Part 3

Biodiversity Planning Issues

The previous section provided a survey of the landscape characteristics of the Holmes Run/Cameron Run watershed. This section examines factors that are likely to have a significant impact on biodiversity planning in the watershed. One broad category of issues is contained under the umbrella of habitat loss. Given the importance of riparian habitat in the watershed, water quality is a significant habitat issue. Upland habitat conservation and invasives management are also major habitat issues in this urban location. The other category of issues affecting biodiversity is water, land use, and natural resources policies. The discussion of policies focuses on resource protection areas (RPAs), environmental quality corridors (EQCs), open space strategies, and urban forestry efforts.

3.1 Habitat Loss

Native vegetative cover and wildlife habitat have been lost throughout the Holmes Run/Cameron Run watershed. Upland habitat has been especially impacted by development and impervious surfaces. What little upland habitat remains is therefore important. Upland impervious surfaces have impacted riparian and stream habitats by increasing the volume and pollution of runoff. Based on limited field surveys of the watershed and the first-hand accounts of local conservation specialists like Mark Kelly, City of Alexandria naturalist, and Todd Bolton of the Fairfax County Park Authority, invasive species dominate the understory throughout the watershed. The undeveloped land that remains in the watershed is mostly in stream corridors. Stream quality, upland habitats, and invasive species are discussed below.

3.1.1 Stream Quality and Biodiversity

Stream quality affects plant and animal habitats. For example, if trees are removed from stream corridors, stream temperatures will rise, killing many species that cannot survive in warm water. Nitrate- or phosphate-laden runoff from fertilizers promotes algal growth and limits habitats for macroinvertebrates. In discussions with NBII stakeholders, it was clear that water quality issues such as these are very important in the Holmes Run/Cameron Run watershed and that addressing water quality would be an essential part of any biodiversity planning efforts.

The quality of the water running in local rivers and streams is an important indicator of the watershed health. Protecting the quality of surface water is a major challenge for urban areas, particularly, since many, including Fairfax County and the cities of Alexandria and Falls Church, were highly developed prior to the establishment of water quality regulations. Provided below is a discussion of the water quality and biodiversity issues that affect the watershed.

It is useful to have some way to compare the overall health of Holmes Run/Cameron Run with the health of other stream systems in the Washington, D.C. metropolitan area. One such indicator comes from the Stream Protection Strategy (SPS) planning process undertaken by the

Fairfax County Department of Public Works and Environmental Services (DPWES). The SPS identifies protection goals and management recommendations for watersheds throughout the county based on current subwatershed development patterns, future imperviousness, and assessments of biological condition. The management categories developed are:

- Watershed Protection (31.5% of Fairfax County)
- Watershed Restoration Level I (7.2% of Fairfax County)
- Watershed Restoration Level II (61.3% of Fairfax County)

The Watershed Protection category contains the highest quality streams, and the management goal is to maintain that quality with preservation strategies. Watershed Restoration Level I streams are impaired, but considered worthy of restoration efforts based on estimated likelihood of success with reasonable expenditure of time and financial resources. Watershed Restoration Level II streams are impaired to the extent that restoration does not appear to be feasible at the present time. The goal for these streams is "to maintain areas to prevent further degradation and implement measures to improve water quality to support or comply with Chesapeake Bay Initiatives, Total Maximum Daily Load (TMDL) regulations and other water quality initiatives and standards" (Fairfax County Stream Protection Strategy, 2001). As noted in section 2.5.2, the county identified the Holmes Run/Cameron Run watershed as a Watershed Restoration Level II area.

To further understand the conditions affecting water quality in the watershed, pollution, imperviousness and flooding, and riparian forest buffer systems are discussed below.

3.1.1.1 Potential Sources of Environmental Pollution.

Point sources. Point sources of pollution are those that can be tracked to a specific discharge point. While pollution from point sources is often large in volume, it is easy to manage due to permitting procedures and accountability of specific parties. Point source pollution includes the effluent from factories, wastewater treatment facilities, and above ground and underground storage tanks. In the Holmes Run/Cameron Run watershed, point sources include Cameron Station, municipal landfill sites, and several industries. The Alexandria sewage treatment plant discharges into Hunting Creek.

Nonpoint sources. Nonpoint source pollution is pollution that originates from diverse sources such as atmospheric deposition, leaking automobiles, pet waste, and misapplied lawn fertilizers and pesticides. When these pollutants get swept up into stormwater runoff, their exact source is lost, and they become nonpoint source pollution. Nonpoint source pollution is a significant issue in the Holmes Run/Cameron Run watershed. It is a result of pollutants accumulating on impervious surfaces that are subsequently flushed into local waterways by stormwater runoff. The contributions of nonpoint source pollution to poor water quality become more apparent as point source discharges are reduced or eliminated.

Sedimentation. Sedimentation is one of the greatest water quality problems facing Fairfax County and the cities of Alexandria and Falls Church. Some of the sedimentation in the watershed comes from construction activities, but a substantial amount comes from streambank

erosion resulting from excessive stormwater flows caused by high amounts of impervious surfaces. Debris from intense storm scour drains into Holmes Run and its tributaries, blocking flow and impairing water quality. Dredging of sediments can be costly. Since 1961, approximately 400,000 cubic yards (yd^3) of sediment have been removed from Lake Barcroft at a total cost of more than $2 million (Stuart Finley, Lake Barcroft Watershed Improvement District, personal communication, 2002).

3.1.1.2 Impervious Surfaces

According to the Fairfax County DPWES, the Holmes Run/Cameron Run drainage contains some of the oldest and most highly developed areas in Fairfax County. According to the SPS report, the watershed has substantially degraded biological and habitat quality, and fish communities are limited in numbers. Many streams in the watershed have been altered to accommodate large volumes of stormwater runoff. Such alteration includes channelizing or straightening stream reaches in extensive areas and stabilizing banks with concrete, rip-rap, gabion baskets, or a combination of all three (Fairfax County SPS, 2001).

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots covered by impenetrable materials such as asphalt, concrete, rock, and stone. These materials seal surfaces, repel water, and prevent precipitation and melt water from infiltrating soils. In addition, soils compacted by urban development are also highly impervious. Increased watershed imperviousness adversely impacts water quantity, water quality, microclimates, habitat, and landscape aesthetics (Fairfax County SPS, 2001). The percentage of land area that is impervious is an indicator of urbanization's impacts on the hydrologic system.

Figure 23. Infill development in Alexandria

Habitat quality and biological integrity in stream systems is significantly impacted when an area's percentage of impervious surface reaches 10 to 20% (Schueler, 1994). (See Figure 24.) Decades of development have transformed the Holmes Run/Cameron Run watershed from a natural area into a highly urbanized place with imperviousness ranging from 23% to 41%. (See Figure 10.)

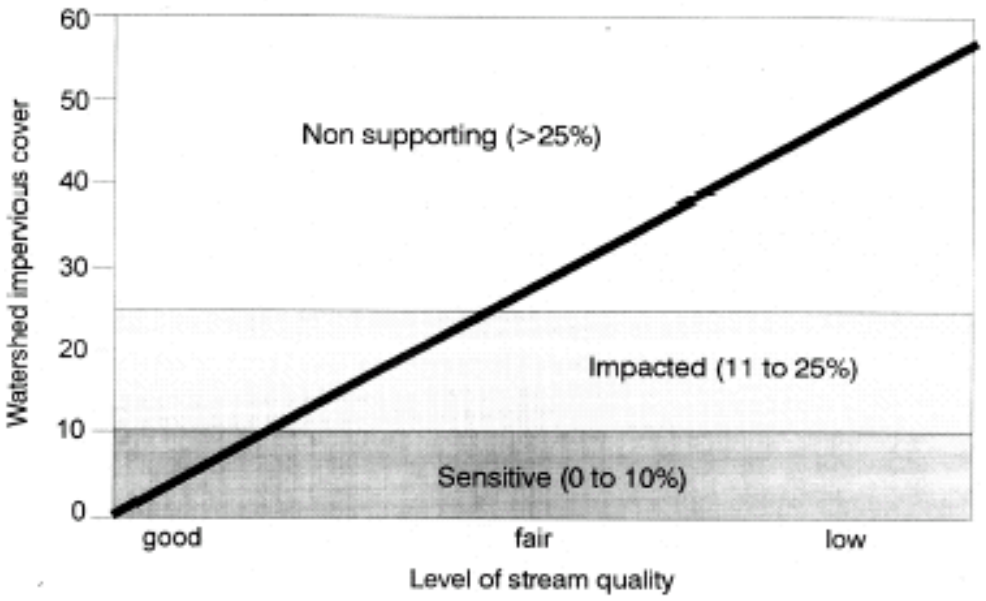

Figure 24. Schueler's Simple Model

The southeastern portion of Holmes and Cameron Runs is more developed. This includes the area of Old Town Alexandria, 41% of which is impervious surface (Bell and Champagne, 2000). As one proceeds upstream to the Fairfax County and Falls Church jurisdictions, the watershed is still highly developed, although it is more residential and less dense than the southeastern portion. Fairfax County indicates that areas with 35 to 50% impervious surfaces will lead to 30% runoff potential, 20% shallow infiltration, and only 15% deep infiltration of rainfall events. This contrasts with natural ground cover which allows for 25% deep and shallow infiltration and a runoff potential of only 10% (Fairfax County, 2001b).

3.1.1.3 Flooding and Flood Control

In urban areas, increased volume of runoff due to increased impervious surfaces is coupled with an increased speed of water across concrete, which has a lower coefficient of friction than natural ground cover. When rain events occur in urbanized areas, more water is traveling more quickly through storm sewers to streams, compared to areas with higher levels of natural ground cover. In addition, developed land adjacent to the stream restricts the stream from naturally changing its shape in order to accommodate fluctuations in flow. Streams are often reduced in size, piped, or placed in culverts to make room for development. Development within the floodplains of urbanized areas is more prone to flooding during severe rain events.

Frequent flooding from storm runoff from 1960 to 1970 resulted in over $40 million in damage in Holmes Run/Cameron Run watershed. Figure 25 shows the proximity of Holmes Run development to the streamside. Many current buildings are near or within the floodplain areas.

Cameron Run and lower Holmes Run are now maintained as flood control structures and are dredged periodically to remove accumulated sediment that may impede the flow of water. This has the effect of removing vegetation and destroying some habitat. Public debate over dredging in May of 1997 led to the flora and habitat survey described in section 2.6.2.2 (Simmons, Tice, and Strong, 2001). The authors of the study determined that no significant adverse effect on habitat would result from dredging. In fact, beneficial removal of exotic species was predicted to be an outcome. This study has led to the development of a maintenance plan that includes differential treatment for designated zones in the stream corridor. The intent of this plan is to minimize impacts on plant and animal habitat while still protecting adjacent land from flooding.

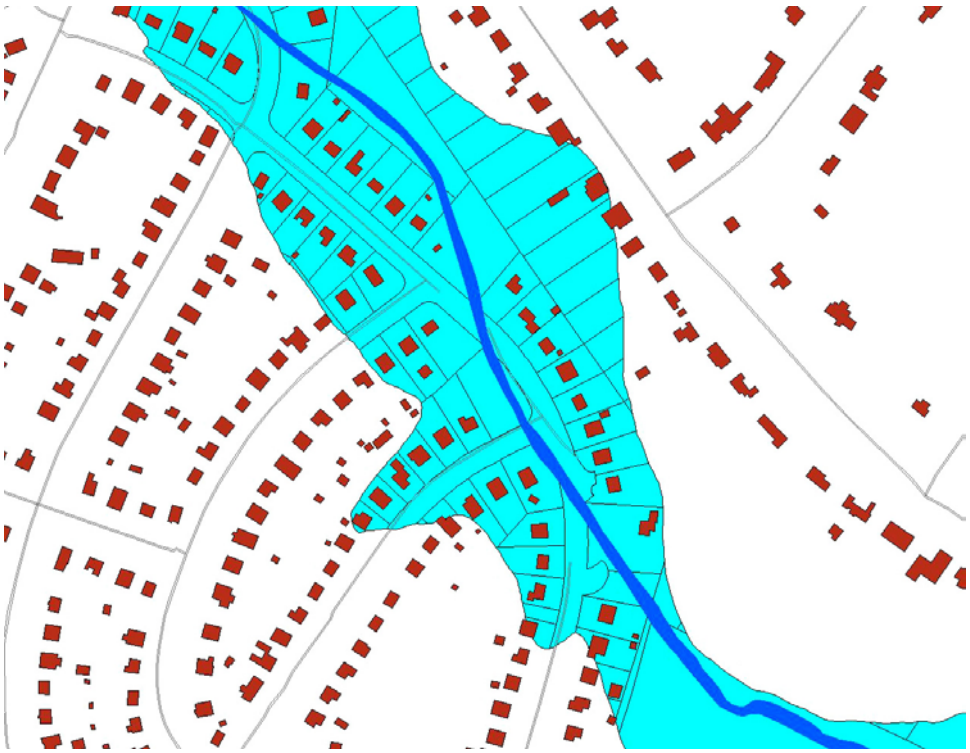

Figure 25. Floodplain development in Holmes Run just upstream from Lake Barcroft

3.1.1.4 Riparian Forest Buffer Systems

The USDA Forest Service defines a *riparian area* as: "the aquatic ecosystem and the portions of the adjacent terrestrial ecosystem that directly affect or are affected by the aquatic environment. This includes streams, rivers, lakes, and bays and their adjacent side channels, flood plain, and wetlands. In specific cases, the riparian area may also include a portion of the hillslope that directly serves as streamside habitats for wildlife." Riparian forest buffer systems are forests that are characterized as linear areas that are clearly defined and provide a transition between aquatic

and upland environments within the riparian zone (Palone and Todd, 1998). These areas play a role in protecting water quality and supporting biodiversity.

Riparian forest buffer systems are widely recognized for their ability to reduce nonpoint source pollution. Nitrate removal is facilitated by these buffers due to plant uptake, rhizoidal microbial denitrification, and the removal of surface-borne pollutants due to soil filtration. Tree shading alongside stream corridors regulates the water temperature and light penetration, maintaining an oxygen-rich environment for aquatic wildlife. Habitat diversity and complex food webs are supported when riparian terrestrial communities interact with the aquatic environment. In addition, these buffer areas create space for natural channel morphology and provide an area for floodwater.

Large protected areas like Dora Kelly Nature Park and the Winkler Botanical Preserve provide critical riparian habitat. However, the dense development and value of land for future development endangers the future of smaller-sized riparian forest buffer systems that still exist throughout the watershed. See Figure 20 for a comparison of forest cover, RPAs, and parkland.

Figure 26. Riparian buffer in lower Cameron Run

3.1.2 Upland Habitats

There is little undeveloped upland habitat in the watershed. This is evident from the maps of vacant land (Figure 17) and land cover (Figure 12). Conservation lands are concentrated in the riparian corridors (Figures 3 and 18). According to Michael Knapp of the Fairfax County Urban Forestry Division (personal communication, April 2002), the lack of protection for upland habitats represents a gap in the county's conservation strategy. The upland areas are prime development land in a region that has experienced high levels of growth for many decades. Riparian areas have been easier to protect because they are not the most suitable areas for development. The upland patches that do exist are small and fragmented. As a result, opportunities for wildlife requiring upland habitats are limited.

3.1.3 Invasives Management

Invasive exotic species dominate the ground plain and shrub layer flora of undeveloped land throughout the Holmes/Cameron Run watershed (Figure 27). This observation was made in limited field reconnaissance conducted in April 2002, and it is supported by the observations of the City of Alexandria naturalist, Mark Kelly, and Todd Bolton of the Fairfax County Park Authority. The finding was not surprising considering that most urbanized watersheds support significant populations of invasive species (e.g., Godefroid, 2001). The Simmons, Tice, and Strong (2001, 1) survey of Cameron Run found "extensive colonies of invasive exotic plants, such as porcelainberry." Non-native vegetation has become a significant part of the urban ecosystem, and urban biodiversity efforts must address the difficult task of invasives management.

Figure 27. Bamboo understory in Holmes Run floodplain

While many exotics "invade" available urban ground, most are intentionally planted in yards and public spaces. According to Westbrooks (1998, 4):

> Many introduced plants appear innocuous when first introduced; these plants then adapt and, in the absence of their co-evolved predators, explode in their new environments. Many introduced plants that appear to pose no obvious threat to native ecosystems at this time could become invasive in years to come. Often by the time an invasive species is recognized as a major problem in a new area, it is well-established and difficult or impossible to eliminate.

The 50-acre Dora Kelly Nature Park is one of the most noteworthy natural areas in the Holmes Run/Cameron Run watershed (located near the Alexandria's border with Fairfax County). Invasives management is proving to be an insurmountable task, according to the park's naturalist, Mark Kelly (personal communication, April 2002). According to Kelly, the park has made several attempts at physical removal of plants using volunteers, but their success has been very limited. A new strategy being considered is to maintain "patches" of native habitat within the park rather than trying to keep the entire park free of invasive plants.

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3.2 Conservation Strategies

A review of the local governments' policies affecting natural environment is found below. First, local regulations and strategies created in response to Chesapeake Bay regulations are considered. Next, environmental goals as stated in local planning documents are reviewed and strategies for open space, habitat, and tree cover are considered.

3.2.1 Compliance with Chesapeake Bay Regulations

One thing that Fairfax County and the cities of Falls Church and Alexandria have in common is the need to comply with environmental regulations protecting the Chesapeake Bay. Designation of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) and regulation of development within these areas have been undertaken by each local government in the Holmes Run/Cameron Run watershed. Development limitations imposed on RPAs and RMAs have resulted in protection of riparian corridors in the watershed which provide a substantial percentage of remaining natural habitat in Holmes Run/Cameron Run.

3.2.1.1 Fairfax County

In Fairfax County, protection of stream corridors began in the 1980s. Poor water quality and flooding became a countywide problem in the 1970s as the county became more developed. To improve water quality, Fairfax County implemented best management practices (BMPs) in the 1980s that consisted of low-density residential zoning and the creation and/or maintenance of vegetation stream buffers for its most threatened watersheds. By 1993, the BMPs were

implemented countywide with the designation of stream corridors as RPAs (www.geog.umd.edu/resac/northernva.htm).

The county's performance criteria for RPAs and RMAs indicate that any use, development, or redevelopment of land in the Chesapeake Bay Preservation Areas (CBPAs) must not disturb more land than necessary, must preserve indigenous vegetation to the maximum extent possible, and must minimize impervious cover. In addition, the Director of Planning and Zoning must approve maintenance agreements for best management practices (BMPs). With the exception of development restrictions in floodplains and the RPAs, there are no other areas where development is prohibited (Noel Kaplan, Fairfax County, personal communications, 2002).

3.2.1.2 City of Alexandria

In 1992, the City of Alexandria adopted a Chesapeake Bay Preservation Ordinance (CBPO) to prevent increases in nonpoint source pollution from new development and to reduce nonpoint source pollution by at least 10% during redevelopment. In accordance with the guidelines established by the Chesapeake Bay Preservation Area Designation and Management Regulations, the City mapped CBPAs and adopted a Chesapeake Bay Preservation Area Overlay District in 1992. All land within the corporate limits of Alexandria is designated a CBPA.

Compliance with the Chesapeake Bay Preservation Act has resulted in similar regulations concerning RPAs and RMAs in each of the jurisdictions of the Holmes Run/Cameron Run watershed. Therefore, the details provided below for Alexandria are similar to regulations in Fairfax County and the City of Falls Church.

The following land areas are classified as RPAs: tidal wetlands, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, tidal shores, tributary streambeds (not owned by the Commonwealth of Virginia), and buffer areas 100 feet in width for the previously mentioned categories. In most instances, these lands are not available for new development, with the exception of land that is water dependent and permitted in the underlying zone. Redevelopment is allowable in RPAs if authorized in the underlying zone (City of Alexandria Master Plan, Water Quality Management Supplement, 2001).

The uses permitted within an RPA (if not prohibited by another provision of city code and if they do not require development, redevelopment, structures, grading, and fill draining or dredging) include conservation or preservation of soil, water, vegetation, fish, shellfish and other wildlife. Passive recreational activities such as, but not limited to, fishing, bird watching, hiking, boating, horseback riding, swimming and canoeing; educational activities, scientific research and nature trails; and historic preservation and archeological activities are also permitted.

There are performance requirements for development and redevelopment of RPAs. Development or redevelopment in RPAs must not disturb more land than necessary, should preserve indigenous vegetation as much as possible, and should minimize impervious cover. Proposed development must comply with the Erosion and Sedimentation Control regulations in the city code. An RPA buffer must achieve 75% reduction in sediments and 40% reduction in nutrients. Buffer reduction to 50 feet is allowable if BMPs meet these conditions. However, a

100-foot buffer is adequate for meeting the standard. Trees can be pruned for sight lines but they must be replaced with other vegetation sufficient for retarding runoff, preventing erosion, and filtering nonpoint source pollution—this will be approved by the city arborist. In addition, any constructed path must control erosion. Finally, a 100% impervious redevelopment site must be restored to its original vegetated open space at a minimum of 20%.

Unlike Fairfax County and the City of Falls Church, all lands in Alexandria that are not RPAs are RMAs, since all of Alexandria drains through natural or manmade channels to the Potomac River. Development and redevelopment within the RMAs must meet several performance criteria to minimize impacts of water quality. They include preventing an increase in nonpoint source pollution, based on a citywide average, decreasing nonpoint source pollution by 10% during redevelopment, minimizing land disturbance during redevelopment, maximizing the preservation of native vegetative cover, and minimizing impervious surfaces for the desired land use. In addition, the ordinance requires that a 100-foot vegetated buffer area must be preserved along all RMA features and tributary streams and, in some cases, reestablished if one does not presently exist or is in poor condition.

The city's stormwater management policy requires compliance with a state or locally implemented program of stormwater discharge permits. On-site BMPs shall be used and improvements to existing structures must not degrade the quality of the surface water. All development projects are required to submit a site plan, environmental site plan, landscape plan, stormwater management plan, erosion and sediment control plan and an impact assessment on water quality is required for all RPA developments.

According to the Watershed Program Manager for the City of Alexandria, the city's 1992 adoption of the Chesapeake Bay Program has resulted in some of the main land use policies affecting open space, forest cover, and wildlife (Bill Hicks, personal communication, 2002). For example, short and long-term initiatives found in Alexandria's Water Quality Report, summarized below, directly concern natural habitat and open space.

> The City [of Alexandria] will examine the feasibility of establishing a minimum percentage of vegetated space to satisfy the City's current open space requirements by 2003. The aim is to promote infiltration of stormwater into the soil and reduce stormwater runoff.
>
> Cluster development will be considered to avoid or minimize the impacts of redevelopment on sensitive natural areas.
>
> The City plans to restore degraded wetlands for wildlife habitat over the next five years. It will also identify, characterize, and map significant natural habitat areas including stream valleys and isolated groves. The City will also develop an evaluation procedure for dealing with conflicts between erosion and flood control management and Chesapeake Bay preservation and wildlife habitat. The City will develop stream specific maintenance plans that try to minimize the impact on the environment and wildlife habitat including minimizing the use of herbicides for clearing vegetation. Development of these plans will be done in consultation with the Chesapeake Bay Local Assistance Department to ensure that it is compatible with the Chesapeake Bay Preservation Area Designation and Management

Regulations. All of these initiatives are anticipated to be completed by 2003. Alexandria also intends to examine the feasibility of culvert design that includes a raised concrete area for small animals to traverse new or reconstructed City roads. This effort is being considered to reduce the amount of additional habitat fragmentation resulting from new road projects. (City of Alexandria Water Quality Report, 2001).

3.2.1.3 City of Falls Church

The City of Falls Church mapped CBPAs and adopted a Chesapeake Bay Preservation Area Overlay District as part of the city's zoning ordinance. The CBPAs were delineated according to criteria established by the Chesapeake Bay Local Assistance Board. If the CBPA boundaries include a portion of a lot, parcel or development project, the entire area must comply with the city's ordinance. The criteria establishes rules that local governments can use in granting, denying, or modifying requests to rezone, subdivide, or use and develop land in the RMAs and RPAs. Implementation of the criteria is achievable through use of performance standards, BMPs, and various planning and zoning concepts (City of Falls Church Comprehensive Plan, 1997). The RPA designation within Falls Church includes 100-foot vegetated buffer areas located adjacent to Tripps Run and Four Mile Run. In most instances, development on these lands is restricted.

Floodplains, highly erodible soils, including steep slopes, and highly permeable soils in the City of Falls Church are designated RMAs. The city established a floodplain district as part of the zoning ordinance in 1982. The ordinance restricts or prohibits certain uses, activities and development from locating within districts subject to flooding. The ordinance also regulates uses, activities, and development that, alone or in combination with existing or future uses, will cause an unacceptable increase in flood heights, velocities, and frequencies (City of Falls Church, Comprehensive Plan, 1997).

Recently, Falls Church received a grant from the Chesapeake Bay Local Assistance Board to create a database of all BMPs in the city. Funds will also be used to clarify the city's existing Chesapeake Bay Ordinance and to expand their CBPAs, RMAs, and RPAs. In particular, RMAs will have citywide restrictions on impervious surfaces based upon best management practices.

3.2.2 Other Local Government Policies Affecting Biodiversity

This section summarizes the planning processes and land use goals that are not directly related to the Chesapeake Bay Preservation Act. The focus of discussion is on environment strategies like Fairfax County's Environmental Quality Corridors (EQCs), tree cover protection measures, and open space preservation. Each of these strategies has the potential to improve biodiversity in the watershed by affecting the amount and quality of habitat.

3.2.2.1 Fairfax County

A large portion of the Cameron/Holmes Run watershed lies within Fairfax County. The county's environmental quality corridors, Chesapeake Bay Ordinance, and its planned initiatives from the 1999 Infill and Residential Development Study have enhanced and will continue to enhance

wildlife habitat, water quality, and open space (Noel Kaplan, Fairfax County Planning and Zoning, personal communication, 2002).

The Fairfax County Comprehensive Plan consists of the Policy Plan, four Area Plans, a plan map and a transportation plan map. It contains goals, objectives, and policies for land use, transportation, housing, environment, heritage resources, public facilities, human services, and parks and recreation. The plan serves as a guide for planning and development by describing future development patterns in the county and protecting natural and cultural resources for present and future generations (Fairfax County Comprehensive Plan, 2000).

The environmental element of the Policy Plan provides guidance for achieving a balance between protecting the environment and planning for the orderly development of the county. The Policy Plan aims to protect and preserve remaining resources, rehabilitate degraded environments, and provide visual relief in the form of natural vegetation between adjacent and sometimes incompatible land uses. Some of its policies include the minimization of fertilizers, pesticides, and herbicides to lawns and landscaped areas through, among other tools, the development, implementation, and monitoring of integrated pest, vegetation, and nutrient management plans.

Environmental policy primarily focuses on the identification and protection of Environmental Quality Corridors (EQC) and other ecologically valuable land and surface waters; conservation and restoration of tree cover; and avoidance or minimization of environmental hazards such as unstable soils, gas and petroleum pipelines, and flood hazards.

Environmental Quality Corridors. Fairfax County defines "open space" as parks, conservation areas, private open space, and vacant land. In the county, open space has declined by more than 30% from 1975 to 1995. In recognition of the fragmentation of remaining ecologically significant land, the continued loss of open space, and the corresponding loss of environmental resources, Fairfax County is committed to identifying, protecting and enhancing an integrated network of ecologically valuable land and surface waters. This involves adding land to the Environmental Quality Corridor (EQC) system, the core of which is the county's stream valleys. Lands achieving the following purposes that may be included within the system are those that: (1) have a desirable or scarce habitat type or host species of interest, (2) provide connectivity for the movement of wildlife, (3) separate land uses, providing passive recreational opportunities, (4) induce significant reductions to nonpoint source water pollution, and/or (5) affect microclimate control, and/or reductions in noise. Additions to stream valleys shall be selected to augment the habitats and buffers provided by the stream valleys and to add representative elements of the landscapes that are not represented within the stream valleys (Fairfax County Comprehensive Plan, 2000). The core stream valley EQC is defined in Figure 28. It includes:

- All 100-year floodplains,
- All areas of 15% or greater slope adjacent to the floodplain or, if there is no floodplain, beginning within 50 feet of the stream channel
- All wetlands connected to stream valleys
- All land within a corridor defined by a line 50 feet plus 4 feet for each percent slope measured from the stream bank

Another policy preserves the integrity and the scenic and recreational value of stream valley EQCs when locating and designing stormwater detention and BMP facilities. The most recent additions to the policy apply low-impact site design techniques to reduce stormwater runoff volumes and peak flows, to increase groundwater recharge, and increase the preservation of undisturbed areas for new development and redevelopment. Objectives associated with this policy include:

- Minimizing impervious surface created, and cover associated with driveways and parking areas
- Encouraging tree preservation, cluster development, and the preservation of wooded areas and steep slopes adjacent to stream valley EQC areas
- Using protective easements in areas outside of private residential lots as a mechanism to protect wooded areas and steep slopes
- Maximizing the use of infiltration landscaping within streetscapes

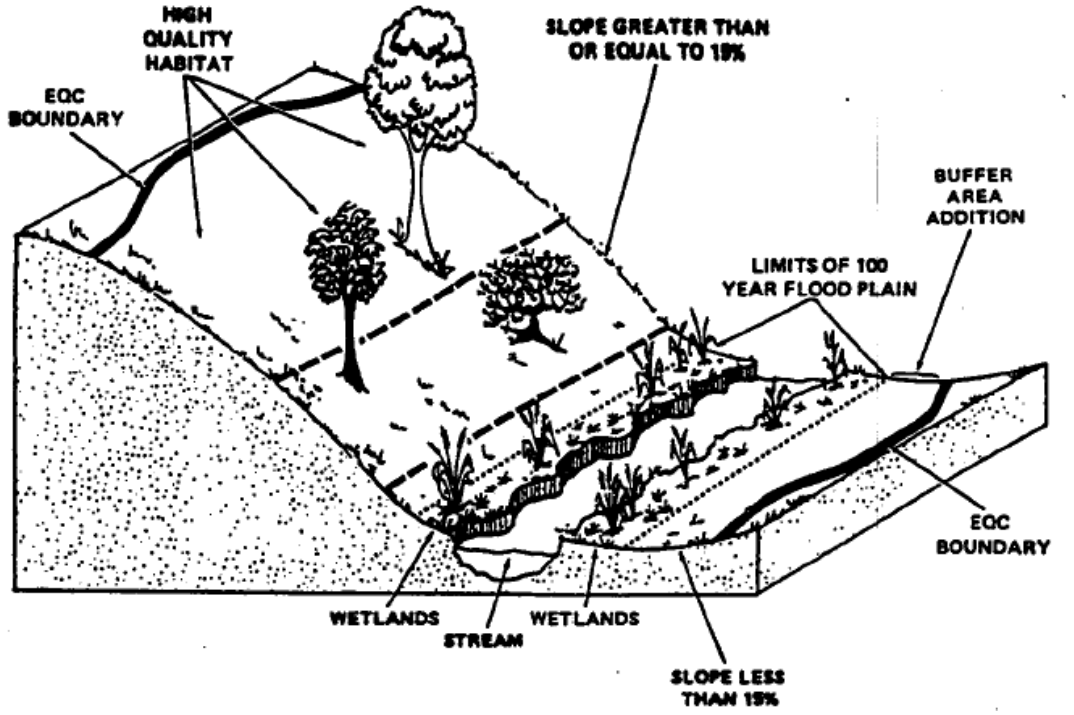

Figure 28. Fairfax County's Stream Valley Environmental Quality Corridor (EQC)

A final EQC policy provides preservation incentives while protecting the integrity of the EQC system and allows density transfer from the EQC portion of developing sites to the less sensitive areas of these sites. The increase in effective density on the non-EQC portion of a site is proportional to the percentage of the site preserved. In addition, overall site yield will decrease as site constraints increase. The policy requires maximum density according to a simple mathematical expression based upon the ratio of EQC land to total land. This policy and other plan policies ensure that impact density does not supersede other compatible land use policies (Fairfax County Comprehensive Plan, 2000).

Policies Concerning Open Space. Fairfax County's tree cover policy consists of the conservation and restoration of tree cover on developed and developing sites and provision of tree cover on sites where it is absent prior to development. The objectives of this policy are listed below.

- Protect or restore the maximum amount of tree cover on developed and developing sites consistent with planned land use and good silviculture practices
- Require new tree plantings on developing sites that were not forested prior to development and on public rights-of-way

In addition to the EQCs and tree cover policies, several recent and ongoing planning studies also have the potential to affect biodiversity in Fairfax County. In 1999, county staff developed recommendations to improve residential infill as directed by the Board of Supervisors and Planning Commission. Residential infill is residential development that occurs proximate to or within already established neighborhoods. Issues addressed in the report include compatibility, traffic, tree loss and stormwater management. Fairfax County is concerned about the nature and location of new residential development characterized by larger and taller homes on smaller lots in comparison to homes built during the first phase of suburbanization (Infill and Residential Development Study, 1999). Individual staff recommendations are currently being fleshed out (Noel Kaplan, Fairfax County Planning and Zoning, personal communication, 2002)

In the summer of 2002, public hearings were held about three comprehensive plan amendments relating to open space and water quality. They addressed open space/conservation easements, residential development criteria, and water supply and facility projects. The amendments are currently in various stages of final approval.

3.2.2.2 City of Alexandria

Some of Alexandria's environmental strategies that pertain to open space and tree cover are listed below.

1. Catalogue and inventory all open land for public use and prioritize properties classified for public use.
2. Protect shorelines that are only to be modified in conformance with guidelines established by the city, state or federal governments to prohibit erosion, sedimentation, and adverse visual impacts. Docks and piers should be limited and their use controlled.
3. Map and preserve woodlands throughout the city and plant a variety of trees most suitable to the climate and soil of the area.
4. Maintain a citywide forestation program including street trees.
5. Encourage property owners and developers to preserve existing trees and vegetation.
6. Coordinate city policies with adjoining counties, the Corps of Engineers, state governmental agencies, U.S. Environmental Protection Agency and other federal agencies, Chesapeake Bay Coalition, etc.

The intensity of development in Alexandria means that public parks are one of the most important tools for achieving "open space" and natural habitats. The preservation and

augmentation of passive and active parkland throughout the city and its integration among other land uses is identified in two of the city's five master plan goals.

Park and recreation objectives include:

1. Providing a park within walking distance to every resident and developing a park/stream valley system to provide continuous linkage and access,
2. Protecting lands used for park and recreational purposes by creating public open space and community recreation zones,
3. Encouraging city beautification—trees or other flora,
4. Encouraging developers to incorporate open spaces in nearby developing areas targeted for dense residential and commercial use and developing parkland over garages, on roof tops, and within structures of development projects and over freeways,
5. Cataloging significant historic sites in the city and providing signage,
6. Promoting scenic easements,
7. Cataloging vacant land owned by the city and requesting park designation, and
8. Preserving and expanding the number and variety of trees in the city.

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To implement these goals and objectives, Alexandria will employ the strategies listed below for designating areas for parks and recreation to be preserved and protected from encroachment.

1. Add publicly accessible space in creative ways to integrate pubic and private open space into the city at all scales; protect remaining open spaces.
2. Increase availability of parkland to a minimum of 6.5 acres of active/passive open space per 1000 people.
3. Encourage developers to incorporate open spaces to serve added residential and employed population—1/2 acre per 500 non-resident employees.

3.2.2.3 City of Falls Church

The City of Falls Church, the first of the three jurisdictions to be fully developed (built out), is only about 2 square miles in size. The city uses many tools to preserve and protect its natural resources and sensitive environmental areas. Zoning and subdivision ordinances contain provisions for protection and enhancement including cooperative efforts between the city and developers during the rezoning and site plan review processes. Creating new ordinances is another mechanism used.

One goal of Falls Church is to reduce the impacts of existing development on city streams and to protect the city's streams, Potomac River and Chesapeake Bay from new development impacts. A second goal is to ensure adequacy of the city's present and future stormwater management and drainage systems while emphasizing the need to protect tributary streams and water quality. A third goal is to identify natural resources important to the city's character and develop programs and policies to protect and restore features. This involves expanding the existing tree management inventory, including trees located in city parks and other public properties. A fourth goal is to preserve and maintain existing parkland and open space, in addition to pursuing the creation of additional open space for vegetative cover, water infiltration, and wildlife habitat.

Encouraging sensitive development and educating and involving residents in environmental protection activities are also goals of the city (City of Falls Church, Comprehensive Plan, 1997).

Erosion and Sediment Control. Like the other jurisdictions in the Holmes Run/Cameron Run watershed, Falls Church has an Erosion and Sediment Control Ordinance that contributes to the health of riparian areas. Much of the Falls Church portion of Tripps Run is channelized, and other parts are lined with concrete. With the exception of exposed areas and the streambank near the West Street culvert, erosion is not as important to the city as it is for other jurisdictions. Channelization, however, increases the velocity of stormwater that exacerbates erosion potential in natural downstream reaches. Moreover, nonpoint pollution flushes directly into local streams without being absorbed by vegetation or infiltrated through the soil horizon. To the extent that it helps limit removal of vegetation and sediment deposition, the Erosion and Sediment Control Ordinance contributes to stream health.

The city's Erosion and Sediment Control Ordinance prevents the degradation of properties, stream channels, waters, and other natural resources by providing adequate soil erosion and sediment control measures taken before, during, and after the period of site clearance, development, and construction. Landowners proposing a non-exempt regulated land disturbing activity of greater than 2,500 square feet must first submit an erosion and sediment control plan to the city's Department of Public Works. Some of the ordinance requirements include development suitable for topography and soils, development that retains and protects natural vegetation, and conservation practices that are equal to or exceed the Virginia Erosion and Sediment Control specifications (City of Falls Church, Comprehensive Plan, 1997).

Tree Cover. One of the most attractive features of Falls Church is its extensive urban tree cover, a historic tradition that originated the first Arbor Day in Virginia in 1892 (Figure 13). Since 1978, the National Arbor Day Federation has honored the city with a "Tree City, USA" designation. The city's Tree Ordinance "regulates the removal of trees from public and private property and establishes standards limiting the removal and insuring the replacement of trees to safeguard the ecological and aesthetic integrity of the community's environment" (City of Falls Church Comprehensive Plan, 1997). To preserve its history of tree preservation, the city recently enhanced its Tree Ordinance, established a Tree Commission, and appointed a City Arborist and an urban forester. Personnel monitor a tree planting and maintenance program for public rights-of-way; review preliminary tree survey required for site plans, subdivisions, and rezoning applications; and enforce regulations designed to preserve existing tree cover on private and city property (City of Falls Church, Comprehensive Plan, 1997).

The city has enhanced commercial and residential areas with street trees and landscaping, in addition to designating trees as historic or specimen examples. There are currently 58 registered specimen trees within its boundaries and 11 additional trees are under consideration for designation.

The city intends to maximize environmental protection through the reduction of overall imperviousness and an increase in vegetative cover. Since the city is largely developed, redevelopment will be used to improve water quality through environmentally sensitive site planning and tree planting efforts (City of Falls Church, Comprehensive Plan, 1997).

3.2.2.4 Environmental Coordination

It is only through environmental coordination that these policies achieve their desired effect. An example of coordination between departments of a single jurisdiction comes from Fairfax County. The county proposes to improve the identification and mitigation of environmental impacts and the monitoring and enforcement of environmental policies as applied to land disturbing activities through the following strategies:

- Requiring both public and private development proposals to identify environmental constraints and opportunities and demonstrate how environmental impacts will be mitigated
- Establishing a centralized environmental planning and monitoring function with responsibility for coordinating the actions of individual county agencies to effect a comprehensive program to preserve and improve the environment

According to Noel Kaplan, the county has not yet established a "centralized environmental planning and monitoring function." However, in recent years, Fairfax County did hire an Environmental Coordinator and established an interagency, management level, Environmental Coordinating Committee. He also stated that "the identification of constraints and opportunities for public and private development proposals is done on a case by case basis during the development review process" (Noel Kaplan, Fairfax County, personal communication, 2002).

It is important to recognize that environmental coordination must extend outside the boundaries of individual political jurisdictions. Fairfax County's plan to create a regional pond above Falls Church in 2003 is an example of a regional effort to improve downstream water quality (Helen Reinecke-Wilt, City of Falls Church, personal communication, 2002).

3.3 Conservation Easements

Conservation easements are a tool used throughout the Holmes Run/Cameron Run watershed to achieve a variety of purposes, including the preservation of open space and environmentally sensitive resources. Property owners donate or sell an easement to the local government or to a nonprofit organization at the local, statewide, or national level. Open space/historic preservation easements allow individual landowners to permanently protect their land or historic structure while continuing to own and enjoy it. These easements become part of the land title, so they offer permanent protection as the property is bought and sold.

Conservation easements are held by charitable nonprofit entities under the Virginia Conservation Easement Act. Public bodies hold open space easements under the Open Space Land Act. In Fairfax County, most conservation easements depicted on the site plans and property identification tax maps are designed to provide natural resource protection for stormwater management and related purposes (Fairfax County Open Space Easements Report, 2000). According to the Virginia Open Space Land Act, open space may include easements of at least five year's duration that preserve land for: (1) park or recreational purposes, (2) conservation of land or natural resources, (3) historic or scenic purposes, (4) assisting in the shaping of the character, direction, and timing of community development, and/or (5) wetlands protection.

Nonprofit land trusts or foundations operating at the local, state and national levels have active easement programs. They specifically focus on the preservation of open space, historic properties, and or sensitive environmental resources. A property owner considering donation of an easement may choose either a public entity (e.g., the Board of Supervisors) to hold the easement or a charitable or nonprofit organization with easement holding authority. The Virginia Outdoors Foundation, Northern Virginia Conservation Trust, Potomac Conservancy, and the Nature Conservancy are examples of state, local, and national level organizations, respectively. Each organization has different policies and guidelines for the types and terms of easements that they seek and hold, but the easement mechanism is basically the same, regardless of who holds it (Fairfax County Open Space Easements Report, 2000).

The following public entities or charitable organizations hold easements for the purpose of preserving open space in Fairfax County:

- Virginia Outdoors Foundation
- Potomac Conservancy
- Northern Virginia Conservation Trust
- Northern Virginia Regional Park Authority
- National Park Service

In 1990, Fairfax County initiated an Open Space/Historic Resources Easements Program to protect open space, historic resources, scenic vistas, and sensitive natural areas while allowing them to remain in private ownership. The county program is a public-private partnership with the Northern Virginia Conservation Trust. This partnership enables property owners to work with either a nonprofit organization or the county to preserve their property. Other entities hold easements as well, such as the Fairfax County Park Authority, various state agencies, and other land trusts like the Potomac Conservancy. Property owners always have the option to work with one of these other groups, rather than through the county program (Fairfax County Open Space Easements Report, 2000).

Established in 2000 by the Fairfax Board of Supervisors, the Open Space Land Preservation Fund is a mechanism for citizens and businesses to make voluntary tax-deductible contributions for open space preservation. It is managed by the Fairfax County Park Authority, and, as of 2002, the Authority held 20,000 acres in trust.

The Virginia Land Conservation Foundation was also established in 2000 to expend funds for the conservation of farmland, historic sites, natural areas, parks, and open space. The foundation is empowered to provide 50% matching funds to a locality or 501 3(c) nonprofit organization to purchase conservation easements and other land conservation needs. These funds can be used to leverage the Park Authority's and Northern Virginia Regional Park Authority's park bonds as well as available federal funds. The foundation provides the appropriate mechanism for receiving and expending funds from dedicated state funding sources for land conservation.

The current Fairfax Open Space Easements Program has functioned with limited resources and only attracts short-term proposals on parcels smaller than ten acres. The Board of Supervisors holds one easement under the program that is listed on the National Register of Historic Places.

Another donated easement, proffered for a farmhouse in Sully District, is currently proceeding through the development process. In Virginia, the Open Space Land Act that allows for easements for a minimum duration of five years has been used mostly in rural areas with large amounts of land suitable for open space or farmland conservation. Fairfax County's Open Space Easements Policy set the minimum duration of an open space easement at 10 years. However, most state, federal and private easement holding organizations accept only perpetual easements (Fairfax County Open Space Easements Report, 2000).

To provide an incentive for property owners to donate easements, Virginia recently enacted the Virginia Land Conservation Incentive Act of 1999, legislation that became effective January 1, 2000. It provides a state income tax credit for donating an easement for the purpose of preserving open space or historic resources. Such an easement must be in perpetuity and donated to a qualified charitable organization or public body. The amount of this credit is 50% of the fair market value of the easement as determined by appraisal. In addition, the Virginia Outdoors Foundation may provide funds for qualifying landowners to reimburse them for some of the costs incurred in donating an easement such as legal fees, recording fees, and/or the survey cost.