

Chapter 8

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Chapter 8

Natural Resource Protection

The natural resources of Charles County, its rivers and streams, marshland, forests and shoreline support a wide variety of plant and wildlife communities. These diverse environments also greatly contribute to the County's overall beauty, quality of life and rural character.

In recent years Charles County has attracted increased growth and development. More than ever before, people are relocating to Charles County to enjoy its relatively low cost of living and proximity to Washington, D.C., as well as the benefits and aesthetics of its natural resources. There are limits to the amount of growth that areas of the County can accommodate without degrading environmental resources. The primary natural resource management issue, therefore, is how to maintain the quality of the County's air, water, land, and wildlife resources while managing growth.

In this chapter the Comprehensive Plan seeks to balance the need to preserve natural resources with the desire for economic growth and development. To this end, goals and objectives are formulated that take into account different levels of protection needed for different environmental resources.

This chapter contains an inventory and analysis of the components of the natural environment identifying environmentally sensitive areas as well as areas that are more resilient to disturbances. Existing planning programs and regulatory controls are described identifying deficiencies and areas in need of improvement.

Actions since adoption of the 1997 Comprehensive Plan

1. In 2004, the Natural Resource Conservation Service completed an update of the Soil Survey of Charles County.
2. In 2004 the County updated its forest conservation ordinance.
3. In 2004, the County completed a Hazard Mitigation Plan, as required by the federal Disaster Mitigation Act of 2000.
4. In 2003 the U.S. Army Corps of Engineers completed a Mattawoman Watershed Management Plan.
5. In 2002 the County received its second five-year National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Permit for the Development District. NPDES permits have the goal of eliminating non-stormwater discharges and reducing pollutants from storm sewer systems.
6. In 2002 the County partnered with the U.S. Geological Survey to continue a long term non-tidal water quality monitoring station for the Mattawoman Creek.
7. In 2001, the federal Bureau of Land Management (BLM) and the State of Maryland made a series of land acquisitions totaling around 1,800 acres near Douglas Point in Nanjemoy. The BLM drafted a Lower Potomac River Coordinated Management Plan in 2003 to guide future land acquisition and management in a broader 5,500-acre area.
8. In 2001, the County revised its stormwater management ordinance to incorporate the *2000 Maryland Stormwater Design Manual*.
9. In 2001, the County updated its Chesapeake Bay Critical Area program including a new buffer management protection element.

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10. In 2000 Charles County signed *Maryland's Chesapeake Bay Partnership Agreement* committing to participate in development of revised Tributary Strategies, address where appropriate the goals the *Chesapeake 2000 Agreement*, support local government participation in development of Chesapeake Bay Program policies, and pursue adequate funding to support local government watershed restoration and protection programs.
11. In 1999, the U.S. Environmental Protection Agency approved a Total Maximum Daily Load (TMDL) for the Port Tobacco River Watershed limiting the annual nitrogen and phosphorus load.
12. In 1999, the Conservancy for Charles County, a private land trust that incorporated in 1996, executed its first protective easement jointly with the Maryland Environmental Trust.
13. In 1998 the State of Maryland approved the County's plan to establish a Rural Legacy Area in the Zekiah Swamp Run Watershed (see below in this chapter).
14. In 1998 the State purchased approximately 2,220 acres south of Bryans Road known as Chapmans Forest.

Goals & objectives

The overall goal of the Natural Resources Protection element of the Plan is to:

Protect the natural resources and enhance the environmental features of the County.

To define this goal in more immediate terms the following objectives are established:

General objectives

- 8-1 Cooperate in efforts to improve and protect the water quality of the Chesapeake Bay and its tributaries through support of the state's Tributary Strategies and enforcement of the County's Critical Area Program that are designed to reduce pollution loads in the Bay's subwatersheds.
- 8-2 Preserve the Resource Protection Zone to ensure protection of sensitive inland and environmental features in stream valleys outside the Critical Area such as the Mattawoman Creek, Zekiah Swamp Run, Gilbert Swamp Run, Port Tobacco River, Nanjemoy, Swanson, and Indian Creeks' watersheds.
- 8-3 Maintain a safe and healthy environment by protecting air, water, and land resources, and preventing the degradation of those resources from pollutants.
- 8-4 Place special emphasis on watershed management to balance the protection of the Mattawoman Creek's natural resources and water quality with the County's development plans.
- 8-5 Manage agricultural activities to minimize runoff and sedimentation to adjacent waters.
- 8-6 Enhance the County's environmental preservation and conservation policies through administrative mechanisms including subdivision regulations, sediment and erosion control, environmental review processes, development regulations, and zoning.
- 8-7 Protect ground water resources.
- 8-8 Guide development away from areas vulnerable to natural hazards especially areas subject to flooding, shore erosion, and wildfires.
- 8-9 Encourage best management practices including low-impact development techniques to minimize the impacts of development on the natural environment.

- 8-10 Through public and private resources, purchase or otherwise acquire conservation easements to preserve environmentally sensitive resources. Develop parks, recreation and open space plans in conjunction with stream valley protection objectives.

Land resources - including floodplains, steep slopes, and forest lands

- 8-11 Restrict development within 100-year floodplains.
- 8-12 Conserve remaining wooded areas in the County, and require new plantings to support other natural resource objectives including enhancing riparian buffers, reducing erosion and sedimentation, improving air quality, and mitigating the effects of stormwater runoff.
- 8-13 Require special engineering and construction standards when development occurs on erodible soils, steep slopes, or areas requiring special geotechnical consideration.

Inland habitat areas

- 8-14 Protect the habitats of rare, threatened and endangered species to maintain their long-term survival.
- 8-15 Conserve large tracts of contiguous forestland and forest interior dwelling bird habitat determined by the County to be of local significance due to their wildlife habitat value.
- 8-16 Promote wildlife education through the development of nature centers and park visitor centers to explain the importance of preserving natural habitat areas.

Shorelines

- 8-17 Place a high degree of restriction on the use of waterfront land in the form of low residential densities, and high levels of protection for forest land and agricultural land regulated under the Chesapeake Bay Critical Area Program.
- 8-18 Protect instream and stream bank habitats of anadromous fish spawning waters. Promote land use policies in the watersheds of spawning streams that minimize adverse impacts to aquatic resources.
- 8-19 Protect shoreline habitats such as tidal wetlands, shellfish harvesting areas, colonial water bird nesting sites, and waterfowl staging and concentration areas through the habitat protection policies established in the County's Critical Area Program.
- 8-20 Manage development in shoreline areas to minimize problems of shoreline erosion.

Water resources

- 8-21 Improve and maintain water quality in coastal, estuarine, and upper basin tributary streams.
- 8-22 Ensure that point source discharges of pollutants are maintained at safe levels of environmental quality through strict enforcement of state water quality standards for sewage effluent.
- 8-23 Encourage the establishment of Soil Conservation and Water Quality Plans on all farms in Charles County to reduce sediment and nutrient export from agricultural activities.
- 8-24 Continue and improve programs and policies to assure the functional maintenance of stormwater management systems.

Environmental health

- 8-25 Reduce solid waste generation and increase recycling levels.
- 8-26 Promote reclamation of resource extraction areas.

Natural Resource Protection

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| 8-27 | Monitor sewage sludge application on agricultural lands to ensure the continued high quality of soil, surface water, ground water resources, and to minimize impacts from odor, run off, etc. on adjoining properties. |
| 8-28 | Correct sanitary sewage and water supply problems in existing problem areas to provide a safe environment for all of the County's residents. |
| 8-29 | Work cooperatively with the Metropolitan Washington Area Air Quality Committee to ensure the area complies with the requirements of the 1992 Clean Air Act. |
| 8-30 | Promote awareness of environmental quality issues through public and school environmental education programs, to cultivate a basic understanding of the earth and its valuable resources. |

Natural resource inventory

As the steward of its natural resources, Charles County has an obligation to develop a management strategy that preserves and enhances the quality of its natural environments. The following section describes the components of the County's resource base.

Geology, topography

Charles County is located within the Atlantic Coast Plain physiographic province and wholly underlain by layers of sand, gravel, silt, and clay. These unconsolidated layers range in age from 135 million to 1 million years old, which in geologic time represent relatively recent deposits. Mineral resources of the Coastal Plain are chiefly sand and gravel which are used by the construction industry as aggregate material.

The landscape of Charles County may be divided into four general regions: nearly level upland plateau; steep slopes between uplands and low terraces; shoreline stream terraces; and floodplains and tidal marsh. Approximately 65 percent of Charles County is nearly level or gently sloping, 24 percent is moderately or strongly sloping, and 11 percent is considered steep. (i.e. slopes 15 percent and over).

Soils

The Soil Survey of Charles County categorizes the soil types by association. In general the soils of Charles County are naturally acidic, low in fertility, and highly intermixed and variable as to their suitability for various land uses. The Soil Survey also provides generalized guidance as to the suitability and limitation of specific soils for various land development activities. The suitability ratings consider characteristics such as depth to water table, permeability, run-off potential, erodibility (K factor), and shrink-swell potential.

Soil suitability for septic system absorption fields is a limiting factor to development in many areas of Charles County, and is especially important in the evaluation of residential development proposals: Approximately 80 percent of the County has severe limitations for septic system use, due to poor drainage, slow permeability or a seasonally high water table. Less than five percent of the County is mapped with soils having moderate limitations for septic tank filter fields. Soils with slight limitations for septic systems are distributed over approximately 15 percent of the County, primarily in the central and northeastern portions.

Watersheds

Charles County is bordered by estuarine portions of the Patuxent and Potomac Rivers. In addition to these two brackish water bodies, the County contains numerous smaller freshwater rivers and

streams. Three lakes in Charles County have a normal surface area of 12 acres or larger: Jameson, Trinity and Wheatley.

Charles County overlays nine major watersheds. The freshwater tributary streams develop in the interior of the County and flow into estuaries along their tidal shorelines due to the influence of the more saline waters of the Potomac and Patuxent Rivers. These major watersheds include Mattawoman Creek in the north; Port Tobacco River in the central portion of the County; Nanjemoy Creek in the west; Middle and Lower Potomac River on the west and south; and Lower Patuxent in the eastern portion of the County. Figure 8-1 shows these watersheds and the land area associated with each. The southeastern half of the County is drained by the Zekiah Swamp Run, Gilbert Swamp Run, and the Wicomico River.

Ground water resources/aquifer recharge areas

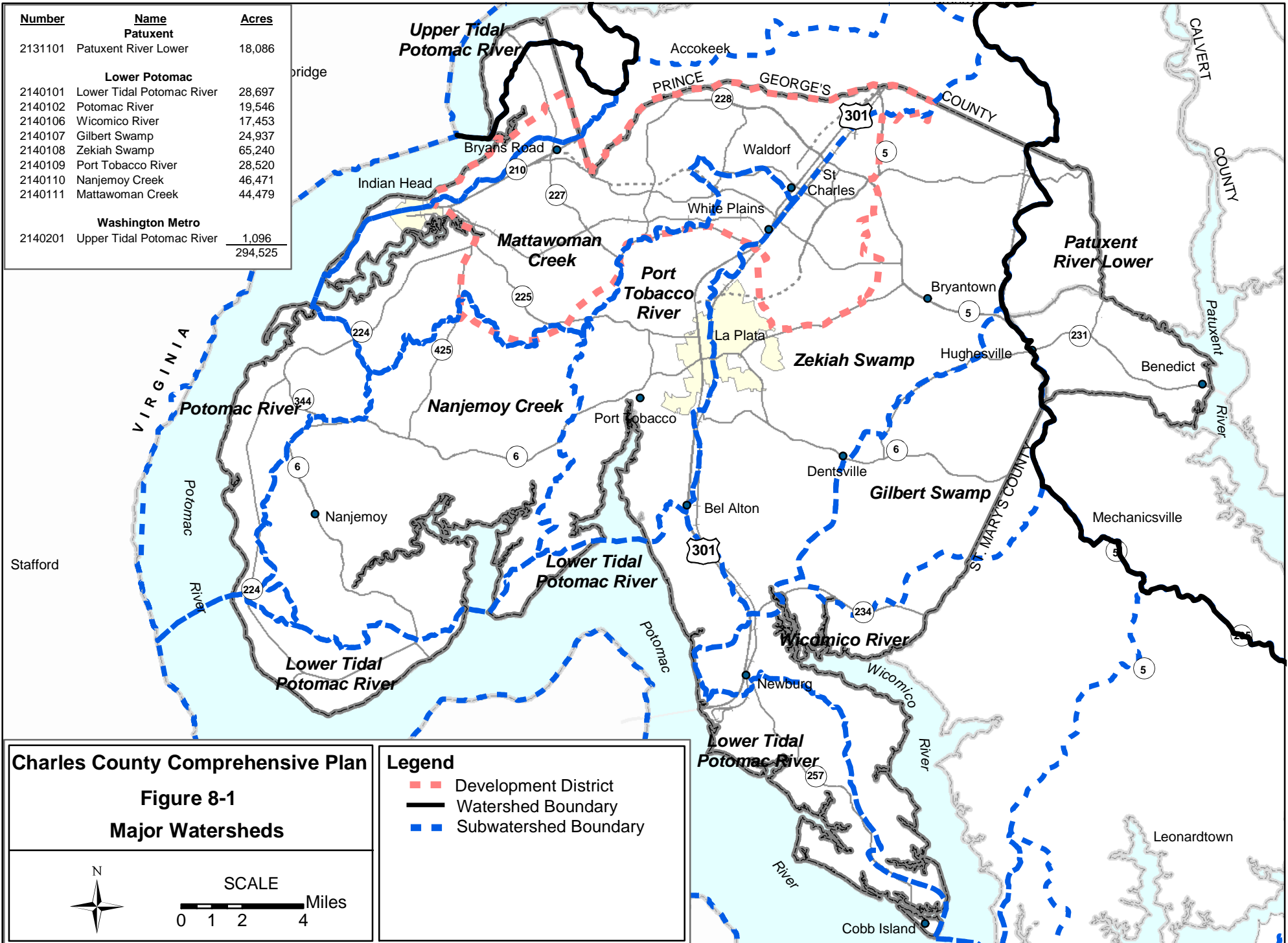
Ground water is a critically important source of water in Charles County. The sedimentary sand and gravel geologic formations underlying the County are porous and permeable and contain large quantities of water in storage. These water-bearing layers are confined by layers of silt and clay that yield very little water. The quantity and quality of ground water is very important to the County, and maintaining ground water quality in coastal areas subject to saltwater intrusion is a particular concern.

Four major water-bearing formations or aquifers underlie Charles County. Sloping from west to east, they are the Patuxent, Patapsco, and Magothy formations of the Cretaceous system and the Aquia Greenstone of the Tertiary system. Replenishment of water in the underground aquifers is provided by precipitation falling in the outcropping area of the formation that filters downward. The outcrop area is the point where the sloping rock formation intersects the surface. For shallow aquifers the recharge area is within the County. Deeper aquifers, however, outcrop outside of Charles County either under the Potomac river or farther to the west in Fairfax, Prince William, and Stafford counties in northern Virginia. The deeper aquifers will become increasingly important in supplying Charles County with adequate water resources in the future (see under Water Service in Chapter 6).

Floodplains

Floods are natural phenomena that occur when rivers are unable to contain an abnormally high volume of water within their channels. Since the river channel can only accommodate a specific rate of flow, the increased volume periodically overflows the banks onto the stream valley floor. The relatively level valley floor that is inundated by the floodwaters is referred to as the floodplain. Floodplains are often described in terms of flood frequency which is related to discharge. A 100-year flood refers to a flood with a one percent probability of occurring in any given year.

Number	Name	Acres
2131101	Patuxent River Lower	18,086
Lower Potomac		
2140101	Lower Tidal Potomac River	28,697
2140102	Potomac River	19,546
2140106	Wicomico River	17,453
2140107	Gilbert Swamp	24,937
2140108	Zekiah Swamp	65,240
2140109	Port Tobacco River	28,520
2140110	Nanjemoy Creek	46,471
2140111	Mattawoman Creek	44,479
Washington Metro		
2140201	Upper Tidal Potomac River	1,096
		294,525



Charles County Comprehensive Plan

Figure 8-1

Major Watersheds

N

SCALE

0 1 2 4 Miles

Legend

- - - Development District
- Watershed Boundary
- - - Subwatershed Boundary

Floodplains moderate and store floodwaters, absorb wave energies, and reduce erosion and sedimentation. Wetlands found within floodplains help maintain water quality, recharge ground water, protect fisheries, and provide habitat and natural corridors for wildlife. Stream buffers found within floodplains also help to maintain water quality. Although flooding is a natural occurrence, flood damage is a result of allowing development to occur in flood hazard areas. Floodplain development poses a considerable risk to human health and safety. In addition, the development may alter the stability of the stream environment and disturb both aquatic and terrestrial habitat areas.

Wetlands

Wetlands are of major importance to the ecosystem of the County and of the Chesapeake Bay. The County has approximately 26,700 acres of wetlands (See Table 8-1 and Figure 8-2). Researchers estimate that historically the wetland acreage was double the current acreage.

Tidal Wetlands

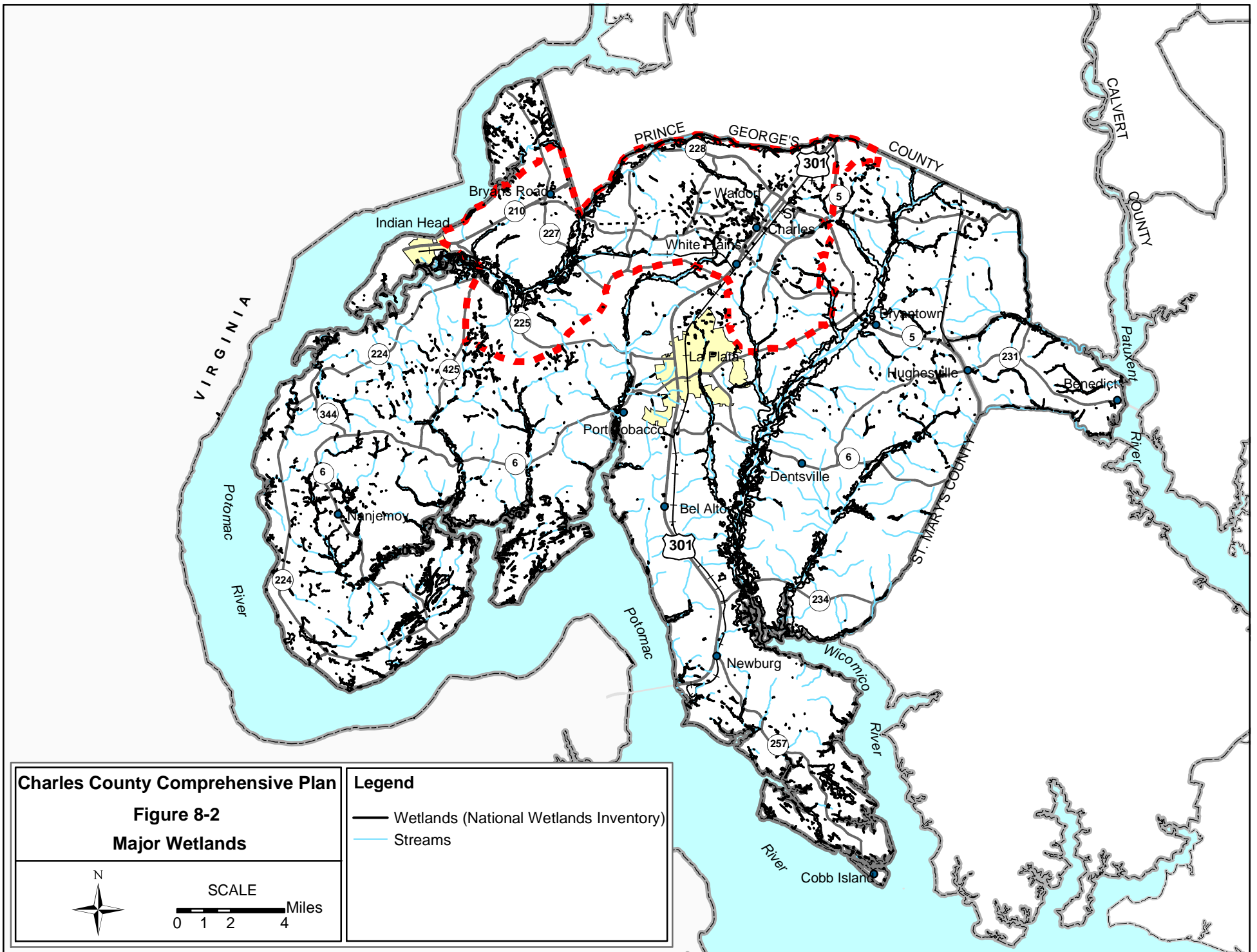
Tidal wetlands have long been recognized as particularly productive ecosystems. Many of the major streams in the County develop into tidal marshes at their confluence with the Potomac and Patuxent rivers.

Table 8-1 Wetlands in Charles County

Type of Wetland		Acres
Tidal	Estuarine	4,909
	Palustrine	1,453
	Riverine Tidal	22
	Subtotal:	6,384
Non-Tidal	Rivers (open water)	677
	Palustrine	19,625
	Subtotal:	20,302
Total		26,686

Source: U.S. Fish and Wildlife Service, National Wetland Inventory, Charles County, Maryland 1995.

Tidal wetlands provide a transition zone between dry land and open water, and serve numerous ecological functions. They provide habitat for wildlife, and serve to protect water quality by filtering run-off from adjacent uplands. The vegetation of tidal wetlands acts to stabilize shorelines, prevent erosion, and absorb and store significant amounts of floodwater. Perhaps most importantly, wetland plants species take up, store, and recycle nutrients. Ultimately, the majority of nutrients are transported as organic detritus into coastal waters, providing the foundation for complex aquatic communities. It is the nutrient conveyance that supports the State's prolific commercial fish and shellfish industry.



Non-Tidal Wetlands

Non-tidal wetlands, although similar in function to tidal wetlands differ greatly in their range of habitats, and species composition. Non-tidal wetlands are often referred to as inland or upland wetlands and include freshwater swamps, bogs and bottomland hardwood forests. The best example of a non-tidal wetland in Charles County is the Zekiah Swamp (see below). The Zekiah, as well as numerous smaller non-tidal wetlands in the County, occurs as a result of poor surface drainage.

Non-tidal wetlands are valuable natural resources. As in the case of tidal wetlands, they provide habitat for plants, fish, and wildlife, maintain water quality, act as ground water recharge areas, and control flooding and erosion.

Shoreline

There are approximately 183 miles of tidal shoreline in Charles County. Over 90 percent is dominated by forests, wetlands, or agricultural fields. Maryland's Chesapeake Bay Critical Area law adopted in 1984 identified the lands within 1,000 feet of tidal waters as critical environmental areas in need of protection. This legislation was a part of a larger multi-state effort focused on restoring the health of the Chesapeake Bay.

The Charles County shoreline has experienced varying degrees of erosion over time. The erosion process is a function of the County's geology and shoreline terrain, the nature of soils adjacent to water areas, and off-shore water depths. The degree of erosion is further influenced by shoreline characteristics and land cover, as well as wave, tide, and other coastal processes. Less than 11 percent or 20 miles of the county's shoreline experiences serious erosion rates of greater than two feet per year. They are on the Potomac shoreline from Sandy Point south to lower Thomas Point, Blossom Point to Windmill Point, the eastern shore of Port Tobacco River to Pope's Creek; and the southwestern shore of Cobb Island.

The Charles Soil Conservation District has evaluated many sites along the main stem of the Potomac where bluffs are as high as 40 or 50 feet. Unprotected bluffs are subject to erosion at the base of the bank leading to bank collapse. This often results in a greater erosion rate than sites without bluff configurations. In addition to wave undercutting, the Natural Resources Conservation Service (formerly the Soil Conservation Service) has frequently found evidence of subsurface seepage which weakens the face of the bluff. This erosion from ground water activity has complicated efforts to find cost effective solutions to shore erosion on the Potomac. The only recourse has been to evaluate each site on its unique engineering and economic considerations. In locations with high erosion rates, cliff setbacks may be appropriate for new structures.

Unique environmental habitats

Zekiah Swamp and Mattawoman Creek

In addition to the Chesapeake Bay Critical Area, the Zekiah Swamp and Mattawoman Creek are recognized as areas of unique ecological importance by the State of Maryland (see Figure 8-3). The areas contain extensive tidal and non-tidal wetlands, floodplains and adjacent forest habitat. Both the Zekiah and Mattawoman were designated Areas of Critical State concern in 1981¹. The portions of the Zekiah and Mattawoman that are owned and managed by the Maryland Department of Natural

¹ The Areas of Critical State Concern program has since been replaced with other programs.

Natural Resource Protection

Resources are designated as natural environmental areas, wildlife management areas, and state forests.

Zekiah Swamp is 20-miles long, 3/4-mile wide hardwood swamp. It is a designated wetland of special state concern. The Zekiah Swamp is the largest hardwood swamp in Maryland and received the highest rating of all natural areas in the Chesapeake Bay region from the Smithsonian Institution. The swamp encompasses about 17,800 acres (within a 65,000-acre watershed) and traverses the eastern half of the County in a north/south orientation. Gilbert Swamp Run adjoins the Zekiah to the east and is included in the Zekiah Watershed planning area (see below under interjurisdictional coordination). The Mattawoman Creek has its source in Prince George's County and extends along the Prince George's/Charles County border from U.S. 301 west to Billingsley Road, turns south between Maryland Airport and Myrtle Grove Wildlife Refuge and empties into the Potomac River. The Creek extends approximately 20 miles through the County and drains about 45,000 acres of Charles County. The tidal wetlands of the Mattawoman are essential nursery areas for numerous species of fish. The main stem and tributaries of the creek are among the Potomac basin's most important spawning waters. Since the Mattawoman drains most of the County's Development District land use activities have the potential to significantly affect Mattawoman Creek resources. Figure 8-3 shows some of natural resource features in the Mattawoman watershed including a portion of the Mattawoman Natural Environmental Area and several non-tidal wetlands of special state concern.

Forest & woodland

Forest land occupied almost all of Charles County prior to colonization. These forests were primarily hardwoods including oaks, chestnuts, sweetgum, yellow poplar, and beech. The first settlers to the County cleared large expanses of land for agricultural production, predominantly to cultivate corn, tobacco, small grain, and hay.

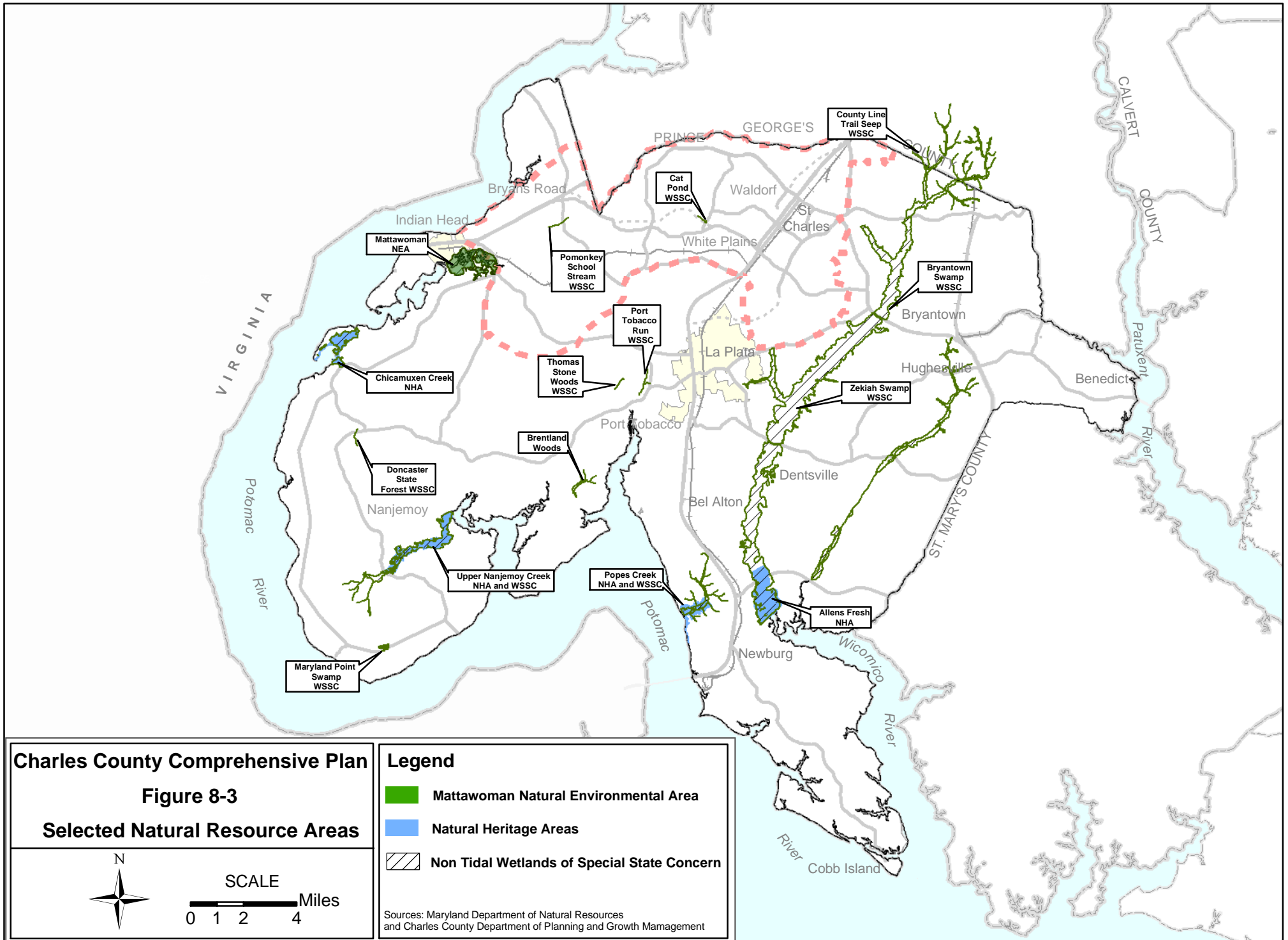
Immediately preceding the Civil War, a large percentage of the original forest land had been cleared for agricultural uses, but during the first half of the 20th century there was a gradual reversion back to forest cover. By 1967, almost two-thirds of the County was wooded. Forest lands represent the dominant land use in Charles County with approximately 178,500 acres or 61 percent of the land area (see Table 8-2).

Table 8-2 *Distribution of Forest by Forest Type*

Forest Type	Acres	Percent of County
Deciduous Forest	99,395	34
Coniferous Forest	16,269	6
Mixed Forest	57,323	19
Shrub/Scrub and Regenerating Forest	5,484	2
Total Forest	178,472	61
Total County	294,404	100

Source: Maryland Department of Planning, 2004 (2002 Land Use Land Cover dataset)

The coniferous forest type is composed primarily of Virginia Pine with small additions of Loblolly, and occurs on the higher, well drained sandy ridges, old fields, and cut over woodlands. Oaks are predominant in three forest types with the red oak being the primary oak species. Red and white oaks are found on the better soils having higher available moisture content and adequate drainage.



Natural Resource Protection

The oak-pine and oak-hickory types are found on mid to upper slopes and higher elevations on well drained soils. The oak-gum type which includes tulip poplar is found on lower slopes with moderately drained soils. Sweet gum and red maple replace poplar on more imperfectly drained soils along bottoms, and eventually gives way to bottomland hardwoods. This latter type includes such species as willow oak, and river birch in the flat bottomlands and floodplains.

Between 1990 and 2002, the County had a net loss of approximately 3,500 acres of forest cover (see Table 3-1). Unlike the clearing that took place during colonization, the current pressure is for residential development, not for agriculture. Land which is developed residentially is permanently committed to some form of development and reversion to forest cover is unlikely. Between 1997 and 2002 the pace of forest land loss was reversed with the County gaining approximately 600 acres of forest land.

Fish & wildlife resources

The extensive open water shoreline marshes, and mature forests of Charles County provide excellent habitat for numerous fish and wildlife species. The Chesapeake Bay and its tributaries are one of the largest and most productive estuarine systems in the world, and support a major commercial fishery.

Anadromous fish, species that live in marine environments and migrate to freshwater to spawn, utilize the Patuxent and Potomac Rivers. Striped bass spawning occurs in the Potomac River between Indian Head and Riverside. Remaining portions of the river are important nursery areas for spot, croaker, gray trout, and white perch.

Colonial water bird nesting sites, and waterfowl staging and concentration areas exist along tidal shorelines, tributary streams, and non-tidal wetlands throughout the County. Great blue heron rookeries can be found on Mattawoman Creek, Nanjemoy Creek, Zekiah Swamp Run, and Swanson Creek, and numerous active Bald Eagle nests have been identified along the County's extensive shoreline.

During the year, Charles County is inhabited by approximately 30 species of water fowl, 70 species of other wetland birds, three species of upland game birds, 20 species of birds of prey, 150 species of upland song birds, 25 species of amphibians, 32 species of reptiles, and 45 species of mammals.

Rare, threatened and endangered species

Lists of rare, threatened and endangered animals and plants, including federally listed species, are maintained by the Natural Heritage Program, which is part of the Maryland Department of Natural Resources. Statewide, approximately 152 animals and 455 plants appear on the lists, although not all are listed as threatened or endangered, thereby affording them levels of legal protection. As of May 2004, 19 animal and 86 plant species were listed within Charles County. Of these, two animals and one plant were listed as threatened or endangered by the U.S. Fish and Wildlife Service. These are the dwarf wedge mussel, the bald eagle and the sensitive joint vetch.

Natural Heritage Areas

Natural Heritage Areas (NHAs) are composed of plant or animal communities within the Chesapeake Bay Critical Area that are considered to be among the best statewide examples of their kind. In addition, all NHAs contain at least one species designated or proposed as endangered, threatened, or in need of conservation. There are four NHAs in Charles County (see Figure 8-3).

Allen's Fresh	NHA-16	Popes Creek	NHA-18
Chicamuxen Creek	NHA-17	Upper Nanjemoy Creek	NHA-19

Development activities or other disturbances in these areas are not allowed unless it can be shown that the proposed activity will have no adverse impacts on habitats. Specifically, it must be shown that the structure and overall species composition of the plant and animal communities will be retained.

Private lands in the County support the majority of wildlife, and active farms support the greatest upland game populations. Waterfowl and upland game meet a demand for almost 160,000 hunter days among County residents². Wildlife also provides opportunities for passive recreation and educational activities, observing, and photographing them in their natural habitat.

Oyster Recovery Partnership

Between 2000 and 2003 the Oyster Recovery Partnership (ORP), made up of 24 partners including state and federal agencies, planted over four million oyster spat (young) in the Potomac River and over 26 million oyster spat in the Patuxent River. Of the spat planted in the Patuxent River, 2.6 million were planted on Elbow and Teague Bar Sanctuaries just north of the Benedict Bridge. No harvesting is allowed in sanctuaries. Just south of the Benedict Bridge is Holland Bar where 0.31 million spat were planted and are available for harvest.

In the Potomac River all of the bars within Charles County are open to harvest and include Morgantown, Swan Point, and Neale Sound. The ORP planted 2.5 million spat in the Potomac.

Planning programs & regulatory controls

The overall strategy for preserving and enhancing the County's valuable environmental resources incorporates existing review processes. Although it may be necessary to revise obsolete or out-dated measures, coordination with existing programs is essential to avoid duplication of efforts. The following is a summary of existing environmental management programs.

Subdivision & site plan review

Under the provisions of Article 66B, the Planning Commission is responsible for the approval of all subdivision activity in the County. The County Zoning Ordinance gives the Board the authority to review residential and commercial subdivision plans. Site plans are reviewed administratively except within the St. Charles PUD. The review process is a joint effort between county, state and federal agencies that addresses environmental concerns such as Critical Areas, flood plains, streams and their buffers, wetlands, steep slopes, erodible soils, sensitive habitat areas, stormwater management, forest management, and sediment control. Construction, utility and grading plans are reviewed for compliance with applicable ordinances.

Resource Protection Zone (RPZ), protecting streams and their buffers

The RPZ was adopted as part of the Charles County Zoning Ordinance in 1992, and revised in 1994 and 1998. It is an overlay zone applying to County streams outside the Chesapeake Bay Critical

² Participation in Local Park and Recreation Activities in Maryland (Norris, Hanson, and Coleman, 2003)

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Area. The RPZ encompasses stream valleys, steep slopes, associated wetlands and floodplains, if present, as a buffer. Inside the RPZ, most forms of development are prohibited, and permitted uses, such as agriculture and commercial timber harvesting, must follow management plans. The RPZ buffer is a minimum 50 feet for small and intermittent streams and 100 feet for larger streams. The buffer is expanded to account for non-tidal wetlands, 100-year flood plains and steep slopes.

Floodplain management

Charles County has recognized the significant community costs that are incurred through unwise floodplain development. With the assistance of various State and Federal agencies, the County has developed a comprehensive Floodplain Management Program. The Program is administered through the Charles County Floodplain Ordinance which was last revised in 1992.

The ordinance establishes and delineates those areas in Charles County that would be inundated by the 100-year regulatory flood. The ordinance establishes three floodplain zones: a non-tidal floodplain zone; a tidal floodplain zone; and a coastal high hazard zone. The ordinance provides for the issuance of permits and also imposes certain restrictions on construction and development within the floodplain district in order to protect human life and health and minimize public and private property damage. Provisions of the ordinance include:

- Required flood protection setbacks from the banks of mapped or unmapped streams;
- Prohibition of development in the floodway that increases flood levels;
- Minimum elevations above the flood protection elevation;
- In new subdivisions, a prohibition on residential building sites inside the floodplain;
- Required alternatives analysis before certain development is permitted in the floodplain.

The biological value of floodplains, particularly tidal and non-tidal wetlands, can be adversely impacted by floodplain development. By regulating development in these areas, the ordinance aids in maintaining the biological diversity and environmental quality of watersheds.

Steep Slopes

The County's 2001 Grading and Sediment Control Ordinance defines steep slopes as slopes over 15 percent grade. Grading is permitted provided an applicant obtains an approved erosion and sediment control plan. Steep slopes near streams are given additional protection through the RPZ; the minimum buffer from streams is increased to account for 15 percent steep slopes contiguous or adjacent to the buffer. Areas of steep slopes over 25 percent over 10,000 square feet are encouraged to be preserved as undeveloped open space under design standards contained in the 1996 subdivision regulations.

Within the Critical Area, the buffer from tidal waters is expanded to account for contiguous steep slopes greater than 15 percent. In addition, within the Limited Development Zone and Resource Conservation Zone (more than 99 percent of the Critical Area) any development on 15 percent slopes is prohibited.

Charles County Critical Area Program

The Chesapeake Bay Critical Area Law requires Charles County to adopt and implement a Critical Area Management Program to protect the water quality and wildlife habitats of the Bay and its tributaries. The Program must be reviewed every six years, and Charles County's program and ordinance was updated and revised in 2001. The Critical Area is defined as those lands along the tidal shoreline extending 1,000 feet landward of mean high tide or the landward boundary of tidal wetlands. All development activity within the Critical Area must comply with specific criteria established by the Program.

Habitats of threatened and endangered species

Habitat of Threatened and Endangered Species are defined by Charles County as:

An area which, due to its physical or biological features, provides important elements for the maintenance, expansion, and long term survival of threatened and endangered species listed in COMAR 08.03.08. This area may include breeding, feeding, resting, migratory, or overwintering areas. Physical or biological features include, but are not limited to: structure and composition of the vegetation; faunal community; soils, water chemistry and quality; and geologic, hydrologic, and micro climatic factors. This area may need special management protection because of its importance to conservation of the threatened or endangered species. *1996 Charles County Subdivision Regulations.*

Maryland's Nongame and Endangered Species Conservation Act requires State agencies to use their authority to maintain and enhance nongame wildlife and endangered species populations. Threatened and endangered plants and animals, as well as animal species in need of conservation, are listed under the Act for regulatory protection. This list is regularly updated by the State. In addition to listing the species, the Act lists Natural Heritage Areas statewide, which are located both inside and outside of the Chesapeake Bay Critical Area. Natural Heritage Areas are given regulatory protection in the Chesapeake Bay Critical Area. Four of the five tidal Wetlands of Special State Concern in the County are designated Natural Heritage Areas. The fifth tidal Wetland of Special State Concern is Mattawoman Creek Marshes, which is under Maryland Department of Natural Resources ownership as a Natural Environmental Area.

The State also identifies other important plant or wildlife habitats, as required by the Chesapeake Bay Critical Area Act. These are habitats of rare or highly rare species that may become threatened or endangered if not conserved. Local jurisdictions are required to provide protection for these important habitats.

Since 1997, the Maryland Department of Natural Resources has identified two additional habitat protection areas with rare, threatened or endangered species in the Critical Area and twenty additional sites outside the Critical Area in Charles County. This brings the total number of rare, threatened and endangered habitat sites, outside of Natural Heritage Areas and Wetlands of Special State Concern, to over forty.

Charles County protects habitat of rare, threatened and endangered species under separate regulations for inside the Chesapeake Bay Critical Area and outside the Chesapeake Bay Critical Area.

Habitat Protection in the Chesapeake Bay Critical Area

In the Chesapeake Bay Critical Area, Charles County defines Habitat Protection Areas as land containing specialized plant or wildlife habitat, where protection is essential to the preservation of biological species and water quality. Habitat Protection Areas in Charles County include:

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- The 100-foot Critical Area buffer for all tidal waters and wetlands
- Threatened and endangered species habitat
- Non-tidal wetlands
- Colonial waterbird nesting areas
- Forest areas with forest interior dwelling birds
- Other important plant and wildlife habitat areas
- Expansions of the Critical Area Buffer
- Habitats of Local Significance
- Natural Heritage Areas
- Historic waterfowl staging areas
- Anadromous fish propagation waters.

All proposed development activities are subject to the Habitat Protection guidelines and requirements described in the Charles County Chesapeake Bay Critical Area Program.

The habitats of Local Significance in the Critical Area are:

1. Audubon Woods
2. Bullitt Neck Point
3. Cornwallis Neck Marshes
4. Friendship Landing
5. Porter Woods
6. Purse Uplands and Ravines
7. Thoroughfare Island
8. West Stump Shoreline

Habitat Protection Outside the Chesapeake Bay Critical Area

Outside the Chesapeake Bay Critical Area, there are two categories of habitat protection. These are Nontidal Wetlands of Special State Concern, and other significant ecological areas.

Nontidal Wetlands of Special State Concern, are the best examples of Maryland's nontidal wetland habitats and are designated for special protection under the State's non-tidal wetlands regulations. These special wetlands most often have rare, threatened or endangered species, and, at minimum, must have a unique plant and/or animal community. Activities which involve any clearing of vegetation, filling, excavating, flooding or draining are regulated by the State, which requires a 100-foot protective buffer around the nontidal wetlands of special state concern. The twelve wetlands of special state concern in Charles County were adopted with the original legislation, and are:

1. Brentland Woods
2. Bryantown Swamp
3. Cat Pond
4. County Line Trail Seep
5. Doncaster State Forest
6. Maryland Point Swamp
7. Pomonkey School Stream
8. Popes Creek
9. Port Tobacco Run
10. Thomas Stone National Historic Site
11. Upper Nanjemoy Creek
12. Zekiah Swamp

The 1996 County Subdivision Regulations affords protection for other significant ecological areas, including but not limited to:

- Habitat of rare, threatened and endangered species
- Fish spawning areas
- Submerged aquatic vegetation
- Forest Interior Dwelling Bird habitat
- Colonial waterbird nesting sites

The County requires Habitat Protection Plans for addressing the protection of the habitats of rare, threatened and endangered species, and these are required at time of property subdivision. Habitat Protection Plans must be prepared with the assistance of the Maryland Department of Natural Resources to develop and identify habitat protection measures.

In addition to the protection by the 1996 Charles County Subdivision Regulations, habitat of rare, threatened and endangered species is a priority forest retention area under the State and County Forest Conservation regulations.

Grading & sediment control

The Development and Capital Services Division of the Department of Planning and Growth Management and the Charles Soil Conservation District review all building permits to insure compliance with County and State regulations regarding soil disturbance. By enforcing these laws the sediment loading of waterways is reduced thereby preserving water quality in downstream areas.

The Charles Soil Conservation District is an autonomous organization run by a board of supervisors. The organization is funded by both the County and the State, and is charged with the conservation of soil and water in Charles County. The District reviews sediment control plans for the County to ensure water quality during construction. The District also prepares soil conservation and water quality plans for local farmers. These farm plans are designed to control non-point source pollution through the use of Best Management Practices (BMPs) and stormwater control structures to improve water quality.

Stormwater management

Charles County's Stormwater Management and Drainage Ordinance was revised in 2001 to incorporate statewide required changes to the stormwater management program. The ordinance protects water quality by controlling the adverse impacts associated with increased stormwater runoff. With the use of water retention areas and other structures, sediment and other forms of pollution are retained on site helping to improve water quality, prevent downstream flooding and reduce stream bank erosion.

In 2001 revisions included referencing the *2000 Maryland Stormwater Design Manual, Volumes 1 and 2* and water quality regulations. The three goals of the *Design Manual* are to:

1. Protect waters of the State from adverse impacts of urban stormwater runoff,
2. Provide design guidance on the most effective structural and nonstructural best management practices (BMPs) for development sites, and
3. Improve the quality of BMPs constructed, specifically with respect to performance, longevity, safety, maintenance, community acceptance and environmental benefit.

The *Design Manual* lists 14 performance standards that must be addressed at all sites where stormwater management is required. Some examples include maximizing pervious areas, maintaining annual groundwater recharge rates, and designing structural BMPs to remove 80 percent and 40 percent of the average annual post development loads of total suspended solids and total phosphorus, respectively.

The water quality regulations establish authority for the County to pursue and correct suspected illicit discharges into the storm sewer system. This supports the annual dry weather storm sewer outfall inspections required by the National Pollutant Discharge Elimination System Municipal Storm Sewer System Permit.

Wetland protection programs

The Maryland Department of Environment (MDE) and the U.S. Army Corps of Engineers (Corps) regulate the alteration on any floodplain, waterway, or tidal or non-tidal wetland through a joint permitting process that ensures the proper permits are obtained for the activity. For example, a state

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wetlands license is required from the State Board of Public Works for dredging, filling, or construction in tidal wetlands which include marshes, swamps, and submerged bottoms below the mean high water mark. An MDE letter of authorization is required for any activity that alters a non-tidal wetland or its buffer. Other types of permits that may be necessary include State Water Quality Certification and a Corps Section 404 permit.

All development applications submitted to the County are reviewed for the potential presence of wetlands, based on U.S. Department of Interior, National Wetland Inventory maps and the more recently available Maryland Department of Natural Resources Wetland Inventory maps. These wetland inventories are based on photo interpretation and are used for planning purposes only. Both wetland inventories are available to the public on-line by the Maryland Department of Natural Resources. If it appears that wetlands may be present, the County notifies the appropriate State and Federal permitting agencies. A wetland delineation and jurisdictional determination by the U.S. Army Corps of Engineers provides an accurate location of wetlands and may be necessary before permit applications may be reviewed. Interagency (County, U.S. Army Corps of Engineers and Maryland Department of the Environment) coordination meetings are held as needed to review development proposals affecting wetlands. The County will approve a subdivision or site plan, but on the condition the applicant obtains the necessary wetland permits.

Forest Protection

In 2004 the County updated its forest conservation ordinance. The update included and enhancement to improve water quality in watersheds in the Development District by providing incentives to maintain forest cover in the watershed where development occurs. The ordinance applies to all lands outside the Critical Area and requires development proposals to include forest stand delineations and forest conservation plans. The forest conservation plan can require afforestation or reforestation. Afforestation is planting trees where forest cover has been absent, such as farm fields. Reforestation is replacing existing trees.

The Maryland Department of Natural Resources Forest Service administers a forest management assistance program to educate private landowners in basic forest ecology, and promote conservation of important forest resources. The forest management plan is the heart of the assistance program. The Plan may include practices such as timber harvesting, site preparation, reforestation, thinning, improvement cutting, and/or road stabilization. Forest Plans are required for all timber harvesting of one acre or more in the Critical Area, and for any disturbance within 100 feet of the shoreline or tidal wetlands.

Watershed Management and Protection

Watershed management and protection is key to maintaining water quality, and since the 1997 Comprehensive Plan much attention has been paid to planning and management of Charles County's watersheds.

The federal Clean Water Act requires states to assess the quality of their waters every two years and publish a list of those waters not meeting standards. In 1996, pursuant to the Act, the Maryland Department of the Environment first submitted the list of impaired waters known as the 303(d) list, to the federal Environmental Protection Agency. All the waters in Charles County are on this list as impaired for nutrients and sediment, and some water bodies are listed for additional impairments. Since 1996, a number of plans and programs have been initiated to restore and improve water quality in these waters so they will meet their designated water quality standards. These programs include Maryland's Clean Water Action Plan, Tributary Strategies, Total Maximum Daily Loads, and the National Pollutant Discharge Elimination System. These last three programs each have slightly different goals but are key to controlling non-point source pollution.

National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System

The Clean Water Act requires jurisdictions over 100,000 population to have a NPDES permit for their storm sewer system with the program goal of eliminating non-stormwater discharges and reducing pollutants from the storm sewer system to the “maximum extent practicable.” In 1994 Charles County submitted its NPDES permit application to Maryland Department of the Environment and was issued permit coverage for the Development District in 1997. The permit covers the portions of the three watersheds that drain the Development District, the Mattawoman, Port Tobacco, and the Zekiah Swamp Run. In 2002 the permit was reissued for another five year term. The first permit contained six categories of compliance: legal authority, source identification, discharge characterization, management programs, program funding and assessment of controls. The second permit added a seventh category: watershed restoration, requiring 10 percent of the untreated impervious surface in the Development District to be restored.

Tributary Strategies

Tributary Strategies resulted from the 1983 Chesapeake Bay Agreement between the Bay States to restore the Chesapeake Bay. The Tributary Strategies describe ways in which nutrient pollution loads can be reduced by 40 percent in many sub-watersheds that drain into the Bay. Charles County lies primarily in two tributary watersheds (basins): the Lower Potomac and the Patuxent.

According to the Tributary Strategies, nutrient reduction goals can be achieved through the following actions: wastewater treatment plant upgrades; full implementation of erosion, sediment control and stormwater management programs; reduction of forest loss; and implementation of other nonpoint source pollution control efforts. "Tributary Implementation Teams," comprising about 30 members, have been established to facilitate the continued participation of local governments, interest groups and citizens in deciding how best to refine and implement the Strategies.

By 2000 Maryland came close to meeting the original nutrient 40 percent reduction goals, but restoration of the Bay was not achieved. Consequently, Maryland, along with its partners committed to develop a new Tributary Strategy that will achieve the nutrient reduction goals established in the *Chesapeake 2000 Agreement* and restore living resources in the Bay and its tributaries. After several years of effort, the Maryland Tributary Strategy Development Workgroup completed Maryland's Tributary Strategy in 2004. The strategy includes targets for nutrient reductions from stormwater, septic systems, growth management, agriculture, point sources, and air sources. As of late 2004, the implementation strategy to meet the targets is under development.

Total Maximum Daily Load (TMDL)

Water bodies on the the 303(d) list of impaired waters require a plan to address the impairment called a Total Maximum Daily Load (TMDL). The TMDL is the prescribed amount of pollutant a water body can assimilate and still meet water quality standards. TMDLs must be completed within ten years of being listed on the impaired list.

In 1999 the first TMDL for nutrients in the state was approved for Port Tobacco River watershed addressing eutrophication, which is the over enrichment of aquatic systems by excessive inputs of nitrogen and phosphorus. Highly eutrophic waters will characteristically have fewer species present, and particularly high concentrations of algae. The TMDL assigns pounds of nitrogen and phosphorus to both point (waste water treatment plants) and non-point (agriculture, urban, forest, air deposition) sources that when attained should eliminate the eutrophication problem.

Additional TMDLs being prepared in 2004 for Charles County are to address nutrient impairments in the Mattawoman Creek Watershed and bacteria impairments for Indian Creek and Charleston Creek. MDE plans to review and update TMDLs on a five-year basis.

Natural Resource Protection

Maryland Clean Water Action Plan

The 1999 Maryland Clean Water Action Plan designated all watersheds within the County as Category 1 (in need of restoration) and Category 3 (in need of protection). The Mattawoman Creek Watershed was identified as a “priority” for restoration, and “selected” for protection.

Mattawoman Creek Watershed Management Plan

In 2003 the US Army Corps of Engineers completed a watershed management plan for Mattawoman Creek in Charles County. The plan was developed in response to concerns that development within the Development District had the potential to significantly affect Mattawoman Creek resources, with water quality and aquatic biota the primary concerns. The purpose of the plan was to balance the protection of the Mattawoman Creek’s natural resources and water quality with the development plans of the County. A model was developed for the plan to assess the future pollutant loads within the Mattawoman Creek in a variety of future land use conditions and time scales. In addition, several management scenarios were modeled, including the continuation of current trends, complete regulatory compliance, enhanced regulatory compliance, and stream valley protection. Together with the time scales nine scenarios were run through the model.

Based on the model results, phosphorous, nitrogen, and sediment loads were projected to increase dramatically, with increases of over 50 percent by 2020 under the build-out scenario – the maximum potential development under current zoning practices. To allow for the continued development of the Mattawoman Creek Watershed, while emphasizing natural resource protection, the Corps developed a management plan with three specific recommendations:

- Delineate and protect the stream valley – defined as the top of the slope to the stream.
- Future development should implement low impact design techniques, minimizing the amount of impervious surfaces and promoting stormwater disconnects.
- Examine existing developments for stormwater retrofit opportunities.

Wicomico Scenic River and Zekiah Swamp Management Program

In 1983, an interagency committee was formed by the state to coordinate research and management efforts in the Zekiah Swamp watershed. This committee developed policy recommendations for the Zekiah which stressed the need for protecting the watershed from intense development and habitat degradation. The Wicomico River and its watershed, which includes the Zekiah Swamp, was one of nine rivers in the State to receive designation as a Scenic or Wild River under the Maryland Scenic and Wild Rivers Act of 1968. One requirement of the state designation was that a plan be prepared addressing how the resources in the watersheds with scenic or wild designations should be managed. In 1988, a committee was formed to develop a management plan which met the state requirements. The resulting Wicomico Scenic River Study and Management Plan was completed in 1994. The plan is not regulatory, but is intended to serve as a guide for state and local governments.

In 1995, to ensure that the goals and objectives of the plan are carried out, Charles and St. Mary's Counties formed the Wicomico River Commission, with members appointed by the Commissioners of both counties. The Commission provides education and outreach to the community on water quality issues and reviews major development projects in the watershed.

Patuxent River Planning

In 1971, the State designated the Patuxent a state scenic river. The County has been actively involved in watershed-wide planning efforts on the Patuxent involving seven counties and numerous state and federal agencies to protect the river's resources through land management and pollution control strategies. This effort began in 1984 with the development of the Patuxent Policy Plan that

identified key goals and objectives for minimizing pollution throughout the watershed. The Patuxent River Commission was formed to oversee the implementation of the Patuxent River Policy Plan.

One of the outcomes of this planning process was the Patuxent River Demonstration Project. This project, began in 1991, and focused on linking land and nonpoint source pollution management and developing a comprehensive planning strategy for the watershed. Through the Project, the County and the Charles Soil Conservation District developed Soil and Water Quality Management Plans for the majority of the farms in the watershed.

The County is striving to meet the goals of the Patuxent River Policy Plan in the form of easement acquisitions as part of the State Agricultural Preservation Program, outright purchase of land using State Program Open Space funds, and enforcement of the County's Resource Protection Zone. In 2000 Charles County adopted the Commission's 1997 addendum to the 1984 Patuxent River Watershed Policy Plan designed to further implement the comprehensive planning strategy for the watershed. The Patuxent River Commission serves as the Tributary Strategies team for the Patuxent River.

In 2003 the Patuxent River Commission requested federal legislation to enable a study to determine the qualification of the Patuxent River for designation as a Wild and Scenic River. As a result of the study, the river could become part of the federal Wild and Scenic River program.

Potomac River

The Interstate Commission on the Potomac River Basin (ICPRB) is an interstate compact commission established by Congress in 1940 to help the Potomac basin states and the federal government to enhance, protect, and conserve the water and associated land resources of the Potomac River basin through regional and interstate cooperation. The ICPRB lists almost 30 watershed organizations for the Lower Potomac sub-watershed including several in Charles County such as the Lower Potomac Tributary Strategy Team, the Chapman Forest Foundation, the Conservancy for Charles County and the Nanjemoy-Potomac Environmental Coalition.

In 1998 the Potomac River was designated one of the first 14 American Heritage Rivers in a program designed to streamline federal participation in local efforts to protect and enhance the natural, cultural, and economic resources inherent in the waterways.

Port Tobacco River

In 2001 a group of private citizens formed the Port Tobacco River Conservancy. In 2004 the County received a state Watershed Restoration Action Strategies (WRAS) grant to work with stakeholders in the watershed to address water quality issues. WRAS focus on restoration strategies in watersheds listed as impaired in Maryland's Clean Water Action Plan.

Environmental Education

Environmental education is a strong component in the science curriculum of the County's school system. Classroom instruction is supplemented by field trips to allow students to investigate first hand the County's natural environments. The primary facility used is the Charles County Public Schools' Nanjemoy Creek Environmental Education Center. The Center offers courses for kindergarten through high school, as well as teachers' training courses and summer camps.

The Izaak Walton League is developing an outdoor education center on a 140-acre farm near Waldorf that includes approximately 60 acres of the Zekiah and Jordan swamps.

Natural Hazards

In 2004, the County completed a Hazard Mitigation Plan, as required by the federal Disaster Mitigation Act of 2000. The County is considered vulnerable to seven natural hazards: flooding; winter storms; coastal erosion; wildfires; tornadoes; hurricane winds; and drought. The Plan assesses the County's vulnerability to these hazards and identifies a series of projects to mitigate the potential effects of such hazards. The assessment found the County's floodplain management ordinance to be good, but recommends strengthening the floodplain management by implementing a higher floodplain protection elevation (see also Chapter 6 under Emergency Management).

Conservation programs

Using various programs, the County and the State works with property owners and citizens' groups to promote the preservation of unique environmental areas, and natural resource areas, including such areas where they exist on agricultural land.

As of 2003, the Maryland Department of Natural Resources owned approximately 15,500 acres of land in Charles County including parks, forests, and environmental areas. Of these, approximately 5,700 acres comprise wetlands, floodplain and adjacent forest buffers along Mattawoman Creek in the tidal section and upstream almost to the Prince Georges-Charles County line at Billingsley Road. The State owns about 2,750 acres of open marsh and forested wetlands in the Zekiah Swamp Run Watershed, including the headwaters in Cedarville State Forest, and in Allen's Fresh, where the Zekiah enters the Wicomico River.

Since 1998 the state has acquired or participated in several significant acquisitions countywide including Chapmans Landing (approximately 2,200 acres) in 1998, and Douglas Point (approximately 700 acres) and Mallows Bay (approximately 500 acres), in 2002.

Green Infrastructure

Maryland's green infrastructure initiative is a statewide effort by the Maryland Department of Natural Resources (DNR) to identify large, contiguous blocks of ecologically significant natural areas (hubs) and to link them with natural corridors to create an interconnected network of natural resource lands across the state.

Interconnection between hubs is a key concept in green infrastructure. If hubs are not connected via natural corridors, they become isolated "islands" that do not offer the necessary resources to support healthy populations of species. The State's goals for conservation of natural resource lands relating to Green Infrastructure are to:

- Work with local governments and the private sector to focus conservation and restoration activities on priority areas within the statewide green infrastructure.
- Synthesize local inventories of natural resource lands and environmentally sensitive areas with DNR's inventory of green infrastructure to assist State and local implementation programs
- Assess the combined ability of State and local programs to expand and connect forests, farmlands, and other natural lands as a network of contiguous green infrastructure.

Figure 8-4 shows the State's Green Infrastructure map for Charles County. Note that the map is an assessment rather than a program. It shows where existing hubs and corridors exist and where there are gaps in the network. The area covered by the assessment is very extensive, approximately 170,000 acres or 57 percent of the County.

Discussion

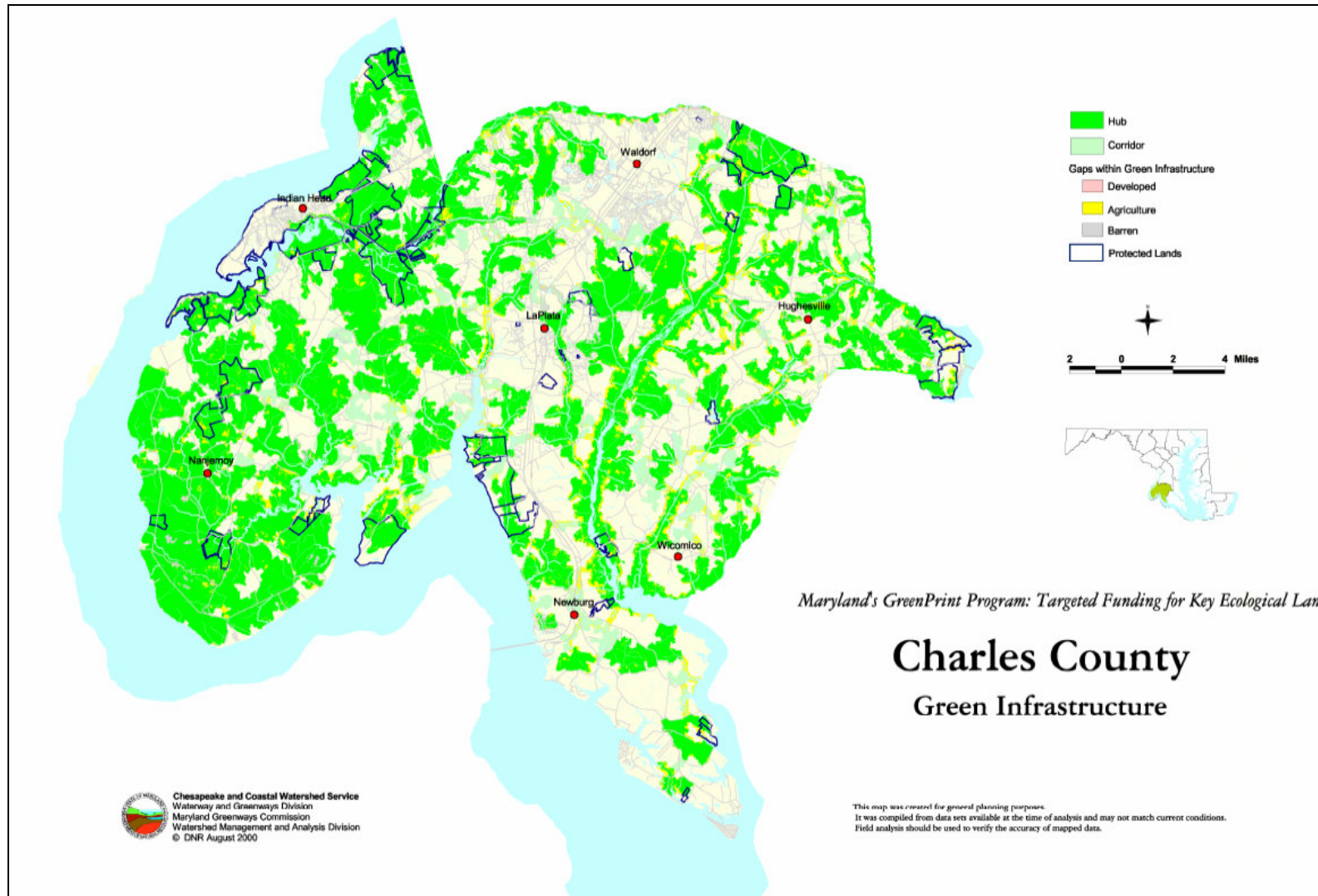
Charles County recognizes that a Green Infrastructure program would have benefits including enhancing habitat areas and the County's open space network, and helping guide the location of development so that negative effects on ecologically valuable lands are minimized. As described in this chapter, Charles County has extensive existing resource protection programs. Currently, the focuses of these program are on streams and their buffers, critical areas, forest land, steep slopes, and habitats of threatened and endangered species. The programs are not currently focused on creating an interconnected network of resources. Broadening the county's programs to incorporate interconnection would be an adjustment of approach.

Approximately 20 percent of the County's land is currently protected from development (75 percent of the 20 percent is permanently protected). Charles County understands that the state's Green Infrastructure is an "assessment", not a plan, and may be treated as a goal or as a starting point for the County to develop a plan. It may not be possible, or desirable, to protect every acre of land in the state's Green Infrastructure. The amount of land needed for growth and economic development would need to be considered as part of any potential application of Green Infrastructure to the County.

The County does not envision the entire Green Infrastructure as public land. Like the Zekiah Swamp Run Watershed Rural Legacy Area, the vast majority of any lands protected through a Green Infrastructure program will remain in private hands.

The County can use the state's Green Infrastructure as a starting point for its own assessment and identification of goals. This assessment could help i) prioritize Green Infrastructure with respect to other programs, ii) identify focus areas for the Green Infrastructure, such as inside or outside the Development District. The state's Green Infrastructure assessment was developed based on data some of which is now out of date, for example land use/land cover from the 1990s. The Green Infrastructure would need to be reexamined for Charles County based on current information.

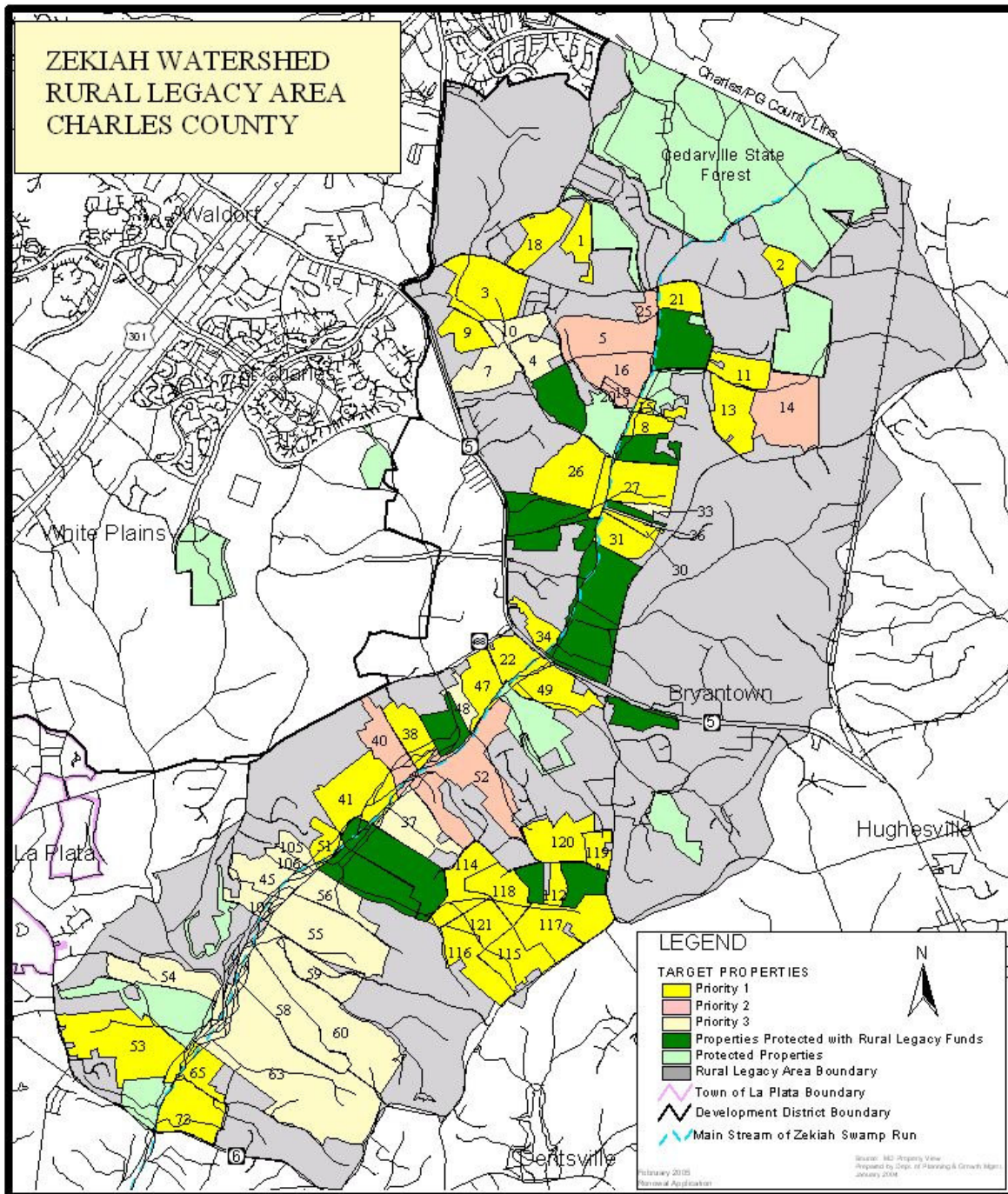
Figure 8-4 Green Infrastructure



Rural Legacy Program

In 1998 the State of Maryland approved the County’s plan to establish a Rural Legacy Area in the Zekiah Swamp Run Watershed. The Rural Legacy Program is part of Maryland’s Smart Growth program, and as of 2004 almost 1,800 acres of land have been protected in the northern part of the Zekiah Swamp Run Watershed using grant awards of over \$5.5 million (Figure 8-5)

Figure 8-5 Zekiah Swamp Run Watershed Rural Legacy Area



Natural Resource Protection

Maryland Environmental Trust

The Maryland Environmental Trust (MET) was created in 1967 to conserve, stimulate, and perpetuate the state's natural environment. The primary objective of the Trust's Land Conservation Program is to protect open areas such as farm and forest land, wildlife habitat, waterfowl, unique or rare natural areas, historic sites and properties with scenic features. Using tax incentives, the MET preserves land as open space through the use of conservation easements. As of January 2005, the MET had 5,771 acres under easement in Charles County.

Other Organizations

A number of private organizations such as the Chesapeake Bay Foundation (CBF) and the Nature Conservancy offer technical assistance to groups interested in establishing land trusts or donating conservation easements. The CBF has developed a cooperative agreement to combine its outreach efforts with MET's strength in administering easements.

The Nature Conservancy owns approximately 2,500 acres in Charles County including 1,000 acres in the Nanjemoy Creek area that has a large, great-blue heron rookery. During the spring nesting season, the site provides refuge to approximately 350 pairs of heron.

The Conservancy for Charles County is the only private land trust operating in Charles County. It incorporated in 1996 and executed its first protective easement in 1999 jointly with the Maryland Environmental Trust. As of January 2005, the Conservancy holds 1,371 acres in easements, all but 114 acres co-held with MET.

Other groups active in the County and not mentioned elsewhere in this chapter include the Chapman Forest Foundation, Southern MD Audubon Society, Sierra Club, and the Patuxent and Potomac Riverkeepers.

Agricultural Land Preservation Program

As of January 2005, 18,214 acres of agricultural land are enrolled as Agricultural Land Preservation Districts (see Chapter 9).

Implementation strategies

The following is a summary of the implementation techniques recommended to continue to protect and enhance Charles County's natural resources.

1. Mattawoman Creek Watershed Protection. As discussed under watershed management and protection, a watershed management plan for Mattawoman Creek in Charles County was completed in 2003. The three key recommendations were to:

- ⇒ Delineate and protect the stream valley – defined as the top of the slope to the stream.
- ⇒ Implement low impact design techniques, minimizing the amount of impervious surfaces and promoting stormwater disconnects, and
- ⇒ Examine existing developments for stormwater retrofit opportunities.

Implementation of these recommendations will be through a combination of regulatory, capital, and programmatic approaches.

2. Green Infrastructure. Develop a Green Infrastructure strategy for Charles County. Counties are responding in different ways to the state’s Green Infrastructure assessment. The strategy should include examining the approaches taken by different counties and determining the right approach for Charles County, especially with respect to prioritizing green infrastructure in relation to other existing programs. The strategy should include a public input component for Charles County residents, businesses, and interest groups.

3. Maintain and enhance the county’s urban forests.

⇒ Consider adopting an urban forest canopy coverage goal. This was identified as an objective of the Waldorf sub-area plan.

⇒ Investigate strategies under the County’s forest conservation ordinance to retain as much of the forest and tree cover as possible within urban areas.

4. Green buildings and architectural techniques. Investigate the potential use of and incentives for “green” building and architectural techniques. Green building techniques such as using recycled materials, eliminating harmful chemicals for cleaner indoor air, recycling stormwater for industrial uses or toilet flushing, and maximizing solar exposure are gradually becoming better known and more mainstream though the increased cost and liability considerations remain barriers to widespread use. Some jurisdictions have taken the lead by using green buildings in public projects.

5. Promote ozone action days in coordination with the Metropolitan Washington Air Quality Committee. This will help reduce air pollution when weather conditions and human activities combine to create unhealthful air quality conditions. Techniques include promoting carpooling, and avoiding the use of farm and garden equipment, solvents, and paints.

6. Erosion on the Potomac and Port Tobacco Rivers. Provide restoration and stabilization features to reduce erosion areas, improve water quality and enhance aquatic conditions. This strategy is recommended pursuant to the 2004 Charles County Hazard Mitigation Plan.

7. Ongoing planning. Continue to coordinate and implement the goals and objectives of adopted policy plans including the Patuxent River Policy Plan, Tributary Strategies, the Wicomico Scenic River Study and Management Plan, Mattawoman Watershed Management Plan, Rural Legacy Plan, Total Maximum Daily Load plans, and other watershed restoration and management plans.