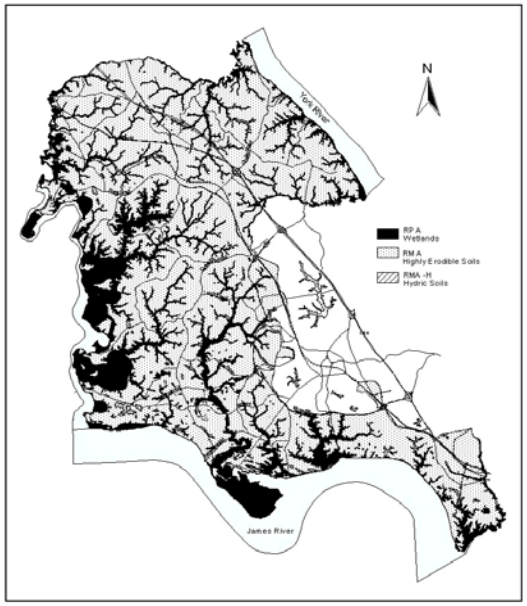
- RPAs are defined as "tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or perennial streams, tidal shores, and 100-foot vegetated buffers adjacent to these features and along both sides of perennial streams (riparian buffers)." Within RPAs development is limited to water-dependent uses and redevelopment.
- RMAs are defined as "floodplains, highly erodible soils (including steep slopes), highly permeable soils, nontidal wetlands included in RPAs, and any other lands the locality deems necessary to protect the quality of state waters."

Although development is permitted within RMAs, developers must adhere to the performance criteria contained in the Chesapeake Bay Preservation Area Designation and Management Regulations and incorporated into local ordinances.[44]

The three general performance criteria are as follows:

1. No more land shall be disturbed than is necessary to provide for the desired use or development (9VAC 10-20-120.1)
2. Indigenous vegetation shall be preserved to the maximum extent possible consistent with the use and development allowed. (9VAC 10-20-120.2)
3. Land development shall minimize impervious cover consistent with the use or development allowed (9VAC 10-20-120.5).

The City of Williamsburg adopted a Chesapeake Bay Preservation Area Ordinance in 1989 to comply with Act. Williamsburg is nine square miles and as a result of the act 60% of Williamsburg is now part of the Chesapeake Bay Preservation Area.[45] Although being part of the CBPA does not stop an area from being developed, it does require that developers adhere to the three performance criteria listed above. Due to James City County's geography and



James City County
Chesapeake Bay Preservation Areas

environmental sensitivity, the County has designated all County land as a Chesapeake Bay Preservation Area and any land in the county not classified as an RPA is designated a RMA.[46] York County adopted the Act in 1990 and since then has designated certain areas in the county as either an RPA, RMA or Intensely Developed Area (IDA). Each of these specific designations coincides with certain development standards.[47]

Three Comprehensive Plans

The local governments of Williamsburg, James City County and York County have each developed a Comprehensive Plan that envisions the future of the community and serves as a guide for future decisions. Although the plan does not carry the force of law, land use decisions in the Plan determine the direction of development in the area.

Development standards are said to have the intention of providing "a guide to accommodating land uses in a manner harmonious with the natural and built environment."[48] James City County's Comprehensive Plan states that "Considering the balance the County must strike between accommodating additional development and providing services for the already approved development, the County will not approve additional residential development without first carefully considering the issues of adequate schools, transportation, water, sewer, recreation and public safety facilities and services." The three major goals relating to land use elements are:[49]

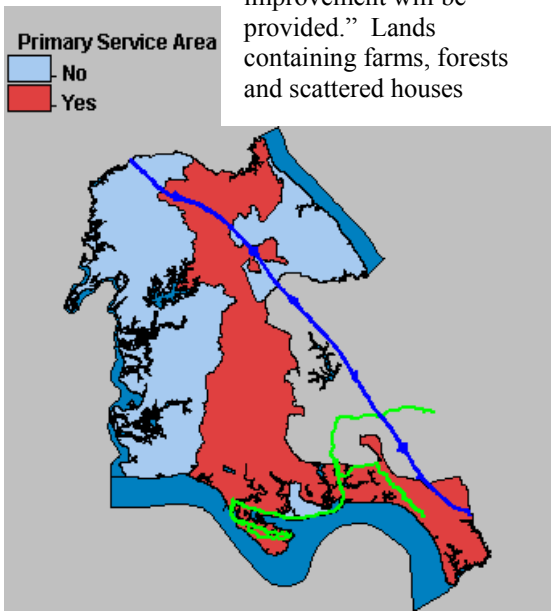
1. Achieving a pattern of land use and development that reinforces and improves the quality of life for the citizens and assists in achieving the goals of the Comprehensive Plan in Economics, Environment, Housing, Public Facilities, Transportation and Recreation.
2. Enhancing and preserving farm and forestall lands and the predominantly wooded and natural character of the County.
3. Directing growth into designated growth areas.

The Williamsburg Comprehensive Plan has several goals for development related to the environment, transportation, housing, land use, etc. Williamsburg's environmental goal is to "Protect and enhance the natural and built environment of the City."[50] Williamsburg's concern for the environment is also related by the Planning Department, "Carefully orchestrated urban growth and environmental preservation along with stress on the importance of maintaining a strong link between Williamsburg's urban planning goals and effective land use implementation techniques is one of the major emphases of planning for the City's future."[51] On the other hand, Williamsburg's goal related to economic development is to, "Support and promote Williamsburg's existing tourism base while exploring other economic development opportunities to expand employment and revenue bases throughout the City."[52]

According to York County's Comprehensive Plan, development in the county encourages "proper use, management, and/or protection of sensitive and unique lands and waterways in the County that contribute to the economy of the region and the environmental quality."[53] The County seeks a balance between its "natural and built environment" in order to enhance the "quality of life of both current and future generations."[54] York County's general environmental goals include:[55]
1) Preserving and protecting environmentally sensitive areas and natural resources from the avoidable impact of land use activities and development.
2) Enhancing public awareness and understanding of the importance of environmental conservation and preservation.
While York County's economic development vision emphasizes the importance of generating revenue without detracting from the natural environment, the County has decided to take an "aggressive stance" toward economic development in order to gain a "balanced tax and employment base."[56]

James City County's "Primary Service Area"

One tool implemented by James City County to control development is a growth boundary called the Primary Service Area (PSA).[57] County water and sewage services exist solely within the boundary, thus discouraging new development. James City County refers to the PSA as the "principal tool used by the County to manage growth." It is an "area in which the County encourages most growth to occur and to which the bulk of public facilities and services improvement will be provided." Lands containing farms, forests and scattered houses



exclusively outside of the Primary Service Area are classified as Rural. "Residential developments not related to agricultural or forestall uses are only appropriate when they meet the Rural Lands Developments Standards of the Comprehensive Plan and minimize adverse impacts on rural lands, in particular rural character and the soils more suited for agriculture." Tools to implement the PSA include the Land Use section of the Comprehensive Plan, the Land Use Plan Map and County ordinances and policies.[58]

There are occasionally exceptions to development occurring outside the PSA.[59] Governors Land is one example of residential development being allowed outside of the PSA. However, JCC development Manager John Horne said that Governor's Land only consists of 700 units, which is of much smaller size than some of the larger developments such as Ford's Colony.

Recently there has been talk of expanding the Primary Service Area. Horne has said that at some point in the future the PSA may be expanded.[60] However, Supervisor John McGlennon has said there is no solid talk of expansion among the Board of Supervisors at this time, but the board is under pressure from developers to expand the PSA.

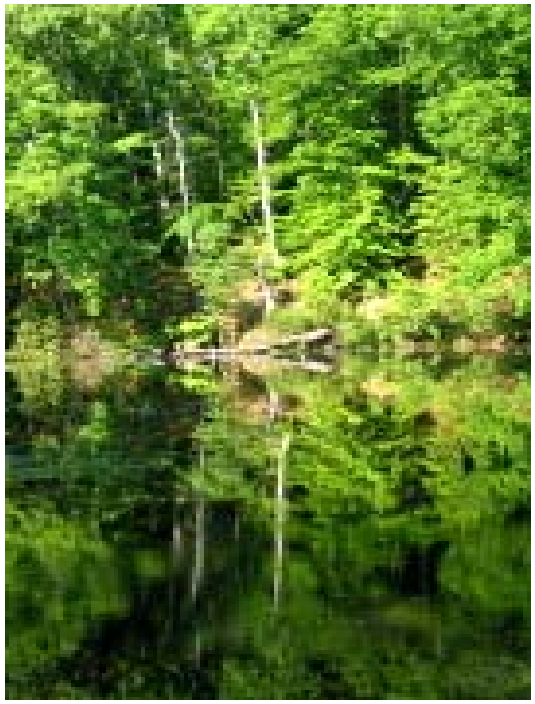
Stormwater Management: Best Management Practices (BMPs), Buffers & Other Controls

Stormwater threats include changes in hydrology of streams, wetlands and floodplains; increased pollutant loads delivered in urban storms; and water level fluctuations that degrade wetlands and the habitat of rare, endangered or threatened plant species.[61] Stormwater management is often used to mitigate these threats. Best Management Practices (BMP's) such as retention ponds, buffers and other measures are common methods employed to lessen effects of stormwater.

Another tool used by James City County to encourage the use of open space is the stormwater management plan approval process. The Best Management Practices (BMP) Point System is a unique tool developed by the County to ensure that requirements are met for Chesapeake Bay Preservation and to ensure that sites are adequately covered by BMPs. Compliance can be achieved through several structural or non-structural BMPs and/or treatment of offsite drainage area. Non-structural BMPs include the permanent preservation of natural open space. Points are awarded for BMPs. A site must attain at least 10 BMP Points to receive stormwater management plan approval.

Buffers are believed to benefit our environment by controlling streambank erosion and flooding, and promoting infiltration and groundwater recharge. Buffers benefit wildlife by decreasing water temperatures, providing food and shade for aquatic life, and providing habitats for wildlife on land.

Riparian buffers are extremely reliable mechanisms for removing pollutants from runoff and serve as backups for upslope BMPs.[62] Buffers are reported to improve water quality by reducing sediment in the water by 97%, reducing nitrogen up to 80%, and reducing phosphorus up to 77%.[63] In addition, they help to protect sensitive areas from encroaching development. Chesapeake Bay Preservation regulations require a buffer area not less than 100 feet surrounding all Resource Protection Areas (RPAs). Resource Management Areas (RMA's) usually extend 500 feet from RPAs and have different regulations than RPA's. According to Darryl Cook, Environmental Director of JCC, "the location of



RMAs is based on what jurisdictions have designated as RMA area or based on characteristics of the land such as non-tidal wetlands, floodplains, highly erodible soils, highly permeable soils or other environmentally sensitive lands at local discretion."[64]

While all localities must comply with state and federal law each has its own set of stormwater management guidelines.[65] The Chesapeake Bay Preservation Area Designation and Management Regulations require localities to satisfy "stormwater management criteria consistent with the water quality protection provisions (VAC 3-20-71 et seq.) of the Virginia Stormwater Management Regulations (4 VAC 3-20)." Williamsburg Planning Director Reed Nester stated that the Chesapeake Bay Preservation Act mandates that stormwater be collected on-site, and that evaluation proposals for development

include stormwater management plans and zoning ordinances that meet the given standards.[66]

Another control taken by James City County to protect the environment is the designation of the entire county as a Resource Management Area.[67] Some older lots that were developed before the Chesapeake Bay Protection Act (CBPA) mandate on RPAs may be granted a waiver by the county. Some violations of the CBPA laws do occur. Recently in JCC about 47 variances were granted in an 18 month period. Most of these are small such as an individual owner wanting to expand a deck or shed slightly into the RPA. Ann Hewitt, president of Friends of the Powhatan Creek Watershed, disapproves of these variances and believes the County often fails to enforce RPA boundaries.[68] Horne, Development Manager of JCC, responded that these comments are "absolutely unsupported by the facts."[69] He believes that the County has made considerable efforts to enforce RPA boundaries and that violations are minor. Hewitt believes any violation, no matter the size, will have an adverse impact on the watershed, creating a ripple effect that will continually lead to more problems. Also, the fine for such a "minor" violation in JCC is $10,000. She believes charging such a hefty fine proves that such violations are more than "minor."

Recent trends in stormwater management reveal mixed support for larger stormwater management facilities and small retention ponds on individual developments.[70] In some cases, larger ponds are more effective in pollutant reduction and are more aesthetically pleasing as they resemble a lake rather than a small, "scummy pond."[71] A local example of a larger stormwater management system is the BMP that will be built for High Street Williamsburg. It will drain water from as far as James Blair Middle School to the west and as far north as Richmond Road. This area is part of the College Creek watershed that drains into Lake Matoaka. In other cases, regional systems may be falling out of favor. Darryl Cook, Environmental Director of JCC, cites problems with permitting and land acquisition issues associated with the placement of regional ponds as key deterrents.

One question that remains is whether stormwater management systems are an adequate replacement for the natural "stormwater management" that existed before the land was altered. Many of the modern stormwater management systems are effective in reducing stream discharge over time to below pre-development values. However, it is unknown whether this lower stream discharge is primarily a benefit or whether there are detrimental effects of this altered stream flow.

Williamsburg City Manager Jackson Tuttle states that he believes Lake Matoaka has suffered mostly as a result of old developments with poor stormwater management, such as those along Richmond Road and the Walnut Hills subdivision, along with the resulting decades of sedimentation.[72] According to Tuttle, modern development, with its adequate stormwater management facilities, is not the problem. He believes that such modern stormwater management more than adequately deals with stormwater runoff and may in fact provide environmental benefits as it can capture stormwater runoff from other already developed areas with inadequate facilites. Tuttle stated that stormwater management facilities built by the hospital and those to be used on the Torsion property will be of a very high quality. On the other hand, JCC development manager, John Horne, describes a growing consensus among planners that BMP's are not a substitute for natural watershed protection. He states that "the best BMP is a forest."[73]

"Greenways," "Greenbelts," and "Clustering"

Greenways are "linear open spaces that are managed for conservation, recreation, and/or alternative transportation use." They create linkages and networks between green environment and open spaces fostering a sense of community and protecting the natural environment.[74] Paul Tubach, the Greenways Master Planner for James City County, stresses the importance of these linkages as "continuous corridors" that are designed to get rid of fragmentation between open spaces.[75] Greenways can also act as an Urban Growth Boundary (UGB) much like the Primary Service Area in the County.

In James City County, one of the main ways the county preserves land and open space is through its Greenspace/Openspace preservation and acquisition programs. "Open space" in James City County refers to a multitude of types of open spaces including: park and recreational land; greenways (easements, trails, migration corridors, etc.); historic preservation & cultural heritage landscapes; scenic properties and scenic view sheds; wetland protection and environmental planning; agricultural and forest lands; roadways and greenbelt buffers; interstitial urban space; and green infrastructure.[76] The County has also preserved open space through the general performance standard of the Chesapeake Bay Preservation ordinance, Section 23-9 (b)(1)(b) by stating that impervious cover shall not exceed 60 percent of a site.[77]

James City County has recently adopted a Greenways Master Plan. `The County does not have the power to tell someone they cannot develop their land, therefore the acquisition of land for greenways and trails are primarily

voluntary. Much of the land comes from proffered easements or donated land given to the County during the Plan Review process by developers and landowners.

Neither Williamsburg nor York County has an official greenways plan such as that of James City County. However, each in their own way includes similar aspects of the greenways and open spaces concept. Williamsburg's Urban Design criteria are designed to "protect the unique cultural and historical architectural character of Williamsburg," and "achieve an identifiable character or image."[78] This includes providing aesthetically pleasing entrance corridors into the city, and ensuring that new construction projects correspond in size and appearance to neighboring buildings.

Increasingly popular among planners and developers are "Greenbelts." Greenbelts are open spaces of land that are to remain undeveloped and are typically found along street lines of roads. The City Zoning ordinance requires a 50 foot Greenbelt of open space along the roads designated by the Comprehensive plan and a 75 foot Greenbelt along Route 199.

York County also provides some incentives for landowners to preserve their undeveloped land.[79] Through the land use assessment program the County taxes certain agricultural and horticultural lands at their *use* value rather than their *market* value. Thus, landowners may have incentives to preserve their land in its undeveloped status. Also, according to Chairman of the Board of Supervisors Don Wiggins, "for the past several years the Board has been putting funds aside through the Capital Improvement Programming process for open space and conservation easements, etc."

Greenways and open spaces are mentioned only briefly in the Land Use Goals and Strategies section of the York County Comprehensive Plan. The fourth land use goal of the County is to "Preserve open space through the County such that these areas will become an integral part of the community."[80] The Comprehensive Plan lists two strategies to achieve this goal. The first is to "Use conservation easements, clustering and other techniques to preserve open space." According to Wiggins, any new residential development in York County must set aside 7.5% of the acreage as common space.[81] If the new development is a cluster development, one in which houses are located close together on small lots, then a minimum of 40% must be set aside as common open space. According to Wiggins, the majority of new subdivisions are in the form of cluster developments. The second strategy aimed to preserve open space is, "Where appropriate, assist in making conservation areas accessible to citizens through the development of greenways, trails and similar facilities."[82] York County also utilizes greenbelts along major corridors to "preserve trees and rural vistas."

Conservation Easements and Purchase of Development Rights (PDRs)

Much of urban sprawl begins with the selling of land by landowners to developers. Instead of using their land for farming, timber management or other uses, landowners have economic incentives to sell their land for commercial development, thereby resulting in increased sprawl. In 2001, James City County enacted the Purchase of Development Rights (PDR) program that recognizes this fact and incorporates the landowner's economic concerns with the county's environmental preservation concerns.[83] Through this program the county purchases land from landowners in return for a "permanent conservation easement." "A conservation easement is a legal document between the landowner and the County that places permanent limits on future development of the property and is recorded at the local courthouse." It binds not only the current landowner but also subsequent owners of the property.[84] It is signed and recorded like other deeds and is a covenant that accompanies the title to the land. Excluding development, the landowner still has rights to "own, use and control the land" in whatever way he or she deems. The PDR program currently receives its funding from a one cent real estate tax rate, which amounts to over $0.5 million a year.[85]

In the first application period for JCC's Purchase of Development Rights Program, fourteen landowners submitted applications.[86] Total acreage for these fourteen landowners amounted to 1,170 acres.[87] Thirteen more landowners considered applying, which would substantially increase the amount of land preserved. The number of properties that are selected for the program depends on the value of the land and their rankings.

Unlike James City County, neither the City of Williamsburg nor York County has an official purchase of development rights program that receives city funding. In Williamsburg, land is not bought from individual owners but may be donated as a conservation easement.[88] York County also encourages the use of conservation easements in its Comprehensive Plan as a "means of protecting and preserving areas with desirable or sensitive environmental or aesthetic qualities especially shoreline and groundwater recharge areas."[89] It is unclear the extent of impact achieved by these programs.

A Model? The Powhatan Creek Watershed Management Plan

Powhatan Creek is a valuable historical and natural resource to the region with its "historic past and present biodiversity."[90] However, as a result of development occurring around the region, in 1998, four subwatersheds of Powhatan Creek were classified as "impacted" and eight subwatersheds were classified as "sensitive." In 2000 these numbers shifted to six subwatersheds classified as impacted and six as sensitive. Considering the current zoning it is likely that in the coming decades all subwatersheds will shift to the impacted category.

In response to concerns over the Creek, James City County contracted with the Center for Watershed Protection in the summer of 2000 to develop a Powhatan Creek watershed management plan. The center completed the study and published 5 documents that included the *Stream and Floodplain Assessment* and the *Stormwater Management Master Plan*.[91] The *Conservation Area Study* found that the current RPA boundaries do not protect all vulnerable streams or conservation areas.[92] Dispersed throughout the watershed are several populations of rare, threatened and endangered species. The *Stormwater Management Master Plan* concluded that James City County's existing stormwater management practices are not enough to protect highly sensitive and pristine subwatersheds from degradation.[93]

Residents of James City County including the Friends of the Powhatan Creek Watershed, a citizens group dedicated to protecting the watershed, joined together as stakeholders to design eight goals to guide implementation of the Plan.[94] Although James City County already requires stormwater management facilities for most plans of development, the intent of the watershed management plan is to go above and beyond current County criteria.[95] The first goal is to prevent further degradation of water quality and maintain the outstanding quality of tidal and nontidal mainstem wetlands. Implementation of this goal includes extending the RPA's to protect all perennial streams and connected wetlands. These stakeholders would also like to see an emphasis on improving water quality rather than just preventing it from getting worse. This could be achieved through strategies such as reforestation and expansion of RPAs and buffers along the Creek's mainstem and tributaries. Negative impacts of storm water runoff can be reduced through better site design techniques limiting impervious cover in new developments, increased homeowner stewardship practices, and storm water systems for new developments.

The second goal is to maintain biological land habitat diversity and to promote habitat connectivity by protecting wildlife and riparian corridors between watersheds, subwatersheds, and the tidal and non-tidal portions of Powhatan Creek. The Plan recommends widening the RPA buffers along the mainstem of Powhatan Creek to a minimum of 300 ft for new development.[96] Other goals include improving existing mechanisms for storm water maintenance, and adequate long term funding for such; linking the unique history and culture of Jamestown and Colonial Williamsburg with Powhatan Creek watershed protection, and implement most of plan by the 2007 Jamestown Anniversary. Their final goal is to promote watershed awareness, active stewardship among the residents, community groups, and businesses, through enhanced educational and recreational opportunities.[97]

The Powhatan Creek Watershed Management Report contains recommendations for meeting these watershed goals using six tools for watershed protection: land use planning (decisions on the amount and location of development and impervious cover); aquatic buffers; better site design (encourages the design of individual projects with less impervious cover and more diffuse storm water runoff); storm water management, conservation areas (decisions about the types, location and relative importance

of different lands that need to be conserved); and watershed education.[98] The plan also charts out where the specific protection tools should be applied, their costs to JCC, the actions required and the responsible parties. In the end, the report estimates that the watershed protection tools will

cost JCC approximately $1.5 million over 6 years with additional funds needed for conservation easements/open space protection.[99]

When the plan went before the Board of Supervisors for approval in spring 2002, three controversial recommendations from the Center of Watershed Protection were removed from the report.[100] They are the following: 1) Prohibit rezoning in sensitive areas. 2) Encourage clustering to create additional open space 3) Limit how much land can be paved in selected areas. There are, however, 21 other goals that were included.

6. Solutions from around the Nation

Smart Growth is a more "environmentally friendly" alternative to sprawl.[101] It involves planning development in a way that allows minimal environmental impact while promoting community, safety, and non-automobile forms of transportation. One model of "livable communities" includes "narrower streets and no cul-de-sacs, shops that front directly onto sidewalks instead of onto parking lots, as well as office, apartment and condominiums above the shops." It is designed so that all shops, restaurants and offices are within walking or biking distance for residents. Many solutions are promoted as alternatives to sprawl, all of which are important components of Smart Growth. Following are several of these initiatives:[102]

- Developing growth boundaries outside which no development can occur.
- Increasing transportation choices, such as trains and bus services.
- Improve safety for walkers, bicyclists and drivers using highway transportation dollars.
- Oppose government programs and tax policies that tend to promote sprawl.
- Encouraging developers to pay impact fees to cover the cost of the new services that will be required as a result of more development. These services include new roads, schools, water and sewer lines, and increased police and fire protection.
- Promote redevelopment and revitalization of older developments.
- Advocate the permanent conservation of important, environmentally sensitive areas through voluntary or purchased easements. These areas include historic areas, agricultural areas, wildlife habitats and open or green space.

A 2000 phone survey conducted by the American Planning Association states that "78% of voters believe that it is important for the U.S. Congress to help communities solve problems associated with urban growth."[103] Poll respondents favored many specific government policies related to smart growth.

Some examples of these smart growth strategies being put to use throughout the United States:

1. Growth Boundaries:
Oregon has adopted Urban Growth Boundaries (UGBs) for all 241 towns and cities in the state.[104] They serve to keep growth concentrated and to protect farmland from sprawl. Approximately 16 million acres have been zoned Exclusive Farm use. The land use regime in place has helped to ensure that the land is valued for agricultural uses only rather than residential development. According to Ken Buelt, an Oregon farmer, "This means that farmers can reduce their unit costs by expanding their operations at prices that reflect farm values."

2. Conservation of Important Environmentally Sensitive Areas:
Maryland has a very aggressive and well funded Purchase of Development Rights Program.[105] The state's agricultural land preservation program has a budget of $10 million in 1996 (and another $1 million from the 1996 federal farm bill) to buy farmland. In total, Maryland has spent some $140 million to save over 130,000 acres and more than 2,000 farms. Transfer of Development Rights is a program used in many municipalities around the country that allows a developer to buy development rights at one location-- such as farm or woodlands, wetlands, historic sites, etc. -- and sell that right to develop to another place within the jurisdiction. The transfer program is used to "channel market pressure for development away from rural areas into designated growth areas." People are still allowed to use the land, but increasing development moves to areas that already have access to roads, sewers and schools.

3. Recycling the Land, Reusing Old Buildings:
One of the major factors contributing to sprawl is the abandonment of old buildings in the center of a town in favor of new developments on raw land in the surrounding suburbs. The community hospital in center Williamsburg will be abandoned temporarily as it moves to nearby York County. It is unknown how the large facility will be utilized. A similar situation occurred in Portland, Oregon when Bess Kaiser Hospital closed leaving an abandoned building in the center of town.[106] After several development companies made proposals, a developer was chosen for his innovative vision. He brought in Adidas and revitalized the building with office space, a recreation center, and an underground parking garage. The new facility provided a better connection to surrounding neighborhoods using improved pedestrian pathways, bicycle lanes and a relocated bus stop. Leftover fixtures and equipment from the hospital were donated to developing countries. "Adidas Village" was a success not only because it brought economic revitalization to the city, but because it prevented development from sprawling toward the suburbs.

4. Regionalism:
Regionalism is an important smart growth strategy as it allows localities to combine forces to implement more effective long term solutions for growth management.[107] While at least twelve states have instituted systems of regional planning and growth management, these programs are often abandoned or lack the teeth needed to be effective. Some states, such as Oregon, Maryland, Vermont, New Jersey, Florida and Washington State, have developed strong and effective land use programs. Keys to success include helping local governments manage growth; providing financial incentives to localities implementing comprehensive plans; establishing goals and performance measures to track progress; and educating all parties about the impacts of growth and effective tools to address these issues. While full regional governance may offer the most effective solution, there are other smaller steps that can be taken. One strategy, annexation, taken by Charlotte, NC is to expand the city limits from 30 to 225 miles thus capturing 50% of the region's population growth. Unfortunately, annexation is prohibited in Virginia.[108]

7. Political/Economic Forces Driving Us To Overbuild

One of the largest economic forces that often results in sprawl is development costs. When it comes to real estate, developers gain bigger profit margins by putting less money into their project.[109] This means the more they have to spend on rainwater drains, etc., the less money they make. Although this information may be common knowledge, there is one important point to be remembered from this: because it is often difficult to piece together existing urbanized properties into a larger development, and because rural lands can be relatively cheap, it often costs far less for developers to develop over a few acres of woods or a meadow than to redevelop or revitalize already developed land. In some instances it is easier to convince city boards to rezone an area of raw land into a developable area, rather than face residents potentially angry about rezoning near their neighborhoods. As a result developers often continue to build more and more new stores and buildings further out of town instead of redeveloping and restoring old lots and buildings in the heart of the city. Money and politics are both influential forces driving their decision to develop raw land.

Developers are able to keep the cost of developing raw land low because some of their costs are spread to county citizens. The costs of new schools, increased fire and police coverage in remote areas, and extending roads, sewage and water service to these locations generally exceed fees or taxes levied on the new developments. Existing taxpayers therefore effectively subsidize sprawl. Unless the incentive structure is reversed, developers will continue to look for raw land to develop on instead of revitalizing an old site, which will consequently lead to more sprawl.

A second force driving sprawling development in the area is the political environment. In South Hampton Road's May 2002 local elections, construction-related companies, real estate firms and people in development businesses gave at least $321,000 to candidates, making them the largest of any group of campaign contributors.[110] This has especially been the case in areas that sought to control growth, such as Chesapeake and Virginia Beach where the Green Line – the imaginary line separating the developed north from the rural south- open space preservation and the Agricultural Reserve Program have dominated the elections. As a more pro-environment council in Virginia Beach has been replaced over the years, areas protected from development have been steadily eaten away.

However, many candidates deny that they accept money from developers asking for favors and claim to have sought donations from a broad spectrum. Clearly, those with development related concerns donate their money to candidates they believe support their viewpoint and will take actions towards it. Louis S. Haddad, president and chief executive officer of Armada/Hoffler, the Chesapeake-based developer building Town Center in VA Beach, said that for them as a development company, "…we have a vested interest in land-use

decisions and those are obviously made at a local level."

Some analysts of urban politics have identified a "growth machine" which is driving the American patter of sprawl and overbuilding. The "growth machine" is a coalition of leaders from businesses and institutions that benefit from the sale and more intensive use of land and the growth of local populations.[111] This pro-growth coalition includes the obvious – developers and realtors, construction firms and local newspapers, TV and radios, telephone and cable and electric companies. But they also include universities, sports teams, and many foundations who join in local "boosterism" because they see their growth tied to the increase of local population and wealth.

For developers and homebuilders, paying attention to the issues of growth is their job, and so they actively and consistently seek to influence politicians individually and through their trade organizations. For citizens with other jobs, expressing their concerns is more difficult, since they have to attend to their regular jobs and families. Environmental organizations are often staffed by volunteers who have many conflicting issues and demands on their time.

Many counties say that they want to control sprawl and people agree that sprawl is a problem, but experts say people cannot agree on specific tactics to slow sprawl. According to Connie Bawcum, deputy city manager in Richmond, counties are "doing the best they can with the tools they have." Counties in Virginia have been limited by the General Assembly which has resisted giving counties the power to charge impact fees against developers. Many political leaders in the counties are not taking actions to control sprawl because their constituents are not aware or place more value on the right to develop their land.[112]

One side is not noble and the other evil, but it is plainly true that the structural conditions favor those for whom developing the land brings personal gain. Individual struggles over one property or development project may go one way or another, but the overall result in the long term is overbuilding in a way that is individually rational but eventually threatens the watershed and character that makes a community special.

8. Workable Solutions for Greater Williamsburg

Starting Small:
The first step in making any type of change is education. We must first acquire knowledge of the current situation before we are able to recommend solutions. One beneficial program that could be used to assess the current water quality in the Lake Matoaka and surrounding watersheds is a volunteer water quality monitoring program. The Friends of the Powhatan Creek watershed have a successful monitoring program that is a formal affiliate of the Virginia Department of Environmental Quality.[113] Using funds received from individual or group donations, volunteers are able to meet twelve times a year to test for evidence of chemical pollutants. With the data obtained the Friends are able to determine whether the Creek is experiencing any significant water quality degradation. This type of community participation and education could be expanded to other watersheds and groups and would increase awareness of our surrounding environment. "Watershed user training" could be designed and taught at schools, churches and civic organizations. Trade groups such as developers and homebuilders must be part of these efforts.

Building Right:

Too often the application of the general performance criteria regulations from the Chesapeake Bay Local Assistance Department has focused on nutrient control aspects and technical solutions/BMPs for storm water control rather than good site design.[114] "Good site design provides a more appropriate, and cost effective, approach to meeting the performance criteria." The more effective solution is to incorporate these criteria into development plans at the beginning of site design rather than at the end.

The Center for Watershed Protection highlights

16 areas for consideration by local planners, developers, citizens, etc. to change the standard approach to site design. It looks at our communities as being a mix of three habitats: open spaces and natural areas that are relatively undeveloped; the habitat where we work and live, our yards and homes; and the habitat devoted to the automobile including roads, driveways, and parking lots. The principles are designed to result in "more environmentally sensitive, economically viable, and locally appropriate development."

"Builders for the Bay" is another organization that aims to encourage environmentally friendly development.[115] It combines local watershed groups, homebuilders, local governments and other stakeholders in a process of code and ordinance review to develop better site design principles such as those promoted by the Center for Watershed Protection. More information is below on these groups.

Planning for a Livable Future in Williamsburg:

Another way the area can be improved is through a more aggressive implementation of the Purchase of Development Rights program and the Greenspace programs. These programs are especially needed in York County and Williamsburg, where they are not as developed or as prominent as in James City County. The Greenways Plan in James City County could also be accelerated considerably with VDOT and EPA funds.

The Powhatan Creek Watershed Management Plan has been very effective in raising people's awareness of the state of the watershed. The Plan is also one small example of what can happen when citizens groups and local government officials work together towards a common cause. Watershed plans similar to the Powhatan Creek plan could be adopted for other watersheds in James City, York and Williamsburg.

Removing Barriers From Above:

Virginia laws dating from colonial times have blocked municipalities and counties from thinking and working collectively on their shared planning issues. While many take a fatalistic approach to these laws, we believe there may be enough accumulated frustration and justification to begin the process of reform. Regional planning needs to be a top priority.

Rethinking Our Future Together:

A community dialogue has clearly been underway for years on issues of development and water in the Williamsburg area, but these discussions must be structured into some kind of effort that is more than just talk. One approach that has been adopted by more than 2,000 communities around the world is called "Local Agenda 21."[116] Communities begin by establishing an "effective and participatory process." They then conduct a "sustainability inventory," articulate a vision for a "healthy, vibrant and ecologically sustainable community," develop an active strategy and monitor their progress. There will be obvious roles for local governments, industries, developers, the College, Colonial Williamsburg, and the military to play in this effort. But, the most important step is to gain broad participation in the community.

9. Who's Working on these Issues, What They Are Doing and How You Can Be Involved

Local Government

An article from a 1996 Daily Press article relates the difficulty of public involvement in local governments.[117] It states, "Politicians lose elections, planning commissions change; boards of supervisors change…the constant is-or should be-the vision of the people who live in the place." The problem with many local government initiatives is that citizens do not always feel they are being directly affected and therefore do not make the effort to understand programs. Without such community participation, however, the important decisions end up being made by small commissions and boards.

While many citizens are not aware of ways to be involved, many opportunities exist for people to get involved in their local government and to have input in development decisions in their community. One of the most important ways to be involved is to vote for those council members or supervisors who support your vision for the community. Another important responsibility a citizen has in improving their community is attending a public meeting such as the Board of Supervisors, the Planning Commission, etc. A crucial time for citizens to be involved is in the Comprehensive Plan review process. During JCC's Comprehensive Plan review process, *Towards 2007: Steering Our Course*, there were 2 parallel work efforts.[118] A public participation element used public input meetings to inform County citizens and allowed them to voice their views for the future. Tools for public participation and open communication in the process included The Community Participation Team (CPT) with the responsibility for overseeing citizen participation in the review process as well as public input meetings called *Community Conversations.* The technical

planning element involved using data analysis and citizen input to create policies and strategies. The James City County 2002 Comprehensive Plan review process has already begun and there will be several public meetings in the fall.

County or city websites are valuable tools for notices of public meetings, past minutes, and information on various programs and initiatives. County officials are also available for you to voice your questions and concerns.

City of Williamsburg
http://www.ci.williamsburg.va.us
City Council: 220-6104
City Manager: 220-6100
Planning Department: 220-6132

York County
www.yorkcounty.gov
Board of Supervisors: 890-3321
Planning Commission: 890-3884

James City County
www.james-city.va.us
Board of Supervisors: 253-6609
Development Management: 253-6671

Virginia State Government

Department of Environment Quality (DEQ)
The DEQ monitors the water quality of Virginia's rivers, lakes, and estuaries through a system of monitoring stations. "DEQ administers the federal Clean Water Act and enforces state laws to improve the quality of Virginia's streams, rivers, bays and ground water for aquatic life, human health and other water uses. Permits are issued to businesses, industries, local governments and individuals that take into account physical, chemical and biological standards for water quality."[119]

Contact:
www.deq.state.va.us
(804) 698-4000
The DEQ provides a complete listing of Virginia watershed programs at the following: http://www.deq.state.va.us/watersheds/programs.html

Department of Conservation & Recreation (DCR)
The DCR works to protect watersheds through its soil & water conservation programs. It is the state's lead agency for developing and implementing statewide nonpoint source pollution control programs and services. DCR staff administer a number of nonpoint source pollution control programs required by state law that include: erosion and sediment control, storm water management, nutrient management, agricultural best management practices, shoreline erosion control, floodplain management, dam safety, public beach conservation and the administrative, technical and financial support of soil and water conservation districts.[120]

Contact:
www.dcr.state.va.us
(804) 786-1712

The Chesapeake Bay Local Assistance Department

In 1998, the Virginia General Assembly enacted the Chesapeake Bay Preservation Act.[121] The Bay Act is a cooperative program between state and local government with the goals of improving water quality in the Chesapeake Bay and its tributaries through better land use decisions while still allowing reasonable development to continue, giving to local governments the primary responsibility for managing land uses and development. The Chesapeake Bay Preservation Act can be found in its entirety in Section 10.1-2000 through 10.1-2116 in the Code of Virginia.

To assist local governments in implementing programs, a nine member citizen board called the Chesapeake Bay Local Assistance Department (CBLAD) was established. The CBLAD has been given the statutory authority in Sections 10.1-2103 and 10.1-2107 in the Code of Virginia for promulgating and keeping regulations that establish criteria for local Bay Act programs; providing technical and financial assistance to local governments; providing technical assistance and advice to regional and state agencies; and ensuring that local government comprehensive plans, zoning ordinances, and subdivision ordinances are in compliance with the Bay Act regulations. Complete regulations established by the Chesapeake Bay Local Assistance Board can be found in regulation title 9 VAC 1—20-10 et seq. – *Chesapeake Bay Preservation Area Designation and Management Regulations.*

Unfortunately, Virginia's budgetary woes are affecting CBLAD.[122] The Secretary of Natural Resources has been directed to develop a plan to merge CBLAD into the Department of Conservation and Recreation as well as to reduce its budget by $1 million in each year of the next biennium. Effective July 1st 2002 CBLAD has found it necessary to discontinue its financial assistance program.

Contact:
www.cblad.state.va.us
(804) 225-3440
1-800-CHES-BAY (1-800-243-7229)

EPA Surf Your Watershed

The Environmental Protection Agency's Surf Your Watershed website provides access to a variety of databases containing information regarding watershed location and conditions, wetlands projects, and more.

Contact: Surf Your Watershed
United States Environmental Protection Agency
Mail Code 4503F, 401 M Street SW
Washington, D.C. 20460
(202) 260-7144
www.epa.gov/surf/

Citizens Groups

Local:

The Williamsburg Land Conservancy

The Williamsburg Land Conservancy's aim is to preserve the land, water and way of life in the Historic Triangle.[123] Objectives of the Williamsburg Land Conservancy include encouraging appropriate methods of land conservation and use; increasing public understanding and appreciation of land conservation and promoting partnerships among like-minded entities. The Land Conservancy works with the knowledge that "neither a policy of no-growth nor one of unfettered development serves the community's interest. Rather, protection of natural resources goes hand-in-hand with well-considered economic growth."

The Conservancy relies on donated easements in order to protect and preserve land.[124] Permanent conservation easements allow the Conservancy to reach its goal, "important land permanently protected from development." Through such donated conservation easements the Conservancy has helped to protect about 600 acres of land as of 2002.

The Conservancy has a Volunteer Committee that completes many tasks the Conservancy would otherwise have to struggle to finance. The volunteers complete such tasks as ticket sales, selling raffle tickets, serving food and/or beverages, security, tee-shirt sales, children's events, distributing materials, etc. The volunteers help out at the different events, such as fairs and fundraisers, that are held throughout the year. Another way members or non-members can get involved is through donations. The Conservancy accepts annual tax-deductible contributions from individuals or businesses.

Contact: Williamsburg Land Conservancy, Suite 1202, 5000 New Point Road, Williamsburg, VA 23188
(757)565-0343

Friends of the Powhatan Creek Watershed

In January 1999, citizens in JCC in and around the Powhatan Creek Watershed joined together to form Friends of the Powhatan Creek Watershed.[125] With the help of the Virginia Environmental Endowment, the Center for Public Policy at the College of William and Mary, as well as several state and local agencies, what started as a group of citizens concerned about their watershed has evolved into an "organization committed to the preservation, conservation and enhancement of the Powhatan Creek Watershed as an ecologically diverse system within the Chesapeake Bay Watershed." The Friends currently run a number of projects including a citizens' water quality monitoring program, stream cleanup through the Adopt-a-stream program, and public awareness forums on issues impacting the watershed.

Contact: Friends of the Powhatan Creek Watershed, P.O. Box 5112, Williamsburg, VA 23188
http://www.widomaker.com/~watershed/

Sierra Club- York River Group
The Sierra Club York River group is a branch of the national Sierra Club and serves members on the Virginia Peninsula.
Contact: P.O. Box 11266, Newport News, VA 23601-11266
Thomas Ellis, Chair: 722-9785
http://dandelionproject.org/sierra/

State

The Virginia Conservation Network

The Virginia Conservation Network is "devoted to advancing a common, environmentally sound vision for Virginia." It was created in 1990 and is composed of over 100 groups committed to protecting Virginia's natural resources. Its mission includes disseminating vital information, coordinating legislative information during the General Assembly, sponsoring the Virginia Environmental Assembly and environmental seminars, and many other activities. The VCN serves its members through public policy, education and training, and outreach.

Contact: Virginia Conservation Network, 1001 East Broad Street, Suite LL 35-C, Richmond, VA, 23219
(804) 644-0283
www.vcnva.org

Nature Conservancy, Virginia

The mission of the Nature Conservancy is "To preserve the plants, animals and natural

communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive."[126] They work to achieve this mission by purchasing lands that they have determined to be the highest priority places using their Conservation by Design process. The Conservancy then joins together with communities, businesses, governments, partner organizations and individuals to protect these places. The Nature Conservancy of Virginia has protected over 235,000 acres of natural land at risk in Virginia.

Contact: The Nature Conservancy, 490 Westfield Road, Charlottesville, VA 22901
Phone: (434) 295-6106
E-mail: dwhite@tnc.org

James River Association
The James River Association is a non-profit citizens' organization "dedicated to the conservation and responsible stewardship of the natural and historic resources of the James River Watershed."[127] Its goals are, "to ensure the quality and responsible use of the James River and its natural and historic resources; to encourage orderly and sustainable development and land uses; to enhance the quality, quantity, and diversity of aquatic and wildlife resources in the James River Watershed; to increase public education for greater appreciation of the James River; and to promote effectively managed public access to the James River." The Association worked along with the Center for Watershed Protection to develop a watershed management plan for JCC.

Contact: James River Association, P.O. Box 909, Richmond, VA 23111-0909
(804) 730-2898

Regional

Southern Environmental Law Center (SELC)
The SELC is the "only environmental organization dedicated solely to protecting the natural resources of the southeastern United States."[128] It was founded in 1986 by a small group of attorneys and has grown into a multifaceted organization that works to strengthen environmental protection laws and policies on a regional level. The SELC uses direct legal action, policy reform, public education and partnerships with other groups to achieve its goal of protecting our valuable natural resources.

Contact: 201 West Main St., Suite 14, Charlottesville, VA 22902-5065
(434) 977-4090
www.southernenvironment.org

Center for Watershed Protection
It is a nonprofit 501(c) (3) organization with a mission to find cooperative ways of protecting and restoring our watersheds. .[129]
It conducts independent research and provides technical support to local governments and watershed management professionals around the country to develop more effective urban stormwater management and watershed protection programs
Contact: Center for Watershed Protection, 8391 Main Street, Ellicott City, MD 21043-4605
(410) 461-8323

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National groups

Sierra Club
The Mission of the Sierra Club is four fold: to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and lastly to use all lawful means to carry out these objectives.

The Sierra Club's Campaign to Stop Sprawl is supported and implemented by over 700,000 Sierra Club members in chapters and groups across the country. Through various initiatives and programs the Sierra Club is educating others about alternatives to sprawl and smart growth strategies.

Contact: Sierra Club, 85 Second Street, Second Floor, San Francisco, CA 94105-3441
(415) 977-5500
http://www.sierraclub.org
The Sierra Club's Challenge to Sprawl Campaign:
challenge.sprawl@sierraclub.org
Brett Hulsey, Challenge to Sprawl Campaign Coordinator, 608-257-4994
brett.hulsey@sierraclub.org

The International Council for Local Environmental Initiatives (ICLEI)

The mission of ICLEI, an international environmental agency for local governments, is "to build and serve a serve a worldwide movement of local governments to achieve tangible improvements in global environmental and sustainable development conditions through cumulative local actions."[130] Over 350 cities, towns, counties, and their organizations worldwide are members of ICLEI. The agency functions as an information clearinghouse provide policy guidance, training and technical assistance, and consultancy services on sustainable development to local governments.

Contact: 15 Shattuck Square, Suite 215
Berkeley, California, USA 94704
(510) 540-8843
www.iclei.org

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