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Introduction

1.1 BACKGROUND

Caroline County's planning policies and guidelines concerning water and sewerage were originally adopted in 1970, in the *Caroline County Master Plan for Water and Sewerage*. Subsequent revisions to this document occurred in 1986 and in 1992, when the Plan title was changed to *Caroline County Comprehensive Water and Sewerage Plan*. Since the 1992 update, a number of amendments to the Plan have been approved to reflect changes in water and sewer service areas, timing categories, and public and private system inventories.

This Plan is an update of all previous County water and sewerage plans, and incorporates all water and sewer plan amendments and revisions. It is compliant with the standards set forth in Environmental Articles 9-501 through 9-512, Annotated Code of Maryland, and its provisions apply to both unincorporated (i.e. County) and incorporated (i.e. Towns) areas of the County.

This Plan was prepared in 2009 by the Caroline County Department of Planning, Codes and Engineering with the cooperation and support of the Caroline County Departments of Environmental Health and Public Works, and the Towns of Denton, Federalsburg, Goldsboro, Greensboro, Henderson, Hillsboro, Marydel, Preston, Ridgely, and Templeville. It is intended to be used as a working guide for water and wastewater planning, and to serve as an incremental, long-range plan that supports the goals of the County's Comprehensive Plan and facilitates direction and management of growth and development.

1.2 PURPOSES OF THE PLAN

The Comprehensive Water and Sewerage Plan serves three purposes:

- 1) It is an inventory of existing and planned water and sewerage systems;
- 2) It catalogues and addresses critical water supply and sewerage treatment issues in the County as identified by the State of Maryland, Caroline County, and municipalities within the County, and
- 3) It guides the future expansion of public and private water and sewerage systems in Caroline County in ways that are consistent with the environmental, water quality, and development policies established in the County's Comprehensive Plan and other County planning documents.

1.3 STATE REQUIREMENTS

Maryland has procedures to ensure that public infrastructure improvements are consistent with growth policies, as defined in the law. All counties in Maryland are required to adopt a Comprehensive Water and Sewerage Plan under Environment Articles 9-501 through 9-512 of the Annotated Code of Maryland. State law requires that provision be made for the Plan to be fully updated triennially, as required by the Maryland Department of the Environment (MDE). The Commissioners of Caroline County, after reviewing a draft update of the Plan, must convene a public hearing and invite review and comment of the draft Plan prior to adopting it. Once adopted, the Plan serves as the official planning and policy document for the provision of water and sewerage systems and service in the County. Future amendments may be made to the Plan to reflect changes over time in governing laws, population, housing, land use, and industry patterns, and environmental conditions in Caroline County. These amendments must be reviewed and adopted by the Commissioners of Caroline County following a public review process (see Review and Amendment Procedures, Section 2.6.2.).

Title 9, Subtitle 5 of the Annotated Code also requires that expansions of water and sewerage systems be consistent with County goals and policies for development, and that the extent, adequacy, sizing, staging and other characteristics of these systems be in compliance with State laws regulating water and air pollution, environmental protection and land use.

Caroline County's development goals, established in the Land Use Plan of the County's Comprehensive Plan, are based on the eight Visions contained in the State's 1992 Planning and Zoning Enabling Act (Article 66B of the Annotated Code). These Visions were evaluated and revised in April 2009 with the adoption of the Smart, Green, and Growing Act (Maryland HB 294) and are the foundation on which the Land Use Plan of the County's 2010 Comprehensive Plan are based:

1. **Quality of Life and Sustainability:** A high quality of life is achieved through universal stewardship of the land, water and air resulting in sustainable communities and protection of the environment.
2. **Public Participation:** Citizens are active partners in the planning and implementation of community initiatives and are sensitive to their responsibilities in achieving community goals.
3. **Growth Areas:** Growth is concentrated in existing population and business centers, growth areas adjacent to these centers, or strategically selected new centers.

4. **Community Design:** Compact, mixed-use, walkable design consistent with existing community character and located near transit options is encouraged to ensure efficient use of land and transportation resources and preservation and enhancement of natural systems, open spaces, recreational areas, and historical, cultural, and archeological resources.
5. **Infrastructure:** Growth areas have the water resources and infrastructure to accommodate population and business expansion in an orderly, efficient, and environmentally sound manner.
6. **Transportation:** A well-maintained, multimodal transportation system facilitates the safe, convenient, affordable and efficient movement of people, goods and services within and between population and business centers.
7. **Housing:** A range of housing densities, types, and sizes provide residential options for citizens of all ages and incomes.
8. **Economic Development:** Economic development that promotes employment opportunities for all income levels within the capacity of the State's natural resources, public services, and public facilities is encouraged.
9. **Environmental Protection:** Land and water resources are carefully managed to restore and maintain healthy air and water, natural systems and living resources.
10. **Resource Conservation:** Waterways, open space, natural systems, scenic areas, forests and agricultural areas are conserved.
11. **Stewardship:** Government, business entities, and residents are responsible for the creation of sustainable communities by collaborating to balance efficient growth with resource protection.
12. **Implementation:** Strategies, policies, programs and funding for growth and development, resource conservation, infrastructure, and transportation are integrated across the local, regional, State and interstate levels to achieve these visions.

The development policies established in the Land Use Element of the 2010 Caroline County Comprehensive Plan are guided by these twelve Visions. Those policies, in turn, guide the water and sewerage policies of this Plan.

Additional provisions in Maryland law that guide the development of the County's water and sewerage policies include the 1997 *Neighborhood Conservation and Smart Growth*

Areas Act (Smart Growth Act). County water and sewerage policies follow the intent of this legislation, which is “to support growth in Maryland’s communities and limit development in agricultural and other resource conservation areas”. The Smart Growth concept is enacted in the designation of “Priority Funding Areas” (PFAs), which are local areas targeted for growth and eligible for State funding of public water and sewer service. PFAs include municipalities that existed on January 1, 1997, existing rural villages and planned communities (or growth areas) and industrial areas. Areas annexed by municipalities after January 1, 1997 must meet additional density requirements and have water and sewer service in order to qualify as a PFA.

Under the Smart Growth Act, all of Maryland’s municipalities are automatically designated as PFAs. As of 1998, State funding can only be applied to “growth-related projects” in PFAs. Growth-related projects include highway and road construction and improvements, water and sewer construction, and economic development assistance.

In 2004, the Maryland Department of Planning prepared a list of draft “Water & Sewer Planning Principles” to assist towns and counties in preparation for annexation, development and growth management in regards to water and sewer planning. These include the following:

Principle 1 – Support Smart Growth: Water and Sewer Plans should be proactive in contributing to Smart Growth objectives of revitalizing existing towns and communities, promoting economic development in Priority Funding Areas (PFA’s), and protecting rural areas from sprawl and leapfrog development. The Plan should do this by focusing on maximizing use of existing facilities through strong renovation and maintenance programs. Capacity increases should be based on documented needs and expansion of systems to new areas and should be in an orderly manner to areas contiguous to existing service areas. The Plan should present policies and practices that help reduce the cost of development on sewer and water relative to development on individual systems.

Principle 2 – Maintain and Improve Existing Systems: Water and Sewer Plans should address how the physical and fiscal condition of existing water and sewer systems can be improved to support Smart Growth. This means that the Plan should give the highest priority to identifying and meeting needs for renovation and maintenance of existing systems in existing locations. This will help assure that there is adequate infrastructure to support revitalization and infill in existing communities.

Principle 3 – Manage Service Area Expansions: Water and Sewer Plans should support any geographic expansion of existing systems only in existing PFA’s and areas contiguous to existing service areas with densities no less than 1 unit/per acre and average densities sufficient to qualify for PFA designation (3.5 units/per acre). The Plan

should indicate the staging of expanded areas with reference to specific timeframes. Techniques should be developed to discourage or prohibit physically preemptive low density development on individual systems in planned future service areas. As stated in State law, service should be shown for "...those parts of the county that can reasonably be expected to be served in the next 10 years." This provision is consistent with the PFA designation criterion which states: "PFA designation must represent a long-term policy for orderly development and efficient use of land and public services."

Principle 4 – Expand System Capacity Based on Demonstrated Needs: Water and Sewer Plans should provide for adequate treatment and conveyance capacity for service areas that are delineated with "all practical precision." Capacity should be based on "reasonable" population, household and economic projections, in the context of local zoning as referenced in Principle 3. This will help to assure that capital, maintenance, and operating costs will be reasonable. Systems that have either too little or too much capacity in relation to realistic projected needs and/or geographic coverage can strain rate payers and local budgets and harm local bonding ability.

Principle 5 – Present a Capital Program Based on Demonstrated Needs: Water and Sewer Plans should translate projected needs into specific projects for new, renovated, or expanded facilities for at least the 10 years following Plan adoption. These projects should be shown in tables with estimated costs and funding sources. Existing and planned major facilities and projects should be shown on the service area maps.

Principle 6 – Allocate Capacity to Support Smart Growth: Water and Sewer Plans should describe capacity allocation policies and systems that serve the other principles and that maintain local control over available capacity. Allocations should be time limited and not transferable to avoid private control of capacity rights that are not used and to prevent the development of an unregulated market in these rights. Priority for allocations should be given to infill, redevelopment, and expansions into new areas that are contiguous to existing service areas and meet State PFA requirements.

Principle 7 – Protect Water Quality and Water Supply Sources: Water and Sewer Plans should demonstrate how existing and proposed facilities, and the development patterns they support, will meet permit requirements for point discharges and stormwater. The Plan should describe its relationship and contribution to meeting the objectives of relevant watershed plans, TMDLs, and the Chesapeake Bay Agreement. In areas where sewage is treated by on-site disposal systems, promote the use of best management practices that reduce nutrient pollution without increasing housing density. For water supply, the Plan should identify that safe and adequate supplies are available for projected growth and describe programs to protect the integrity and quality of existing and planned ground and surface water supply sources.

Principle 8 – Assure Adequate User Rate Structures: Water and Sewer Plans are mandated to address how systems will be adequately funded to assure protection of public health, water quality, and environmental protection. Recent Statewide studies of sewer and water infrastructure found extensive and expensive needs for renovation of existing systems that were leaking, overflowing, or otherwise inadequate to meet existing or planned future demands. A major finding of these studies was that rate structures are often inadequate for proper system maintenance. This has led to increasing risks to public health, water quality, and the environment. At the same time, the deterioration of older systems was found to be detrimental to Smart Growth.

Principle 9 – Incorporate Subsidiary Plans: Water and Sewer Plans must by law, fully integrate planning and facilities for the county, municipalities, and other private and government entities that own or operate water and sewerage systems within the county or that serve more than one county. These entities must be full partners in the planning process to assure that their operating and capital program information, allocation policies and practice, and other required information is updated and that service areas reflect both county and municipal comprehensive plans. Issues related to future service areas and annexations around municipalities must be addressed and resolved to the maximum extent possible.

1.4 CAROLINE COUNTY WATER SERVICE NEEDS

1.4.1 Jonestown

At the time of this update, there is one high priority area for water service in the County: the village of Jonestown, a Priority Funding Area (PFA) located approximately 1.25 miles northeast of the Town of Preston. Residents of Jonestown have reported incidents of failing on-site sewage disposal systems (OSDS – septic systems) over the past several years; at present these failing septic systems pose a contamination threat to the wells located in close proximity to them. The issue is compounded by the failure of a small community water system located in Nelpine Heights, a small subdivision of 26 homes in Jonestown. A comprehensive study of the entire PFA revealed several incidences of failing septic systems in the area as well as a lack of indoor plumbing facilities in some homes, resulting in the recommendation of the installation of a water system to serve the entire PFA. The system will serve the 26 properties in the Nelpine Heights subdivision (20 of which are occupied), 20 homes in the adjoining Nelpine mobile home park (MHP) and 78 other properties (48 of which are occupied) in the Jonestown PFA. Future connections will be limited to 10 percent of the number of currently occupied homes in the PFA, approximately 10 connections.

The Jonestown water and sewer service areas (see Chapters 4 and 5) will follow the boundary of the Jonestown PFA and will include the Nelpine Heights subdivision,

Nelpine Motor Home Park, and the remaining properties located within the PFA boundary. The water service area will be divided into appropriate timing categories ranging from W-1 to W-3. At present there are no sewer systems in Jonestown; further review of the area's failing septic systems will determine whether a public sewer system or upgraded septic systems is the appropriate course for the community. At the time of this update the Jonestown sewer service area is designated as an S-3 timing category.

The Jonestown water system will be owned by the County and operated by a licensed operator under a contract agreement with the County. The system will be constructed following completion of an MDE-funded Civil Engineering Feasibility Survey, which will determine appropriate system parameters including treatment equipment and facilities, capacity sufficient to allow for future infill development, and a possible fire suppression system. Immediately upon start-up operation of the public system the residents of Nelpine Heights and Jonestown will be required to connect to the system. At the present time it is not necessary to connect the MHP to the public system as it is in good working order, was recently permitted, and is run by a licensed operator. Should the MHP's system fail, the park will be required to connect to the public system.

1.5 CAROLINE COUNTY SEWER SERVICE NEEDS

1.5.1 North County Region

In 2008, the Commissioners of Caroline County and government representatives of the North County towns – Goldsboro, Henderson, Marydel and Templeville – formed the North County Water and Sewer Authority (NCWSA) to address the issue of failing septic systems in the North County area and the need for a public wastewater treatment and collection system to replace failing them. The four towns and the County are the subjects of a proposed complaint and Consent Order (Proposed Order) prepared by the Maryland Department of the Environment (MDE). Similarly, Goldsboro is the subject of a separate Consent Order with MDE.

The Authority defined areas in and near each of the four towns to be served along with the minimum and maximum number of parcels to be served in each of the four areas. As per an allocation agreement approved by the NCWSA, the maximum number of homes permitted to be connected to a North County treatment plant is 1,532; the allocation agreement restricts the plant's maximum flow to 383,000 gpd.

On behalf of the Authority, Caroline County and the Maryland Environmental Service commissioned an Engineering Study, completed in October 2009, to determine the most appropriate type of regional wastewater system to serve the Authority's service area. Several engineering studies performed in the past provided recommendations for

implementing wastewater systems, however, none of the recommendations were implemented, primarily due to the unavailability of funds.

In the October 2009 Engineering Study, alternatives were evaluated for a regional wastewater collection, conveyance, treatment, and disposal system that would serve a minimum of 746 equivalent dwelling units (EDU) and a maximum of 1,532 EDUs. In the study, the use of a centralized system and de-centralized, or multiple, systems for collection and treatment were evaluated. A total of six alternative systems, or options, as well as a “no action” alternative were evaluated and compared. A preliminary Environmental Assessment was performed for the recommended alternative.

Based on a comparative analysis that addressed economic and non-economic factors, the study recommended the most feasible alternative: a low pressure (grinder pump) sewer collection system in each of the four towns and surrounding areas and a conveyance system to convey the collected wastewater to a single treatment plant near Goldsboro, which would have an initial capacity of 260,000 gpd, expandable to 383,000 gpd. Based on funding considerations the construction of the system would be phased over a period ranging in length from between five and nine years, beginning with the Town of Goldsboro in the first phase.

In December 2009, a supplemental engineering study was commissioned by Caroline County on behalf of the NCWSA to assess the feasibility of a seventh option (the “Greensboro” option), wherein wastewater from the NCWSA and the Town of Greensboro would be treated at the same treatment plant located in Greensboro (Greensboro currently owns and operates a 280,000 gpd stream discharge treatment plant that discharges to the Choptank River). The study evaluated the economic and non-economic impacts of extending the project to include Greensboro, and addressed impacts on conveyance, treatment and final effluent disposal were evaluated. The evaluation was performed on the basis that the Town of Greensboro would not be a member of the Authority and that each entity would provide separate funding for implementing the Extension Project.

The Greensboro option includes a new pumping station in Goldsboro, new force main from Goldsboro to Greensboro, a new pumping station and force main in Greensboro, and a new surface water discharge treatment facility that utilizes sequencing batch reactor and filtration technology. The treatment facility would be located at a new site on the north side of the Town of Greensboro and would discharge to the Choptank River. The new facility would be sized for an ultimate capacity of 814,000 gallons per day, which includes the Authority's planned capacity of 383,000 gpd and the Town of Greensboro's planned expansion from their existing treatment capacity of 280,000 gpd to 431,000 gpd. The project would be implemented in two phases, with the initial phase providing a treatment capacity of 540,000 gpd to account for Greensboro's existing

capacity of 280,000 gpd and 260,000 gpd planned for the initial phase for the Authority. The treatment facility would provide Enhance Nutrient Removal (ENR)-level treatment for both the Authority and for the Town of Greensboro.

The supplemental engineering report recommended that the Greensboro option be implemented, based on environmental benefits and long-term economic factors.

At the time of this update (2009) the NCWSA is working with Maryland Environmental Service (MES), MDE, the U.S. Department of Agriculture (USDA) and the Maryland Rural Development Corporation (MRDC) to evaluate the feasibility of securing State and/or federal funding for the phased construction of the facility. The October 2009 Engineering Report and the December 2009 Supplemental Engineering Report were submitted to MDE and USDA for review and comment.

Pending final review and comment by MDE and USDA on the engineering reports, the NCWSA will select a preferred alternative and the project will move to the design and construction phase.

1.5.2. On-Site Sewage Disposal (Septic) Systems

In many areas of Caroline County rural developments, small villages, and in some cases small municipalities, do not have the financial resources necessary to provide, operate and maintain community sewage systems. The wastewater from these properties is usually treated by individual on-site sewage disposal systems (OSDS), also known as septic systems. Currently, property owners in the four small towns in the northern region of the County are served by individual septic systems.

At the time of the update of this Plan (2009), based on MDE data, there are 11,105 on-site sewage disposal systems in Caroline County. About 13 percent of the septic systems in the County are located within the Critical Area, i.e., within 1,000 feet of tidal waters. These systems load an estimated, collective total of 101,000 pounds of nitrogen into County receiving waters annually.¹

Due the nature of the soils in the northern region of the County, and the size constraints that limit on-site septic improvements on small municipal lots (such as those located in the four North County towns), the development of a public wastewater facility will be the most effective solution to failing septic systems in the region.

Wherever possible, the matter of failing septic systems in other areas of the County should be addressed with the installation of upgraded, best available technology systems. In 2008 the Maryland Board of Public Works voted to approve funding through

¹ Draft 2009 Caroline County Comprehensive Plan, Water Resources Element.
2010 Caroline County Master Water and Sewerage Plan
Chapter 1 Introduction
January 2010 Draft

the Bay Restoration Fund (BRF) to upgrade septic systems with best available technology (BAT) for denitrification to prevent excess nitrogen from discharging to the State's waterways. The nitrogen load from a BAT system is 50 to 80 percent less than the load from a conventional septic system. The Caroline County office of Maryland Environmental Health Services (EHS) oversees the BRF program to install denitrification septic systems in Caroline County. Failing systems located within the Critical Area are given top priority for BRF funds, followed by non-failing systems in the Critical Area. At the time of this update, EHS is performing 48 to 60 system upgrades per year. The implementation of the 2009 Denitrification Law (SB 54), which mandates that new homes in the Critical Area install BAT systems, will likely spur an increase in awareness of the new technology.

Chapter 2 Goals, Objectives and Policies

2.1 FEDERAL CLEAN WATER ACT

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1977.

Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry and water quality standards for all contaminants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges.

The objective of the Act is "to restore and maintain the chemical, physical and biological integrity of the Nation's waters". The Act establishes the following national goals to achieve this objective:

- 1) It is the national goal that the discharge of pollutants into the navigable waters be eliminated;
- 2) It is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved;
- 3) It is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;
- 4) It is the national policy that Federal financial assistance is provided to construct publicly owned waste treatment works;
- 5) It is the national policy that area-wide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State;

- 6) It is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, waters of the contiguous zone and the oceans.

In addition to the nationwide goals for restoring and maintaining water quality, the Federal government has given special recognition to the Chesapeake Bay as a natural resource of major significance.

The 1972 act introduced a permit system for regulating point sources of pollution. Point sources include:

- industrial facilities (including manufacturing, mining, oil and gas extraction, and service industries)
- municipal governments and other government facilities (such as military bases), and
- some agricultural facilities, such as animal feedlots.

Point sources may not discharge pollutants to surface waters without a permit from the National Pollutant Discharge Elimination System (NPDES). This system is managed by the United States Environmental Protection Agency (EPA) in partnership with state environmental agencies. EPA has authorized 46 states to issue permits directly to the discharging facilities. The CWA also allows tribes to issue permits, but no tribes have been authorized by EPA. In the remaining states and territories, the permits are issued by an EPA regional office.

The required reduction in point source loads is being made with upgrades to major treatment plants (flow over .5 mgd) to ENR technology, which reduces total nitrogen (TN) load to 3mg/l and total phosphorus (TP) to .3mg/l (a 40% reduction from 1985 discharges). As of the end of 2007, the Bay's total point source load was a 44% reduction from 1985 total nitrogen levels and a 29% reduction from 1985 total phosphorus levels.

Congress exempted some water pollution sources from the point source definition in the 1972 CWA, and was unclear on the status of some other sources. These sources were therefore considered to be nonpoint sources that were not subject to the permit program. Agricultural stormwater discharges and irrigation return flows were specifically exempted from permit requirements. Congress, however, provided support for research, technical and financial assistance programs at the U.S. Department of Agriculture to improve runoff management practices on farms.

Stormwater runoff from industrial sources, municipal storm drains, and other sources were not specifically addressed in the 1972 law. In the early 1980s EPA conducted the

Nationwide Urban Runoff Program (NURP) to document the extent of the urban stormwater problem. The agency began to develop regulations for stormwater permit coverage, but encountered resistance from industry and municipalities, and there were additional rounds of litigation. This litigation was pending when Congress considered further amendments to the Act in 1986.

In the Water Quality Act of 1987 (1987 WQA) Congress responded to the stormwater problem by requiring that industrial stormwater dischargers and municipal separate storm sewer systems (MS4) obtain NPDES permits, by specific deadlines. The permit exemption for agricultural discharges continued, but Congress created a nonpoint source pollution demonstration grant program at EPA to expand the research and development of nonpoint controls and management practices.

Under the CWA, non-point sources (any source that is not a point source, e.g., certain agricultural and other un-channeled stormwater runoff) are generally not regulated under the NPDES permit program.

Instead, pollutant controls for nonpoint sources are promoted through Federal grant programs like CWA section 319. In addition to the CWA section 319 grant program, there are other Federal assistance programs such as the Environmental Quality Incentives Program (EQIP) provided through the U.S. Department of Agriculture. Each State also has a variety of regulatory and non-regulatory programs that provide important measures or incentives to control nonpoint sources of pollution. Because EPA's ability under the CWA to influence nonpoint source pollutant reductions solely through grant-related programs is not expected to fully address nonpoint source reduction needs, EPA is working with state and local jurisdictions to develop innovative approaches to achieving nonpoint source reductions of nutrients and sediment.

2.2 STATE WATER QUALITY INITIATIVES AND PROGRAMS

In response to the objectives of the Clean Water Act, Maryland operates its portion of the National Pollution Discharge Elimination System (NPDES) permit program and manages the Federal construction grants program for sewage treatment facilities under agreements with the U.S. Environmental Protection Agency. The State's water quality planning program also is based directly on the policy expressed in the CWA.

With the signing of the Chesapeake Bay Agreement of 1987 by Maryland, Virginia, Pennsylvania, the District of Columbia, and the Environmental Protection Agency, a commitment was made to implement coordinated plans to improve and protect the water quality and living resources of the Bay. To initiate this effort, Federal funds earmarked specifically for Bay implementation actions and long-term resource management

became available. This effort was furthered by the subsequent signing of the Chesapeake Bay Agreement of 2000.

2.2.1. The Maryland Water Quality Improvement Act

The Maryland Water Quality Improvement Act “requires that comprehensive and enforceable nutrient management plans be developed, approved and implemented for all agricultural lands throughout Maryland.” This act specifically requires that nutrient management plans for nitrogen be developed and implemented by 2002, and plans for phosphorus to be done by 2005. In 2008, 379 farming operations filed nutrient management plans with MDA; however only 80 percent, about 90,000 acres, reported that their nutrient management plans were actually implemented. EPA, through the Chesapeake Bay Program, continues to emphasize that achieving 100 percent implementation of agricultural nutrient management plans is critical to achieving nutrient reduction. Caroline County supports the 100 percent implementation goal and will identify opportunities to assist MDA with increasing implementation of nutrient management plans for Caroline County farms.

2.2.2. Chesapeake Bay Agreement

In the 1987 Chesapeake Bay Agreement, Maryland made a commitment to reduce nutrient loads to the Chesapeake Bay. In 1992, the Bay Agreement was amended to include the development and implementation of plans to achieve these nutrient reduction goals. The Tributary Strategies developed in support of the 1992 Agreement provide a framework to support the implementation of non point source pollution controls in the Choptank River and LES basins.

In June 2000, the Chesapeake Bay Program adopted Chesapeake 2000: The Renewed Bay Agreement; an agreement intended to guide restoration activities throughout the Chesapeake Bay watershed through 2010. Maryland, Virginia, Pennsylvania, Washington, DC, the EPA, and the Chesapeake Bay commission pledged to achieve over 100 specific actions all designed to restore the health of the bay. Chesapeake 2000 also provided the opportunity for Delaware, New York and West Virginia to become more involved in the Chesapeake Bay Program partnership.

In March 2009, EPA issued a “Bay Barometer” that the agricultural community had achieved 50 percent of the 2000 Agreement goal for reducing nutrient loads from agricultural land. The 2009 Barometer also reported that wastewater plants Bay-wide had achieved 67 percent of the WWTP nitrogen reduction goal and 91 percent of the phosphorus reduction goal.

2.2.3. Bay Restoration Fund Enhanced Nutrient Reduction (ENR)

The Bay Restoration Fund (BRF) was created by Senate Bill 246 in May, 2004. The BRF uses funding from public sewer taxes to provide up to 100 percent state grant funds to local governments to retrofit or upgrade sewage treatment plants to reduce the nutrient levels in plant discharge to Enhanced Nutrient Removal (ENR) levels: 3 mg/l total nitrogen (TN) and .3 mg/l total phosphorus (TP). Upon completion of an ENR upgrade, MDE requires the permittee to make a best effort to meet the load goals, providing reasonable assurance of implementation.

The BRF also funds the cost of installing denitrification upgrades for septic systems in the Bay watershed through funding supplied by septic user fees paid by property owners with septic systems. Denitrification systems remove 50 percent or more of the nitrogen discharged by septic systems. The Chesapeake Bay Nitrogen Reduction Act, passed at the end of the State's last legislative session, requires that septic systems being built or replaced for homes located within the Critical Area must utilize the "best available technology" to reduce the level of nitrogen output of the septic system. The Caroline County office of Maryland Department of Environmental Health oversees implementation of the BRF program and administration of the new law.

2.2.4. The Chesapeake Bay TMDL

The U.S. Environmental Protection Agency (EPA) is leading a major initiative to restore the Chesapeake Bay and its network of local rivers, streams and creeks through the development of a Chesapeake Bay total maximum daily load (TMDL), which will establish strict limits on nutrient and sediment pollution in the Bay. The Bay TMDL will be used as a regulatory tool of the federal Clean Water Act and will be backed by a series of accountability measures, or reasonable assurances, that will ensure cleanup commitments are met. The Bay TMDL will be the largest and most complex ever developed, involving six states and the District of Columbia and the impacts of pollution sources throughout a 64,000-square-mile watershed.

The Bay TMDL will contain the load allocations for non-point sources and waste load allocations for point sources necessary to achieve the states' existing Chesapeake Bay water quality standards. Under the Clean Water Act and EPA's regulations, the Bay TMDL will contain the loading budget necessary to achieve existing water quality standards in each impaired Bay segment.

A final approved TMDL is expected by December 31, 2010. It will be comprised of individual TMDLs of TN, TP, and sediment for each Bay water quality impaired segment (there are 52 impaired segments in Maryland). Load and waste load allocations will be determined at different geographic scales:

- Bay-wide
- Major Basin/Jurisdiction (States and DC)
- Bay Water Quality Segment (The TMDL Scale)
- County/Segment (Co-Seg)

Allocations will be determined for different source sectors:

- Waste Load Allocations
 - Major WWTP –listed individually
 - Minor WWTP –aggregate
 - Major Industrial –listed individually
 - Minor Industrial –aggregate
 - Dredged material placement sites
 - CAFO
 - Diffuse sources
 - Construction
 - Regulated urban stormwater
 - Mines (sediment impacts)

- Load Allocations
 - Agriculture
 - Septic systems
 - Forest
 - Harvested forest
 - Non-regulated urban stormwater

Maryland must allocate basin loads down to Bay segmentshed (the specific geographic land area that drains to a Bay water quality segment) level, and by source sector (point source and non-point source target loads for each impaired segment drainage area). Maryland will apply parts of EPA’s allocation methodology by:

- setting targets based on controllable loads per source sector
- assessing equitable levels of effort, and
- relative effectiveness of each segmentshed per change in Dissolved Oxygen (DO) levels.

It will be up to the State, working with local governments and urban and farm communities, to assign these aggregate target loads more specifically. EPA will put those target loads by source sector back into the model to ensure that Water Quality Standards will be met and to develop load and wasteload allocations for the Bay TMDL.

2.2.5. Tributary Strategies

Tributary Strategies are river and creek-specific cleanup strategies for the Bay's ten major tributary basins that detail effective methods to reduce the amount of nutrients and sediment flowing into the Chesapeake Bay. The strategies, which are managed by Tributary Teams, outline how the Bay states and the District will develop and implement a series of "best management practices" to address local water quality problems and minimize pollution. Among the pollution control options being implemented in each tributary basin are upgrades to wastewater treatment plants, the planting of stream-side forests to absorb nutrient runoff, best management practices to reduce agricultural runoff and "smart growth" plans aimed at concentrating new development and protecting open spaces and natural habitat.

Tributary strategies also will play a role in achieving the Bay TMDL for non-point sources. If the final load analysis shows that the Tributary Strategies load allocations are equal to or less than the allowable loads for a TMDL, the Tributary Strategies implementing the Bay allocations will serve to implement the TMDL. However, if the TMDL allocation is less than that required by the trib strategy load allocations, additional implementation will be applied to trib strategies reach the more stringent TMDL goal.

Waste Load Allocation is a maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated.

A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Reasonable assurance is a demonstration of proof that each wasteload allocation and load allocation in a TMDL will be implemented. For point sources regulated under section 402 of the Clean Water Act, reasonable assurance is demonstrated by procedures that ensure that enforceable National Pollutant Discharge Elimination System (NPDES) permits will be issued expeditiously to implement applicable wasteload allocations for point sources. For nonpoint sources, reasonable assurance is demonstrated by specific procedures and mechanisms that ensure load allocations for nonpoint sources will be implemented for that waterbody. Specific procedures and mechanisms for nonpoint sources must apply to the pollutant for which the TMDL is being established, must be implemented expeditiously and must be supported by adequate funding. Examples of specific procedures and mechanisms which may provide reasonable assurance for nonpoint sources include State regulations, local ordinances, performance bonds, contracts, cost-share agreements, memorandums of understanding, site-specific or watershed-specific voluntary actions, and compliance audits of best management practices.

2.2.6. Tier II Waters

The State's water quality standards include Designated Uses, the criteria to protect Uses, and an Antidegradation Policy. The Antidegradation policy protects waters where water quality exceeds the minimum requirements specified by the State. These waters are identified as Tier II waters. Implementation procedures were developed for Tier II waters to protect and maintain them as high quality waters so they are not allowed to degrade to meet only the minimum standards (Tier I). Apart from certain short-term changes, water quality cannot be lowered in such waters.

MDE recommends stream segments for Tier II consideration after measuring and monitoring data against biological criteria and water quality thresholds. If a segment exceeds minimum water quality standards, it is eligible for Tier II consideration. If a segment is designated Tier II, any new or proposed amendments to County water and sewer plans and NDPEs discharge permits are required to assure consistency with anti-degradation requirements.

MDE is reviewing several Caroline County stream segments eligible for Tier II designation, including segments located along the north, east and west boundaries of Denton, one along the west boundary of Greensboro, and several segments located on unincorporated County land. Final review and comment on proposed Tier II designations will take place in 2009. If Tier II designation is granted, the County will amend relevant planning documents to include standards of protection for the Tier II waters.

2.3 COUNTY WATER AND SEWERAGE GOALS

The goals in this Plan are consistent with the goals of the Caroline County Comprehensive Plan. The following summarized goals from the Comprehensive Plan are related to water and sewerage development:

- 1) Direct future growth to municipal growth areas where infrastructure and amenities such as roads, schools, businesses, and public water and sewer facilities are available.
- 2) Require all new development in County growth areas that are outside of sewer service areas to utilize septic systems capable of biological nutrient removal to reduce nutrient loading to the County's waterways.
- 3) Coordinate the designation of County growth and TDR receiving areas with municipalities based on available capacity of water and sewer systems, with the goal of achieving the Clean Water Act (CWA) goal of 40 percent reduction from

1985 point source loads. Consideration also needs to be given for the number of existing homes that have now or may in the future have failing septic systems.

- 4) Assist towns with finding technical and/or fiscal support for decreasing effluent concentrations of total nitrogen and total phosphorus.
- 5) Protect the County's agricultural and resource lands from widespread development served by individual septic systems by developing a Transfer of Development Rights (TDR) program for the R-1 residential zone and a Purchase of Development Rights (PDR) program for the R residential zone.

The goals and policies stated in this Plan are consistent with those of the Maryland Department of the Environment, as found in Environmental Article 9, Subtitle 5 Annotated Code of Maryland. Briefly, that Subtitle states that ample water supply and wastewater collection be available; that wastewater be adequately treated before discharge to State waters; that adequate sanitary facilities be provided at marinas; and that consideration be given to related aspects of land use, zoning, population estimates, engineering and economic factors, and all plans for privately-owned water and sewerage facilities.

The following County goals for water and sewerage are intended to guide future actions over a long period of time:

- 2.3.1. To ensure that water and sewer services shall be monitored and maintained in a manner that strives to maximize the public health, safety, and welfare for all citizens of Caroline County while minimizing every environmental impact.
- 2.3.2. To ensure a sufficient supply of water is and will be collected, treated, and delivered to the points of use where it is programmed for service or to abate issues that threaten public health and safety.
- 2.3.3. To ensure that wastewater is and will be collected from and extended to areas programmed for growth and delivered to points best suited for wastewater treatment and disposal or reuse, or to abate issues that threaten public health and safety, while maintaining CWA 40 percent reduction goals.
- 2.3.4. To incorporate the water and sewer planning principles of the Maryland Department of Planning and Smart Growth initiatives to implement best land management practices and highest water quality protection management practices.

- 2.3.5. To coordinate the planning for and designation of County water and sewer service areas with existing and future municipal growth areas and Transfer of Development Rights (TDR) receiving areas in order to reduce pollution from development served by individual septic systems.
- 2.3.6. To insure that all water supply and wastewater systems are designed and constructed to acceptable standards.
- 2.3.7. To coordinate water and sewerage planning with efforts to conserve valuable ground and surface water resources and minimize water pollution caused by point and non-point pollution sources.
- 2.3.8. To use innovative methods of on-site treatment and disposal of wastewater to resolve existing public health threats, whenever possible.
- 2.3.9. To require that all municipalities, public and private communities, multi-use facilities, industries, and individuals provide adequate and appropriate water and wastewater facilities with due regard for future need.

2.4 COUNTY WATER AND SEWERAGE OBJECTIVES

To accomplish the County's water and sewerage goals, the following objectives are related to the provision of water and sewerage service:

- 2.4.1. To improve the water quality of Caroline County receiving waters by meeting the point source discharge requirements, at a minimum, by striving to achieve the Clean Water Act (CWA) goals for point source nutrient loads, and by identifying and reducing other sources of pollution (i.e., failing septic systems, stormwater runoff).
- 2.4.2. To promote the upgrade of municipal wastewater treatment plants (point source discharges) to Biological Nutrient Removal (BNR) or ENR (Enhanced Nutrient Removal) systems while ensuring that new development does not negate environmental gains.
- 2.4.3. To correct sewerage and water supply problems in existing problem areas by utilizing the best available and most economical water and sewer technologies and methods, whether regional, municipal, community or individual in nature, in a manner which will protect the health, safety and welfare of the existing public.
- 2.4.4. To support Smart Growth concepts by concentrating development in planned growth areas and receiving areas where adequate public facilities and services

exist or are planned in accordance with State laws and local policies and regulations.

- 2.4.5. To develop planning and regulatory mechanisms to address Federal and State water quality laws and initiatives including Total Maximum Daily Loads (TMDLs).
- 2.4.6. To assist municipalities and the North County Water and Sewer Authority (NCWSA) with determining thresholds and benchmarks for point source nutrient loads based on population and housing units and the CWA goal of 40 percent reduction from 1985 loads (point source and other controllable loads), and developing a system to monitor and address increases over time.
- 2.4.7. To coordinate the designation of County growth and TDR receiving areas with municipalities based on available capacity of water and sewer systems, with the goal of achieving the CWA goal of 40 percent reduction from 1985 point source loads.
- 2.4.8. To coordinate with municipalities on long-term strategies to address failing septic systems in unincorporated areas of the County, including the use of alternative and innovative waste disposal systems, and systems capable of connecting to public sewerage systems.
- 2.4.9. To work with the agricultural community, developers, and municipalities to develop and implement best management practices (BMPs) to reduce the impacts of stormwater runoff from agricultural operations and developed land (non-point source pollution).

2.5 COUNTY WATER AND SEWERAGE POLICIES

The following policies will be used to accomplish the stated goals and objectives and to implement the Comprehensive Water and Sewerage Plan:

2.5.1. Policies Regarding Water Quality and Supply

- 2.5.1.1. Existing sewage treatment plants will be encouraged to upgrade treatment levels in an effort to meet the Federal Clean Water Act of 40 percent reduction of 1985 point source loads as much as possible (see Appendix for EPA data on 1985 point source loads for treatment plants in Caroline County) and to continue to meet or exceed Maryland Water Quality Standards.
- 2.5.1.2. Inter-jurisdictional planning for future growth in Caroline County will address managing the capacity of municipal and regional treatment plants to support

additional growth, including that directed to Transfer of Development Rights (TDR) receiving areas in towns and in town growth areas, without diminishing water quality in receiving waters.

- 2.5.1.3. The County will cooperate with and support State and federal efforts to reduce any sources of surface and ground water pollution, including State and federal initiatives to establish, monitor and enforce Total Maximum Daily Load limits for watersheds, tributaries and jurisdictions.
- 2.5.1.4. The utilization of best available technologies for on-site sewage disposal (septic) systems shall be required in County Critical Areas and those Transfer of Development Rights (TDR) Receiving Areas not served by public sewer systems, and encouraged in all other areas served by individual septic systems.
- 2.5.1.5. In areas where a community water supply is available, individual water supply wells for non-potable uses (e.g. irrigation, swimming pools) may be approved provided certain safeguards are met and approval is received from the community water service authority. These safeguards will include a registry of the well by the owner of the supply which also provides for inspection of the well.
- 2.5.1.6. In the event that existing individual private water supply or sewerage systems prove inadequate or unsafe, the County will attempt to provide connection to a public system or an alternative system.
- 2.5.1.7. The nature and extent of all existing water and sewer problems will be investigated and solutions sought within a timely manner.
- 2.5.1.8. The County will develop and maintain a database of Caroline County Groundwater Appropriation Permits (GAPs) to monitor and assess trends in groundwater withdrawals over time. The County Department of Planning and Codes will work with the County Department of Environmental Health to develop and coordinate strategies to address critical groundwater issues as they arise.
- 2.5.1.9. The County shall maintain the capability to review and approve proposed community water and sewerage systems where these systems are extended and the Maryland Department of the Environment does not require State Construction Permits. This is managed by the Caroline County Department of Environmental Health.

2.5.1.10. In planning for public water and sewer facility construction programs, the following shall be considered:

- a) Areas experiencing public health hazards needing immediate solution.
- b) Existing systems in need of upgrading.
- c) Municipal growth areas.
- d) Recommendations of the Comprehensive Plan.
- e) Determination of physical and financial feasibility.

2.5.2. Policies Regarding Public Water and Sewer Systems

2.5.2.1. Public water and wastewater systems are permitted within municipal boundaries defined in the County's Comprehensive Plan.

2.5.2.2. Public facilities are defined as those whose operation and maintenance is provided by either the State, County, an incorporated town, or other public entity.

2.5.2.3. To the extent possible, municipal systems will be encouraged within the County and municipal growth areas designated in the County's Comprehensive Plan and the use of individual or multi-use systems will be limited according to the designations as outlined in Section 2.6.1.

2.5.2.4. Generally, outside of the limits of growth areas, community systems, multi-use systems, or individual wells and individual septic tank/drain field systems may be permitted. (Refer to the Definitions section for the differences between these types of systems). The burden of proof of feasibility and design of these systems shall rest on the developer. Shared facility systems of an interim or a permanent nature may currently only be permitted for the correction of existing problems. These systems must be in compliance with COMAR and the policies of this Plan, as established in Section 2.5.4.

2.5.3. Policies Regarding Multi-Use (Community) Systems

A multi-use system is a single system serving a single lot, whether owned or operated by an individual or group of individuals under private or collective ownership, and serving a group of individuals. Multi-use systems may have a capacity in excess of 5,000 gpd.

2.5.3.1. All multi-use sewerage systems having an average daily treatment capacity of less than 5,000 gpd (or less than 8 pounds BOD5 per day, and less than 10 pounds TSS per day) and all multi-use water supply systems having an

average daily capacity of less than 5,000 gpd shall, for regulatory purposes, be considered individual systems.

- 2.5.3.2. Multi-use systems between 5,000 gpd and 30,000 gpd are to be considered multi-use systems and are to be operated and maintained privately.
- 2.5.3.3. Multi-use systems in excess of 30,000 gpd are to be considered community systems, whether publicly or privately owned.
- 2.5.3.4. All multi-use systems having average daily water treatment capacities of 5,000 gpd or more, or average daily wastewater treatment capacities of 5,000 gpd or more (or handling more than 8 pounds BOD5 per day, or handling more than 10 pounds TSS per day) shall need to be authorized by the County Commissioners via an amendment into this Plan.

2.5.4. Policies Regarding Shared Systems

- 2.5.4.1. A shared facility may be allowed as a replacement system to correct an existing problem. The County will review applications for shared systems on a case-by-case basis.
- 2.5.4.2. It is the policy of Caroline County to discourage the use of shared facilities for new development. Should the decision be made to utilize shared systems in the future, the County Commissioners must adopt an ordinance and an amendment to this Plan to allow for the construction and maintenance of the systems. Some minimum considerations to allow shared systems are listed below.
- 2.5.4.3. Minimum requirements to allow shared systems may include but may not be limited to:
 - 2.5.4.3.1. The establishment of two distinct entities to implement a shared system (as required by State law). The Approving Authority, which reviews the soils at the selected site and the proposed design, and the Controlling Authority which undertakes operation and maintenance responsibilities once the system is installed. The Approving Authority would be the Caroline County Environmental Health Department and the Controlling Authority would be a management entity established or approved by the County. The Controlling Authority would own and operate the shared facility.
 - 2.5.4.3.2. All private owner/operators of shared systems would be required to post a trust indenture, naming an unrelated successor

- organization that is prepared to intercede and assume responsibility should the owner/operator fail.
- 2.5.4.3.3. All private owner/operators would be required to provide continuous coverage to implement an approved “closure plan” in the event of transfer of ownership or operational control of the system occurs, until released from financial assurance requirements by the County and the new owner or operator has demonstrated compliance with State and County requirements for shared systems. The closure plan implementation cost estimate would be required to be revised concurrently with any revision made to the closure plan which increases the closure plan cost.
 - 2.5.4.3.4. All private owner/operators would be required to post a performance bond or other comparable form of financial guarantee in a sum equivalent to three years of budgeted operating costs for the system plus an allowance for equipment replacement.
 - 2.5.4.3.5. Each property using the shared facility would be required to pay a portion of the capital costs required for the shared facility, including but not limited to: planning, design, and construction costs, including costs to obtain and construct drain fields.
 - 2.5.4.3.6. Each property using the shared facility would be required to pay a quarterly user fee to cover the cost of operation and maintenance, as well as to build up a capital reserve fund.
 - 2.5.4.3.7. Each property would typically have its own grinder pump that is owned and operated by the property owner. In addition to the above ‘user fee’ the property owner would be required to hold a service contract with the vendor of the grinder pump.
 - 2.5.4.3.8. The Controlling Authority would own the drain field lands in fee simple as well as be granted easements for the pipe network connecting the homes to the drain field.
 - 2.5.4.3.9. In order to maximize the life of the drain fields, the construction of two drain fields is required, each capable of serving the entire number of properties(or section of properties, if there is more than one drain field serving the entire number of properties) in order to dose and rest one field at a time.
 - 2.5.4.3.10. All construction would need to be inspected, for which the County would be reimbursed by inspection fees paid by the properties using the shared facility.
 - 2.5.4.3.11. Any such system, regardless of size, would require an amendment into the County’s Comprehensive Water and Sewerage Plan for inventory purposes.

2.5.4.3.12. Any shared system with an average flow of 5,000 gpd, or more, may be required to obtain a groundwater discharge permit from the Maryland Department of the Environment.

2.5.5. Policies Regarding Alternative and Innovative Wastewater Systems

2.5.5.1. On-Site Sewerage Disposal Systems – Where septic tank/drain field systems are malfunctioning, innovative and alternative systems such as aerated tank/drain field systems, aerated tank/mound systems, and bermed infiltration pond systems, or shared facilities, may be considered by the Caroline County Environmental Health Department for the correction of existing problems. These systems require regular monitoring, competent operation, and routine maintenance by an experienced operator. The County desires to avoid the proliferation of these systems, however the County is not discouraging innovative/alternative wastewater systems that are approved by the State. Systems that fall under this category will be considered on a case-by-case basis, taking into account their usefulness in specific situations, and the County's ability to review the design and monitor operations in conjunction with MDE. Both innovative and alternative systems may be used in areas where approved conventional systems are permitted.

2.5.5.1.1. Alternative on-site sewerage disposal systems are systems that typically have percolation rates of wastewater in excess of those recognized as conventional (see Definitions). Examples include sand mounds, shallow low-pressure distribution systems, and shallow alternating trench drain fields.

2.5.5.1.2. These systems are allowed only on new construction of existing lots of record or wherever a conventional system has been approved.

2.5.5.1.3. The use of alternative systems will not change the requirements for set back distances, recovery areas, or unsaturated treatment zones.

2.5.5.1.4. Innovative on-site sewerage disposal systems are systems that have percolation rates in excess of those which fall into the alternative category (see Definitions).

2.5.5.1.5. Innovative systems can be used only to rectify existing failed systems or for new development for which a conventional system was granted approval. These systems shall not be permitted as a

means to allow property owners to develop previously undevelopable properties. However, in order to correct existing problems resulting from previous construction of onsite wastewater systems, the use of innovative systems in existing problem areas will be considered on a case-by-case basis.

2.5.5.2. Community Wastewater Treatment Facilities – the use of alternative or innovative wastewater collection, treatment, and disposal systems is encouraged to enhance and maximize nutrient removal capabilities of treatment systems. Alternative or innovative systems include:

2.5.5.2.1. Tertiary Treatment Wetlands: In this system, constructed wetlands are used to purify treated effluent from a BNR or ENR sewage treatment plant. These wetlands purify the effluent to the point where the eventual discharge is essentially free of nutrients and other pollutants. Tertiary treatment wetlands are also suitable for schools and other institutional uses. Implementation of this method depends heavily on soil characteristics and other conditions.

2.5.5.2.2. Wastewater Reuse: In this system, as with tertiary treatment wetlands, effluent is treated to potable (or better) standards. In the final stage the purified effluent can be injected back into the aquifer as recharge or re-circulated through a pipe system to be utilized as ‘grey’ water (irrigation, toilet flushing, outdoor uses, etc.). This approach may have merit in the Aquia Aquifer.

2.5.6. Policies Regarding Nutrient Trading

The State’s Policy for Nutrient Cap Management and Trading was established by MDE as an effort to maintain water quality in the Bay watershed. All states in the Chesapeake Bay Watershed are now required to issue NPDES permits with limits for nutrients based on their state’s Tributary Strategy nutrient load caps. This has not yet been implemented in Maryland, but when it is, all major WWTPs will have Tributary Strategy loading cap-based nutrient limits in their permits (no word yet on minor dischargers’ permit requirements). Under the policy, to maintain the required caps, nutrient loadings from new or expanding major plants have to be offset by equivalent nutrient reductions.

The policy is being developed by MDE in two phases. Phase I establishes definitions, principles, and fundamentals of the trading program, as well as point source-to-point source trading policies. Phase II will address point source to non-point source trading

and offsets. The State's trading policy is essentially a set of guidelines; it is not regulatory, and will be used by MDE primarily "to guide future administrative decisions."²

2.5.6.1. Caroline County is not prepared to support nutrient trading until the State's policy better addresses such things as protection of local water quality, baseline nutrient level requirements for trades (in other words, nutrient levels that must be achieved and maintained by a potential trader before he can participate), protocols for quantifying loads and reductions, and standards for compliance, for both point and non-point trading.

2.5.7. Policies Regarding Response to Sanitary and Water Supply Problems

The Maryland Department of the Environment has the statutory power to direct that action be taken to correct a public health emergency caused by failed septic or well systems. Recognizing this and also the existence of well and septic systems on the perimeter of municipalities served by public water and sewer, the following policies and procedures have been established.

They address how the County and municipality will jointly respond to health emergencies which may arise. In addition, they establish standards for planning extension of water and sewer services to un-served areas adjoining municipalities which are not emergencies, but which may need such service in future.

The following policies apply if the number of septic or well failures determined by a Health Department Sanitary Survey exceeds 25% of the properties surveyed and the area is contiguous to a municipality which provides sewer or water service.

2.5.7.1. Problem Area Response Procedures:

- 2.5.7.1.1. When notified by the local Health Department of a well or septic failure area, the County will initiate a meeting between County and municipal representatives to discuss the problem and potential solutions. There must be a written request to the Health Officer to do a formal sanitary survey, following which the results will be forwarded to the Maryland Department of the Environment.
- 2.5.7.1.2. An informational meeting with affected landowners will be held by the County following the first meeting between County and municipal officials.
- 2.5.7.1.3. If capacity is available, the municipality will serve the area of need.

² "Maryland Policy For Nutrient Cap Management And Trading In Maryland's Chesapeake Bay Watershed", Maryland Department of the Environment, Water Management Administration, April 17, 2008.

- 2.5.7.1.4. Should the municipality favor annexation of the area to be served, the County will support and assist in the annexation when possible.
- 2.5.7.1.5. If annexation is not favored by the municipality, the County will require all properties in the area of need, pursuant to the requirements of Section 2.5.8., below, to hook up to any public line that passes the property when service becomes available.
- 2.5.7.1.6. The County will initiate the appropriate change in the County Water and Sewerage Plan to reflect the actions taken to address to the area of need.

2.5.7.2. Connection and Financing Costs

- 2.5.7.1.1. The owners of developed and undeveloped buildable lots shall be responsible for the cost of extension of services to their properties.
- 2.5.7.1.2. The property owners shall be responsible for the cost of the tap fees and the connections from the sewer line to the house or the waterline to the house, and the closure of septic field or well.
- 2.5.7.1.3. The County or Municipality may consider financing mechanisms to assist property owners in costs for the service.
- 2.5.7.1.4. The Municipality or County may adopt property tax abatement to the property owner for a specified number of years.

2.5.8. Policies Regarding Denied Access Lines

- 2.5.8.1. In order to properly regulate development and direct growth to appropriate locations in accordance with the Comprehensive Plan, access will not be permitted to water and sewer lines identified on Water and Sewer Maps as “Denied Access Lines” except under the conditions listed below.
 - 2.5.8.1.1. The Caroline County Departments of Health and/or Environmental Health determines access is necessary to abate an existing threat to public health; and
 - 2.5.8.1.2. The property is constrained by factors that prohibit the use of reasonable alternative systems to solve the existing health-related problem; and
 - 2.5.8.1.3. Only the immediate health emergency area is to be served; and
 - 2.5.8.1.4. Any change to the status of a denied access line will require an amendment to the Comprehensive Water and Sewerage Plan approved by a vote of the County Commissioners. Prior to such a

vote, a vote in the affirmative to consider the change must be received from the Planning Commission. Should a vote by the County Commissioners to change the status of a denied access line be successful, a subsequent hearing must then be held to amend the service area maps on a parcel-by-parcel basis following the typical procedures outlined in Section 2.6.2.

- 2.5.8.1.5. Such extension is not to be construed as a modification of the Land Use Plan, zoning, or character of the area being served, or of the areas adjacent to any conveyance line required to serve the affected health emergency area.

2.5.9. Policies Regarding Interjurisdictional Coordination

- 2.5.2.1. All branches of County and municipal governments will be expected to comply with the Comprehensive Water and Sewerage Plan and their activities will be expected to be in conformance with the policies of the Plan.
- 2.5.2.2. The County government shall aid and encourage watershed cooperation with all jurisdictions in the Choptank River Basin.
- 2.5.2.3. In adopting this Plan, it is not the intent of the County Commissioners to usurp the basic powers and responsibilities of the municipalities as now existing under present laws and regulations.
- 2.5.2.4. Nothing in this Plan should be construed as relaxing any existing regulations, rules, agreements, decisions or other acts of any municipality or any branch of the County or State governments; in cases of conflict, the more restrictive provisions shall apply.

2.5.3. Policies Regarding Individual Water Supply and Sewerage Systems

- 2.5.3.1. All individual water supply or sewerage systems shall be considered to be interim in nature.
- 2.5.3.2. An individual water supply or individual sewerage system may not be permitted to be installed within a sewer service area where a public water or wastewater facility with adequate capacity is available. In such cases, properties will be required to connect to the public system. If an existing municipal water or sewerage facility is inadequate or is not available, an individual water and sewerage system may be used as set forth below.

- 2.5.3.3. Individual water supply and sewerage systems, unless otherwise prohibited, may be permitted to be installed in any portion of the County where public systems are or will be programmed for construction with the S-3, S-4, S-5 and W-3, W-4, W-5 map designations, provided that:
- a) Such systems are determined by the Caroline County Environmental Health Department to be adequate, safe, and in compliance with pertinent State and local regulations, including minimum lot ownership as set forth in COMAR Regulation 26.03.01 (Regulations for Planning Water Supply and Sewerage Systems), COMAR Regulation 26.04.03.03 (Regulations for Minimum Ownership), the Caroline County Groundwater Protection Report (as prepared by the Environmental Health Department), and any applicable provisions of the Zoning Ordinance and Subdivision Regulations of Caroline County, and
 - b) Permits for such systems shall bear a notice regarding the interim nature of the permit and state that connection to a future municipal system shall be made, at the applicable cost, when such system becomes available. Further, any plats to be recorded will carry a similar note of the interim nature of the system and the requirement to connect to a future municipal system, and
 - c) When such systems are used, provisions shall be made whenever possible to locate such systems so as to permit connection to the public facilities in a most economical and convenient manner.
- 2.5.3.4. Individual water supply or sewerage systems may be permitted to be installed in any portion of the County where municipal systems are not planned (i.e. areas mapped S-6 – No Planned Service). Such installations shall be governed by COMAR 26.04.02, 26.04.03, and 26.04.04 as minimum requirements, and such requirements as the Caroline County Department of Environmental Health and the County Commissioners may from time to time impose.
- 2.5.3.5. Emergency individual water and sewerage systems may be provided where community facilities are available, provided:
- a) the need is justified to local, State and or/federal authorities;
 - b) such emergency systems are judged by the Caroline County Health Department to be adequate, safe and in compliance with pertinent State and local regulations; and
 - c) the systems are used for emergency purposes only.

- 2.5.3.6. Newly constructed and replacements of individual on-site wastewater disposal systems for properties located within the Critical Area and/or within a County Transfer of Development Rights (TDR) Sending Area are required to utilize systems capable of biological nutrient removal.
- 2.5.3.7. Wells serving a single property are to be of their nominal diameter for the first 200 feet in length, i.e. telescoping to a small diameter pipe in the bottom of a shallow well is prohibited. This telescoping practice greatly reduces the usable life of the well as it inhibits the ability to drop the well pump to below the lowered aquifer water level.
- 2.5.3.8. All lots on individual systems in areas designated S-5 (service programmed for 6-10 years) and S-6 (agriculture and rural open space areas where no service is planned) must have a sewage reserve area (SRA) to replace or renovate the system. SRAs are to be evaluated and approved by the Caroline County Environmental Health Department.
- 2.5.3.9. Large projects, which generate 5,000 or more gallons of wastewater per day and are proposing to use an individual on-site sewage disposal system, are required to gain concurrent approval from the Caroline County Environmental Health Department and the Maryland Department of the Environment (MDE). MDE procedures require that for each 5,000 gallons of wastewater generated, three acres of septic area must be designated for the septic system installation and repair. This area must be evaluated and approved concurrently by the Caroline County Environmental Health Department and MDE. Once the septic area has been evaluated and approved, septic system design plans must be submitted to MDE for review and approval. Caroline County requires these projects serve only one lot, although there may be many individuals served as in a school or camp. The State classifies these systems as Multi-Use Systems (MUs), and requires their inclusion in the County Water and Sewerage Plan.

2.6 ORGANIZATION AND ADMINISTRATION PROCEDURES

2.6.1. Water and Sewer Plan Classifications

In conjunction with COMAR regulations (26.03.01.04), the County has established a classification system for properties which will be served by water and sewer service. The system reflects a progression towards the extension or establishment of community water and sewer service to achieve County growth management goals as set forth in the County Water and Sewerage Plan and County Comprehensive Plan.

The classification system is designed to show need and intent of the County, its municipalities and private developers for establishing or extending community water and sewer systems. The classification system is not intended to prevent development of community water and/or sewerage facilities prior to or later than the time periods indicated; rather it is the best estimate at the time of adoption as to when such development may be expected to occur. Every effort should be made by the County, municipalities, and developers to progress with water and sewer projects to the point that construction may occur in accordance with the Plan. However, there is no guarantee that having achieved one level water or sewer service timing, the next level will be granted.

Tracts of land where the County or municipalities anticipate that development may occur within 20 years may be assigned one of the following service timing classifications:

W-1/S-1: areas served by community and multi-use water and sewerage systems which are either existing or are under construction. The actual bounds of areas served by these systems shall be clearly indicated. The areas so delineated in this category shall be referred to as W-1 for water systems and S-1 for sewerage systems.

W-2/S-2: areas to be served by extensions of existing community and multi-use water supply and sewerage systems which are in the final planning stages. The areas so shown in this category shall be referred to as W-2 for water systems and S-2 for sewerage systems.

W-3/S-3: areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be given immediate priority. The areas so shown in this category shall be referred to as W-3 for water systems and S-3 for sewerage systems.

W-4/S-4: areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be programmed for the 3 to 5/6 year period. The areas so shown in this category shall be referred to as W-4 for water systems and S-4 for sewerage systems.

W-5/S-5: areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems are programmed for inclusion within the 6/7 through 10-year period. The areas so shown in this category shall be referred to as W-5 for water systems and S-5 for sewerage systems.

W-6/S-6(NPS – No Planned Service): areas that are not planned or projected to be provided with community water or sewer service within the timeframe of the current County Comprehensive Plan.

2.6.2 REVIEW AND AMENDMENT PROCEDURES

2.6.2.1. Triennial Review

State Law Title 9, Subtitle 5 of the Environment Article of the Annotated Code of Maryland requires the governing body of the County, after reasonable opportunity for public hearing, review at least triennially the County Water and Sewerage Plan.

2.6.2.2. Amendment Procedures

The County Commissioners may at their discretion initiate amendments to the Water and Sewerage Plan when necessary:

- a) To allow service to an existing structure from an existing system when a potential health hazard has been declared by the Health Department, or
- b) To allow requests submitted by a government agency or capital projects to proceed, or
- c) When Maryland Department of Environment requires it.

2.6.2.2.1 Comprehensive Plan Update Process

The County Commissioners may, as part of the Comprehensive Plan Hearing and Adoption Process, concurrently make revisions to the Water and Sewerage Plan. These revisions may include the addition or removal of proposed infrastructure or facilities, as well as placing properties into or out of the Planned Service Areas.

As required under State law and the County Plan, notice will be provided prior to the Plan hearings when revisions to planned water and sewer service areas or infrastructure will be discussed. All Water and Sewerage Plan revisions made during the Comprehensive Plan update process shall be forwarded to the Maryland Department of the Environment as currently required.

2.6.2.2.2. Piecemeal Application Process:

- a) Applications for amendments to the Water and Sewerage Plan for Caroline County and its incorporated municipalities, may be submitted at any time. Applications received are processed and submitted to the Planning Commission for review, comment and recommendations.

- b) Applications for proposed amendments to the County Water and Sewerage Plan and supporting documents, shall be submitted to the Caroline County Department of Planning and Codes, Health and Public Services Building, Denton, Maryland. Requests for amendments to provide service to properties designated in Priority Preservation Areas, or zoned Rural (R) in the County Comprehensive Plan are not in conformance with the County Comprehensive Plan and will not be accepted, unless service is permitted pursuant to Section 2.5.8. of this Plan.
- c) Requests to amend the water and sewer classification of a particular property may be made by the property owner, the property owner's agent or a contract purchaser with consent of the owner. A municipality may also initiate applications with regard to infrastructure or service area. The County Staff may initiate an application with regard to location of infrastructure generally or reclassification of properties to implement the Comprehensive Plan, or if the property no longer meets the requirements of its current classification.
- d) It shall be the responsibility of the Caroline County Department of Planning and Codes to coordinate the review of amendments to the Water and Sewerage Plan in cooperation with the staff of the County Health Department.

The above-referenced staffs shall review the proposed amendments and submit their recommendations which may be in the form of text, maps, tables, charts or other information necessary to explain the proposed amendments.

- e) Amendments proposed within a municipality must be proposed by that municipality and be accompanied by a letter from a designated municipal official certifying the amount of excess water supply system and wastewater system capacities and the intent to provide the available capacity to the property that is the subject of the amendment. When certifying the amount of excess water supply system and wastewater system capacities, a methodology not less stringent than that provided in the Maryland Department of the Environment, Water and Wastewater Supply Capacity Management Plans will be utilized. In the event that excess water supply system and wastewater system capacity do not exist, the application shall include detailed information proposing how sufficient capacity will be provided to serve the property and a letter from a municipal official indicating that the municipality agrees to the proposal.
- f) The County Staff will submit the proposed revisions or amendments to the County Planning Commission, which will determine whether the Water and Sewerage Plan revision or amendment is consistent with the County Comprehensive Plan and vote to approve or deny the proposed revision or

amendment. If the proposed revision or amendment is approved, the Planning Commission issues a Recommendation Resolution to the County Commissioners (official procedure prohibits the scheduling of a public hearing with the County Commissioners until the Planning Commission has approved the Plan revision or amendment and issued a Recommendation Resolution).

- g) Before the County Commissioners adopt any revision or amendment to the Plan they must:
 - a. Conduct a public hearing and,
 - b. Give the principal elected official of each municipal corporation that is affected notice of the Plan revision or amendment at least 30 days before the hearing, and
 - c. Publish notice of the time and place of the public hearing, with a summary of the revision or amendment in at least one newspaper of general circulation, once each week for two successive weeks with the first notification appearing at least 14 days prior to the hearing.
- h) Following the decision of the County Commissioners, the revision or amendment shall then be sent to the Maryland Department of the Environment for its review and final approval. The State has at least 90 days and may extend its review period.
- i) Unless an amendment or revision to the County Plan expressly provides otherwise, an amendment or revision to the County Plan shall take effect: upon approval by the Maryland Department of the Environment (MDE) or upon the failure of MDE to disapprove, in whole or in part, the proposed amendment or revisions within the review period specified in the Annotated Code of Maryland, Environment Article §9-507.

Chapter 3 Background

3.1 GENERAL

Caroline County is located on the Delmarva Peninsula in the State of Maryland. It is part of the Upper Eastern Shore Region. The Upper Eastern Shore comprises five counties; Caroline, Cecil, Kent, Queen Anne's, and Talbot. Caroline County is bordered by Queen Anne's, Talbot, and Dorchester Counties in Maryland and Kent and Sussex Counties in the State of Delaware. There are ten incorporated municipalities in Caroline County: Denton (the County Seat), Federalsburg, Goldsboro, Greensboro, Henderson, Hillsboro, Marydel, Preston, Ridgely, and Templeville. Caroline is a "Code Home Rule" county, as established by the State of Maryland, with three elected County Commissioners who serve four year terms.

3.2 HISTORY

Caroline County was formed in 1773 from portions of Dorchester and Queen Anne's Counties by Maryland's last colonial governor, Robert Eden. The County was named after Caroline Calvert, wife to Robert Eden and the sister of Frederick Calvert, the last Lord Baltimore. Much of the historic and cultural legacy of the County represents late colonial settlements, traditional agriculture, and the development of the railroad industry.

3.3 POPULATION AND DEMOGRAPHICS

Caroline County experienced population increases from 1880 to 1910 and 1970 to 2007. Based on Census 2000 data and U.S. Census 2007 estimates, the average annual population growth rate for the Eastern Shore is 1.1% per year, only slightly below Caroline County's average annual growth rate for the same periods of 1.4%.

As illustrated in Table 3-1, compared to Queen Anne's and Talbot counties, Caroline County's growth since 1980 has been moderate. The same is true when comparing Caroline County with all other counties on the Eastern Shore.

Table 3-1: Regional Population Statistics

Mid-Shore Region	1980	1990	1980-1990 % Chg	2000	2007	1990-2000 % Chg
Caroline County	23,143	27,035	17%	29,772	32,910	11%
Kent County	16,695	17,842	7%	19,197	19,987	4%
Queen Anne's County	25,508	33,953	33%	40,563	46,571	15%
Talbot County	25,604	30,549	19%	33,812	36,193	7%

Source: Draft 2009 Caroline County Comprehensive Plan

A comparison of growth trends between 2000 and 2007 in County municipalities (see Table 3-2) illustrates that while some municipalities have increased in population, several of the smaller municipalities have begun to lose population. None of the three small towns that have lost population provide water or sewer service to their residents, a factor that may be responsible for the lack and/or reversal of growth in these towns. Additionally, the combination of failing septic systems in the North County towns of Goldsboro and Marydel and the poor soils in the North County region in general diminish the potential for buying or building homes in these areas.

Table 3-2: Caroline County Population Change			
	2000 Population	2007 Population	Percent Change
Denton	2,960	3,833	29%
Federalsburg	2,620	2,611	0%
Goldsboro	216	211	- 2%
Greensboro	1,632	1,967	21%
Henderson	118	121	3%
Hillsboro	163	157	- 4%
Marydel	147	142	- 3%
Preston	566	671	19%
Ridgely	1,352	1,514	12%
Templeville	80	82	3%
Total Incorporated	9,854	11,309	15%
Total Unincorporated	19,918	21,601	8%

Source: Draft 2009 Caroline County Comprehensive Plan

New Home Construction

Between 1990 and 1999, approximately 1,751 new housing units were constructed in Caroline County, not including replacement homes. Of those new homes, 23% were located in municipalities. Between 2000 and 2007, approximately 1,793 new housing units were constructed. Of these 901 (50%) were located in the County and 892 (50%) were located within municipal boundaries.

Table 3-3: New Home Construction								
	2000	2001	2002	2003	2004	2005	2006	2007
Unincorporated	125	127	121	122	138	109	87	72
Denton	10	14	9	77	64	138	147	86
Federalsburg	2	44	12	3	15	9	3	2

	2000	2001	2002	2003	2004	2005	2006	2007
Goldsboro	-	-	-	-	-	-	1	-1
Greensboro	7	8	21	28	77	4	5	1
Henderson	-	-	-	-	-	-	1	0
Hillsboro	0	0	0	0	0	0	0	0
Marydel	-	-	-	-	-	-	0	-2
Preston	0	0	0	0	26	12	1	0
Ridgely	1	4	2	5	26	52	15	0
Templeville	-	-	-	-	-	-	-	0
Incorporated	17	66	44	109	202	209	159	86
% Incorporated	12%	34%	27%	47%	59%	66%	65%	54%
% Unincorporated	88%	66%	73%	53%	41%	34%	35%	46%

Source: Draft 2009 Caroline County Comprehensive Plan

Prior to 2000, growth and development largely occurred in unincorporated areas. Growth and development began concentrating in municipalities in 2003 and by the end of 2004, for the first time since at least 1990, municipal growth surpassed growth in unincorporated areas. Development shifts are attributed to several factors, the County's implementation of policies to preserve agricultural and rural lands and direct growth to population centers, market trends, and access to municipal infrastructure and services.

Population Projections

Shown below are the population projections for the unincorporated areas of Caroline County by the Maryland Department of Planning (MDP) and the Caroline County Department of Planning, Codes & Engineering (the Department). This plan is based on the projections made by the County, which were based on the state projections.

Source	Estimates	2010	2015	2020	2025	2030
MDP	Population	22,727	24,695	26,517	28,170	29,686
	Annual % Increase	1.7	1.7	1.5	1.2	1.1
	New Annual DUs	161	177	160	157	145
County	Population	21,992	23,092	24,477	25,946	27,503
	Annual % Increase	1.0	1.0	1.2	1.2	1.2
	New Annual DUs	104	108	124	140	146

Note: Maryland Department of Planning, December 2008. Uses MDP Persons/Household projections. DU = Dwelling Unit

As noted above, the average annual growth rate for Caroline County over the past 20 years has been 1.4% and the current state of the National and local economies make it difficult to justify the spike in the annual growth rate forecast in 2010 and 2015 by MDP. Therefore the County has adjusted the growth rate to show a slower steady growth over the next 20 years that averages out to an overall 1.3% growth rate.

The projected County growth affects water consumption, schools, recreation land, police and fire and rescue, as well as other public services and amenities such as libraries and transportation. Based on industry standards for forecasting demand, the Department estimates that between 2010 and 2030 the County will serve 5360 students total. It is also estimated that the County will need a total of 72 police personnel and 44 fire and rescue personnel with 22,002 square feet in fire and rescue facilities. A total of 825 acres of recreational land will be required and the recommended square footage of library space for the projected 2030 population is 2,750.

Transportation

Major highway access routes near or within Caroline County include US Route 301, US Route 50, US Route 13, and MD Route 404. MD Routes serving the County include 16, 404, 480, 311, 312, 317, and 328. Every major city within the Mid-Atlantic region is located less than 300 miles from the County. The closest regional cities include Dover and Wilmington, Delaware; Annapolis and Baltimore in Maryland; and Washington D.C., all located within 2 hours driving time of the County.

Geography, Resources, and Industry

Caroline County is approximately 321 square miles or 206,719 acres. According to the Maryland Geological Survey, the County elevation ranges from 0 to 79 feet above sea level and is located entirely with the Atlantic Coastal Plain, a geographical area extending along the East Coast seaboard below New York and Pennsylvania. The topography of the region is relatively flat, which has created an environment suitable for crop farming. Large mineral deposits of sand and gravel exist in the middle and southern portions of the County.

Caroline County contains numerous natural resource areas, including large forested areas, a number of rivers and streams, and large areas of wetlands. Major water resources include the Choptank and Tuckahoe Rivers and Marshyhope Creek. The County is served by several large fresh water aquifers.