

STAFFORD COUNTY, VIRGINIA

***WILDLIFE HABITAT
PROTECTION PLAN***

June 20, 2000

**1997 URBAN AND COMMUNITY FORESTRY ASSISTANCE GRANT
VIRGINIA DEPARTMENT OF FORESTRY**

PARTICIPATING AGENCIES AND MEMBERS

Friends of the Rappahannock

John Tippett

Mary Washington College

Dr. Michael Bass

Dept. of Conservation and Recreation – Division of Natural Heritage

Tom Smith

Quantico Marine Corps Base

Tim Stamps

Rappahannock Area Development Commission

Stephen Manster

Stafford County Department of Parks and Recreation

Michael Scott

Stafford County Department of Planning and Community Development

Cornell Gordon

Jeff Harvey

William Shelly

Philip Thompson

Michael Zuraf

Tri-County Soil and Water Conservation District

George White

U.S. Army Corps of Engineers

Hal Wiggins

Virginia Department of Conservation and Recreation

Steve Carter-Lovejoy

Virginia Department of Forestry

Dean Cumbia

Dr. Rei Lui

Mike Nickle

Virginia Department of Game and Inland Fisheries

Keith Kline

Dan Lovelace

Virginia Native Plant Society

Nicky Staunton

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(1) Derived from 1995 infra-red digital ortho-photography with 1 meter resolution

(2) Derived from 1990-93 satellite imagery with 30 meter resolution

I. INTRODUCTION

Stafford County is located approximately forty (40) miles south of Washington, DC, and sixty (60) miles north of Richmond, Virginia. It is bordered by Prince William County on the north, Fauquier County and Culpeper County on the west, Spotsylvania County and the City of Fredericksburg on the south, and the Potomac River (Charles County, MD) and King George County to the east (see Figure 1). Stafford County is traversed by important transportation corridors including Interstate 95, U.S. Route 1, U.S. Route 17, and the CSX Railroad. The County covers 277 square miles (Quantico MCB accounts for 51 square miles) of generally level to rolling land, with 68 percent of it not built upon or forested.

The County's proximity to major industrial and commercial markets, combined with its high percentage of vacant or forested land, makes Stafford an attractive area for development (residential, commercial, industrial). As an area within commuting distance of major employment centers to the north and to the south, the County continues to face increased growth pressures from developers eager to meet the demand for housing.

Over the past thirty years, the population of Stafford County has been increasing at a dramatic rate. In 1970, the population was 24,587; by 1990, the population had risen to 61,236 (149 percent increase). As of 1998, the population was estimated at 92,000 (274 percent increase). If current trends continue, the population will increase to 159,295 by the year 2020.

The significant amount of growth and development that has occurred over the past thirty years has resulted in the urbanization of many rural areas of the County. The rapid shift in land use from rural to urban uses has accelerated the processes of environmental degradation including soil erosion, sedimentation, non-point source pollution, loss of forest areas, and loss of wildlife areas. As the County's population continues to grow, there will be increased demands for housing, roads, schools, utilities, and other public services, which will continue to impact the County's natural resources. There will also be increased demands for open space, recreation, and natural areas. Conflicting interests will compound the task of effectively managing and protecting the County's natural resources. While other localities to the north have found themselves trying to correct past mistakes, Stafford County is attempting to learn from the experience of others by encouraging development that has minimal impact on the natural environment. One such way is the development and implementation of this Wildlife Habitat Protection Plan (WHPP). The WHPP outlines development strategies that preserve the natural environment while recognizing existing development trends within the County. The WHPP identifies migration corridors for animal species, critical forest coverage areas, and riparian forest systems within the County for preservation and protection.

The County has established several management programs in the past to address impacts on its natural resources. These management programs are directed toward the goal of maintaining water quality, providing for future water consumption, and expanding recreational opportunities. Other management programs maintain high water quality by controlling sediment and stormwater runoff and protecting natural systems such as wetlands. This Plan discusses those management programs and recommends additional measures that may be implemented by the County to protect sensitive wildlife habitats and forested areas.

II. BACKGROUND

Natural Resources

Physiographic Regions

Stafford County is divided into two major geologic zones: the Piedmont Plateau, west of Interstate 95, and the Coastal Plain, east of Interstate 95 (see Figure 2). The general environmental characteristics of the County are reflected by the different geological characteristics within these two areas. The Piedmont geology is underlain by hard igneous and metamorphic crystalline rock, which constitutes the hard basement strata underlying the surface soils. The Coastal Plain was formed by ancient erosion deposits from upland streams and tidal inundation. The sedimentary beds of the Coastal Plain fall within two groups, the Potomac Group of the Cretaceous and the Tertiary Group. The Potomac Group is a result of stream, river, and fluvial erosion, and deposition of sediments from the uplands. The Tertiary Group (marine formations) is a result of the alternating encroachment and retreat of ancient seas.

Two major north-south roads in the County (Interstate 95 and U.S. Route 1) were constructed over the prime aquifer recharge area. Because of this, large amounts of land within the recharge area are currently developed, with the remainder under continuing development pressure, causing ongoing challenges with the protection of the aquifer recharge area.

Topography/Hydrology

There are five (5) major watersheds (Aquia Creek, Accokeek Creek, Potomac Creek, Rappahannock River and Widewater/Chopawamsic Creek) within Stafford County (see Figure 3). In general, each drainage basin runs in a west to east direction across the County. The drainage basins are generally characterized by rough, steep terrain, except in the areas of the Coastal Plain where large floodplain areas exist. Each drainage basin has several sub-basins. It is important to maintain the natural flow of streams and drainage channels, not only to protect against sedimentation in streams, but also to protect existing development from the adverse affects of redirected water courses. The prevention of non-point source pollution is essential to the sustainability of existing and future development.

Approximately 5,394 acres of the County are covered by water, and the County has 51 miles of shoreline. The County currently has two drinking water impoundments, Abel Lake and Smith Lake. Abel Lake was created in 1970 and drains a watershed of 30.5 square miles. The lake impounds 1,304 million gallons of water and has a surface area of 185 acres. Smith Lake drains a watershed of 55.3 square miles and has a surface area of 141 acres. The lake impounds 957 million gallons of water. A third water impoundment is planned to be located on Rocky Pen Run, a tributary to the Rappahannock River. Other water bodies that provide valuable wildlife habitat throughout the County include Lake Curtis in Curtis Memorial Park, Willowmere Pond, and other small lakes that are located in residential subdivisions.

Soils

Stafford County's soils have a variety of characteristics which present both assets and limitations for development. To determine a soil's development potential, it should be analyzed in terms of its susceptibility to erosion, instability for building foundations, drainage limitations, and other environmental constraints. A soil's susceptibility to erosion is related to slope, vegetative cover, and soil composition. Its instability for building foundations is dependent on the subsurface materials, bedrock conditions, compressibility, shear strength, and shrink-swell capacity. Its drainage limitations are dictated by the soil's percolation capacity, topography, and proximity to surface and groundwater discharge.

An analysis of the County's soils according to engineering characteristics and the surface geological conditions was used to classify the County's soils into three categories: severe, moderate, and slight.¹ A 1988 environmental assessment revealed that 4.5% of the County soils had slight limitations, 46.8% had moderate limitations, and 48.7% had severe limitations. Soils with moderate to severe limitations are primarily located in the Coastal Plain areas of the County.

Groundwater

Approximately one-half of Stafford County residents rely on private wells recharged by groundwater supplies. The County's two public water supply impoundments also rely, in large part, upon groundwater recharge. Besides residential uses, commercial and industrial uses rely on groundwater to supply a portion of their needs. In many areas of the County, groundwater is the only feasible source of water.

Groundwater is generally recharged through water percolating through the soil or through direct re-supply by surface water in areas where groundwater aquifers outcrop at the surface. The quantity and quality of the water that reaches the groundwater aquifers depends on the amount and type of topography, vegetation, soils, land use, and underlying bedrock. The County considers groundwater protection important and has adopted a groundwater protection plan to address this challenge.

Wetlands

It is estimated that there are approximately 4,500 acres of tidal and non-tidal wetlands within Stafford County. According to the Stafford County Tidal Marsh Inventory prepared by the Virginia Institute of Marine Science, there are approximately 1,337 acres of tidal marsh in Stafford County. The Potomac and Accokeek Creeks account for 705 acres of tidal marsh, Aquia Creek for 420 acres, and the other tributaries of the Potomac River for the remaining 212 acres. Wetlands serve many important functions in the natural environment, such as providing flood

¹ Stafford and King George Counties, Virginia, Soil Survey. United States Department of Agriculture Soil Conservation Service. February 1974.

conveyance and storage, controlling sediment, filtering pollutants, serving as wildlife habitats, and providing a source of food for wildlife.

Forestland

In a 1985 report entitled "The Forest Resource of Stafford County", Stafford County had an inventory of 120,200 acres of forested land. It is estimated that the amount of forested land is currently 100,000 acres. The majority of the forested land is held by private landowners with varying parcel sizes. Approximately 21,876 acres of timberland is located within the Quantico Marine Corps Combat Development Command's (MCCDC) boundaries. Figure 4 identifies recent forestry activities (forest management plans, tree planting or tree harvesting).

As a natural resource, forests are an indispensable asset to the County and its residents. Stafford's forests consist of deciduous hard woods, mixed soft woods, and a vast number of pine forests. Forests produce clean air and water by filtering out pollution. Tree root systems prevent soil erosion. The forest canopy and leaf layer protect against runoff. Forested watersheds protect water quality and provide areas for the recharge of groundwater supplies. Trees provide safe nesting places and are a valuable food source for a variety of animal species. Forest areas provide excellent habitats for a number of wildlife species.

Wildlife

According to the Virginia Department of Game and Inland Fisheries, there are approximately 242 wildlife species known to exist in Stafford County. The number of species are listed by habitat as follows: wetlands - 101 species, beaches - 26 species, riparian zones - 90 species, water - 108 species, and urban areas - 80 species (Note: species may be cited in more than one habitat location). Protecting habitat and reducing impacts to habitat are important to protecting the diversity of wildlife within the County.

There are a number of Federal and State endangered species listed in the County (as identified on the Habitat and Farmland Map – Figure 5).² Although the Federal and State list were helpful in determining locations of some species, it is a limited survey of the entire County. Thousands of acres remain unexamined within the County. In order to provide a more accurate database, the County in cooperation with other agencies will need to conduct additional surveys.

As was mentioned in the introduction, Stafford County has established several management programs to address the impacts on natural resources. These management programs are directed toward the fundamental goal of improving or maintaining water quality which in turn benefits natural habitat preservation, water consumption, and recreation. There are also programs to manage direct inputs into waters, to control indirect sediment and stormwater inputs, and to protect natural systems to help improve water quality. While these programs have been an important step in protecting the County's natural resources and wildlife habitats, additional measures are needed to protect and preserve wildlife habitats.

² Virginia Department of Conservation and Recreation, Natural Heritage Program, 5/98.

Development Policies

COMPREHENSIVE PLAN ELEMENTS

Land Use Plan / Transportation Plan / Water/Sewer Master Plan

The primary purpose of the Land Use Plan is to manage and direct growth in an orderly fashion. The Land Use Plan established a Growth Area (see Figure 6), where more intense development should occur. More intense development should occur in areas where proper infrastructure is in place or will be in place and where there are slight environmental constraints. The Transportation Plan and the Water/Sewer Master Plan provide for the orderly expansion of infrastructure within the Growth Area. Future urban development is planned to occur within the Growth Area. However, not all areas within the Growth Area should be developed, due to environmental constraints. The County's Growth Area bisects the County and its watersheds. Intense development in the Growth Area could sever the migration corridors within the County's watersheds.

Shoreline Area Management Plan

A primary objective of the Shoreline Area Management Plan is to guide future growth and development in a way that minimizes its effect on environmentally valuable shoreline resources. Growth and development that is not properly managed may cause soil erosion, sedimentation, and other forms of non-point source pollution which will have a negative impact on shoreline area resources. The Shoreline Area Management Plan contains guidelines to reduce the damaging effects of development in shoreline areas while achieving a balance between development and the protection of shoreline resources and water quality.

The Shoreline Area Management Plan establishes a "Shoreline Management Area" which contains environmentally sensitive land features that play a role in preserving water quality. The Shoreline Management Area is separated into three distinct areas: Critical Resource Protection areas; Sensitive Resource Protection areas; and Land/Resource Management areas.

Critical Resource Protection Areas contain land features which must be protected, to the greatest extent possible. These areas contain the vital land features that are the most sensitive to the negative effects of development and contain ecologically significant resources which play a significant role in maintaining environmental quality. The Critical Resource Protection areas include rivers and creeks, tributary streams, tidal shorelines, tidal and non-tidal wetlands and buffer areas.

Sensitive Resource Protection Areas also contain land features that are to be protected, to the greatest extent possible. However, although these areas contain land features that are sensitive to the negative effects of development, these areas will continue to function effectively when limited non-intensive uses occur. Sensitive Resource Protection areas include the 100-year floodplain and steep slopes (>25%).

Land Resource/Management Areas contain environmentally sensitive land features which need to be protected from the potentially negative effects of development through sound environmental management. These land features include hydric soils, highly erodible soils and highly permeable soils that are contiguous to Critical Resource Protection areas. Development may occur in these

areas; however, it must meet specific performance standards designed to mitigate detrimental impacts on the environment.

The Shoreline Area Management Plan provides recommendations for the protection of sensitive environmental resources. These recommendations should be pursued to ensure a balance between development and environmental resource protection.

Ground Water Resource Protection Plan

The purpose of the Ground Water Resource Protection Plan is to assist the County in making land use decisions. The data, maps, and recommendations in the Plan provide a means to evaluate the impact of a development on the County's ground water resources and provide recommendations that mitigate any potential ground water degradation identified.

The Plan recommends the use of overlay designations. The purpose of the overlay is not to place undue restrictions on future development, but rather to support land use decision making by focusing data gathering and analysis efforts in those regions which are potentially most susceptible to ground water contamination. A further objective is to collect well data Countywide to support the evaluation of ground water resources as a possible supplement in responding to projected water supply shortfalls.

Regional Stormwater Management Plan

The Regional Stormwater Management Plan is part of a comprehensive stormwater management program for Stafford County. The program is intended to implement regulations for stormwater management (water quality control as well as flooding/erosion control) in a cost-effective manner. It also places the County in a favorable position to address potential state and federal regulations for stormwater pollution control.

A system of regional stormwater detention facilities (designed for water quality control as well as flooding/erosion control) is recommended in the Plan. At the present time, five watersheds have been studied for regional facilities. Additional studies are being developed so that the entire County is covered under the regional program.

Reservoir Protection Plan

In an effort to protect drinking water supply reservoirs, a Reservoir Protection Plan was completed by the County. Performance standards which address erosion and sediment control, non-point source pollution, minimization of mass earthwork, and the excavation and disposition of materials in watercourses are developed in the Plan. The standards also require revegetation of lands immediately upstream of water supply impoundments and restrict intensive land uses.

The standards require the establishment of a buffer zone adjacent to the water supply impoundment and those tributaries draining directly to the impoundment. Buffer zones are to have a width (possibly varying) large enough to provide protection of the water supply

impoundments. The Plan recommends that the storage and application of hazardous wastes, toxic materials and drainfields be prohibited in the buffer area.

Solid Waste Management Plan

The Rappahannock Regional Solid Waste Management Board (R-Board) was formed in 1988 to assist Stafford County and the City of Fredericksburg with solid waste management and disposal. The Solid Waste Management Plan developed by the R-Board focuses on providing a cost-effective, environmentally sound regional program that has the support of the participating communities and elected officials. The Plan emphasizes source reduction, reuse of materials, recycling and landfilling. Resource recovery is monitored and evaluated by the R-Board and will be evaluated when the Plan is revised.

ORDINANCES

Chesapeake Bay Preservation Area Ordinance

The State enacted the Chesapeake Bay Act regulations in 1989. The County first adopted a local ordinance in 1991, with revisions in 1992. Chesapeake Bay regulations implement many of the recommendations of the Shoreline Area Management Plan.

Under Chesapeake Bay regulations, the County has identified two types of resources for protection. Critical Resource Protection Areas (CRPAs) include perennial streams, any associated wetlands, and an undisturbed buffer landward of these resources. Land Resource Management Areas (LRMAs) include sensitive soils (highly erodible, highly permeable, and hydric soils) contiguous to CRPAs.

The aim of the program is to prevent any net increase in non-point source pollution of waterways which ultimately flow into the Chesapeake Bay. The program is implemented by reviewing development proposals on a site by site basis to determine the impact of a project's impervious cover in the watershed. If calculations indicate that a proposal will result in a substantial increase in impervious cover, and therefore a substantial increase in runoff, then the developer may have to take steps to offset the increase.

Flood Hazard Ordinance

The Flood Hazard Ordinance establishes three districts which limit development and protect flood prone areas within the County. The Floodway District, Flood-Fringe District and the Floodplain District regulate uses, activities and development which may cause unacceptable increases in flood heights, velocities and frequencies. The Ordinance also restricts or prohibits certain uses, activities and development from locating within areas subject to flooding.

Wetlands Ordinance

Stafford County adopted a local wetlands ordinance in 1972. The ordinance applies to tidal wetlands throughout the County. Tidal wetlands are defined as those lands between mean low water and mean high water and, where wetlands vegetation exists, one and one half times the mean tide range. Any development or activities within a tidal wetlands area requires a local wetlands permit. The purpose of the wetlands ordinance is to ensure that development occurs with a minimal impact on environmentally valuable tidal wetlands.

Typical development that has a potential impact on tidal wetlands are shoreline erosion control structures. Erosion is naturally occurring along the tidal waterways in the County. The bulkhead is the most common shoreline erosion control structure along the tidal shoreline in Stafford County. A bulkhead acts to harden the shoreline and minimize further erosion. Unfortunately, these structures along the shoreline result in loss of valuable wildlife habitat.

Erosion and Sediment Control Ordinance

The local Erosion and Sediment Control Ordinance requires an approved erosion and sediment control plan prior to any land-disturbing activity. The ordinance includes general criteria to control erosion and sedimentation due to land disturbing activities. The ordinance also addresses

permanent soil stabilization, vegetative cover, sediment basins, activities in water courses, sediment deposition, erosion and downstream damage due to increases in runoff.

Stormwater Management Ordinance

The County adopted a stormwater management ordinance in July of 1994. The purpose of the ordinance is to establish minimum stormwater management requirements which: protect the safety and welfare of County residents and businesses; reduce flood damage to property; minimize the impacts of increased stormwater runoff from new land development; maintain the adequacy of existing and proposed culverts, bridges, dams, and other structures; prevent an increase in non-point source pollution; maintain the integrity of stream channels for their biological functions and drainage; minimize the impact of development upon stream erosion; and preserve and protect water supply facilities from increased flood discharges, stream erosion, and non-point source pollution.

Zoning Ordinance/Subdivision Ordinance

Provisions in these ordinances provide some protection of natural resources. The Zoning Ordinance for Stafford County establishes minimum open space requirements for each zoning district. The ordinance also regulates maximum slopes permitted after development is complete. The ordinance protects natural resources from degradation by soil erosion and soil instability on slopes greater than 25 percent.

The Subdivision Ordinance allows for cluster subdivisions in some zoning districts. Clustering allows for design flexibility and cost reduction of smaller lot sizes in exchange for the protection of sensitive areas such as steep slopes and stream valleys, and the integration of open space and recreation areas into a development.

III. BENEFITS OF WILDLIFE PRESERVATION

Environmental Value

Preservation of wildlife habitats provides benefits to more than just wildlife. Preservation of these areas maintains air and water quality and controls acts of nature such as floods. Prime habitats for wildlife are located within riparian corridors. Preservation of these areas are multi-functional.

A riparian corridor is where the most diversity in wildlife is found. Due to this, it is of great benefit environmentally. A healthy stream is a requirement in a high quality wildlife habitat. Stormwater runoff may carry with it pollutants from suburban development. Pollutants such as fertilizer and motor oil degrade the health of streams. Adequate stream buffers provide greater nutrient and pollutant removal than conventional stormwater management structures.

Erosion will degrade the quality of a wildlife habitat. The existence of established tree stands and woody vegetation is vital in stabilizing stream banks and minimizing erosion. A shoreline with trees and established vegetation is much more likely to remain stable than a shoreline lacking them. Erosion causes sedimentation of streams which in turn detrimentally affects the riparian corridor.

Tree canopies help by shading streams, thereby keeping their temperatures stable. Drastic increases or decreases in water temperature may harmfully affect the biology of a stream.

Forest land within a riparian corridor helps to control flooding. Forest areas provide storage for flood waters and trees act to slow down the water velocities.

Every one mile of 100-foot buffer on the side of a stream provides approximately 24 acres of high quality wildlife habitat.³ As noted before, trees and other vegetation in wildlife habitats are a key component in pollution reduction. Vegetation traps and filters out atmospheric pollution and replaces it with oxygen. Also, harmful nutrients from fertilizers are filtered out of groundwater from surface waters.

Community Value

Wildlife habitat protection benefits a community. When wildlife habitats are preserved, the negative impacts of growth are less severe, recreational opportunities become more available, a higher quality of life is ensured for future generations, and rural character is maintained.

As the community continues to grow, development may encroach into prime wildlife habitat. This is apparent in northern parts of the County where development dominates the landscape and riparian corridors have been reduced. What often results is an overcrowding of wildlife that may result in unsafe interaction with humans. Preserving prime wildlife habitat can limit the crowding that leads to unsafe situations.

Recreational opportunities become available in habitat areas. Stream corridors are excellent locations for recreational greenways. New communities often include pedestrian/bicycle trails as

³ Brabec, E., "Value of Open Spaces." Scenic America Technical Information Series, Volume 1, No. 2. Annapolis, MD. 8p., 1992.

part of their master plan. Properly maintained, trails have little negative impact on habitat corridors. Recreational trails can also provide educational opportunities for school groups. As noted before, wildlife habitat can be utilized for hunting, fishing, photography and other recreation.

Wildlife habitat protection offers a higher quality of life for future generations. Maintaining adequate stream buffers ensures that future degradation will not occur. The damage resulting from over-developing is often not realized until several years later. The costs to preserve are much less than the costs to mitigate the effects once the damage has been done.

Economic Value

It is important to understand the economic value that wildlife preservation offers. Wildlife habitat can be an economic benefit to the developer, private landowner, and entire community.

Developer

In developing new communities, measures can be taken that will preserve wildlife habitat while at the same time, maintain economic viability for the developer. Developers have found that homes sited adjacent to forest and buffers can increase the value of a lot by 15 to 20 percent.⁴ Homeowners will pay more to have wildlife at their doorstep. Walking trails through wildlife habitat areas also provide an amenity that may promote the community. Developers can preserve sensitive habitats by clustering lots, and utilizing smaller street frontages and natural stormwater management systems. These techniques also reduce the development costs of a project since the amount of infrastructure has been reduced.

Property Owner

Agricultural landowners can benefit from timbering that meets forestry guidelines. Among agricultural crops, timber ranks as the highest in value according to the United States Department of Agriculture Forest Service.⁵ Land can be leased for access for hunting, fishing, photography, or field education. Properties in new subdivisions adjacent to wildlife habitat areas will likely maintain a higher resale value.

Community

Communities benefit economically from preservation of land for wildlife habitat. Recreational greenways within linear riparian corridors have several benefits in addition to wildlife protection. Pedestrian/bike paths promote tourism, provide alternative modes of travel, encourage eco-tourism, and provide a quality of life that attracts businesses to an area. Costs to the community are reduced by wildlife habitat. Adequate riparian forest buffers reduce the need for costly water treatment by filtering pollutants from the waterways. Forest buffers also help to minimize flood damage and the associated costs. The costs of traditional air pollution controls are staggering.

⁴ Brabec, E., "Value of Open Spaces." Scenic America Technical Information Series, Volume 1, No. 2. Annapolis, MD. 8p., 1992.

⁵ Thomas, M. G. and Schumann, D. R. 1993. "Income Opportunities In Special Forest Products - Self Help Suggestions for Rural Entrepreneurs." Agricultural Information Bulletin-666. Washington D.C. USDA Forest Service. 206

Vegetation traps and filters atmospheric pollution and helps to minimize the need for air pollution controls.

Migration Corridors/ Habitat Protection

In order to maintain a variety of wildlife, it is important to provide a climate that is conducive to its maintenance. Therefore, it is important to maintain large continuous tracts of vegetated area to accommodate a number of species of plants and animals. The abundance of the habitat within larger continuous tracts of vegetative area is dependent upon the surrounding land uses.⁶ Many species of plants and animals must have a certain micro-climate in order to exist. These micro-climates are so vital to the survival of certain species that certain minor changes, such as the installation of a sewer line, could disrupt the balance that is needed for species survival.

Animals move from place to place to search for food, to rest, and to mate. The paths that are taken are termed migration corridors or migration routes. Migration routes vary by species. Some animals migrate along riparian corridors, while others may venture out into open meadows. The process of fragmenting forest or vegetative areas with roads and development increases the chance of confrontation between man and animals.

Although it is important to maintain large continuous tracts of vegetation, it is difficult in areas with continuing growth pressures. With the construction of roads and increased development, forests become fragmented. As land area is transformed from a rural to an urbanized environment, overcrowding of wildlife results in the remaining open spaces. Hunting is not permitted in these areas and species such as deer become overpopulated to unhealthy levels. It is important to know the innate value of a forest prior to development. In knowing the value of the forest or vegetative areas, one can design to reduce the overall impacts on the forest, and thus protect a greater diversity of species.⁷

⁶ Duerkensen, C. J., et. al., "Habitat Protection Planning: Where the Wild Things Are." Planning Advisory Service Reports. American Planning Association. 11p.

⁷ Duerkensen, C. J., et. al.

IV. GOALS, OBJECTIVES AND STRATEGIES

Goal

Develop a plan that conserves migration corridors for animal species, critical forests, and riparian forest systems and take related measures to preserve the bio-diversity of plants and animals native to Stafford County.

Objectives and Strategies

1. *Develop protective measures for wildlife habitat corridors.*
 - a. Define major and minor migration corridors.
 - b. Identify potential migration corridors within the County.
 - c. Establish guidelines to protect migration corridors.
 - d. Monitor effectiveness of protection measures.

2. *Develop protective measures for sensitive plant and animal species.*
 - a. Identify sensitive plant and animal species.
 - b. Map sensitive plant and animal habitat within the County.
 - c. Map the linkages between sensitive plant and animal habitats and migration corridors.
 - d. Establish guidelines for protective measures.
 - e. Monitor the effectiveness of protection measures.

3. *Identify forest areas that have special value for wildlife habitat.*
 - a. Define special value areas.
 - b. Map special value areas.
 - c. Conduct quantitative analyses to document special value features.
 - d. Identify techniques to preserve the most sensitive special value areas.

4. *Establish habitat conservation practices for forest and wildlife habitat protection.*
 - a. Develop habitat conservation practices, for agriculture, silviculture, and land development.
 - b. Incorporate habitat conservation practices into County plans, policies and ordinances.
 - c. Encourage local organizations (HOA's, beautification committees, garden clubs, etc.) to help in restoration of habitat areas.

V. WILDLIFE HABITAT PROTECTION PLAN

Watershed Value

In evaluating the goal and objectives of the WHPP, it was determined that the County's watersheds encompassed the characteristics that are necessary in sustaining a wide range of wildlife habitats. The characteristics include contiguous forest stands, areas that provide special land features such as wetlands or buffered stream areas, continuous tracts of undeveloped land, and features necessary to support sensitive and endangered species. The County's key watersheds, depicted in Figure 3, include: Potomac Creek, Rappahannock River, Accokeek

Creek, Aquia Creek, and Chopawamsic Creek/Widewater Creek. Using the County's Geographic Information Systems (GIS) mapping, aerial photography, and field observations, each watershed was analyzed. Maps were developed identifying land features such as: location of endangered animal and plant species, developed areas, areas approved for future development, significant forest stands, contiguous forest stands and resource protection areas. Once the mapping was completed, each watershed was ranked in accordance with the importance of its wildlife habitat value into one of three categories. The categories are as follows:

Critical: 70% of the land in the watershed is undisturbed. Areas identified as having high potential for supporting endangered species and wildlife habitat. Areas having special land features and/or land value. (*Widewater Creek/Chopawamsic Creek*)

Highly Sensitive: 50 to 70% of the land in the watershed is undisturbed. Areas identified as having some potential of supporting wildlife habitat and endangered plant and animal species. Areas that have some special land features and/or land value. (*Potomac Creek, Rappahannock River*)

Sensitive: Less than 50% of the land in the watershed is undisturbed. Areas identified as being severely impacted by development. Areas having some potential to support wildlife. Areas in need of preserving existing Critical Resource Protection Areas (CRPA) and/or restoring impacted CRPA's. (*Aquia Creek, Accokeek Creek*)

Rappahannock River

The Rappahannock River forms the southern boundary of the County. It is one of the primary watersheds of the Chesapeake Bay. The Rappahannock River stretches across the state from the Bay west to the Blue Ridge Mountains. Much of the Rappahannock's riverfront is undeveloped. Approximately 60 percent of the watershed remains forested, 23 percent is open land or active farms, and 5 percent is covered by wetlands (Figures 7 & 8). The City of Fredericksburg gets its drinking water from the river. The City owns the riparian lands along the river west of Interstate 95. As a result, the land along the banks of the river has remained in its natural state and is abundant with wildlife. Public ownership of the land along the river will ensure that the wildlife habitat value remains high.

The Rappahannock River watershed within Stafford County is bisected by Interstate 95 and adjacent to the City of Fredericksburg. During the 1970's and 80's, much of the development occurred east of Interstate 95, across the river from the City. In recent years, much of the development has been occurring west of Interstate 95 along Warrenton Road. Development pressures presently exist in this area. An office campus and golf resort is presently being planned near the river. The County is presently planning its third public water reservoir along Rocky Pen Run, a tributary to the Rappahannock River. The proposed Outer Connector, a beltway around the Fredericksburg region, is presently being planned. This roadway may have a future impact on several migration corridors.

Proposed land use in the watershed concentrates much of the urbanized development along Interstate 95 and Warrenton Road. Future land use recommendations along these heavily traveled corridors consist of urban commercial, industrial and suburban residential. Land in the eastern portion of the watershed along King's Highway (with the exception of the industrially designated area along the rail line) and west along Warrenton Road near Fauquier County are proposed to remain mainly agricultural.

Since the watershed extends beyond the County's boundary and affects the hydrology for one hundred miles downstream, increased efforts in working with adjacent jurisdictions to implement preservation strategies are necessary to maintain the quality of the river. The County has actively participated in the Rappahannock River Watershed Planning Group, which includes jurisdictions that border the river, and area groups and citizens. The group is a result of the Rappahannock River Watershed Plan developed by the City of Fredericksburg. The group is given the task of providing input that results in beneficial water resources management along the upper Rappahannock River basin.

Potomac Creek

The Potomac Creek watershed is approximately 40,706 acres and spans the width of the County. Current aerial and satellite imagery identifies the Potomac Creek and Widewater Creek watersheds as the least developed areas of the County. The Potomac Creek watershed has over 66% of forestland, 24% of active or inactive farmland, and 7% of transitional or open bare land. The Potomac Creek drainage basin is affected by Long Branch and Potomac Run. Abel Lake Reservoir was built on Potomac Creek in the mid-seventies. The reservoir supplies southern Stafford with water and is an emergency source for the City of Fredericksburg. With the construction of the reservoir, development pressures exist along the reservoir's boundaries. The watershed provides a rich habitat of undisturbed land, with a variety of deciduous forest and open lands and a major tract of forested wetlands. Potential impacts from developments such as the

Stafford Regional Airport, the construction of a new interchange for the airport, and the construction of the Outer Connector will greatly change the development pattern in this area. The watershed and Abel Lake provide a rich habitat of undisturbed land, with a variety of deciduous forest and open lands, and account for a major portion of Stafford's forested wetlands.

An area of the Potomac Creek basin, known as Crow's Nest, has become of interest to the County. Crow's Nest is a peninsula between Potomac Creek and Accokeek Creek. The area contains approximately 3,800 acres of forested wetlands, tidal marsh, and mixed forests. Many species of plants and animals have been identified in this area. Although this area has remained virtually untouched over the years, it is not protected from development. Several hundred lots are platted on Crow's Nest but have not been developed due to environmental constraints such as steep slopes and poor soils (see Crows Nest map, Figure 11).

Currently, private funding sources are looking for ways to preserve and protect Crow's Nest from being developed. Development is limited due to topography and soil conditions. Crow's Nest is noted for its timber that remains totally unprotected. The rich timber crop that protects the vast plant life covering the forest floor remains defenseless to the threat of timbering.

Accokeek Creek

The Accokeek Creek watershed, like Potomac Creek, is contained entirely within the County. Approximately 62% of the watershed is forested; 12% is open land or agriculture and 4% is wetlands. Accokeek Creek and its tidal marshes form the northern boundary of the Crow's Nest Peninsula. The shorelines are somewhat similar, however the topography in the Accokeek Creek watershed is moderately sloped with fewer restrictions to development than in the Potomac Creek watershed.

The Accokeek Creek watershed is one of the most actively developing areas. Many of the areas identified on the map as agricultural areas have recently experienced or are currently under development (see Figure 12). The upper portion of the watershed to the west of I-95 is experiencing suburban residential development. Subdivisions such as Sheltons Run and Augustine

North, which includes an 18-hole golf course, are under construction. Augustine Central, consisting of urban residential development is being proposed within the watershed. Industrial and commercial development is occurring in the middle watershed area. This development is being spurred by construction of the Stafford Regional Airport and proposed upgraded I-95 interchange at Courthouse Road. A regional landfill is located in this area of the watershed. The lower end of the Accokeek Creek watershed is experiencing waterfront residential development along the tidal shoreline.

Much of the development within Accokeek Creek has occurred within close proximity of the water's edge, with limited riparian buffers and many of the intermittent streams having been piped (i.e. subdivisions, roads, stormwater management). Areas to the east remain practically undeveloped; however, with major interest in the Accokeek's waterfront increasing and the quick access to the Potomac River it provides for boaters, the Accokeek basin is becoming an area under increased developmental pressures.

Aquia Creek

The Aquia Creek watershed extends beyond the County's boundaries into Fauquier County. Aquia Creek's watershed was significantly developed in the mid-to-late eighties, as Stafford County became a prime locality for commuters to Washington, D.C. As depicted on the Land Cover map in Figures 14 & 15, the watershed is primarily developed. The County's portion of the Aquia watershed has approximately 25% of forest area, 11% open land or agriculture land and 2% in wetlands. The northern side of the Creek, which includes a portion of Quantico Marine Corps Base, has approximately 80% forest cover.

The majority of the Aquia Creek watershed is faced with extreme development pressures. The lower portion of the watershed, located east of U.S. Route 1, includes the tidal portion of Aquia Creek. This portion of the watershed has experienced residential development along the tidal shoreline due to the recreational opportunities available. The largest residential subdivision in Stafford County, Aquia Harbour, is developed along Aquia Creek and includes several man-made canals that offer its residents direct water access. Boating is a popular recreational activity in Aquia Creek and is served by a number of marinas. Waterfront development has included the construction of shoreline hardening structures such as riprap revetments and bulkheads. A development is proposed on the Widewater peninsula that will include single-family housing and amenities such as a marina and golf course. The general development plan proposes 60 percent open space within the development.

The middle portion of the watershed is one of the most intensely developed areas of the County. This area lies within the County's Urban Growth Boundary which allows for higher density developments. The proximity of this area to Interstate 95, US Route 1, and Garrisonville Road (State Route 610) has spurred this intense development. Commercial and residential developments exist and are proposed in this location. Older residential subdivisions include Vista Woods and Foxwood Village. Recent developments include St. Georges Estates, Austin Ridge, and Park Ridge. A neo-traditional neighborhood is being planned that will add an additional 1,500 dwelling units to the watershed. The water supply for this area of the County, Smith Lake,

lies within this section of the watershed. Garrisonville Road is a heavily developed commercial corridor. Service commercial establishments, strip centers, and offices are located along State Route 610.

Land uses in the upper portion of the watershed consist of rural residential subdivisions. The older subdivisions of Lake Arrowhead and Hidden Lake consist of one to two acre parcels. The recently constructed subdivisions, such as Windsor Forest, consist of a maximum of one lot per three acres. Several rural residential subdivisions have been constructed in this area as there is a high demand for large lots within close proximity to Interstate 95.

Widewater Creek and Chopawamsic Creek

The Widewater Creek and Chopawamsic Creek watersheds are located in the northern portion of the County. The northern portion of the Widewater area is bordered by Quantico Marine Corps Base. The Widewater Creek drainage basin remains totally within the County and has been slightly affected by development. Approximately 85% of the area is forested; 6% is agriculture and 2% is wetlands. Like the Potomac Creek and Accokeek Creek basins, the Widewater Creek watershed has not been developed. The area is currently heavily wooded (see Figures 16, 17, 18, & 19), which is supportive of sensitive habitats. Future developments may have a greater impact on the watershed. A plan to develop the Widewater Peninsula will add several hundred single-family homes and amenities such as a golf course and marina. To gain access to this secluded site, a parkway is being proposed from US Route 1.

The Chopawamsic Creek watershed is located north of Widewater Creek and includes a portion of Prince William County to the north. A majority of this watershed is on Quantico Marine Corps Base. The County encompasses only a portion of the watershed abutting Interstate 95. Approximately 85% of the area is forested and 5% is agricultural. Joint efforts between the Quantico Marine Corps Base and the County may help to protect the Widewater Creek and Chopawamsic Creek drainage basins.

VI. IMPLEMENTATION

This plan recognizes the need to preserve open spaces and forested areas. The migration corridors within the County generally coincide with perennial streams and their tributaries. Preservation of these migration corridors will benefit quality of life issues for County residents through support of agricultural and recreational activities such as hiking, hunting, fishing and nature observation.

This plan complements existing planning efforts. It has been developed to be incorporated as a component of the Comprehensive Plan. The Comprehensive Plan is the primary tool used by the County to direct and influence the future development pattern. Key components of the Comprehensive Plan that influence development and form County environmental policies include the following: Land Use Plan, Shoreline Area Management Plan, Ground Water Resource Protection Plan and Regional Stormwater Management/Reservoir Protection Plan. Current

development practices are governed by the Erosion and Sediment Control Ordinance, Stormwater Management Ordinance, Subdivision Ordinance and Zoning Ordinance.

Each plan and ordinance has specific policy recommendations or requirements. Plan recommendations are suggestive and ordinances are mandatory in nature. For the Wildlife Habitat Protection Plan to be effective, the recommendations should be followed. Implementation of any planning document is the most difficult and time consuming part of the planning process. Implementation starts with establishing goals and objectives and having them adopted as County policies. The goals and objectives may ultimately be translated into ordinances or development control policies. Implementation strategies may also be used to identify conflicting regulations or policies and suggest alternatives to meet the goals of the planning documents. A key factor is public involvement. Through public participation planning programs achieve a level of success, which is not possible through other means. Finally, identifying funding sources for future studies, property acquisition, informational programs and administrative functions influences the likelihood that a plan will be successfully implemented.

Stafford County is currently the second-fastest growing county in Virginia. As a result, the impacts that are occurring due to rapid development are apparent. Sediment deposits currently affect streams in the northern portion of the County. Stafford County recognizes the need to manage how development will affect the watersheds and the forests of the County. The implementation of this plan is a key catalyst in preserving, protecting and maintaining the natural environment of the County.

With implementation comes the responsibility of monitoring, evaluating and modifying the plan. In order for the plan to be effective, the County needs to monitor how the wildlife habitat is being preserved, how effectively corridors are being used, and what effect development has had upon habitat areas. The elements of a successful plan include continued study of resource areas, ongoing educational efforts on preservation practices, and a willingness to adapt to change. As development continues, it should be understood that there will always be impacts on the environment, but it is how development is integrated into the environment that is critical.

Development Regulations

Below are the implementation strategies including recommendations affecting development polices and ordinances. In order for these strategies to become polices and ordinances, they must be approved by Stafford County's Board of Supervisors. The polices mentioned below are primarily intended to complement established ordinances and development guidelines.

Zoning Ordinance:

- A. Allow clustering in all zoning districts. (*Cluster subdivisions currently are not permitted in A-1, Agricultural and A-2, Rural Residential Zoning Districts. This type of subdivision could allow for conservation of sensitive areas.*)
- B. Encourage clusters rather than penalizing the use of clusters. (*The Zoning Ordinance permits density and lot yield for cluster subdivisions based upon an adjusted net density.*)

Prior to a 1995 amendment to the Zoning Ordinance, developers were permitted to achieve density and lot yield based on gross density. Since enactment of the 1995 regulations, the number of cluster developments requested by developers has significantly diminished.)

- C. Extend floodplain requirements to include small streams.
- D. Establish standards to increase floor area ratio (FAR) and building height restriction where development provides increased protection measures adjacent to a designated habitat corridor.
- E. Provide flexibility for the location of required buffers/landscaping for properties in identified habitat corridors.
- F. Establish a Land Resource Management Area (LRMA) buffer.
- G. Promote tree preservation practices in new developments.
- H. Require that identified critical habitat areas be designated as open space for wildlife habitat preservation.
- I. Permit the use of existing vegetation for buffer requirements when properties are developed along designated wildlife habitat corridors.
- J. Reduce the impacts to high-value forest areas by creating standards which encourage reduction in grading requirements or utilization of retaining walls.
- K. Establish an overlay zoning district for sensitive resource areas. The overlay district could require developmental standard for densities and stormwater management, and require forest management practices.
- L. Establish minimum open space ratios, maximum disturbance limits, maximum noise and glare limits, and minimum contiguous landscaping standards.
- M. Establish an Agricultural/Forest Protection Zoning Overlay District.
- N. Encourage landowners to establish Agricultural/Forest Districts and promote/educate landowners on the Land Use property tax program.
- O. Require preliminary buffer delineations on conceptual Generalized Development Plans (GDPs).

Subdivision Ordinance:

- A. Amend cluster regulations to encourage open space contiguous to CRPAs, tributaries of CRPAs, and other sensitive areas.
- B. Reduce the requirement for useable open space where properties have significant areas that would be eligible for conservation or preservation.
- C. Provide a higher value credit for open space in floodplain areas.
- D. Allow innovative street design practices (such as reduction of right-of-way widths for streets and minimize requirements for street configuration) to reduce fragmentation of forest areas.
- E. Require that the proposed limits of clearing and grading for individual lots be shown on construction plans.
- F. Require the submission of an existing environmental conditions inventory plan. The inventory plan would depict wetlands, Chesapeake Bay Preservation Areas, steep slopes, forest areas, rare and endangered species habitat, and unique specimen(s) as defined in the National Tree Registry.

Erosion Control/Stormwater Management (SWM):

- A. Use vegetative buffers rather than pond structures for SWM measures.
- B. Evaluate reduction of orifice size in SWM ponds to cut down on velocity of water.
- C. Use water velocity dissipaters for development adjacent to identified corridors for protection.
- D. Establish escrow accounts for the use of riparian improvements in lieu of SWM ponds.
- E. Establish guidelines for conservation easements associated with SWM exceptions. *Such guidelines should include additional property landward of designated Critical Resource Protection Areas (CRPAs) and tributaries to CRPAs.*
- F. Establish procedures and standards for SWM exceptions for rural developments where conservation easements are recorded.
- G. Establish procedures and standards for SWM exceptions in suburban and urban areas utilizing conservation easements in designated areas.
- H. Develop standards and procedures which permit innovative SWM / E&S systems to enhance water quality.

Permitting:

- A. Consider requiring land clearing permits for silviculture activities, to the extent permitted by State Code.
- B. Establish a permit registry for timbering and/or clearing operations. This would provide an inventory of forest stands, understory vegetation, streams, and similar information.

Performance Measures:

- A. Establish guidelines for tree value by an ISA Certified Arborist or consulting forester.
- B. Develop a credit system for transplanting, preserving and replanting native vegetative species.
- C. Modify the General Development Plan requirements for Rezoning and Conditional Use Permit applications to provide a site disturbance plan, which provides a narrative description of the proposed grading and stabilization methods.
- D. Develop standards for Environmental Impact Statements to be submitted with Rezoning and Conditional Use Permit applications.
- E. Establish a Stream Assessment Index for analyzing streams and their value relative to applications for Rezoning and Conditional Use Permits.
- F. Consider developing buffer guidelines based on stream classification.
- G. Develop a landscaping plant list for the restoration of riparian buffers.
- H. Provide a means for developers to obtain credit or a reduction of landscape requirements if forest cover preservation practices are used to eliminate gaps in critical wildlife forest linkages.
- I. Utilize soft edge landscapes verses hard edge landscapes as a transition zone between development and the forest edge.

Development Guidelines:

- A. Assess the reduction of buffers and the impact upon them through permitted encroachments by utilities, roads, shoreline structures, etc.
- B. Recommend additional buffers where a proposed project would divide a natural wildlife/forest corridor.
- C. Examine preserving contributing areas which are or would include areas adjacent to designated wildlife/forest corridors.

- D. Develop land use incentives for the preservation of fringe areas.
- E. Require mitigation areas (on site or off site) for the encroachment into CRPAs.
- F. Discourage administrative waivers for encroachments into designated CRPAs.
- G. Develop guidelines to preserve “meadow” areas on lands adjacent to CRPAs.
- H. Promote construction measures such as arch culverts and bridge structures that minimize the amount of land disturbance and use of fill in stream crossings.
- I. Consider amending ordinances, policies, and petition the Virginia Department of Transportation to allow reduced right-of-way and pavement widths in designated wildlife habitat areas. Petition VDOT to use native plant species when replanting in fringe areas.
- J. Develop standards which locate utilities (water, sewer, gas, power, etc.) in a manner that minimize encroachment into sensitive areas and utilize native grasses and vegetation for restoration of disturbed areas.
- K. Require the use of appropriate Forestry Best Management Practices in identified sensitive species locations.
- L. Solicit input from the Virginia Department of Forestry or forestry consultants regarding large timber stands on property programmed for development.
- M. Encourage the use of innovative stormwater management facilities to minimize impacts to wetland buffer areas.

Monitoring and Maintenance

- A. Establish a monitoring program that will tabulate the amount of land disturbed each year, conduct regular site visits to monitor unauthorized disturbance of protected areas, and analyze the effectiveness of implementation strategies.
- B. Purchase computer software that will aid in evaluating the health and viability of the County’s depleting resources.
- C. Monitor the change in environmental conditions to determine the effect upon native species. Develop estimates on the effect upon wildlife species, plant species, and wildlife habitat due to the changes in land use.
- D. Study the viability of wildlife in existing forest tracts associated with undeveloped areas. Examine wildlife corridors in existing undeveloped areas.
- E. Study the viability of wildlife in the existing forest tracts associated with developed areas.

Public Participation

Citizen Involvement & Education:

- A. Permit non-official sources to recommend sensitive areas for conservation and preservation efforts (Audubon Society, Friends of the Rappahannock, Virginia Society of Ornithology, Ducks Unlimited, Sierra Club, etc.)
- B. Utilize citizen assistance in data collection for studies and inventories of environmental resources.
- C. Establish a citizen advisory committee to make recommendations regarding detailed studies to be conducted on a sub-watershed level.
- D. Establish and maintain a dialog with representatives of the land development industry to discuss incentives for conservation and preservation.
- E. Establish a buffer stewardship program for residents.
- F. Establish a Stream Re-leaf Campaign program to educate local nurseries to begin growing more native plant species that can be used replenish the areas native habitat.⁸

Funding Sources

Acquisition and Funding Opportunities:

- A. Utilize private donations for the acquisition of land, the acquisition of development rights, and the leasing of land for the preservation of Wildlife Habitat, Critical Resource Protection Areas and passive recreational areas.⁹
- B. Develop policies and ordinances to allow lease of development rights for properties that do not qualify for the Land Use Tax Program but are beneficial for meeting the goals and objectives of this plan.
- C. Determine target areas for wetland mitigation banks in conjunction with the US Army Corps of Engineers.
- D. Pursue grants to continue/expand/implement the goals and objectives of this plan.

⁸ Duerkensen, C. J., et. al., "Habitat Protection Planning: Where the Wild Things Are." Planning Advisory Service Reports. American Planning Association. 19p.

⁹ Duerkensen, C. J., et. al., "Habitat Protection Planning: Where the Wild Things Are." Planning Advisory Service Reports. American Planning Association. 19p.

- E. Pursue grants for streambank restoration projects to minimize long term erosion problems.
- F. Pursue private funding opportunities for future environmental inventories and studies.

Grant Programs:

Below are descriptions of several grant programs that may provide financial assistance to the County in achieving the implementation strategies of the Plan.

Conservation Reserve Enhancement Program (CREP) – The U.S. Department of Agriculture (USDA) Farm Service Agency administers this program which is designed to protect the State’s waters from the effects of excessive nutrients and sediments resulting from agricultural runoff. The goal of this incentive program for landowners is to establish forested and vegetated buffers in agricultural land that is along waterways.

Conservation Reserve Program - The USDA Farm Service Agency consolidates large blocks of land with undisturbed vegetation, creating areas where wildlife populations can breed and expand. The program encourages diverse covers of natural grasses and other plantings, with the specific aim of sheltering and feeding as great a variety of wildlife as possible.

Environmental Quality Incentives Program - Natural Resources Conservation Service (NRCS) Provides technical, financial and educational assistance in designated priority areas, with the resources targeted to livestock-related natural resource concerns and the remainder set aside for the significant conservation priorities.

Forestry Incentive Programs - Natural Resources Conservation Service (NRCS) Primary goal is to cooperate with landowners to encourage the development, management, and protection of non-industrial, private forest lands.

National Conservation Buffer Initiative - Encourages the use of conservation buffers by farmers, ranchers, and other landowners as a means of improving the soil, water and air quality while enhancing fish and wildlife habitat, and adding to the beauty and diversity of farms and ranches.

Open Space Lands Preservation Funds - Assists landowners with the cost of conveying conservation easements and purchase of all or part of the value of the easements.

Partners for Wildlife – This program, administered by the U.S. Fish and Wildlife Service, provides cost-share and technical assistance to private landowners to restore wetlands, streams, and some grasslands and forested areas to improve their use by wildlife.

Reforestation of Timberlands - Virginia Department of Forestry provides cost sharing assistance to landowners for pine restoration and management practices.

Riparian Forest Protection for Waterways Tax Credit – This program provides a state income tax credit to landowners whom abut waterways on which timber is harvested, but refrain from harvesting certain portions near the waterway for 15 years. The tax credit is an amount equal to 25 percent of the value of timber in that portion of the land retained as a buffer. The Department of Forestry sets the guidelines and monitors the program. The program is aimed at maintaining forested buffers and their associated water quality and wildlife habitat benefits.

Stewardship Incentive Programs - Virginia Department of Forestry or Farm Service Agency provides cost sharing for improved management of private forest land through multiple practices, including planning, tree planting, wildlife and fish habitat, recreation, riparian restoration, soil erosion control and forest improvements.

Urban Forestry Grants - Virginia Department of Forestry program designed to promote tree planting and the care of trees to encourage sustained urban and community forestry programs at the local level.

Urban Riparian Restoration Project - Identifying riparian buffer sites.

Virginia BMP Tax Credit Program - Commonwealth of Virginia cost-share program using state monies to encourage farmers and land owners to apply needed BMPs to their land to control sediment, nutrient loss, erosion, leaching, and inadequate animal waste management.

Virginia Coastal Resources Management Program Grants - Designed to promote watershed management and coastal habitat protection and restoration to manage impacts of development and to aid resource and program assessment and monitoring.

Wildlife Habitat Incentive Program - Natural Resources Conservation Service (NRCS) program for landowners who want to develop and improve wildlife habitats on private land. NRCS provides technical assistance and cost sharing to help establish and improve wildlife areas.

Wildlife Habitat Restoration - U.S. Fish and Wildlife Services provides cost share and technical assistance to private landowners to restore wetlands, streams, some grasslands, and forested areas to improve their use for wildlife.

VII. CONCLUSION

The Wildlife Habitat Protection Plan (WHPP) is to be an integral part of the County's Comprehensive Plan. As further studies and strategies are developed, the WHPP, in conjunction with other elements of the Comprehensive Plan, shall be augmented by changes to ordinances and development guidelines. The key element to the success of this Plan is the County's adherence to strategies that reduce developmental impacts to the environment and citizen involvement in the planning and information gathering process.

This Plan was developed to enhance the protection measures of the Chesapeake Bay Preservation Area Ordinance and provide additional developmental strategies for preserving and protecting inland plant and animal species and their habitat areas, while enhancing water quality. Recommendations for monitoring the areas identified on the Plan maps as Critical Resource Protection Areas and the continued studying of research data shall provide the County the means for tracking the effectiveness of the Plan.

The Plan identifies sensitive areas of varied importance in the County's efforts to maintain its planned development pattern. The areas of importance (critical forest coverage areas, open lands, agricultural areas, key forest linkages, and sensitive and endangered species) vary in each

watershed. Implementation strategies were developed to carry out the goals and objectives of this Plan. The success of the Plan weighs on the ability to amend the County's ordinances based on the implementation strategies and the development of design guidelines and performance measures.

A major portion of the plan depends on public support. The public will need to be informed of the importance of preserving critical forest cover, maintaining riparian buffers, and preserving open areas for native wildlife habitats. Future work to educate the public on voluntary programs accessible to landowners will broaden the support of the Plan. Businesses and corporations also need to be involved. They can sponsor local projects such as riparian buffer restoration or reforestation projects and receive a reduction in taxes for conservation efforts. They can participate in cost-share programs in conservation or restoration while receiving tax credits. Lastly, the implementation of this Plan will require financial resources. The financial burden of acquiring land for preserving critical areas is significant. Potential options include voluntary conservation, fee simple purchase of easements, modification of conservation easements, incentive base programs, and grants for acquiring wildlife areas.

This Plan has been a broad brush study, using GIS mapping, aerial photography, and some field observation. Further studies and research will need to be conducted within the critical areas to identify special land features, individual wildlife species, plant species, and special habitat components necessary to support entire wildlife communities. It will be important to obtain detailed data through other means such as: grants, research by local colleges, information supplied by environmental groups, and guidance from professionals practicing in the field. The County can also obtain information through the review of developmental projects. The County should continuously seek out programs that are supportive of this Plan.

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APPENDIX A – EXEMPTION

Any Property under negotiation for the purposes of conservation as of the date of adoption by the Board of Supervisors of the Wildlife Habitat Protection Plan shall be exempt from the effects of its implementation strategies for a period of six months.

At that time the status of the property will be reviewed and the exemption extended if it is still in the process of negotiation for purposes of conservation.

APPENDIX B – COMMON SPECIES LIST

Amphibian, Reptiles, Mammals

River Otter	<i>Lutra canadensis</i>
Beaver	<i>Castor canadensis</i>
Bull Frog	<i>Rana catesbeana</i>
Black snake	<i>Elapha obsoleta</i>
Copperhead	<i>Agkistrodon confortrix</i>
Gray squirrel	<i>Stuirus carolinensis</i>
Raccoon	<i>Procyon lactor</i>
White tailed deer	<i>Odocoileus virginianus</i>
Gray fox	<i>Urocyon cinereogentilis</i>
Red fox	
Gray tree frog	<i>Hyla versicolor</i>

Fowl

Hooded merganser	<i>Mergus cucullatus</i>
Red winged blackbird	<i>Agelaius phoeniceus</i>

Yellow crowned night heron
Prothonotary warbler
Bald eagle
Pileated woodpecker
Redcrested flycatcher
Ruby crowned kinglet
Grackle
White throated sparrow

***APPENDIX C - LAND COVER MAPS
(Unofficial)***

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- (1) Derived from 1995 infra-red digital ortho-photography with 1 meter resolution
- (2) Derived from 1990-93 satellite imagery with 30 meter resolution

Amphibian, Reptiles, Mammals

River Otter

Beaver

Bull Frog

Black snake

Copperhead

Gray squirrel

Raccoon

White tailed deer

Gray fox

Red fox

Gray tree frog

Lutra canadensis

Castor canadensis

Rana catesbeiana

Elaphe obsoleta

Agkistrodon contortrix

Sturges carolinensis

Procyon lotor

Odocoileus virginianus

Urocyon cinereoogreus

Hyla versicolor

Fowl

Hooded merganser

Red winged blackbird

Yellow crowned night heron

Prothonotary wabblers

Bald eagle

Pileated woodpecker

Redcrested flycatcher

Ruby crowned kinglet

Grackle

White throated sparrow

Mergus cucullatus

Agelaius phoeniceus