Annual Report
on the
ENVIRONMENT
2007

Fairfax County, Virginia
Environmental Quality Advisory Council

A Fairfax County, Va. publication

November 2007

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The cover photo shows a trail within an Environmental Quality Corridor that was identified and protected through the zoning process on the Fairfax County Government Center property. The wooded corridor is located along a tributary to Difficult Run. Photo by Noel Kaplan, Fairfax County Department of Planning and Zoning.

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ENVIRONMENT

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Fairfax County, Virginia

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Printed on recycled paper

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INTRODUCTION

This year's Annual Report on the Environment has been prepared by the Environmental Quality Advisory Council. Staff support for the coordination and printing of the report has been provided by the Planning Division of the Department of Planning and Zoning.

The Annual Report on the Environment, which is an update on the state of the county's environment, serves a threefold purpose. Initially, it is intended to assist the Board of Supervisors in evaluating ongoing environmental programs and to provide the basis for proposing new programs. The document also aids public agencies in coordinating programs to jointly address environmental issues. In addition, the report is directed to residents and others who are concerned with environmental issues.

The report continues to include chapters on major environmental topics including: land use and transportation; air quality; water resources; solid waste; hazardous materials; ecological resources; wildlife management; and noise, light, and visual pollution. In this year's report, EQAC has added a chapter addressing global climate change issues as they relate to Fairfax County. An appendix addressing state legislation relating to the environment has also been added. Within each chapter are: a discussion of environmental issues; a summary of relevant data; and a discussion of applicable government programs. Most of the chapters conclude with recommendations that identify additional actions that EQAC feels are necessary to address environmental issues. In this year's report, recommendations are presented in two formats: items addressing ongoing considerations and continued support for existing programs are noted as "comments." Items addressing new considerations, significant refinements of previous recommendations, or issues that EQAC otherwise wishes to stress are presented as "recommendations."

This report covers activities affecting the environment in 2006; however, in some cases, key activities from 2007 are also included.

While the Environmental Quality Advisory Council has prepared and is responsible for this report, contributions were made by numerous organizations and individuals. Many of the summaries provided within this report were taken verbatim from materials provided by these sources. EQAC therefore extends its appreciation to the following:

Audubon Naturalist Society
Citizens for the Abatement of Airport Noise
Clean Fairfax Council, Inc.
Coalition for Smarter Growth
Fairfax County Deer Management Committee
Fairfax County Department of Systems Management for Human Services
Fairfax County Department of Planning and Zoning
Fairfax County Department of Public Works and Environmental Services
Fairfax County Department of Transportation
Fairfax County Executive's Office
Fairfax County Environmental Coordinator
Fairfax County Fire and Rescue Department
Fairfax County Health Department
Fairfax County Park Authority
Fairfax County Police Department, Division of Animal Services
Fairfax County Wildlife Biologist
Fairfax Joint Local Emergency Planning Committee

Fairfax ReLeaf
Fairfax Water
Illuminating Engineering Society of North America
International Dark-Sky Association
Interstate Commission on the Potomac River Basin
McLean Land Conservancy
Metropolitan Washington Airports Authority
Metropolitan Washington Council of Governments
Northern Virginia Conservation Trust
Northern Virginia Regional Commission
Northern Virginia Regional Park Authority
Northern Virginia Soil and Water Conservation District
The Occoquan Watershed Coalition
Reston Association
The Thomas Jefferson Institute for Public Policy
United States Fish and Wildlife Service
United States Geological Survey
United States National Museum of Natural History
Upper Occoquan Sewage Authority
Virginia Department of Conservation and Recreation
Virginia Department of Forestry
Virginia Department of Game and Inland Fisheries
Virginia Department of Environmental Quality
Virginia Department of Transportation
Virginia Outdoor Lighting Taskforce
Virginia Outdoors Foundation

In addition, EQAC wishes to acknowledge the efforts of the county's interagency Environmental Coordinating Committee, which coordinated the staff responses to the recommendations within EQAC's 2006 *Annual Report on the Environment.*

County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

Board of Supervisors
County of Fairfax
12000 Government Center Parkway
Fairfax, VA 22035

November 19, 2007

Chairman Connolly and Members of the Board:

The Environmental Quality Advisory Council is pleased to present the 2007 Annual Report on the Environment. In this report, we discuss various environmental issues in Fairfax County and make recommendations as to what actions the county should take to resolve identified problems. The report consists of nine chapters – each chapter addressing a different aspect of the environment. This year we have the addition of a new chapter to reflect the county's leadership and efforts to address global climate change. This is the initial chapter and the rest of the chapters are arranged to reflect the order of topics listed in the board of supervisors' Environmental Agenda.

Again EQAC thanks the board for its continued strong support of environmental programs. We continue to find that every year, Fairfax County's programs improve and advance in their efforts at environmental stewardship. But this year we specifically thank the board for its leadership on climate changes issues at the county, regional and national levels.

As real estate tax revenues continue to flatten, we understand that budget constraints are increasing on all programs, including environmental ones. We therefore have only two very specific requests this year. First, we ask that you establish an Energy Coordinator position as recommended in the FY 2009 Environmental Improvement Program. Implementation of this position would allow Fairfax County to more fully implement efforts in support of the Cool Counties initiative that the county played such an integral role in establishing. We also note that this position may result in long-term cost savings through continued improvements in energy efficiency. We are concerned that, without this position, many of the actions that are needed to support the Cool Counties initiative will not be able to be implemented. Secondly, we ask that you continue to support the depth of environmental programs that have been developed over the last decade. We have achieved much and need to maintain that momentum by staying the course.

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We note that during the past years the county has made significant improvements in watershed and stream stewardship, reflected by substantial increases for stormwater funding and the commitment to having watershed planning completed and implementation projects begun for all 30 Fairfax County watersheds. In addition we acknowledge the improvements to the air quality program. We again thank you for the addition of an Air Quality Program Manager, for leading the region in air quality programs by purchasing wind energy, doing diesel retrofits for county Connector and school buses, for the purchase of hybrid automobiles for county fleets and for actively promoting the county's telework program.

We also thank you for your commitment and funding for the replacement of the county's rather old information system UDIS with a highly flexible database that will allow the county to do innovative design and management for all the county's resources and make information much more accessible to citizens.

All of these programs are essential if we are to maintain the high quality of life we have in Fairfax County and the high standards we have set for ourselves. This includes funding of all requests for the Environmental Improvement Program for the upcoming fiscal year. The EIP is a reflection of those non-stormwater programs, including implementation of the Cool Counties initiative. Funding the EIP is necessary to implement the Environmental Agenda adopted by the board for this county.

Each chapter of this year's Annual Report contains the remainder of our recommendations. We urge you to consider and act on each of these.

This report covers 2006, but also includes significant actions from 2007 that could impact EQAC's comments and recommendations. We recognize that the report does not capture all ongoing actions; if we tried to accomplish this, the report would never be finished and would be even longer.

As previous reports have done, we would like to commend the outstanding efforts of the following groups whose actions improve and safeguard the environment in Fairfax County. The Northern Virginia Soil and Water Conservation District continues its work to provide excellent education programs, to consult with the county on innovative stream restoration work, to have a large and successful stream monitoring program and to be available to residents and developers alike for site work consultation. The Northern Virginia Conservation Trust continues to obtain easements on privately owned environmentally sensitive land. Volunteers from the Audubon Naturalist Society provide valuable data on water quality. Fairfax ReLeaf continues to promote tree preservation and tree replacement programs. The Park Authority staff continues to provide exemplary service due to a small group of dedicated individuals, working with a very small budget, who are slowly enhancing environmental efforts in the county's parks. The members of EQAC thank all these groups, and all others who work to preserve and enhance the environment of the county.

EQAC would like to thank and commend the county staff for its continued outstanding work. We thank staff especially for providing the data for this report and for a continued willingness to meet with EQAC to discuss various issues. We commend the county's

Environmental Coordinating Committee, which is chaired by Deputy County Executive Robert A. Stalzer, for its continued efforts at managing environmental action within the county. We appreciate the ECC's willingness to meet with EQAC twice a year and to discuss issues of environmental significance.

EQAC would also like to thank and acknowledge the work of two individuals. Every year we do this and every year the members of council continue to be impressed with the work and input of these two people. First, we need to mention Noel Kaplan of the Environment and Development Review Branch, Department of Planning and Zoning. Noel provides county staff support to EQAC. Noel sets up and tapes every EQAC meeting, follows up on actions generated from the meetings, and coordinates the inputs and publication of the Annual Report. Although the members of EQAC write the Annual Report, it is Noel who makes publication of the document possible. EQAC cannot thank him enough for his hard work and long hours in our support.

Second, we thank Kambiz Agazi, Environmental Coordinator, Office of the County Executive, who also attends all of our meetings and provides helpful advice and suggestions. His insight and his overview of county environmental activities are invaluable to our work. EQAC thanks him for his assistance and valuable contributions.

Third, I would like to personally recognize my fellow EQAC members. They represent a diversity of views that allows for knowledgeable discussions and results in thoughtful recommendations. They spend extensive time investigating issues, write excellent resolutions and produce comprehensive chapters on subjects they have carefully researched. They are to be commended for their efforts.

In conclusion, EQAC encourages the Board of Supervisors to both support and fully fund all of the valuable programs designed to protect the county's environment and enhance the quality of life for its residents. We continue to urge you to take a look at how to integrate these excellent programs to maximize your efforts and returns.

The members of EQAC thank the Board of Supervisors for its leadership and look forward to continue working with you to achieve the goals of the Environmental Agenda in the coming years.

Respectfully submitted,

Stella M. Koch

Stella M. Koch, Chairman
Environmental Quality Advisory Council

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Progress Report on 2006 Recommendations

I. LAND USE AND TRANSPORTATION

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1a. EQAC recommends that the county produce an updated version of the "State of the Plan, An Evaluation of Comprehensive Plan Activities."	As stated in the 2005 response to the similar EQAC recommendation, the publishing of the analysis of Plan changes was anticipated in late 2005. However, due to the need to shift staff resources to other planning efforts, the Plan change analysis document has not been completed. It is now anticipated that this document will be completed by late 2007.	EQAC encourages staff to proceed on this recommendation and reiterates its recommendation.	In process.
1b. EQAC recommends that the county assess the state of the county with respect to the PLUS principles set forth in 1975.	Staff supports EQAC's recommendation to evaluate the extent to which the county has addressed the PLUS principals. Staff feels that EQAC's recommendation presents one type of framework for evaluating change in the county. The development of Plan monitoring measures and the scope of the next Area Plan Review cycle is underway. Staff can include EQAC's recommendation within these considerations and can bring forward the suggested measure to the Policies and Procedures Committee of the Planning Commission for review and approval.	EQAC encourages staff to proceed on this recommendation and reiterates its recommendation.	No.
2a. EQAC recommends that the county acquire the expanded set of planimetric data and continue to acquire oblique imagery.	Staff concurs with the recommendation to update the planimetric data. The DIT GIS Branch submitted a funding request for the FY 2008 budget for this purpose, and the requested funds were provided.	EQAC is pleased that staff concurs with the recommendation and that the requested funding has been provided.	In process.
2b. EQAC recommends that the county begin leveraging three-dimensional models into the planning process.	Staff has begun to use both oblique imagery and three-dimensional modeling in the planning process. However, additional resources are needed for continued program development, hardware purchases, license acquisition, and staff training.	As staff stated, this recommendation is being addressed; however, more needs to be done.	In process.

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2c. EQAC recommends that the county invest in models that leverage GIS capabilities and county data.	Staff recognizes the importance of developing models that leverage GIS capabilities and county data. While runoff modeling has been completed in 11 watersheds, they are large scale, macro models which should be reduced to the micro level for greater accuracy. Staff is therefore planning to reduce county macro models to micro models in the future. Staff is developing a countywide comprehensive multi-modal transportation model. Staff notes that air quality is a regional problem and that efforts in this area are conducted by the Metropolitan Washington Air Quality Committee.	EQAC is pleased that portions of its recommendation are being addressed and reiterates the full recommendation.	In process.
3. EQAC recommends that the county adopt ordinances, incentives and proffers that encourage Green Building and energy conservation practices.	County staff is working on the development of a Policy Plan amendment that would, as part of a broader Plan Amendment addressing air quality issues, incorporate Plan guidance supporting the application of green building practices.	EQAC is pleased that this recommendation is being addressed and on the way to being satisfied.	In process.

II. AIR QUALITY

There were no Air Quality recommendations in the 2006 Annual Report.

III. WATER RESOURCES

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC continues to recommend either posting of health warnings at county streams with high bacterial levels OR the creation of an improved public outreach information campaign that is effective in reaching more residents, including different social and economic groups.	Staff concurs with the recommendation for an improved public information campaign. Staff believes that the posting of signs is an ineffective approach. Therefore, DPWES continues to work with the Division of Environmental Health to ensure that the public outreach program is effective and efficient in protecting the health of Fairfax County residents.	EQAC encourages staff to continue improving the public outreach program.	In process.
2. EQAC recommends that the county conduct a study to analyze and explore options for disposal of materials dredged from stormwater management ponds, such as creating spoil disposal/recycling areas in various parts of the county to assist private facility owners and help protect water quality.	Staff has formed an inter-agency work group and is considering various ideas. Staff will continue to investigate the pros and cons of dredging, hauling, and disposal options and plans to present its findings and recommendations to the Board of Supervisors by the end of FY 2008.	EQAC commends the county for establishing the inter-agency work group. EQAC is pleased that staff is investigating the pros and cons and will present its findings and recommendations to the BOS by the end of FY 2008.	In process.
3. Because of the approximately 30,000 homes in Fairfax County that have septic systems, EQAC recommends the inclusion of a groundwater monitoring and management program in the county.	The Health Department has an extensive database and GIS layer of all the water well systems installed in the county. Water sampling and analysis are conducted on dwellings that are being purchased and by occupants who request a routine water sample. The Health Department is currently working with a private contractor to complete a feasibility study for the formation of a management entity to ensure that required maintenance is conducted on private sewage disposal systems.	EQAC supports the Health Department's feasibility study.	In process.

IV. SOLID WASTE

There were no Solid Waste recommendations in the 2006 Annual Report

V. HAZARDOUS MATERIALS

There were no Hazardous Materials recommendations in the 2006 Annual Report

VI. ECOLOGICAL RESOURCES

Ecological Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. Fairfax County no longer has soil science expertise on the county staff. However, the BOS did provide funding to the Northern Virginia Soil and Water Conservation District for mapping of the county's soils. EQAC recommends that the Board of Supervisors continue the agreement with NVSWD to provide soil scientist expertise.	Staff concurs with this recommendation. In order to ensure the ongoing expertise of a soil scientist, additional funds were included in the FY 2008 Advertised Budget Plan for the Northern Virginia Soil and Water Conservation District. The Board of Supervisors did approve this budget item.	EQAC commends the Board of Supervisors for ensuring that soil expertise will continue to be available in the County. EQAC does recommend that such funding be included in the NVSWCD budget in future years.	Yes.

Ecological Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. FCPA approved a Natural Resource Management Plan in 2004. However, most of this plan cannot be implemented without additional staff and funding. A phased funding approach will allow FCPA to begin to manage ten percent of parklands and set up the program to be phased in over time. Phase 1 would require $650,000 and six positions. EQAC recommends funding and staff positions to implement Phase 1 and that some of the six positions be found from internal FCPA staff assets.	Funding for this item was not included in the FY 2008 Advertised Budget Plan. The Park Authority will continue to work with the Department of Management and Budget to seek funding in future years.	EQAC continues to support the Park Authority in seeking funds for implementing the Natural Resource Plan. However, EQAC also notes that a portion of its recommendation was that the Park Authority use internal staff assets to fill some of the required staff positions. This was not done and EQAC believes that this should be done. EQAC reiterates its recommendation.	No.
3. EQAC continues to recommend that the Virginia State Code §15.2-961 be amended to include tree preservation requirements.	The county's 2006 and 2007 Legislative Programs both contained legislative positions supporting tree conservation legislation. Bills were introduced in both the Senate and House of Delegates to this end. One bill was tabled and the other was defeated. Staff recommends that Fairfax County and other Northern Virginia jurisdictions facilitate meetings with the local building industry to build consensus on this issue. (The bills received considerable opposition from the Home Builders Association of Virginia.)	EQAC continues to recommend that Virginia State Code §15.2-961 be amended to include tree preservation requirements. EQAC considers the staff suggestion about meetings with the local building industry an excellent suggestion and encourages that approach.	No.

VII-1. IMPACTS OF DEER IN FAIRFAX COUNTY

Deer Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC strongly recommends additional staffing for the county's wildlife management program in the form of one full-time equivalent Assistant Wildlife Biologist to assist the County Wildlife Biologist in the Deer Management Program, with several specific areas of responsibility.	The Police Department's Animal Services Division, Fairfax County Park Authority, and the Northern Virginia Regional Park Authority concurred with this recommendation. The FY 2008 Advertised Budget Plan included funding for a Naturalist III to serve as an Assistant Wildlife Biologist. The Board of Supervisors approved this funding and position.	EQAC commends the Board of Supervisors for funding this needed additional staff.	Yes.

VII-2. IMPACTS OF GEESE IN FAIRFAX COUNTY

Geese Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC strongly recommends additional staffing for the county's wildlife management program in the form of a second full-time equivalent Assistant Wildlife Biologist, to undertake several initiatives relating to geese management.	The FY 2008 Advertised Budget Plan included funding for one Naturalist III and did not include funding for a second position. Staff believes that the single position added will further wildlife management goals, but recognizes that this may not be fully sufficient to support both deer and geese management.	EQAC reiterates its recommendation.	No.

VII-3. COYOTES IN FAIRFAX COUNTY

There were no recommendations in the 2006 Annual Report

VII-4. WILDLIFE BORNE DISEASES OF CONCERN IN FAIRFAX COUNTY

There were no recommendations in the 2006 Annual Report

VIII-1. NOISE

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. In recognition of the federal approval of construction of new runways at Washington Dulles International Airport, formally request the Metropolitan Washington Airports Authority and the Federal Aviation Administration to evaluate options for the operation of the existing and new runways to identify approaches that will optimize flight operations in a manner that minimizes community noise exposure.	Staff generally concurs with this recommendation; however, it notes that the first of the two new runways will not be operational until late 2008. Therefore, staff feels that it is premature to issue such a request at this time. Staff also notes that the Fairfax County Airports Advisory Committee advises the Board of Supervisors on airport-related issues and will have an interest in this issue. Therefore, Staff encourages EQAC to coordinate with the Airports Advisory Committee and to reiterate or refine its recommendation based on the outcome of this coordination.	EQAC reiterates the recommendation.	No.
2. Develop and distribute materials to educate the public on airport noise issues. Incorporate these educational materials into the county's overall environmental educational efforts.	Staff agrees with the merits of this recommendation, but there are limited staff resources available. Staff is developing basic noise-related materials to include on the county's Web site; however, resources are not available for a broader initiative at this time. Staff recommends that EQAC work with the Fairfax County Airports Advisory Committee for ideas on how this recommendation can be pursued in light of the limited resources.	EQAC reiterates the recommendation.	No.

VIII-2. LIGHT POLLUTION

Light Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the BOS direct the Department of Planning and Zoning to begin work on a revision to the Outdoor Lighting Ordinance consistent with EQAC's February 8, 2006 resolution on this matter to address glare and several minor issues not later than January 2007 and to have such ordinance revisions ready for board of supervisors approval not later than July 2007.	Any revision to the outdoor lighting standards would require the adoption of a Zoning Ordinance amendment by the Board of Supervisors. Every year the board adopts a Zoning Ordinance Amendment Work Program which contains a Priority 1 list of items that staff will be working on during the year and a Priority 2 list of items that will not be addressed during the year. The ordinance amendment recommended by EQAC is on the board-adopted Priority 2 list. The new amendments list and Priority 2 list will be considered by the board as part of the 2007 ZOAWP review.	EQAC reiterates its recommendation, now recommending that the ordinance revision be ready for board approval not later than July 2008.	No.
2. EQAC recommends that the Board of Supervisors direct the Fairfax County Park Authority to plan and install no further athletic field lighting until the Board of Supervisors has approved revisions to the Outdoor Lighting Ordinance that address limitations on glare.	This issue has been somewhat addressed and will continue to be addressed through coordination and collaboration with key members of EQAC.	EQAC continues to feel that the specifications for athletic field lighting have deficiencies that need to be corrected.	No.

VIII-3. VISUAL POLLUTION AND URBAN BLIGHT

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC strongly recommends that the lack of an explicit provision in Article 12-300 of the present [sign] ordinance for assessment of civil penalties be rectified at the earliest opportunity. (EQAC provided suggested language.) It is further recommended that the modified ordinance be issued as a "Letter to Industry". When an illegally posted sign is observed by an inspector, or reported by a resident, such a letter, containing the text of the ordinance, including the penalties clause, could be sent to the offending party as a means of strongly discouraging continuance or repetition of the violation.	On January 22, 2007, the Board of Supervisors requested additional information from the county staff before authorizing a public hearing on an agreement with the Commonwealth Transportation commissioner. This agreement would permit the county to enforce the provisions of Va. Code Ann § 33.1-373 (2005), which prohibits advertising in the public right-of-ways. Va. Code § 33.1-373 also provides for a civil penalty of $100 for each violation and for injunctive relief for recurring violations. This additional information was requested to better assess the impact of taking over a state enforcement responsibility on current resources and enforcement responsibilities. The existing enforcement effort based on complaints has proven not to be effective in dealing with sign violations. As a result, staff recommends a more proactive effort by staff in addition to entering into an agreement with the Commonwealth Transportation Commissioner.	EQAC continues to recommend changes to Article 12-300 to deal with illegal signs. EQAC does support other efforts such as entering into an agreement with the Commonwealth Transportation Commissioner and a more proactive effort by staff.	No.

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. The Fairfax County Sign Task Force made several recommendations. EQAC strongly urges the Board of Supervisors to again consider the task force's report and either implement its findings or reconstitute the task force to find alternatives that are more palatable to the board and residents of the county.	The Office of the Sheriff has offered to assist the county in dealing with illegal signs in public rights-of-way through the Community Labor Force programs (using prisoners). The Sheriff's Office, however, notes that the CLF program will only provide limited help. The recommendation for an amendment to the Code of Virginia that would treat illegal signs as trash was not recommended by the Board of Supervisors. The General Assembly in its 2004 Session considered House Bill 804 which would classify political signs as advertising and place limitations on these signs as to distance between signs, number and time limits for the signs. This bill was sent to the Privileges and Elections Committee in December and no further action has been taken.	EQAC continues to support this recommendation.	No.

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
3. EQAC supports the general premise underpinning each of the Fairfax County Sign Task Force's recommendations, but believes that before the county seeks any amendments to the Code and introduces new programs of its own, a study should be performed to determine the impact on existing programs, staffing, and budget, and that a cost benefit analysis be performed to determine the extent to which the proposed amendments or additions would contribute to reducing visual pollution in a cost-effective manner, having due regard for the possibilities of cost recovery through the rigorous imposition of civil penalties.	As part of the development of the sign enforcement program, staff will identify the impacts on existing programs, staffing and budgetary considerations which will be presented to the Board of Supervisors. A cost benefit analysis for a sign removal program may be conducted upon the conclusion of the first six months of the program.	Staff proposed actions will satisfy EQAC's recommendation.	In process.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

II. FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

A. INTRODUCTION AND BACKGROUND

In the summer of 2006, Fairfax County was approached by the Sierra Club and was asked to join its Cool Cities Program. This program was designed to help cities meet the conditions of the U.S. Mayors Climate Protection Agreement, which was to reduce their greenhouse gas outputs 7 percent below their 1990 levels by 2012. After carefully reviewing the Cool Cities protocol, county staff recommended against participation in that specific program. However, at the insistence of the Chairman and other members of the Fairfax County Board of Supervisors, county staff was asked to develop a program that would be more robust and contain similar goals and be better suited to county protocols. This program, Cool Counties, which was first mentioned by Chairman Gerald E. Connolly in his 2007 State of the County address, was developed in collaboration with the Sierra Club and other local government partners, and was officially unveiled in July 2007 at the National Association of Counties annual conference that was held in Richmond, Virginia. Much of what Fairfax County lists within the framework of this Cool Counties program was initiated previously to address clean water and clean air issues. However, on October 1, 2007, county staff presented its climate change initiatives as part of its fiscal year 2009 Environmental Improvement Program (http://www.fairfaxcounty.gov/living/environment/eip/).

B. COUNTY EFFORTS SUPPORTING THE COOL COUNTIES INITIATIVE

1. Green Vehicle Solutions

a. Hybrid Vehicle Replacement Program

The county's vehicle fleet currently has 99 hybrid vehicles: 56 Toyota Priuses and 43 Ford Escape Hybrids. The county plans to continue its hybrid vehicle replacement program in 2008. In 2005, the fuel savings from the use of hybrids amounted to 12,939 gallons of unleaded gas, which equates to a savings of 126 tons of CO_2 emissions. Most recently, the county converted one of its Priuses to a "plug-in-hybrid-electric" vehicle. This car travels up to 30 miles on electric power alone before dual power is used; it could have a fuel efficiency averaging over 100 miles per gallon of gas. The county is also pursuing grant funds to have a plug-in-hybrid-

electric school bus transition completed. It is expected that a 40 percent decrease in diesel fuel consumption would be achieved by this process.

b. School Bus Retrofits

The county has retrofitted 436 school buses with diesel particulate filters that reduce NOx emissions and indirectly benefit greenhouse gas reduction.

2. Energy Efficiency Solutions

a. Green Buildings

The Department of Public Works and Environmental Services has informally adopted the Leadership in Energy and Environmental Design rating criteria for its building designs. DPWES has also accomplished innovative energy saving measures in many of its industrial plant processes. For example, the Noman M. Cole, Jr. Pollution Control Plant uses methane gas from landfills in its sludge burning process. As noted below, methane gas is also used to generate electricity at the I-95 Landfill site. The Division of Solid Waste collects and transports trash in Fairfax County to produce electricity in the Waste to Energy Facility. The Fairfax Center and Crosspointe Fire Stations, both of which are green building project, opened recently. DPWES is incorporating the green building approach on nearly twenty active building development projects. The Park Authority will also be using green building technology on an expansion to one of its recreation centers. In addition, the county is developing Comprehensive Plan policy to address green building practices and is exploring mechanisms to encourage such practices through Comprehensive Plan guidance.

b. Energy Efficiency

The county's Facilities Management Department has started an energy efficiency program for the buildings in its inventory. In 2005, 4,232,639 kWh were saved and in 2006 an additional 2,398,036 kWh were saved. Natural gas consumption was also reduced by 111,440 therms per year. Cost avoidance has been over $3.0 million since 2001. These savings would be higher but for the new square footage that came on line during those fiscal years. This department has set an internal goal of a one percent reduction in kBTU/SF; recent numbers show an annual reduction averaging 1.9 percent. The annual savings are cumulative; therefore, after a 10 year period, reductions of 10-20 percent in energy usage per square foot are expected.

3. Renewable Energy Solutions

a. Wind Energy Purchase

The county purchased 5.8 million kWh of wind energy in 2005 from Washington Gas Energy Services/Community Energy/Mountaineer Wind Farm in West Virginia, bringing a reduction of 6.2 million pounds of CO_2 in the two-year contract. Fairfax County will continue the commitment of purchasing five percent of the general county's energy from wind in 2007 and 2008 and has made a commitment to expand to 10 percent of the general county usage in 2009.

b. Waste-to-Energy

The Department of Public Works and Environmental Services has adopted a waste-to-energy approach, recovering methane, controlling nitrous oxide and generating electricity from solid waste. Methane traps 21 times more heat per molecule than CO_2, and nitrous oxide absorbs 310 times more heat. The waste-to-energy plant at the I-95 Landfill generates electricity, offsetting the CO_2 emissions equivalent to that of an 80 MW coal-fired power plant. Also, gas produced can be sold so the recovery offsets energy that would be generated by fossil fuel.

c. Land Fill Gas Recovery and Utilization

The county is in the process of using landfill gas generated at the closed I-66 Sanitary Landfill as a fuel source to heat county buildings on the West Ox Campus. In particular, the new Department of Vehicle Services garage has radiant heaters that can be easily converted to burn landfill gas, as was done for the shop building at the I-95 Landfill. In 2005, the county began the Phase 1 planning and design for the project. Construction of the necessary infrastructure to use landfill gas from the I-66 complex (closed landfill) as a source of renewable energy to heat the Transfer Station Administration Building and Department of Vehicle Services Maintenance Garage will be accomplished in Phase 2, which is to be completed in 2007. The total project cost is $300,000, with estimated annual savings of $70,000 per year in reduced natural gas consumption. The landfill gas pipeline would be approximately 2,500 feet from the existing flare station to the garage. The project would require 4" high density polyethylene pipe to transmit landfill gas. Approximately 150-200 standard cubic feet per minute of landfill gas would be required to heat the garage. In addition, landfill gas is used to generate an additional six MW of electricity at I-95, and as fuel for sludge processing at Noman M. Cole, Jr. Wastewater Treatment Plant.

4. Land Use and Transportation Solutions

a. Board of Supervisors' Environmental Agenda and the Fairfax County Comprehensive Plan

Both the Board of Supervisors' Environmental Agenda and the county's Comprehensive Plan support development in transit-oriented, pedestrian friendly, mixed use centers. The concentration of new development in relatively high intensity, transit-oriented centers characterized by a mix of residential, employment and retail uses, and the provision of opportunities for non-motorized transportation to, from and within these centers should serve to reduce, in aggregate, the number of motor vehicle trips and vehicle miles traveled, and the associated CO_2 emissions, that would otherwise occur through more traditional suburban development patterns in the region. Numerous Area Plan Amendment and zoning actions have been taken to encourage and implement this approach to development, and the Board of Supervisors has adopted a definition and guidance for transit-oriented development in the Comprehensive Plan.

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continue to be subsidized. Ridership on all transit systems (Fairfax Connector, Metro, VRE) serving the county has increased. To further encourage the use of mass transit, on Code Red and Code Orange Days, transit systems throughout the entire region offer free rides to all passengers.

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Facilities that support non-motorized transportation also serve to reduce motor vehicle trips and motor vehicle miles traveled. The county has provided substantial funding for the construction of trails in support of non-motorized transportation.

d. Tree preservation and planting

Planting efforts can also reduce CO_2 concentrations, as trees sequester carbon by absorbing CO_2 during photosynthesis and by storing carbon as biomass. For every acre of forest that the county is able to preserve and keep healthy, approximately 20 to 30 tons of carbon is stored. Fairfax County's tree canopy is currently estimated to cover 41 percent (104,000 acres) of the county; therefore, this equates to between roughly two and three million tons of carbon storage. An earlier study estimated that the biomass of the county's tree canopy stored over 3.5 million tons of carbon. It has also been estimated that the county's current tree canopy absorbs and stores an additional 11,700 tons of carbon annually. A single tree is capable of absorbing and storing an additional 600 to 700 pounds of carbon per year. It has therefore been calculated that between 110 and 130 trees can offset the carbon "footprint" (77,400 pounds of carbon dioxide) that is estimated to be produced by each household in Virginia annually. These data underscore the value of the county's urban forestry programs and other efforts that serve to protect and restore tree cover.

Requirements for the preservation of Resource Protection Areas and commitments during the zoning process to tree preservation efforts, landscaping efforts and the preservation and restoration of Environmental Quality Corridors all serve to enhance overall carbon sequestration, thereby supporting reduced atmospheric CO_2 concentrations. The establishment and enforcement of limits of clearing and grading on site plans, subdivision plans and grading plans also support reductions in CO_2 concentrations, as do tree planting initiatives and public outreach focusing on land stewardship issues such as tree preservation and planting.

The Fairfax County Board of Supervisors has adopted a tree canopy cover goal for the county of 45 percent coverage by the year 2037 and has approved a tree conservation ordinance to strengthen tree preservation policies and procedures. In addition, trees were identified as a special area of interest in the FY 2008 Environmental Improvement Program.

The county continues to support legislative efforts to strengthen local government authority to require tree preservation during development.

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Fairfax County has received national recognition for many of its efforts, including the following:

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D. COMMENT

1. According to a presentation given at the June 11, 2007 Board of Supervisors' Environmental Committee meeting, the Facilities Management Department cost avoidance since 2001 for electricity is well over $3 million with part-time efforts. For example, one energy project performed by part-time efforts of one staff resulted in a cost avoidance of approximately $83,000 annually at the Government Center (variable frequency drives, lighting retrofits and lighting software upgrades).

   In addition, coordinated energy purchasing efforts could result in much larger energy cost savings. Currently, each agency independently arranges energy purchases and the result is that the Park Authority was overlooked and missed out on the opportunity to take advantage of the Metropolitan Washington Council of Government's Natural Gas reverse auction. The Facilities Management Department alone managed to secure significant savings (about $120,000) through this program which will contribute towards offsetting rising electricity costs. How much could the Park Authority have saved if there was a dedicated staff member coordinating all agency purchases?

   EQAC commends the county for its past efforts and looks forward to working with the county in the future on its climate change program.

E. RECOMMENDATION

1. EQAC recommends that the county hire an Energy Coordinator who will coordinate efforts among a number of county agencies to build coordinated, cross-agency efforts to enhance energy conservation and efficiency. The position would also provide an initial point of focus to support implementation of energy conservation practices in the county. A Countywide Energy Coordinator would serve as a central conduit of information to and from agencies and the community to better understand and leverage energy conservation practices employed, and lessons learned. This position would act as the county's expert on all matters pertaining to energy efficiency and renewable energy and work closely and collaboratively with the Environmental Coordinator and other agencies as required.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

II. FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

A. INTRODUCTION AND BACKGROUND

In the summer of 2006, Fairfax County was approached by the Sierra Club and was asked to join its Cool Cities Program. This program was designed to help cities meet the conditions of the U.S. Mayors Climate Protection Agreement, which was to reduce their greenhouse gas outputs 7 percent below their 1990 levels by 2012. After carefully reviewing the Cool Cities protocol, county staff recommended against participation in that specific program. However, at the insistence of the Chairman and other members of the Fairfax County Board of Supervisors, county staff was asked to develop a program that would be more robust and contain similar goals and be better suited to county protocols. This program, Cool Counties, which was first mentioned by Chairman Gerald E. Connolly in his 2007 State of the County address, was developed in collaboration with the Sierra Club and other local government partners, and was officially unveiled in July 2007 at the National Association of Counties annual conference that was held in Richmond, Virginia. Much of what Fairfax County lists within the framework of this Cool Counties program was initiated previously to address clean water and clean air issues. However, on October 1, 2007, county staff presented its climate change initiatives as part of its fiscal year 2009 Environmental Improvement Program (http://www.fairfaxcounty.gov/living/environment/eip/).

B. COUNTY EFFORTS SUPPORTING THE COOL COUNTIES INITIATIVE

1. Green Vehicle Solutions

a. Hybrid Vehicle Replacement Program

The county's vehicle fleet currently has 99 hybrid vehicles: 56 Toyota Priuses and 43 Ford Escape Hybrids. The county plans to continue its hybrid vehicle replacement program in 2008. In 2005, the fuel savings from the use of hybrids amounted to 12,939 gallons of unleaded gas, which equates to a savings of 126 tons of CO_2 emissions. Most recently, the county converted one of its Priuses to a "plug-in-hybrid-electric" vehicle. This car travels up to 30 miles on electric power alone before dual power is used; it could have a fuel efficiency averaging over 100 miles per gallon of gas. The county is also pursuing grant funds to have a plug-in-hybrid-

electric school bus transition completed. It is expected that a 40 percent decrease in diesel fuel consumption would be achieved by this process.

b. School Bus Retrofits

The county has retrofitted 436 school buses with diesel particulate filters that reduce NOx emissions and indirectly benefit greenhouse gas reduction.

2. Energy Efficiency Solutions

a. Green Buildings

The Department of Public Works and Environmental Services has informally adopted the Leadership in Energy and Environmental Design rating criteria for its building designs. DPWES has also accomplished innovative energy saving measures in many of its industrial plant processes. For example, the Noman M. Cole, Jr. Pollution Control Plant uses methane gas from landfills in its sludge burning process. As noted below, methane gas is also used to generate electricity at the I-95 Landfill site. The Division of Solid Waste collects and transports trash in Fairfax County to produce electricity in the Waste to Energy Facility. The Fairfax Center and Crosspointe Fire Stations, both of which are green building project, opened recently. DPWES is incorporating the green building approach on nearly twenty active building development projects. The Park Authority will also be using green building technology on an expansion to one of its recreation centers. In addition, the county is developing Comprehensive Plan policy to address green building practices and is exploring mechanisms to encourage such practices through Comprehensive Plan guidance.

b. Energy Efficiency

The county's Facilities Management Department has started an energy efficiency program for the buildings in its inventory. In 2005, 4,232,639 kWh were saved and in 2006 an additional 2,398,036 kWh were saved. Natural gas consumption was also reduced by 111,440 therms per year. Cost avoidance has been over $3.0 million since 2001. These savings would be higher but for the new square footage that came on line during those fiscal years. This department has set an internal goal of a one percent reduction in kBTU/SF; recent numbers show an annual reduction averaging 1.9 percent. The annual savings are cumulative; therefore, after a 10 year period, reductions of 10-20 percent in energy usage per square foot are expected.

3. Renewable Energy Solutions

a. Wind Energy Purchase

The county purchased 5.8 million kWh of wind energy in 2005 from Washington Gas Energy Services/Community Energy/Mountaineer Wind Farm in West Virginia, bringing a reduction of 6.2 million pounds of CO_2 in the two-year contract. Fairfax County will continue the commitment of purchasing five percent of the general county's energy from wind in 2007 and 2008 and has made a commitment to expand to 10 percent of the general county usage in 2009.

b. Waste-to-Energy

The Department of Public Works and Environmental Services has adopted a waste-to-energy approach, recovering methane, controlling nitrous oxide and generating electricity from solid waste. Methane traps 21 times more heat per molecule than CO_2, and nitrous oxide absorbs 310 times more heat. The waste-to-energy plant at the I-95 Landfill generates electricity, offsetting the CO_2 emissions equivalent to that of an 80 MW coal-fired power plant. Also, gas produced can be sold so the recovery offsets energy that would be generated by fossil fuel.

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CHAPTER II

LAND USE AND TRANSPORTATION

I. LAND USE AND TRANSPORTATION

A. ISSUES AND OVERVIEW

This chapter considers the environmental aspects of land use and transportation, both separately and as they relate to each other from an environmental perspective. According to the Fairfax County Comprehensive Plan, "If current trends continue, the supply of land presently planned for residential development will be all but exhausted shortly after the turn of the century [2000]."[1] As the county approaches this "buildout," the focus of land use across the county is shifting from new development to revitalization and redevelopment. Each acre in the county becomes more valuable every day. The desire to maximize land utilization or productivity puts a strain on all types of land, from residential to commercial to parkland.

While the amount of available land has decreased, the Plan potential has been increasing. The potential is the number of units that can be built in the county according to the current Plan. It changes as requests are evaluated and adopted by the board. Since 1989, there have been over 80,585 new townhouses and multifamily units added and 927 single family homes removed from the Plan. This clearly demonstrates the increased intensity planned for the county.

At the same time, transportation systems across the county and metropolitan region are becoming increasingly congested. During rush hour, most highways in the county receive a failing grade for peak hour level of service. Over the past 15 years, highway construction in the Washington area outpaced population growth[2], yet congestion has still increased. This is due to increased per capita vehicle mileage that puts severe strains on the transportation infrastructure. According to the Texas Transportation Initiative, the Washington, D.C. region is the second most congested in the country. In 1982 the average metropolitan resident spent 16 hours in congestion, by 2005 that ballooned to 60 hours wasted in congestion. That can be translated into roughly $2,331,000,000 of lost productivity and wasted fuel.[3]

Public transportation systems are becoming increasingly important to the county and region. Metrorail is the second largest rail transit system and Metrobus is the fifth largest bus network in the nation. Every day Metro carries nearly 20 percent of all rush-hour trips in the metropolitan area, carrying as many people each day as 1,400 miles of new traffic lanes — equivalent to an 11 percent expansion of the region's road system. From a purely environmental standpoint, Metrorail and Metrobus eliminate more than 10,000 tons of pollution each year and save the

[1] Fairfax County Comprehensive Plan, 2003 Edition, Land Use Chapter
[2] "Where We are Growing", Southern Environmental Law Center, 2002
[3] Texas Transportation Initiative, 2007 Urban Mobility Study

region from using 75 million gallons of gasoline each year.[4] Public transit is clearly an important part of the future.

The buildout of the county's land use plan combined with the overload of the transportation infrastructure will continue to increase as the county population increases. In 2006 the county released a comprehensive demographic study, *Anticipating the Future: A Discussion of Trends in Fairfax County*. The report presents much needed data to plan for the future and incorporate future population and trends. It clearly points out that higher density residential development in Fairfax County and its neighboring jurisdictions will increase traffic congestion. This density, however, will make public transportation alternatives more viable.

As noted throughout this Annual Report, pressures from growth throughout the county directly effect the environment and consequently affect the quality of life, health and natural experiences. The Comprehensive Plan specifically calls out strategies and patterns that can address land use and transportation together. Mixed-use development is an important tool to combine residential and commercial development to "enhance the sense of community" and to "increase transportation efficiency." It provides an opportunity for residents to live and work in the same area, thus reducing transportation needs while increasing the population density to support local businesses and mass transit.

The Board of Supervisors highlighted the effects of growth and congestion in its vision paper: **Environmental Excellence for Fairfax County, A 20-Year Vision**. A variety of tools were specifically called out, including mixed use development and Low Impact Development. In addition, problems that at first seem tangential to the environment, such as neighborhood disruption through tear-down development and low income housing, were raised. Teardowns are becoming more common across the county, as single family homes are replaced with larger homes. The lack of low-income housing means workers cannot afford to live and work in Fairfax County and need to commute from outside the county, which exacerbates problems of both pollution and congestion.

The county faces great challenges from the combined effect of:

- Land use constraints that result from reaching build-out and transitioning from a growth focus to redevelopment.

- Transportation systems strained by congestion and getting further constrained by sprawl beyond the county.

- Population growth that will require additional residential and commercial facilities and transportation options.

[4] Washington Metropolitan Area Transit Authority, www.wmata.com/about/metro_matters/MMfactsheet.pdf

Due to a variety or reasons, land use and transportation decisions in the county have become separated. The county and individual landowners have primary authority for land use while the state has primary authority for transportation. The proposed HOT Lanes for the Beltway introduce yet another wrinkle with a private corporation building a significant for-profit component to our infrastructure.

With increased population and density in the county, the two domains need to be brought closer together. Land use decisions directly affect transportation needs. Transportation systems enable people to move about but need to be deployed in relation to planned population centers.

By planning and learning from the past and from other communities, we can face these challenges and continue to have a high quality of life that includes a healthy environment with natural resources and experiences that are treasured by the county residents.

1. Trends and Concepts

Important concepts that begin to combine land use and transportation are sprawl, smart growth and new urbanism. Sprawl is the unrestricted growth out from the core of a city or a county. In the 1970s, Fairfax was one of the nation's fastest growing counties. Today that rapid growth is happening beyond Fairfax County, in Loudoun and Prince William Counties. As of 2003, Loudoun County was the fastest growing county in the nation, averaging 12.6 percent growth per year. This outer county sprawl directly affects Fairfax County through increased road congestion, changing property values and inefficient use of Fairfax County's infrastructure.

Smart growth is the antithesis of sprawl; it can be defined as environmentally-sensitive land development with the goals of minimizing dependence on auto transportation, reducing air pollution and making infrastructure investments more efficient. The Coalition for Smarter Growth lists the following principles for Smart Growth:

- Mix land uses.
- Take advantage of compact building design.
- Create housing opportunities and choices.
- Create walkable communities.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty and critical environmental areas.
- Strengthen and direct development toward existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair and cost-effective.
- Encourage community and stakeholder collaboration in development decisions.

Reston and the Orange Line corridor through Arlington are good examples of smart growth.

New Urbanism is a design movement that is going beyond smart growth into community building based on traditional urban centers. New Urbanists are working to improve land use by focusing on walkable communities and town centers.[5] A walkable community reduces the distance between where people are and where they want to go.

An important New Urbanist concept to encourage consistent planned development in a community is called **Form Based Codes**. These codes define an appropriate form of development and provide incentives for developers to adopt them. They have been successfully adopted as part of the Columbia Pike revitalization in Arlington County. The community worked through a series of **charrettes** with a planning consultant to create a vision for the new "pike." Form Based Codes provide clear direction on the adopted vision, while incentives encourage developers to adopt the form as the Pike is redeveloped. In particular, developers who follow the codes have an expedited review and approval process.

Infill is the process of filling in larger lots with multiple or larger housing and is a key component to reducing urban sprawl.[6] Infill development can provide new housing or commercial development on vacant or underutilized sites within developed areas, taking advantage of existing infrastructure. While infill provides increased land utilization, it also has the potential to increase the environmental impact upon the infilled community. Particular concern should be paid to the impacts of infill, such as increased stormwater runoff due to additional impervious surface and loss of tree canopy.

Transit Oriented Development or Design is another approach to creating walkable, livable communities. TOD encourages increased multi-use density around transit centers. The goal of TOD is to promote walking, biking or transit as a means of getting to work or the store instead of by car. By focusing development around transit centers, ideally communities will have increased transit ridership, less traffic, reduced pollution and a better quality of life.

Transportation Demand Management is typically associated with a TOD proposal. TDM is a plan to reduce automobile trips that cause congestion. Some elements of a TDM plan include easier and safer pedestrian access, local amenities and shuttle service.

Other concepts that combine land use and transportation provide less dramatic changes to traditional subdivision development. **Clustering** provides residential

[5] Charter of the New Urbanism at: http://www.cnu.org/about/index.cfm.
[6] Greenbelt Alliance, Smart Infill; Creating More Livable Communities in the Bay Area, at http://www.greenbelt.org/downloads/resources/report_smartinfill.pdf

development that allows homes to be built close together with the remaining acreage left as open space in perpetuity. Generally, homes are sited on smaller lots, with the remaining land dedicated to open space. In most cases, the density of homes in a cluster development is the same as what would have been built on the entire site; the development is just configured differently. The challenge with clustering is the lack of public trust that the open space will remain open.

Low Impact Development is an approach that reduces the impact of development on a site. The goal of LID is to better integrate the natural environment with the built environment. LID techniques are intended to mimic an area's natural hydrology to manage stormwater on site, thereby reducing adverse downstream impacts.[7] For example, LID will reduce the amount of impervious surface on a site and reduce the amount of stormwater runoff leaving the site. LID tends to be relatively economical and is flexible enough to be applied to different types of landscapes.

Green Building is another approach to lowering the impact of development by designing structures to conserve resources and using technology that is more efficient. Green roofs can be built with succulent plant gardens that absorb water during rain storms and gradually release it back to dramatically reduce runoff and stream pollution. The county has installed one such roof at the Providence District office to demonstrate feasibility, and a very successful and attractive green roof has been installed at the Yorktowne Square Condominiums[8] in Merrifield. Highly efficient and solar energy systems also minimize the environmental impact.

High Occupancy Toll Lanes are a tool to ease traffic congestion in urban areas. The idea behind HOT lanes is to open High Occupancy Vehicle lanes up to single occupant vehicles that pay a toll. The price of the toll varies, depending on the time of day and amount of traffic. An additional benefit of HOT lanes is that they can provide additional revenue to pay for other transportation improvements.[9]

2. Macro Considerations

Many decisions in the county that affect land use and transportation are made on a micro level. That is, they affect a single parcel or neighborhood. The macro effect of many small changes has a great impact on the county environment. These macro consequences are lost in the day-to-day planning and construction that happens across the county. As higher densities and infill occur, their effect is cumulative and significant. For example:

[7] Low Impact Development Center at: http://www.lid-stormwater.net/intro/background.htm
[8] http://www.fairfaxcounty.gov/nvswcd/newsletter/greenroof.htm
[9] U.S. Department of Transportation, Federal Highway Administration, A Guide for Hot Lane Development at http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE/13668.html

- Small neighborhoods with a stable environmental footprint are being transformed with larger houses. These newer houses bring additional impervious surface through larger roofs and additional pavement. They also displace trees that protect the parcel with a green canopy and provide haven for birds and wildlife. While the effect of a single home is small, the macro effect on community channels more runoff and pollution into the watershed, increases the ambient temperature and displaces wildlife.

- Large scale development, such as the Tysons Corner Urban Center and other Suburban Centers, bring additional residential density to a region. This induces disproportionate transportation needs that can lead to congestion and the associated increase in air pollution and vehicular waste.

a. Understanding Macro Changes

These macro effects are going to become more pronounced with the county build out and change from development to redevelopment. The infrastructure to sufficiently understand and model their effects is lacking across the county systems. Up to now, regional aggregations and averages were sufficient to predict development impacts. The Concept Map for Future Development has done a good job guiding decisions and projecting impact at a broad macro level. Moving into the future, tools are necessary to provide a finer resolution of real time changes that can be quickly aggregated into a macro view.

These new tools should combine the county GIS capability with the existing planning and zoning databases. The data are readily available at a parcel level, but the ability to view the data and use the data to model macro effects is not possible. Understanding and modeling the macro changes happening across the county will help provide insight to the Board of Supervisors and Planning Commission as they deal with micro decisions.

b. Creative approaches

The county also needs to consider creative approaches to address these macro effects. One way to avoid macro consequences is to reduce the impact of micro decisions. For example:

- Modifying the Public Facilities Ordinance to encourage Low Impact Development can protect streams and mitigate the micro impact of infill development.

- Providing incentives for Green Building can protect streams and decrease heat generation from asphalt roofs. This encouragement will be a win-win for the county and for developers.

- High density development should have an effective Transportation Demand Management plan. This should be part of any submission and include future monitoring with options in case the plan deviates from reality. The recent Plan Amendment for Fairlee/Metro West includes TDM as an important element of the development plan.

Planning for large scale redevelopment, such as county Urban and Suburban Centers, has been a useful forum to consider macro effects. These task forces grapple with all aspects of the Urban and Suburban centers, including land-use, transportation and environmental impact. The residential commitment and input to these studies is commendable. They provide a long range vision and plan in harmony with the community vision. These studies and reports complement the Area Plan Review process that focuses on micro changes to the comprehensive plan.

The focus on **Transit Oriented Development**, especially at Metro stations and future stations along the Dulles Rail corridor and Tysons Corner, maximizes the county investment in multi-modal transportation. The Board of Supervisors-appointed Tysons Land Use Task Force has a very ambitious charge to consider the redevelopment of the "Downtown" for Fairfax County. The county has a significant interest in getting Tysons Corner right. Such a large project will demand better tools to envision, model and explain the plan to residents and business owners. It will require substantial community outreach and participation. It will need to be codified into a workable Comprehensive Plan amendment that encourages and monitors the vision. And it will require better macro management and mitigation of changes to this important region.

c. Non-obvious Macro Considerations

The sections above focus on changes caused by development and redevelopment. There are also macro effects generated by non-development changes, such as work patterns, mixed use opportunities and economic considerations that effect the county environment.

Telecommuting, or **telework**, reduces or eliminates the traditional commute to the office. Teleworkers work from home or at local work centers that provide infrastructure for a community of workers. This reduces pressure on the transportation network without building physical infrastructure. The county has an aggressive telework program in place for county employees.

Mixed use development brings work, play and home closer together, reducing the distance for trips and commutes. Mixed use is proliferating across the county, providing economic growth with less congestion than traditional separated communities.

Economic factors, such as increasing property values, also affect the overall county environment. Low-income residents are struggling to find affordable housing near their jobs in the county and frequently choose to live outside the county. This negatively impacts the transportation system. As property values rise, homeowners choose to expand their residences rather then relocate, which changes the impervious nature of communities.

The Board of Supervisors has specifically raised affordable housing and infill development as an environmental concern in their Environmental Vision.

Macro considerations need to be better understood and modeled as the county increases in density. Traditional models did not need to consider macro changes, and the resolution and quality of data is insufficient for planning and protecting the environment. Dealing with the proliferation of small changes across the county will take creative approaches using all available tools, including the Comprehensive Plan, the Public Facilities Manual, special ordinances and public outreach.

B. TECHNOLOGY TO UNDERSTAND THE COUNTY

Fairfax County has created an impressive Information Technology infrastructure to help understand the county and the 395 square miles of land it contains. The Geographic Information System provides a capability to "see" the county through maps, imagery and other geospatial data. GIS is a technology that allows the county to visualize relationships between data that may not be apparent by merely looking at a map. The GIS system has received numerous awards for expanding public access the geospatial data and leveraging that data to enhance productivity. EQAC commends the county for making the investments in IT and GIS that are paying dividends in increased productivity and visibility.

Through work with the county's Department of Information Technology, EQAC has become more familiar with capabilities and possibilities for using technology. There are three basic attributes that must be in place for the technology to be effective:

- The GIS capability—these are the technical systems that move, manipulate and display information based on geographic location. It also includes staff familiar with the systems. The county IT and GIS staffs are experts on this technology.

- Data that are geographically located, in other words, spatial data—this is an expensive component that needs to be constantly updated as the county changes. There are many sources of data, from aerial imagery to U.S. census data to county records, that need to be transformed into useable information.

- Models and applications that can use the data to make projections about the future—these are becoming increasingly important.

Over the past several years, EQAC has advocated for an enhanced IT capability for tracking land use. EQAC has previously recommended that the county adopt a new parcel-based system that would track the full lifecycle of each parcel in the county. This new system, called the Integrated Parcel Lifecycle System, is now being implemented. This is an important step towards better understand how land in the county is used and how it changes over time.

This information managed by IPLS includes population and housing unit estimates and forecasts, which are used by the county to help determine services and service provision levels, respond to state and federal reporting requirements and respond to regional initiatives such as transportation planning, air quality modeling and other programs of regional significance. Other data include: real estate information including land and improvement characteristics, sales information and existing land use; planning data such as planned land use and plan options; proposed and approved rezonings; proposed and approved development plans; and building permit information. County staff is now able to evaluate 30 year demographic forecasts including low, high and "most likely" estimates. Staff is also able to produce reports in a GIS environment using user defined geographies. Reports can be generated for population density, population forecasts, housing starts and completions, vacant land and underutilized land.

As staff considered the IPLS requirements, an informal survey was conducted of the GIS users who would benefit from the parcel based system and additional data about the parcels. Over 38 users from across the county responded indicating a critical need for the system and more data. Some examples:

- Board of Supervisors—resident concerns and land use issues
- Parks—development planning, natural and cultural resource inventory
- Department of Planning and Zoning—evaluation, enforcement, appraisal, plan reviews
- Public Safety—planning for fire and rescue, hazardous spill impacts, crime mapping, improved dispatch
- Public Works—project design and evaluation, stormwater runoff calculation, flood and dam breach emergency plans, solid waste services
- Transportation—pedestrian planning, VDOT permit applications

Although not all of these datasets are available in IPLS currently, if any of these data are loaded into the county's GIS, they can be utilized within the IPLS data warehouse.

The uses of these data clearly go beyond the scope of EQAC but illustrate the interconnectedness of the systems. EQAC's recommendation was narrowly focused on improving the county's land use planning capability to enable better integration of land use and transportation. It turns out that many other organizations and departments also benefit from this capability.

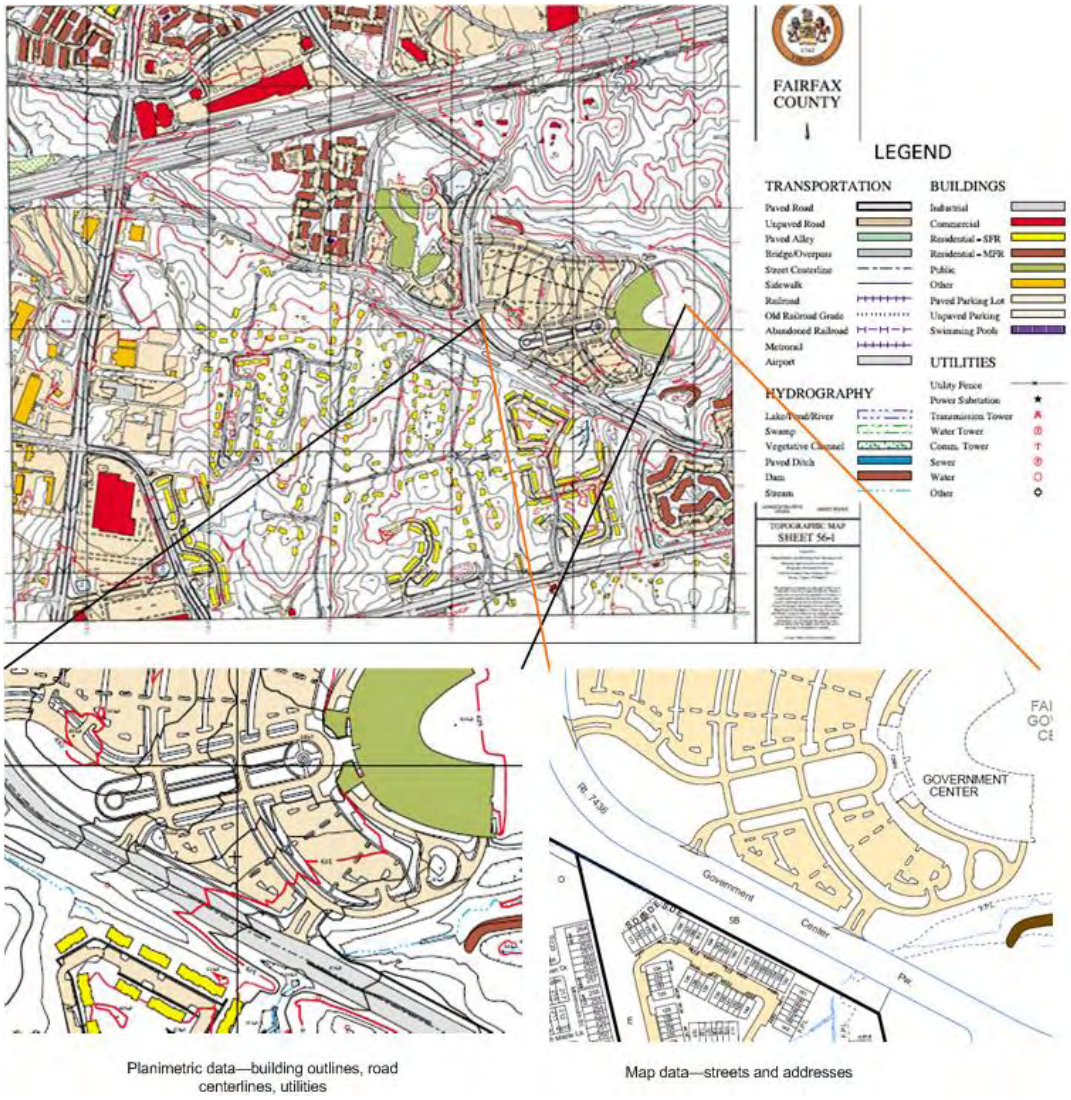
EQAC commends the county for its leadership in adopting technology and, more importantly, for using it to improve service. With the IPLS implementation underway, EQAC is focusing on the data, models and applications that will improve the county's land use and transportation planning capability. The four areas EQAC is most concerned with are:

- Planimetric data—features you can see, such as buildings, driveways, pools, railroads, ponds, trees.
- Oblique imagery—creating three-dimensional images and incorporating them into the planning process.
- Models—leveraging planimetric and oblique data with models that analyze the data and provide valuable information.
- Natural Resource data – identification of resources that should be considered during environmental and conservation planning efforts.

1. Planimetric Data

Planimetric data are the features that can be seen. These data typically come from an aerial image or photograph of the county. The image is analyzed by a specialized contractor to extract features for the GIS system. The current planimetric database was created from imagery gathered in 1997. The following GIS pictures show a map around the county's Government Center with planimetric data and a blowup of some types of information it portrays. It is contrasted with a normal map that has streets and addresses. The planimetric data show the reality of the building outlines and the actual road path. It correlates the data on the map with the actual data and adds additional information not shown on a map.

Figure II-1. Planimetric Information—
Fairfax County Government Center



The county is planning another round of planimetric data gathering and is considering adding additional feature extraction to include driveways, sidewalks, pools, patios, decks, sheds and tennis courts. These impervious surfaces are of interest in modeling the effects of property improvements and calculating the effects that increasing small scale imperviousness have on a macro level.

2. Oblique Imagery

Oblique imagery is taken from an aircraft at an angle rather than straight down. The images can then be processed by software to show the sides of buildings and structures and measure their heights. The primary users of the oblique

imagery are agencies such as the Department of Public Works, the Department of Tax Administration and public safety agencies to reduce field time in assessing and planning. The image below is a sample oblique image of the Government Center:

Figure II-2: Oblique Imagery—Fairfax County Government Center

EQAC believes this imagery will prove very useful in land use and transportation planning. It begins to enable three-dimensional models and can have wide applicability beyond the county operations to public participation. In particular, the Area Plan Review process can benefit from better understanding three-dimensional areas around sites subject to proposed amendments.

Looking into the future, it is possible to begin accepting Land-Use proposals with three-dimensional Computer-Aided Design and Drafting data. The CADD models can be combined with oblique data to provide accurate 3D representations of the changes. In effect the county can begin examining proposals using fly-through technology overlaid on ground truth. This will be much more illustrative than artistic interpretations.

The county has oblique imagery collection in the current IT plan. EQAC recommends that the county continue to gather these data and to expand the use of 3D analysis in planning.

3. Models and Projections

While the GIS system and new data provide valuable insight by which to view the county, they do not necessarily provide new information about the county. Models are computer programs that analyze the data and create reports or projections. The county regularly uses transportation and traffic models to analyze congestion. Some of this information is reviewed in this chapter. As the data warehouse expands, it becomes important to use models to comb through the data and extract information that would otherwise be unattainable.

EQAC realizes that models are complicated and expensive. EQAC recommends that the county begin exploring and evaluating GIS models.

4. Ecological Resource Data

In 2006, county staff began a series of discussions to determine which agencies currently possess ecological data and whether or not other agencies could utilize various ecological data as a shared resource. These data include Resource Protection Areas, wetlands, vegetative communities, hydric soils, tree cover and open space as well as archaeological and cultural resources. The Park Authority has spearheaded the effort to identify data resources and to develop analysis models to evaluate these data. Once appropriate models and protocols have been developed, they may be used in the future to identify areas that could be targeted for conservation or protection. Currently, the final product of this endeavor is envisioned as a model that will allow county staff to evaluate ecological resources. Also included will be a detailed report listing data sources needed and a plan to consolidate these data and recommendations on the applicability and appropriateness of the model and it's limitations.

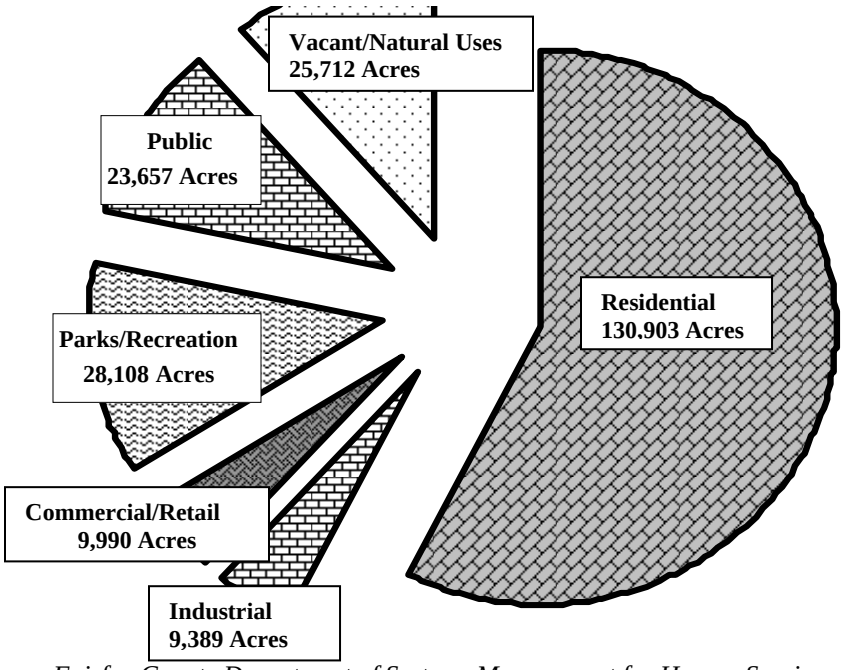
C. LAND USE

A prerequisite to understanding the interrelationship between land use and transportation is to first examine them separately. This section describes land use and land use decision-making in Fairfax County.

1. How Is Land Used In Fairfax County?

Land use in Fairfax County is analyzed yearly via the Urban Development Information System and, going forward, will be captured in the Integrated Parcel Lifecycle System. This section uses 2004 data from UDIS. Fairfax County has 227,751 total acres of land, excluding areas in roads, water or small areas of land unable to be zoned or developed. Those acres are organized into the following broad categories:

Figure II-3: Existing Land Uses in Fairfax County



Source: Fairfax County Department of Systems Management for Human Services, 2004.
Note: Land in Towns of Clifton, Herndon and Vienna included. Total acreage figures do not include areas in roads, water or small areas of land unable to be zoned or developed.

- Residential—acres dedicated to living. Residential acres are measured by the number of dwelling units per acre. For example, a low-density neighborhood has a DU/AC from .1 to .5, a suburban neighborhood ranges from 1-20 and an urban center has a core DU/AC of 35-60.

- Commercial/Retail—acres developed for people to work or shop. Commercial space is measured by looking at the Floor Area Ratio, which is the ratio of gross floor area to the size of the lot. For example, an FAR of 0.5 means that a single story building can cover half the lot, a two-story building can cover 1/4 of the lot and a four-story building can cover 1/8 of the lot. FAR does not include other impervious surfaces, such as parking lots.

- Industrial—acres zoned for industrial use. Industrial space is measured by FAR.

- Parks and Recreation—acres dedicated to public enjoyment and recreation.

- Public—acres owned by the public but not for parks or recreation. This includes: Fort Belvoir; Dulles Airport; the campus of George Mason University; county government facilities such as fire stations, landfills,

police stations, training facilities, schools and government centers; and other publicly-owned properties.

- Vacant—acres currently unused, either natural or vacant, but zoned for Residential, Industrial or Commercial uses.

2. Land Use Planning

The Fairfax County Comprehensive Plan is a guide for making land use decisions in Fairfax County. Major Plan revisions took place in 1975 and 1991. The 1991 Plan, that is the foundation for the current 2003 edition, was developed around 18 Goals for Fairfax County (a 19th goal was added later). The 2003 Edition consists of the Policy Plan plus the Area Plan for each of the four planning areas. The Policy Plan has ten functional sections plus a Chesapeake Bay Supplement. The functional sections are: Land Use, Transportation, Housing, Environment, Human Services, Public Facilities, Parks and Recreation, Revitalization, Economic Development and Heritage Resources.

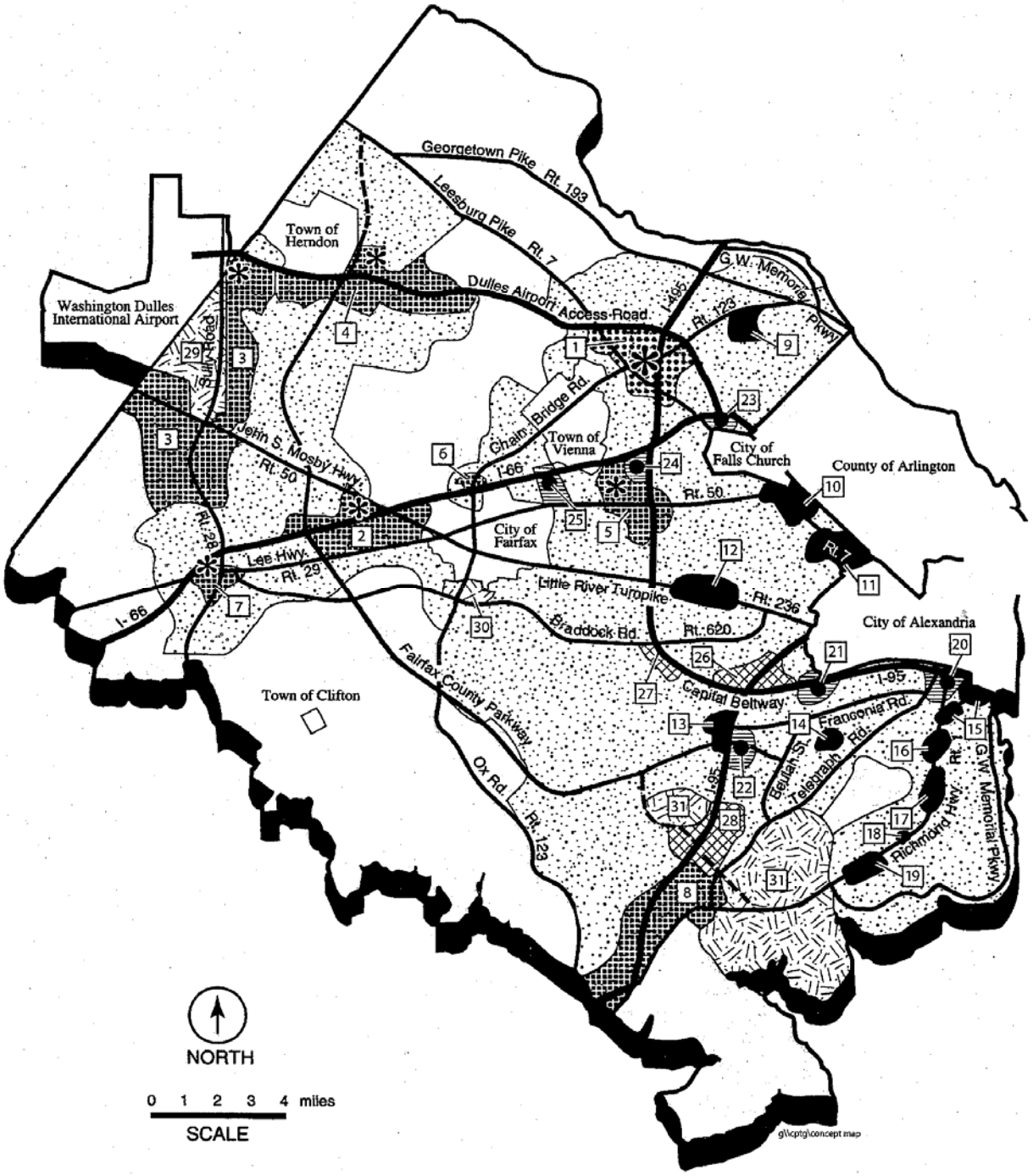
a. Concept Map for Future Development

In 1990, the county's Concept Map for Future Development was developed. This map identified 31 mixed-use centers; the Concept Map has been revised slightly since then, but there are still 31 mixed-use centers shown (Figure II-4). While the Concept Map was not formally adopted, it is an integral part of the Area Plans.

In 1995, a study of the Plan was prepared entitled: State of the Plan, An Evaluation of Comprehensive Plan Activities Between 1990-1995 with an Assessment of Impacts Through 2010. This study outlined a series of recommendations for the county to improve its ability to meet the Plan goals. Many of those recommendations are still applicable.

Currently, the Policy Plan is reviewed by functional sections. The Parks and Recreation section was reviewed in 2003. The Transportation Section was reviewed in 2005 with recommendations presented in 2006. A comprehensive review of the complete Policy Plan is not anticipated in the future due to the overall complexity of the complete document.

Figure II-4: Concept Map for Future Development



CONCEPT MAP FOR FUTURE DEVELOPMENT

CONCEPT MAP FOR FUTURE DEVELOPMENT

LOCATIONS OF MIXED-USE CENTERS

Urban Center
1. Tysons Corner Urban Center

Suburban Centers
2. Fairfax Center
3. Dulles (Route 28 Corridor)
4. Reston-Herndon
5. Merrifield
6. Flint Hill
7. Centreville
8. Lorton-South Route 1

Community Business Centers
9. McLean
10. Seven Corners
11. Baileys Crossroads
12. Annandale
13. Springfield (West)
14. Kingstowne
15. North Gateway and Penn Daw
16. Beacon/Groveton
17. Hybla Valley/Gum Springs
18. South County Center
19. Woodlawn

Transit Station Areas
20. Huntington Metro Station
21. Van Dorn Metro Station
22. Franconia/Springfield Metro Station
23. West Falls Church Metro Station
24. Dunn Loring Metro Station
25. Vienna Metro Station

LOCATIONS OF LARGE INSTITUTIONAL AND INDUSTRIAL AREAS

Industrial Areas
26. Beltway South
27. Ravensworth
28. I-95 Corridor

Large Institutional Land Areas
29. Washington Dulles International Airport
30. George Mason University
31. Fort Belvoir (Main Post and Engineer Proving Ground

LEGEND

Suburban Neighborhoods (Residential density ranges defined in Area Plans; 0.15-0.25 FAR* for neighborhood-serving non-residential use)

Low Density Residential Areas (Residential density of 0.1 to 0.5 du/ac **, specific density ranges in Area Plan; Non-residential use intensity 0.05 to 0.1 FAR)

Tysons Corner Urban Center
Core (1.0-1.65 FAR; 35-60 du/ac)
Non-Core (0.25-1.0 FAR; 8-45 du/ac)

Suburban Centers
Core (0.3-0.8 FAR; 15-35 du/ac)
Non-Core (0.15-0.30 FAR; 5-25 du/ac)

Community Business Centers (0.20-0.50 FAR; 5-25 du/ac; if a core is designated, intensities of up to 0.70 FAR may be allowed)

Transit Station Areas (0.30-1.00 FAR; 8-45 du/ac)

Industrial Areas (0.25-0.50 FAR for Industrial Uses)

Large Institutional Land Areas

* FAR - floor area ratio
** du/ac - dwelling units per acre

b. Area Plan Review

The Area Plans Review process is a community-wide review of site specific changes proposed to the Area Plan volumes of the Comprehensive Plan. The APR process is organized by the Supervisor Districts. The northern portion of the county, which includes Dranesville, Hunter Mill, Providence and Sully districts, was reviewed in 2004-2005. The southern portion, which includes Braddock, Lee, Mason, Mount Vernon and Springfield districts, was reviewed in 2005-2006.

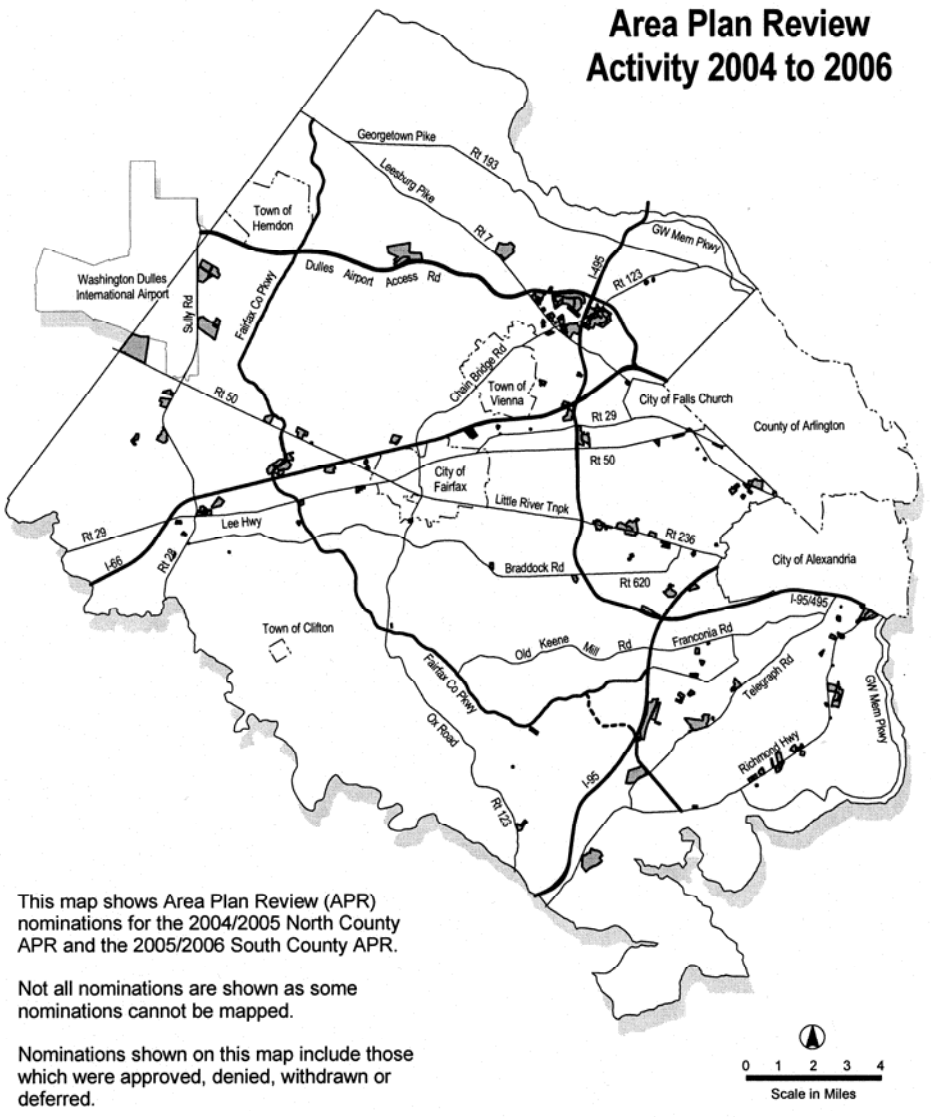
The APR task force for each district is appointed by the district supervisor. Each task force reviews proposed changes at a public hearing and submits a recommendation to the Planning Commission. This is accompanied by a staff recommendation that may or may not concur with the task force recommendation.

Figure II-5 provides an overview of the Area Plan Review activity for the most recent North County and South County APR processes. The nominations span the county. Whereas the plans for Urban, Suburban and Transit Stations are comprehensive in scope, the APR nominations are opportunistic. Each nomination is analyzed thoroughly by staff to consider factors such as impact on transportation, education and environmental resources of the individual nominations. The cumulative effect, however, is not analyzed. Such a concern was the motivation to defer nominations in Tysons Corner and appoint a task force to look at comprehensive changes.

c. Lee District Planning Process

The Lee District planning process is a unique review process that has been in place since 1976. This interjects a step before the public hearing at the Fairfax County Planning Commission. All land use cases (rezonings, special exceptions and changes to the Comprehensive Plan) are presented to the Lee District Land Use Advisory Committee. The committee asks questions, makes comments, etc. When all the information is available, the committee votes to either recommend approval or denial of the application. The Lee District Planning Commissioner participates in these meeting and typically supports the committee decision at the Planning Commission public hearing.

Figure II-5.



d. Chesapeake Bay Preservation Ordinance

Another important ordinance that affects land use is the county's Chesapeake Bay Preservation Ordinance. Amendments to this Ordinance were adopted on November 18, 2003 by the Board of Supervisors. This Ordinance codifies the county commitment to protect the Chesapeake Bay. An important aspect is the designation of Resource Protection Areas around all water bodies with perennial flow. RPAs are the corridors of environmentally sensitive land that lie alongside or near the shorelines of

streams, rivers and other waterways. They include any land characterized by one or more of the following features:

- A tidal wetland.
- A tidal shore.
- A water body with perennial flow.
- A non-tidal wetland connected by surface flow and contiguous to a tidal wetland or water body with perennial flow.
- A buffer area that includes any land within a major floodplain or any land within 100 feet of a feature listed in the four bullets above.

The Chesapeake Bay Supplement, which was incorporated into the Policy Plan in 2004, provides an excellent overview of land use factors in Fairfax County that affect the Chesapeake Bay.

The Comprehensive Plan plus the Chesapeake Bay Preservation Ordinance provide an outline for how and where development is planned to occur in Fairfax County. They can be used to analyze the **potential** development that can occur within the county. The **realization** of that potential is subject to many external variables.

3. Land Use History and Buildout Projections

The Comprehensive Plan contains land use recommendations for all of the land in the county. When the concept plan was conceived in 1990 there was a significant amount of vacant land so it could address changes across the county. That vacant land has been steadily decreasing as shown in Table II-1. In 2004, with only approximately 11% vacant and much of that fragmented, the decisions are much more constrained. Significant planning changes require decisions that will most likely affect existing developed land.

Table II-1
Vacant Land in Fairfax County

Year	Vacant Land (acres)	Total Planned Land (acres)	Percent Vacant
1980	75,550	234,744	32.2 percent
1985	66,685	232,941	29.2 percent
1990	45,042	230,678	19.5 percent
1995	37,006	229,366	16.1 percent
2000	29,529	228,541	12.9 percent
2004	24,307	227,751	10.7 percent
Planned land does not generally include public roads and water			
Source: Fairfax County Demographic Reports, 2004			

The current land use categories are shown in Table II-2 below. Currently, 57.5 percent of the county land is developed for residential use, with 4.4 percent for commercial. These numbers show the land devoted to each use type, but they do not show the corresponding density. Commercial/Retail acreage in the county has a higher density than residential. It is difficult to determine the footprint of mixed-use acreage given the current data. It is also difficult to determine mixed-use density and whether it is a function of DU/AC or FAR, or both.

Table II-2
Existing Land Uses

Land by existing use	Acreage	Percent of Total
Residential	130,903	57.5 percent
Industrial	9,389	4.1 percent
Commercial	9,990	4.4 percent
Parks and Recreation	28,108	12.3 percent
Public	23,657	10.4 percent
Vacant & Natural	25,712	11.3 percent
Total	227,759*	100.0 percent
*Does not generally include public roads and water		
Source: Fairfax County Demographic Reports 2004		

As the current Plan is exercised and the county reaches build-out, the planned land use acreage is shown in Table II-3. All vacant and natural land will be developed or become parkland. The ratios between the types will change, with the residential increasing to 63 percent overall.

The table also includes an estimate of the vacant or underutilized acreage within each type. "Because of the complexities involved in determining whether nonresidential land is underdeveloped, estimates of underdeveloped acreage are only made for residential land."[10]

4. Plan Density Increases

The aggregate acreage available in the county is relatively constant, with occasional changes as land is converted to other uses, such as roads and drainage ponds. The Comprehensive Plan capacity, however, is constantly increasing as new density is allocated across the county. For purposes of

[10] Fairfax County Demographic Reports, 2004

Table II-3 Planned Land Uses				
Land Use	**Planned Acreage**	**Percent of Total Land in the County**	**Vacant/Underutilized Land**	**Vacant Land as a percent of Planned Acreage**
Residential	143,496	63.0 percent	22,505	15.7 percent
Industrial	8,290	3.6 percent	2,326	28.1 percent
Commercial	5,259	2.3 percent	710	13.5 percent
Public Facilities and Mixed Use	26,725	11.7 percent	1,356	5.1 percent
Parks, Recreation, Floodplains	43,852	19.3 percent	3,779	8.6 percent
Vacant and Natural	-	-		
TOTAL	227,622	100.0 percent	30,676	13.5 percent
Source: Fairfax County Demographic Reports, 2004				

allowing for a comparison of existing and planned development levels, Table II-4 shows the "existing conditions" for both nonresidential and residential development as they existed in Fairfax County in the years 1990, 1994 and 2002.

Residential and nonresidential growth in Fairfax County is expected to continue, and the county's Comprehensive Plan anticipates and guides this growth. Table II-5 presents one potential Comprehensive Plan "buildout" scenario based on Comprehensive Plan options that would serve to maximize residential development (as opposed to options that would maximize nonresidential development) in mixed use employment centers. This scenario is presented applying Comprehensive Plan guidance as it existed in 1989, 1991, 1995 and 2003. Prior to the Area Plan revisions in 1991, nonresidential potential could not be quantified due to lack of specific nonresidential development intensity guidance in the Comprehensive Plan; as such, nonresidential Plan capacity information is not provided for the year 1989.

The Comprehensive Plan is not a static document; major revisions to the Area Plans were adopted in 1991, and the Plan has been amended numerous times, both through the Area Plans Review process and through Plan amendments and land use studies authorized by the Board of Supervisors, since that time. As can be seen in Table II-5, the general effect of these Plan amendments has been to increase potential development in Fairfax County; the "buildout" levels of total residential and total nonresidential development under the scenario presented in Table II-5 have increased since 1991.

Table II-4 Existing Land Uses in Fairfax County: 1990, 1994 and 2002			
Land Use	**1990**	**1994**	**2002**
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)			
Office	67,000,000	75, 000,000	98, 000,000
Retail	33, 000,000	39, 000,000	47, 000,000
Institutional	29, 000,000	31, 000,000	37, 000,000
Industrial	34, 000,000	36, 000,000	40, 000,000
Total Nonresidential	**163,000,000**	**182,000,000**	**221,000,000**
Residential (figures given in dwelling units, rounded to the nearest hundred)			
Single Family Detached	163,000	169,700	184,200
Single Family Attached (e.g., Townhouses)	67,300	74,600	90,500
Multifamily	72,100	77,700	96,000
Total Residential	**302,500**	**322,000**	**370,600**
Source: Fairfax County Department of Planning and Zoning, 2004			

Table II-5 Comprehensive Plan "Buildout" Capacity in Fairfax County Applying a Residential Plan Option Maximization Scenario				
Land Use	**1989**	**1991**	**1995**	**2003**
Nonresidential (figures given in square feet of floor space, rounded to the nearest million)				
Office	-	158,000,000	182, 000,000	185, 000,000
Retail	-	48, 000,000	56, 000,000	65, 000,000
Institutional	-	37, 000,000	42, 000,000	44, 000,000
Industrial	-	74, 000,000	75, 000,000	70, 000,000
Total Nonresidential	**-**	**317,000,000**	**355,000,000**	**364,000,000**
Residential (figures given in dwelling units, rounded to the nearest hundred)				
Single Family Detached	216,100	212,200	212,800	215,200
Single Family Attached (e.g., Townhouses)	78,600	82,700	86,200	88,900
Multifamily	83,200	114,400	140,600	153,500
Total Residential	**377,900**	**409,300**	**439,600**	**457,600**
Source: Fairfax County Department of Planning and Zoning, 2004				

The increase in buildout planned residential development levels, under the scenario presented in Table II-5, is summarized in Table II-6:

Table II-6
Residential Development: Plan Build Out, 1989-2003

Land Use	1989 Plan	1991 Plan	1995 Plan	2003 Plan	1989 - 2003 Change	1989 - 2003 Percent Change
Single Family Detached	216,100	212,200	212,800	215,200	(900)	**-1 percent**
Single Family Attached	78,600	82,700	86,200	88,900	10,300	**13 percent**
Multifamily	83,200	114,400	140,600	153,500	70,300	**84 percent**
Total	**377,900**	**409,300**	**439,600**	**457,600**	**79,700**	**21 percent**

Table II-6 clearly shows that the residential units are:

- Increasing in total number—as the population grows, Fairfax County is able to expand through Plan changes that increase the number of potential units.

- Getting closer—the trend is to add more multi-family units (an 84 percent increase since 1989) while maintaining a consistent number of single family detached homes.

D. TRANSPORTATION

This section examines transportation and transportation decision making in Fairfax County.

1. How do People and Things Move About Fairfax County?

There are numerous options for people and things to move about the county.

- Private, motorized transportation is one of the most significant elements of transportation that has a major effect on the environment and is most closely related to land use and development. In modern times, people have become more reliant on the use of automobiles for business, pleasure and various daily functions and activities. The urban sprawl that has been experienced in Fairfax County has greatly influenced this problem, causing major congestion on roadways, particularly during rush hour as many individuals are commuting long distances to and from their jobs.

- Rail and rapid bus transit has long been looked upon as a means of reducing traffic congestion and thereby creating a positive impact on pollution and air quality. It also has a direct relationship to land use planning and development because rail transport centers are ideal locations for business and housing developments. There are numerous projects that have long been in the planning phase; due primarily to budget constraints, however, virtually none of them have reached the actual development phase.

- Commercial vehicular transportation, mainly trucks and buses, are another serious factor impacting the environment. Trucks, whether they are local, inter-county or interstate, are serious contributors to the environmental crisis. In addition to many of them using "dirty" diesel fuel, they also have a negative impact on traffic congestion. Bus traffic includes school buses, most of which are transporting students during rush hour periods. Many of these buses are old and are a hazard to the environment, again because of the type of fuel they use.

- Non-motorized transportation opportunities, namely walking and biking, have been looked upon as viable alternatives for reducing traffic congestion and improving air quality. Not having sufficient infrastructure for walking and biking is a major deterrent to that form of transport, not to mention the frame of mind of the general public that has become automobile-dependent over the years, even for short trips. This component has an important relationship to land use planning and development in order to ensure that adequate facilities (walking and biking trails) are included in the plans.

- "Virtual transportation" has surfaced in recent years as another viable alternative to motorized transportation. Modern technology has created opportunities for people to work out of their homes, using computers for telecommuting and e-commerce to perform their jobs. If these techniques become a more widely accepted means of performing one's job, it would have a significant positive impact on reducing pollution and improving air quality.

Fairfax County is a leader in this field with the Fairfax County Government Telework Program.

2. Vehicular Congestion and Volume to Capacity Ratio Maps

This section examines vehicular transportation options and the associated congestion that is experienced every day by drivers. Vehicle congestion on roadways is typically measured by volume to capacity ratio. The Fairfax County Department of Transportation's Planning Division created a map for this report that shows the current and projected V/C ratios on major Fairfax

County roadways. As V/C increases from zero to one, the volume approaches the road capacity. Over one, there is more volume than the road can support. The Level of Service is a measure of congestion; once V/C reaches one, the road is fully saturated and the LOS is graded an F for failing.

Current V/C ratios on county highways are shown in Figure II-6. Major portions of the Beltway, I-66 and the Fairfax County Parkway already have a failing LOS.

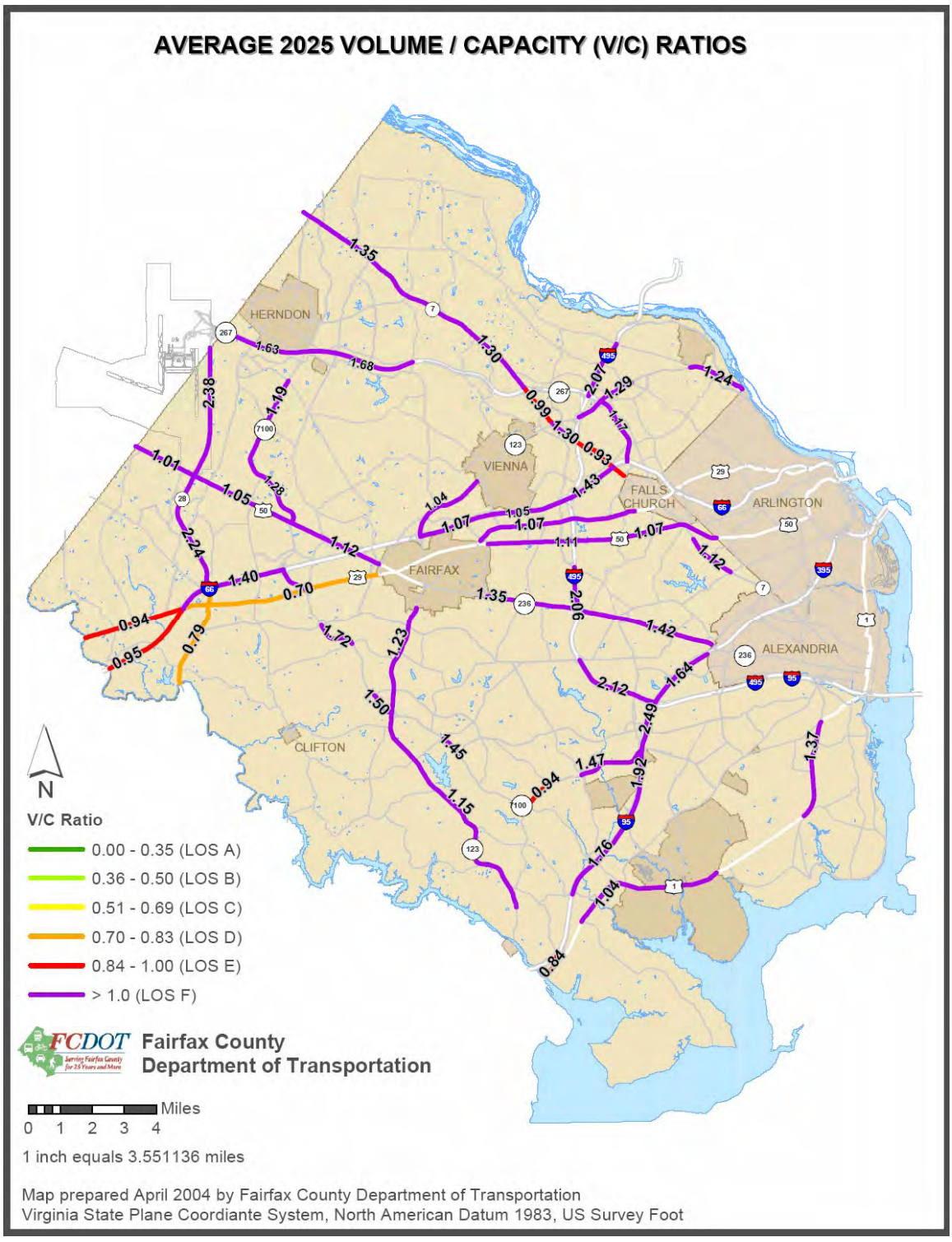
Projected V/C ratios for 2025 are shown in Figure II-7. This information considers population growth and settlement projections. Comparing the current V/C ratio map with the future V/C ratio map provides many insights into how the transportation infrastructure grows with population. Some observations:

- The failing highways are still failing, some much worse and others actually better:
  - I-66 West of the City of Fairfax will get increasingly more congested, while I-66 east of Fairfax will get less congested.
  - The Beltway will become considerably more congested, with V/C ratios ranging from 1.5 to over two. Congestion in the "mixing bowl" area (the I-95/I-395/I-495 interchange area) will continue to get worse. The impacts of the reconstructed mixing bowl are not yet factored into the model; however, interchanges are modeled separately from segments and the data may not reflect the current improvements.
  - I-95 outside the Beltway will get significantly worse, with V/C ratios increasing from 1.01-1.04 to 1.76 or greater.
- Major roads closer to Washington D.C. will not change considerably over this period. This includes Route 29, Route 50 and Route 7 in and east of Tysons Corner. The current congestion has stabilized and increased volumes are not expected on these roads.
- Major roads in the western part of the county will get more congested; this includes portions of Routes 28, 123 and 7 west of Reston. This will primarily be induced by commuters from outside the county.

Figure II-6.

Source: Fairfax County Department of Transportation

Figure II-7.


AVERAGE 2025 VOLUME / CAPACITY (V/C) RATIOS
HERNDON
VIENNA
FALLS CHURCH
ARLINGTON
FAIRFAX
CLIFTON
ALEXANDRIA
N
V/C Ratio
0.00 - 0.35 (LOS A)
0.36 - 0.50 (LOS B)
0.51 - 0.69 (LOS C)
0.70 - 0.83 (LOS D)
0.84 - 1.00 (LOS E)
> 1.0 (LOS F)
FCDOT
Fairfax County
Department of Transportation
Miles
0 1 2 3 4
1 inch equals 3.551136 miles
Map prepared April 2004 by Fairfax County Department of Transportation
Virginia State Plane Coordiante System, North American Datum 1983, US Survey Foot

The maps do not include potential improvements from mass transit. In particular, the Dulles Rail extension will impact congestion in the Tysons Corner area, and an Orange Line extension to Centreville will impact congestion along I-66 throughout the county. The maps also do not show changes from the proposed HOT lanes on the Beltway.

Both of these improvements have a dynamic component and are more difficult to model accurately. One of the recommendations of this Chapter is to continue studies to better model the effect of transit on congestion and other dynamic aspects of a modern transit system. These improvements are being considered as part of the Transportation Section review of the Comprehensive Plan that is currently under way; the improvements need to be implemented to provide the board with better data to make future transportation decisions.

Frequently the focus of transportation congestion is on big projects, such as the mixing bowl or HOT lanes. This needs to be balanced with regular maintenance of the existing infrastructure. An important policy identified by the Coalition for Smarter Growth is "fix-it-first" to ensure that all state maintenance needs are met and to direct funding to fixing problems on existing roads and transit prior to funding new construction.[11] As infill becomes the primary mode of development, the existing infrastructure will demand more resources to accommodate denser developments.

3. Residential Commuting

An interesting statistic on commuter patterns is that over 50 percent of the residents in Fairfax County work in Fairfax County (see Table II-7), with another 17 percent working in the District of Columbia. Similarly, most of the workers in Fairfax County live in Fairfax County (see Table II-8); however over 80,000 workers commute to jobs in Fairfax County from Prince William and Loudon Counties. Only 12,000 workers commute to the county from the District of Columbia.

4. Transportation Options

Just as the Land Use plan has increased capacity in the same footprint through higher density, the transportation plan needs to accommodate more commuters through denser transportation options. Metro is a good example of denser transportation in a smaller footprint.

[11] http://www.smartergrowth.net/vision/regions/region.html

Table II-7 Where do Residents of Fairfax County Go to Work?		
Destination	**Number of Commuters from Fairfax County**	**Percent of Total Commuters from Fairfax County**
Fairfax Co, VA	278,064	52.72 percent
District of Columbia	88,908	16.86 percent
Arlington Co, VA	48,670	9.23 percent
Alexandria City VA	27,641	5.24 percent
Montgomery Co, MD	16,943	3.21 percent
Loudoun Co, VA	16,420	3.11 percent
Fairfax City, VA	15,741	2.98 percent
Prince George's Co, MD	9,594	1.82 percent
Prince William Co, VA	7,013	1.33 percent
Falls Church City, VA	4,061	0.77 percent
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000[12]		

Table II-8 Where Do Workers in Fairfax County Come From?	
Origin	**Number of Commuters**
Fairfax Co, VA	278,064
Prince William Co, VA	44,322
Loudoun Co, VA	35,933
Montgomery Co, MD	22,148
Arlington Co, VA	20,476
Prince George's Co, MD	18,258
Alexandria City, VA	14,643
District of Columbia	12,244
Stafford Co, VA	7,249
Fauquier Co, VA	5,499
Manassas City, VA	5,145
Source: U.S. Census Bureau, Commuting Patterns of Fairfax County, Virginia Residents, 2000	

As a simple example of the space required for vehicular traffic, consider the Fairfax County Parkway. The 35 miles of paved roadway consume roughly:

35 miles * 5,280 ft/mile * 4 lanes * 14 ft/lane = 10,348,800 ft^2 = 237 acres

This does not count medians or access roads. For comparison, the Pentagon covers 29 acres, or 1/10th the total paved surface of the Parkway. A similar Metro right of way is a much thinner with a higher peak capacity. As the

[12] www.fairfaxcounty.gov/comm/demogrph/publist.htm

county continues to grow, a multi-modal network that continues to increase density and maximize existing infrastructure is needed.

One successful multi-modal option that is already making a difference is the Burke Centre Virginia Railway Express subscription bus route. This is a subscription service that picks up commuters and gets them to the VRE station. The key to such a service is that it makes connections and is consistent.

Additional options that use creativity and provide effective multi-modal options are needed across the county. Combining multi-size buses, pedestrian options and public outreach into a systematic plan will be needed to keep the county moving.

5. Transportation Decision Making

Management of transportation to maximize its usefulness and minimize its adverse impact on the environment is made very difficult because of the complex interrelationships of federal, state, regional, sub-regional and local entities that are all involved in Fairfax County transportation planning and funding. Local initiative in addressing transportation needs is further limited because the commonwealth of Virginia owns and maintains every public road in the county. Even subdivision cul-de-sacs are state roads.

The complexity of solving transportation problems in Fairfax County and mitigating the adverse environmental impact of inadequate or less than optimum projects can be better visualized by reading the Northern Virginia Transit Funding Resource Guide issued by the Northern Virginia Transportation Commission.[13] This Resource Guide describes the many sources of funds that are available for transit projects and lists over 50 federal and 30 state and local funding programs. However, with governments at all levels being faced with a severely reduced capability to fund projects, they cannot provide funding levels to qualify for matching grants of funds from many of these sources.

A variety of funds are available from the federal government, but they all come with strings attached. Federal regulations, standards and guidance must be met before consideration will be given as to whether federal share contributions will be made available toward transportation needs.

In Virginia, the Commonwealth Transportation Board has final approval authority over the six-year transportation program for the entire state. Under guidance of the CTB, the Virginia Department of Transportation is responsible for building, maintaining and operating the state's roads, bridges and tunnels.

[13] Northern Virginia Transportation Commission Web site: http://www.thinkoutsidethecar.org/nvtc.asp Funding Resource Guide: http://www.thinkoutsidethecar.org/pdfs/September%2029,%202003%20Revised%20Transit%20Funding%20Resource%20Guide.pdf

For Fairfax County, the transportation goals are included in, and promulgated through, the Fairfax County Comprehensive Plan. Those projects that are to be funded by county resources are included in the county's Capital Improvement Program. However, transportation projects that are to be funded through state and federal funding are included in the VDOT six-year transportation program.

The Northern Virginia Transportation Coordinating Council has developed a Northern Virginia 2020 Transportation Plan, which is a comprehensive study identifying a multi-modal transportation solution to provide safe, efficient and economical choices for travel and transport of goods. The Plan has become part of the broader planning effort of the Transportation Planning Board of the Metropolitan Washington Council of Governments. Specific projects will be submitted by the commonwealth of Virginia for inclusion in Washington region's financially Constrained Long Range Plan as funding streams open up.

A further description of the interplay of planning and funding of projects between agencies in the Metropolitan Washington area can be found in A Citizens Guide to Transportation Decision-Making in the Metropolitan Region, which is available from the TPB of COG.

The Columbia Pike Transit Alternatives Analysis (Pike Transit Initiative) [14] is a study sponsored by the Washington Metropolitan Area Transit Authority in conjunction with Arlington County and Fairfax County. The study analyzed alternatives for a new high-capacity and environmentally friendly transit service along Columbia Pike from the Pentagon/Pentagon City area to Baileys Crossroads. Working closely with local jurisdictions, neighborhoods and community groups, the study team developed a preferred transit investment for the corridor that will support the county's redevelopment initiatives.

The Columbia Pike Transit Alternatives Analysis describes the preferred "modified streetcar" alternative – an initial streetcar line with supporting bus service – recommended by the study team to be carried forward into the next phase of the project development process. On April 26, 2006, the Arlington County Board unanimously endorsed the Modified Streetcar Alternative as the preferred transit alternative for the Columbia Pike corridor. The Fairfax County Board of Supervisors also endorsed the Alternative on May 1, 2006. These actions permit the project to advance into the next phase of development, which includes environmental documentation, development of a financial strategy and conceptual system design. Currently, the study team is analyzing the funding sources and financing options available to support the proposed transit improvements in the Columbia Pike corridor.

[14] Columbia Pike Transit Initiative: http://www.piketransit.com/

6. Programs, Projects and Analyses

a. Walking and Biking Facilities

There are many potential environmental improvements that can be brought about by providing greater opportunities for non-motorized means to commute, travel or obtain recreation. They include: reducing air pollution caused by traffic congestion; reducing water pollution caused by roadway and parking lot construction made necessary by traffic demands; reducing noise pollution caused by on-road vehicles; and reducing energy consumption required to operate motorized vehicles.

Improved non-motorized transit access by connecting hike/bike paths to the Metro stations and bus stops was one of the major considerations for the 2002 update of Fairfax County's Countywide Trails Plan. The Trails and Sidewalks Committee continues to improve the trail connections to transit facilities by working with Metro, the Virginia Department of Transportation and the Fairfax County Department of Transportation. The committee will review and provide comments during the Dulles Corridor rapid transit stations access planning process. In addition, the FCDOT is conducting a study to inventory and improve bus stop access and safety. The county's Pedestrian Program Manager should review and comment on Metro station studies and the related rezoning and special exception applications to improve the pedestrian access and safety to those facilities. Convenient and safe pedestrian access will encourage more people to use transit facilities, therefore reducing vehicular usage and related pollution in the environment.

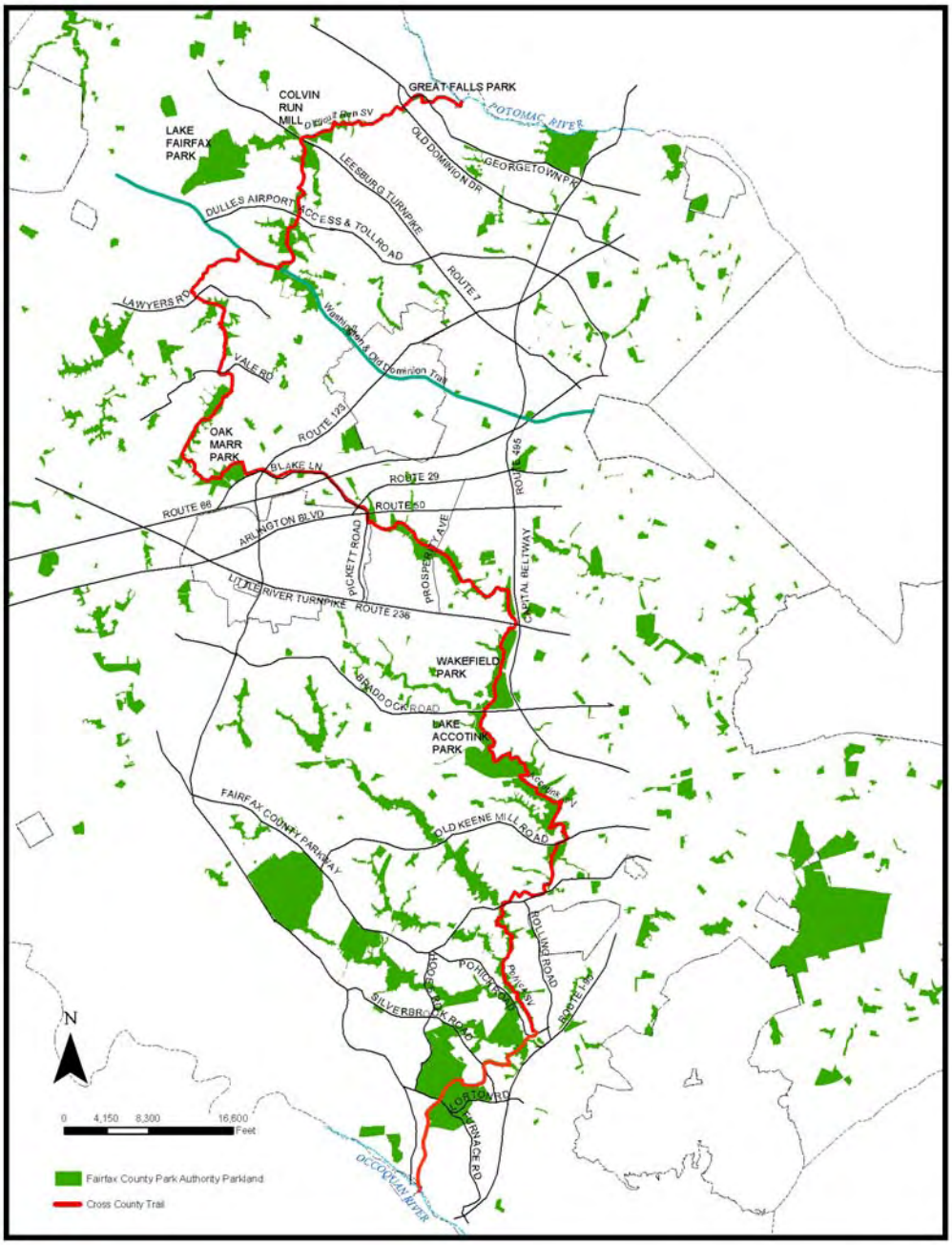
The Countywide Trails Plan added on-road bike routes as a new category of trails. These trails are proposed along routes suitable for commuting and for travel to places for recreational purposes. It is expected that the planned on-road bike routes will be installed with future highway improvements according to the Trails Plan. Currently, there are on-road bike lanes located on Dranesville Road and sections of Beulah Road and Telegraph Road.

The Countywide Trails Plan is developed to provide the general locations of the proposed trails. It does not provide details such as intersection design or mid-block crossing of the street. Those details are examined during the site plan or subdivision plan review process. The site reviewer may need additional training to better detect more of the needs for safe crossing, or to seek advice from the county's Pedestrian Program Manager.

The dream of a multi-use trail crossing Fairfax County from the Occoquan River near Route 123 to the Potomac River at Great Falls is now a reality. After six years of work the Cross County Trail (Figure II-8) was completed in December 2005. This milestone project was celebrated at Trailfest on

May 6, 2006 with more than 10,000 residents participating in the day-long festivities.

Figure II-8: Cross County Trail



Source: Fairfax County Park Authority

It is difficult to predict how many commuters will use the trail, but the trail's completion makes possible connections to Metro stations as well as local trips for areas of shopping, some schools and other trails. With high gasoline prices, more residents are expected to turn to bicycles and other alternative modes of transportation in the future.

The Board of Supervisors' FY 2005 Four-Year Transportation Program funded nearly $11 million for pedestrian projects. The FY 2007 Budget funded $2.5 million for bus stop pedestrian projects. The proposed 2007 Transportation Bond will fund $15 million for additional pedestrian projects and nearly $8 million for additional bus stop projects. This and other programmed funding totals approximately $37 million towards the Pedestrian Task Force's 2006 Ten-Year Funding Goal of $60 million. Construction was recently completed on significant sidewalk segments on Richmond Highway, Little River Turnpike and in Reston. Separately, Fairfax County provided funding to VDOT to install countdown pedestrian signals at over 110 priority intersections. These signals have high visibility lighting and display the walk interval in seconds. Also, the Board of Supervisors approved changes in the Public Facilities Manual, which requires sidewalk construction on both sides of roadways in almost all new subdivisions.

The Transportation Demand Management Proffer Coordinator position was established and filled. TDM proffers decrease single occupant vehicle trips by recording commitments during the land development process to encourage use of car pools, mass transit, walking and bicycling. In addition to promoting alternatives to single occupant vehicle trips, TDM proffers can contain goals for percentage reductions in vehicle trips. These goals can be backed-up by remedies and penalties. This position will oversee TDM proffers and special conditions development, coordinate with developers and staff to create proffers that reduce reliance on single occupant vehicle trips and monitor and evaluate proffer and special condition implementation. FCDOT is also undertaking a consultant study, with a best practices review, to increase the effectiveness and efficiency of the TDM proffer process.

A number of programs are underway as part of the county's Bicycle Initiative:

FCDOT is coordinating with VDOT to re-stripe priority roadway segments for bike lanes as part of several overlay/paving projects. FCDOT is also coordinating with Facilities Management to re-evaluate county facilities in order to make them more bike friendly and accessible.

Work has been initiated to define potential areas for an Interconnected Network Pilot Bicycle Program. Potential sites include Vienna-Dunn

Loring-Merrifield Town Center, Tysons Corner and Seven-Corners-East Falls Church Metro.

A Bicycle Rental Program has been established with ten lockers available at both the Reston East and Herndon Monroe Park-and-Ride lots.

A telephone line (703-324-BIKE), Web page and e-mail box (bicycleprograms@fairfaxcounty.gov) are now operational.

b. Employer Services Program

Fairfax County has a teleworking option for the county staff. An even more significant application of teleworking or telecommunication is part of the county's Employer Services Program. This program partners with area businesses to facilitate the creation and implementation of Commuter Programs. Commuter Programs have been shown to improve productivity, make recruitment and retentions easier and improve morale. The Employer Services Program also partners with businesses and the state and federal governments to encourage telecommuting and the use of mass transit, carpools, vanpools, biking and walking instead of drive alone commuting.

A description of the Employers Service Program can be found on the county's Web site at: www.fairfaxcounty.gov/fcdot/Employer.htm.

The support from the Board of Supervisors and the County Executive, plus the marketing and training campaign and technology enhancements, are working. Increased interest in telework is evident in the number of employees who participate in training sessions, ask for information via email and phone and sign up for telework. There are now teleworkers in departments that previously had none. Managers have expressed an interest in telework as a way to continue business operations during inclement weather or emergencies. The county's active partnership in regional efforts to expand telework keeps it current on best practices and identifies the county as a resource for other businesses on teleworking.

With respect to the county's telework program, the increased publicity and organizational focus on teleworking has resulted in an increase in the number of teleworkers, from 138 in December 2001 to 1,175 in 2006. By the end of 2005, the county had met its goal of 1,000 teleworkers (a number that is based on the Council of Government's goal of 20 percent of the regions' eligible workforce teleworking by 2005). By meeting this goal, it is estimated that county teleworkers potentially saved 59,000 commuting hours and 1.8 million commuting miles in a year. The county will continue to increase the number of county workers who telework and will emphasize telework as an important component of its Continuity of Operations Planning.

c. Community Residential Services Program

This program partners with multi-family complexes, area developers and civic organizations to facilitate the creation and implementation of Community Transportation Programs. These programs have been shown to increase the attractiveness of a residence and impact decisions on where to live. The Community Residential Program promotes telecommuting and the use of mass transit, carpools, vanpools, biking and walking instead of drive-alone commuting.

E. THE INTERRELATIONSHIP BETWEEN LAND USE AND TRANSPORTATION

The above sections presented "Land Use" and "Transportation" as separate environmental issues. The focus of this section is on the interrelationship between land use and transportation. Throughout this chapter, three fundamental observations about Fairfax County have been examined. They are:

- The county is rapidly approaching build-out and is transitioning from a growth focus to redevelopment.

- The county transportation systems are strained by congestion and getting further constrained by sprawl beyond the county.

- The county will continue to grow in population and prosperity. It needs to provide residential, commercial and transportation options for more people.

As the concept plan becomes realized, the transportation infrastructure must be in place to accommodate those new living and working populations. With the county reaching build-out, the transportation options are constrained. Dense options, such as Metro and HOV, are enablers of future growth. Alternatives and choices, such as mixed use development, transit oriented development, telecommuting and flex-work, reduce the amount of transportation that is required.

Combining the land use projections with transportation planning is essential for the county to continue to grow and prosper. By considering the land use and transportation facets of future decisions together, the county can continue to maintain a high quality of life. Conversely, when land use or transportation decisions are made in isolation, they will exacerbate the problems of build-out and congestion and negatively impact quality of life.

The county has already started along this path with the designation of Urban, Suburban and Transit centers. The Board of Supervisors has adopted Comprehensive Plan guidance for several such areas based on the recommendations of board-appointed task forces. The comprehensive results of these efforts have

been impressive, and EQAC anticipates similar results from ongoing and future task force efforts. Equally important are policy changes that encourage more comprehensive planning, such as Transportation Demand Management.

1. Programs, Projects and Analyses

This section outlines projects that have combined elements of land use and transportation via special studies or revitalization districts that incorporate mixed use and transit oriented development.

The establishment of Urban Centers, Suburban Centers and Transit Station Areas (as shown in the Concept Map for Future Development) in critical locations in the county is a fundamental prerequisite to achieving many of those objectives. Significant effort is now focused on the Tysons Corner Urban Center, where plans call for four additional Metro stations. By preparing and planning for future development, the county is making progress towards integrating land use and transportation.

a. Tysons Corner Urban Center

The Comprehensive Plan classifies Tysons Corner as the only Urban Center in Fairfax County: an urban center that is planned for a mixture of high density office, retail and residential uses and parks (including urban parks and active recreation facilities) in a pedestrian-oriented urban environment.

In March 2005, the Fairfax County Board of Supervisors created the Tysons Land Use Task Force to consider the impacts of the four planned Metrorail stations in Tysons Corner. The mission of the Task Force is to gather community input and recommend updates to the Comprehensive Plan for this area. The task force is a 36-member group representing residents, businesses, major employers and community and civic organizations. The task force and the county are working together with the community to create a collective vision for a positive and exciting future for Tysons Corner.

The task force's first task was to study the 1994 Fairfax County Comprehensive Plan and issues related to planning for growth and transit-oriented design. The task force then sought extensive public input to identify key values and concerns for the future of Tysons Corner. In January and February 2006, the task force talked with 424 people – via 20 dialogues and on-line comments – who identified a wide variety of important community values, issues and concerns regarding Tysons' future. These values included creating an increased sense of place in Tysons Corner, improving traffic conditions, protecting surrounding communities, increasing residential options and managing growth, among others.

After considering all of the values and issues raised by the community, the task force identified a set of draft guiding planning principles to provide clear and fundamental direction for planning a future model of Tysons. The Guiding Planning Principles were finalized in October 2006, and can be found at the Tysons Web site. In March 2007, over 300 Tysons area stakeholders participated in six task force workshops to provide input on how future development should be allocated in Tysons Corner and what would make a future Tysons a more livable community. Stakeholders identified the desire for more green space and civic uses; increasing the ability to move around within Tysons; focusing growth at transit stations; achieving higher density around stations; and ensuring lower density on the edge of Tysons. In July, 300 stakeholders attended several public workshops and employee meetings to talk about how these desires might be incorporated into test scenarios at different levels of density which further reinforced issues important for revisions to the Comprehensive Plan. In early 2008, this input will be used to develop two advanced alternatives which will be vetted in public workshops before final recommendations are developed and presented to the Board of Supervisors.

While the Tysons Land Use Task Force is coordinating revisions to the Comprehensive Plan dealing with land use, the project to extend rail into and through Tysons Corner is moving forward. These two projects are closely related, but are not working together because they report to two different authorities. The current schedule for the aerial rail alignment calls for utility relocation to start in fall 2007 with completion by 2012.

b. Dulles Corridor Metrorail Project

Rail service has been envisioned in the Dulles Corridor since construction of Washington Dulles International Airport in the late 1950s, when the right-of-way for future rail was reserved in the median of the Dulles Airport Access Road. The Fairfax County Comprehensive Plan integrates land use and transportation planning for the area from Tysons Corner to Dulles Airport based on the expectation that rail service through Tysons Corner to Dulles Airport will be constructed.

The Dulles Metrorail is a new 23-mile Metrorail line, extending service from the existing Orange Line at the East Falls Church station to Route 772/Ryan Road in Loudoun County. The project environmental reviews are completed and the Virginia Department of Rail and Public Transportation has begun the preliminary engineering process. Construction is expected to start in 2007.

c. Suburban Centers

The county has designated seven areas as Suburban centers. These contain a complementary mixture of office, retail, residential uses and parks (including Urban Parks and active recreation facilities) in a cohesive, moderate intensity setting. The Reston and Merrifield Suburban centers are presented as representative of the comprehensive approach at each area.

Reston Suburban Center: The purpose of the plan for the Reston Suburban Center area is to encourage a more urban and transit-oriented development pattern. The objective is to create, at each Transit Station Area, a pedestrian-oriented core area consisting of mixed-use development that includes support services while maintaining transitional areas at the edges of the Transit Station Area.

Options for development in the Transit Station Areas allow higher intensities based upon compliance with specified conditions. Those options are designed to be site specific.

The Merrifield Suburban Center: On June 11, 2001, the Board of Supervisors adopted an amendment to the Comprehensive Plan that created the Merrifield Suburban Center. The area is served by the Dunn Loring – Merrifield Metro station and has regional and local access from I-66, I-495, Route 29, Route 50 and Gallows Road. As set forth in the Comprehensive Plan, the vision for the Merrifield Suburban Center includes two core areas: one focuses on development near the transit station and the second is planned to evolve into a town center. A new "Main Street" would connect the two core areas. The interrelationship of transportation and land use is evident in the Comprehensive Plan for this Suburban Center, particularly in the following planning objectives for the Suburban Center:

(a) Encourage revitalization and redevelopment of portions of the Merrifield Suburban Center to create more attractive and functionally efficient commercial and residential areas with pedestrian-friendly and transit-oriented environments.

(b) Encourage mixed-use development that includes pedestrian and auto circulation systems that integrate the development both internally and externally, resulting in transit-oriented and pedestrian-friendly environments.

(c) Encourage the development of additional housing (including affordable dwelling units) in the Merrifield Suburban Center so that employees may live near their workplace and transit services, in order to reduce the number and length of commuter auto trips.

(d) Develop a cohesive roadway system that provides a more extensive grid of streets to serve the town center, Transit Station Area, and the area between.

(e) Develop a cohesive pedestrian circulation system linked to open spaces such as plazas, courtyards, greenways, and parkland in order to facilitate walking and reduce reliance on private automobiles.

(f) Develop mass transit options, transportation strategies and planned highway improvements to mitigate traffic impacts in the Merrifield Suburban Center and in adjacent residential neighborhoods.

The Merrifield plan is in the midst of becoming reality. The Merrifield task force spent two years developing the plan as adopted by the county. Between 2001 and 2005 changes in Merrifield were minimal. In 2005 and 2006, significant construction began and there are several large projects currently underway.

The task force approached the plan changes in a new way. It started with the zoning as it existed and created a by-right baseline for what could be constructed. It then had a traffic model constructed based on the by-right baseline. The induced traffic would clearly overwhelm the transportation system. With that knowledge, they created a vision for a workable integrated district. The result is the dual core plan with density around the transit station and a town center away from the transit station connected by a main street. The main street allows traditional moderate rent-based suburban businesses to remain in the district as intense economic development occurs in the new core areas.
The lessons from the Merrifield task force include:

- Understanding the by-right baseline
- Modeling transportation demand and integrating land use and transportation
- Comprehensive land use planning to include community concerns, mixed uses, affordable housing, business stability and economic growth
- Comprehensive transportation planning to include transit oriented development, street grids, pedestrian access, mass transit.

d. Transit Station Areas

The county contains six Metro transit stations with four more slated for Tysons Corner and additional stations stretching through Dulles Airport along the Orange Line. These Metro stations are evolving into the transportation hubs for the county. Redevelopment can be seen at each Metro station. At both the Vienna and Dunn Loring-Merrifield Metro

stations, the Washington Metropolitan Area Transit Authority is in the process of selling land adjacent to the stations to be transformed into transit oriented developments. These transit oriented projects provide the density for future growth with a smaller per-person traffic demand than single family housing that is typical in the county.

Some of the important lessons from the Fairlee development proposed adjacent to the Vienna Metro include:

- Metro Capacity—the Metro system needs to expand to support new riders at these denser developments. Consideration is needed for both additional Metro cars and bottlenecks in the system, such as the Rosslyn tunnel.

- Replacement of Metro Parking—as redevelopment occurs at the transit stations, existing commuters need to be accommodated.

- School Capacity—as density increases, public facilities and schools need to be enhanced and expanded to support new residents.

- Transportation – Transportation Demand Management needs to be in place to verify transportation projections are in line with the development reality and mitigation plans need to be approved in advance. The Fairlee project highlighted the need for better TDM across the county.

- Environmental Issues—include protecting the environment and providing environmental or natural space for residents. Environmental protection includes stormwater management as well as preserving air quality, managing waste, recycling and "green" building to minimize energy consumption. Environmental opportunity means that additional open space needs to be preserved for a denser human population.

- Mix of Uses—the mix of uses should help to create a synergy of uses resulting in an opportunity for both current and new residents to walk to shopping and other services in their neighborhood.

- Protection of Stable Neighborhoods— any increased density should be focused and constrained in a core area of the Metro station platform. The purpose of focusing density is twofold: first, TOD studies show that the highest percentage of transit ridership is generated by development within ¼ mile of the platform and that transit ridership drops off past the quarter mile. Secondly, the protection of stable neighborhoods requires that higher density be constrained and that density does not creep beyond clear, logical boundaries.

These lessons were specifically identified in the Fairlee Comprehensive Plan motion with specific language written into the Plan amendment to address them. As other transit stations are developed, similar consideration will be required.

e. Summary

With the advent of build-out and the continued growth within the county, new development will be much more complicated then the initial development within the county. There will be changes imposed on existing residents and businesses and impacts that are both real and perceived. Integrated land use and transportation planning is essential to maintain our quality of life into the future.

From an environmental perspective, the initial development of the county created a baseline that currently exists. As redevelopment occurs, be it at higher density or simply expanding existing development, the county goal should be to improve the existing baseline. There is no need for any further environmental degradation.

By continuing to integrate land use and transportation planning, the county can change and grow without sacrificing our quality of life.

F. ACCOMPLISHMENTS

Over the past years, Fairfax County has made changes to improve the county's ability to integrate land use and transportation.

- Adopting the Board of Supervisors Environmental Vision and creating the Environmental Improvement Plan to achieve that vision.

- Implementation of the Integrated Parcel Lifecycle System, which replaced UDIS and integrates land use data into the county's award winning GIS.

- Completing the demographic survey, which collects important data about future projections for the county population and residents' issues through 2025.

The county has also initiated several studies and task forces working on specific land use and transportation projects:

- The Tysons Land Use Task Force charged with providing recommendations to update the 1994 land use plan for Tysons Corner.

- The Planning Commission work on Transit Oriented Development, Low impact Development standards and Transportation Demand Management.

- The GIS Outreach Committee to better understand residents' needs and concerns for GIS information.

Several lessons have also been incorporated into the county planning process and the Area Plan reviews. Every proposed project includes staff analysis of induced transportation, educational and environmental impacts. This systematic modeling is an accomplishment and EQAC encourages continued incorporation of new modeling information for proposed projects.

The county also achieved the significant goal of 20 percent staff participation in telework.

G. COMMENTS AND ONGOING CONCERNS

1. Build on the County's Successes

EQAC commends the Board of Supervisors for actively supporting teleworking among the county staff and by employers throughout the county and for reaching its goal of 20 percent participation by county staff. EQAC encourages the county to publicize this success, publish the best practices and lessons learned and encourage others to follow. The county should also continue to work with the federal government and other jurisdictions to encourage them to set similar goals, and the county should work with the Virginia Congressional Delegation to secure resources to establish teleworking sites within the county.

2. Improve Transit Utilization

EQAC recommends that the county focus on improving transit utilization through a systematic plan that includes multiple options within a community. For example, the Virginia Railway Express Burke Centre EZ Bus provides a convenient alternative to commuting to the Burke Centre VRE station. This can be combined with pedestrian improvements, more connector bus options and biking trails that together provide a diverse transportation plan.

3. Comprehensive Understanding

The county is very good at understanding micro changes in the county. EQAC is concerned that the county is missing the macro effects of these micro changes. The new IPLS system provides a base capability to capture and analyze the changes. EQAC's recommendations in the past to replace UDIS identified specific benefits. EQAC will continue to work with staff as IPLS evolves to realize those benefits:

- Evaluate planning issues and development options, account for Comprehensive Plan changes and capture real time plan changes.

- Facilitate public safety and plan for emergency preparedness.
- Forecast future growth.
- Understand and analyze land use at a finer resolution and provide information on mixed use.
- Evaluate the environmental effect of each parcel and provide data necessary for modeling and understanding the cumulative effect of development.

EQAC commends the county for its decision to acquire a full set of planimetric data and oblique imagery. The full planimetric data layer is an important addition to the gathering of base land use data. Oblique imagery is just starting to be leveraged, but it can transform the way the county plans land use.

4. Disparate Authorities

EQAC is concerned that the county does not have sufficient authority over transportation decisions that are in the county's best interest. The Governor's decision on the Tysons Corner aerial rail alignment, even though all parties agreed the tunnel was preferable, shows how conflicting goals will result in inferior results. The aerial route will create less efficient transportation around the rail pillars, resulting in more air pollution in the urban core, less available surface area to manage and mitigate environmental impacts and inefficient entrance and egress at stations disconnected from the surrounding buildings.

The Virginia HOT Lane project is also of concern and needs to be monitored closely. This project directly impacts the county but is being managed by VDOT with two private companies, Fluor and Transurban.

5. Green Buildings

The county is making strides to encourage green building in new developments. EQAC commends this effort and encourages the county to expedite policies that encourage green building and energy conservation practices as part of the land use planning process.

H. RECOMMENDATIONS

1. Land Use and Transportation Vision and Assessment

The current Fairfax County Comprehensive Plan traces its roots back to the Planning Land Use System program that culminated in 1975 and the "Goals for Fairfax County" adopted in 1988. Numerous reviews and regular updates have occurred over the past 30 years, yet as stated in the current Plan: "Many of the key components of the 1975 Plan remain in the revised Plan, such as the emphasis on focusing growth in "Centers"; decreasing automobile dependency;

and protecting environmentally sensitive areas and stable neighborhoods. What has changed are some of the means to achieve these ends."

As the county approaches build out, EQAC recommends that the county:

a. Evaluate the State of the Plan and publish an updated version of the State of The Plan, An Evaluation of Comprehensive Plan Activities between 1990-1995 with an Assessment of Impacts through 2010 (published in 1996) to cover plan activities between 1995-2005 and assess impacts through 2025. The current process of reviewing each section does not provide a comprehensive review of the interrelationships between sections, especially Land Use and Transportation, and does not review the underlying principles of the Plan.

b. Assess the state of the county with respect to the Planning Land Use System Principles set forth in 1975 and the reality 30 years later. The PLUS Principles and planning approach were designed to achieve the following:

   - To increase local employment (in a period when Fairfax County was still primarily a bedroom suburb on the fringe of the urban core).
   - To decrease reliance on the private automobile by reducing the length of work trips and making mass transit facilities more easily accessible.
   - To reduce pressure for development in environmentally sensitive areas.
   - To preserve stable neighborhoods.
   - To lower costs by more efficient provision of public services.

   The Comprehensive Plan provides guidance to balance these competing goals. This assessment will help clarify the historical lessons learned and identify areas that have proven successful at a macro level across the county and where it needs to be strengthened for a future vision.

2. Data and Modeling

a. As noted throughout this chapter, EQAC commends the county for developing the GIS and data infrastructure necessary to integrate Land Use and Transportation planning and modeling. EQAC recommends that these tools and capabilities continue to be pushed out for use by the general public. EQAC understands that there are financial and training costs associated with these advanced technologies, but EQAC recommends that the county find ways to further empower the public and leverage its existing investments.

b. EQAC recommends that the county begin leveraging three-dimensional models in the planning process. The first step is to maximize the use of

oblique data in the planning process, especially the Area Plans Review process. New proposals should include three-dimensional data that can be overlaid with county data to create realistic models.

c. EQAC recommends that the county invest in models that leverage GIS capabilities and county data. This includes:

- Runoff models that use impervious surface data.
- Improved transportation models that incorporate multi-modal systems.
- Analysis of the macro effects of land use and transportation decisions.

These models should highlight congestion, air quality, commuting patterns and health effects for use in future decisions.

Such information is necessary as the county becomes more complex and densely developed. The county should also require Transportation Demand Management studies and plans for significant new development projects.

LIST OF REFERENCES

A Network of Livable Communities, Evaluating Travel Behavior Effects of Alternative Transportation and Community Designs for the National Capital Region; Chesapeake Bay Foundation and Environmental Defense Fund, 1996.

Chesapeake Bay Foundation and Environmental Defense Fund, May 1996- A Network of Livable Communities, May 1996.

Coalition for Smarter Growth, Blueprint for a Better Region--Policies for Implementing Smart Growth Solutions to Traffic Congestion in the D.C. Region
www.smartergrowth.net/vision/regions/region.html

Columbia Pike Transit Initiative--Columbia Pike Transit Alternatives Analysis, July 2005
http://www.piketransit.com/downloads/PTI-Final-Rpt-Cover.pdf

Fairfax County, Virginia, Policy Plan: The Countywide Element of the Comprehensive Plan, 2000 Edition.

Fairfax County, Virginia, Tysons Corner Urban Center Element of the Comprehensive Plan, 2000 Edition.

Fairfax County, Virginia, Upper Potomac Planning District (Reston-Herndon Suburban Center and Transit Station Area) Element of Comprehensive Plan, 2000 Edition, Amendment No. 2000-1 adopted May 21, 2001.

Fairfax County, Virginia, The Merrifield Suburban Center, 2000 Edition, Amendment No. 2000-02 adopted June 11, 2001.

Fairfax Plan Monitoring, State of the Plan, An Evaluation of the Comprehensive Plan Activities between 1990-1995 with an Assessment of Impacts trough 2010, May 1996

McLean Citizens Association, Resolution on the Dulles Corridor DEIS, August 14, 2002.
Washington Regional Network for Livable Communities, Making the Most of Metro: Community Building Through Transit, undated.

Northern Virginia Transportation Commission, Northern Virginia Transit Funding Resource Guide, Revised Sept 2003.

Steven R. Suder, Memorandum to the TCC Technical Committee, Expanded Technical Committee, and Citizen Advisory Committee and attachment regarding Draft Land Use and Transportation Study, January 26, 2001.

Texas Transportation Institute, 2003 Urban Mobility Study at: http://mobility.tamu.edu/ums/mobility_data/tables/washington_dc.pdf.

The Washington Metropolitan Area Transit Authority Fact Sheet at:
www.wmata.com/about/metromattersfactsheet.pdf

Transportation Coordinating Council of Northern Virginia, Task Force on Land Use and Transportation, "The alternative transportation and land use activity strategies study." March 28, 2001.

Virginia Department of Rail and Public Transportation and Washington Metropolitan Transit Authority, Draft Environmental Impact Statement and Proposed General Plans for the Dulles Corridor Rapid Transit Project, June 2002.

OTHERS

Walkable Communities:
www.walkable.org/

Virginia Bicycling Federation:
www.vabike.org/

An excellent bibliography of additional resource materials on the land use and transportation can be found at the Web site of the Washington Regional Network for Livable Communities: http://www.washingtonregion.net/programs/index.html

CHAPTER III

AIR QUALITY

III. AIR QUALITY

A. ISSUES AND OVERVIEW

1. Introduction

We guarantee good air quality by monitoring the air for specific contaminants and taking action against those who cause the contamination level to exceed allowed limits. This is a federal-state-regional-local partnership. Fairfax County's major responsibilities involve conducting the monitoring of air quality and coordinating with regional organizations on plans intended to reduce air pollution and improve air quality. More recently, the county has also taken a leadership role beyond the limits of its traditional air quality partnership and has helped formulate and has subsequently adopted a program to reduce gases that may be the cause of global warming.

With regard to traditional air quality matters, EQAC notes that over the last several years, Fairfax County has demonstrated its commitment to being an active partner in improving the region's air quality. EQAC is pleased with the efforts taken by the Board of Supervisors and county staff to promote and encourage clean air initiatives and practices. Among the efforts deserving special notice are the following:

- Diesel retrofits: Following on significant prior year actions, 91 buses are in the process of being fitted with the catalyzed diesel particulate filters as needed to help reach attainment with the new PM 2.5 ambient air quality standard.

- Wind energy purchase: Fairfax County has agreed to purchase 10 percent of its electricity from renewable, non-carbon sources. The county makes this purchase with knowledge that it must pay a premium price for the electricity, but does so as part of its leadership promoting use of non-carbon energy nationwide.

- Air quality outreach: The county has been proactive in its efforts to inform county employees and residents about air quality programs and ways to reduce air pollution. The Office of Public Affairs and the Health Department have been working together to create public education materials about the dangers of ground-level ozone and particle pollution, and actions that county employees and county residents can take to promote cleaner and healthier air in this region. Materials they've developed for adults and children are being distributed in government offices, libraries, recreation centers, community meetings and at many outreach events such as the county fair, *Celebrate Fairfax.* In addition, articles on air quality have been distributed through internal county publications and external outreach, including NewsLink, Web sites, cable Channel 16 and homeowners associations. The county also has a notification program that involves the posting of Air Quality Action Day forecasts on Fairfax County Government Cable Television Channel 16 and the county Web site, as well as

sending e-mail notifications to all county employees. These messages include appropriate actions to take to reduce contributions to ozone formation. Some actions currently practiced by Fairfax County government when a Code Red Day for ozone is forecast include: the refueling of vehicles after sunset; the restriction on the use of non-essential motorized operating equipment; encouraging employees to telework and teleconference to participate in meetings; and the offering of free trips on the Fairfax Connector buses.

- Alternative Fueled Vehicle Purchases: The county favors purchase of low-emission hybrid drive vehicles when appropriate for replacement of vehicles being retired. The current county fleet has 99 hybrid-electric vehicles (56 Toyota Prius, one of which is a plug-in hybrid, and 43 Ford Escape sport utility vehicles). While these vehicles reduce the level of traditional pollutants controlled under the Clean Air Act, concerns have been raised by some regarding the extent to which these vehicles may have a large carbon footprint related to their manufacture.

- The county uses green building practices in all new buildings and renovation projects. In 2007, the county opened Fire Station No. 42 (the Crosspointe station) and is seeking certification under the Leadership in Energy and Environmental Design program for that building. The county also opened the Kate Hanley Family Shelter which has been certified under the Green Globes program.

- In addition the county has numerous tree preservation and planting efforts (see the Ecological Resources chapter of this report), all of which increase capture of greenhouse gases and reduce air conditioning costs when strategically placed to shade buildings.

The remainder of this section introduces some important topics to which the county either has responded or will have to respond.

a. Massachusetts v. EPA – Carbon Dioxide and Global Warming

The U.S. Supreme Court has concluded that CO_2 is an air pollutant and has ordered the U.S. Environmental Protection Agency to work with the U.S. Department of Energy to determine how to address this pollutant in mobile sources. Notably, the Supreme Court recognized that the USEPA could revisit whether CO_2 is a pollutant if it applies reasoning other than what it previously used.

b. Clean Air Interstate Rule – Help Reduce SO_2 and NOx

On March 10, 2005 the U.S. Environmental Protection Agency issued the Clean Air Interstate Rule, which is expected to achieve the largest reduction in air pollution in more than a decade. CAIR requires 28 eastern states (including the states in the Metropolitan Washington region) to permanently cap emissions of sulfur dioxide and nitrogen oxides. This rule was put into place to address the fact that EPA has determined that upwind states are contributing significantly to nonattainment of

eight-hour ozone and fine particulate/$PM_{2.5}$ standards in downwind states. Implementation of the rule should assist nonattainment areas in achieving the National Ambient Air Quality Standards. States covered by CAIR, including Virginia, must submit state implementation plans including control measures to reduce emissions of NOx and SO_2. EPA is requiring that emissions reductions be implemented in two phases. The first phase of NOx reductions start in 2009 (covering 2009 – 2014) and the first phase of SO_2 reductions start in 2010 (covering 2010 – 2014). The second phase of reductions for both NOx and SO_2 starts in 2015. The emissions reductions requirements are based on controls that are known to be highly effective. When fully implemented, this rule is expected to reduce SO_2 emissions by over 70 percent and NOx emissions by over 60 percent from 2003 levels.

Based on air quality modeling conducted by the Metropolitan Washington Council of Governments, Fairfax County expects a 20 percent reduction in NOx, an important precursor in the formation of ozone. These reductions are an important part of the Washington region's portion of the Clean Air Act State Implementation Plan, a plan to reduce air pollution in our region. Actual reductions in the metropolitan area along with reductions of transported NOx will be critical to attaining the federal standard during ozone season.

This EPA action provides for the NOx SIP Call cap and trade program to be replaced by the CAIR ozone-season NOx trading program. The Virginia Department of Environmental Quality reports this regulation was approved by the State Air Pollution Control Board. The rule includes a voluntary public health set-aside to which affected plants can donate excess emission credits and thus speed attainment of federal air quality standards affecting the county. The proposed rule also has an efficient energy/renewable energy set-aside, which could allow the county to get emission credits for its wind energy purchase and energy efficiency programs in county buildings. These credits would then be retired, lowering the allowable emissions in the state. The state would also be able to use these control measures in the SIP, demonstrating further progress toward meeting the ozone standard.

This rule also includes revisions to the Acid Rain Program regulations streamlining the operation of the Acid Rain SO_2 cap and trade program. The effective date for the Acid Rain Program change is July 1, 2006. This EPA action provides for the NOx SIP Call cap and trade program to be replaced by the CAIR ozone-season NOx trading program.

One oft-voiced concern about this rule is that it allows trading of emission credits and, as a result, although emission will go down, they may not go down in our neighborhoods if the local power plant chose to purchase emission credits rather than make the reductions themselves. There are four large power plants (major sources under the Clean Air Act) within the Washington area and some of these cases those power plants have emitting considerable quantities of NOx in this area

as a result of decisions to purchase emission reduction allowances outside of the Washington Metropolitan air shed.[1] A particular concern for the Washington area is the Potomac River Generating Plant in Alexandria. In the past, the plant produced NOx emissions well in excess of its state operating permit, although it has since come into compliance. In a recent joint federal-state settlement of an enforcement case against the owner of the plant, Mirant Mid-Atlantic agreed to annually eliminate nearly 29,000 tons of harmful NOx pollution generated by its four electricity generating plants in Maryland and Virginia. Although Mirant planned to meet this NOx reduction target by adding pollution controls at its Maryland plants, it has also taken steps to reduce NOx at the Potomac plant as well. Notably, to reduce NOx pollution at the Virginia plant, Mirant is employing pollution control that requires use of ammonia, which is stored on the site. The Commonwealth of Virginia, in consultation with the Department of Energy, is addressing particulate matter impacts from the Potomac River Generating Plant through a separate proceeding.

c. Planning for the New Eight-Hour Ozone and Particulate Matter Standards

EPA published final non-attainment designations for the eight-hour ozone standard in April 2004. The Metropolitan Washington area, which includes Fairfax County, was designated a moderate non-attainment area. EPA revoked the one-hour ozone standard on June 15, 2005 and the eight-hour ozone standard is now in force. The Metropolitan Washington region has now developed a new SIP showing how it will attain the eight-hour ozone standard by 2010. The Metropolitan Washington Air Quality Committee, the air quality planning group for the Washington region, along with its Technical Advisory Committee has been working on a plan for development of the eight-hour SIP and identification of additional emission control measures. On May 31, 2005, Virginia Governor Mark Warner, Maryland Governor Robert Ehrlich, Jr. and D.C. Mayor Anthony Williams signed a Memorandum of Understanding creating the **Interstate Air Quality Council**. The Council consists of six members: the secretaries of the environment and transportation from each of the three governments. The IAQC will provide overall guidance and streamline planning to ensure the states and the District meet their shared goals of improved air quality, including compliance with new federal standards for ozone and fine particulates, and efficient transportation. The IAQC will work in concert with the air quality and transportation committees of the Metropolitan Washington Council of Governments to achieve its goals. All of this serves to make the point that the advent of the eight-hour standard continues to leave little doubt that this new standard will inevitably make air quality management activities in the county considerably more difficult.

In December 2004, EPA designated the Metropolitan Washington region as a non-attainment area for fine particle pollution, also known as $PM_{2.5}$. The designation became effective on April 5, 2005. Nonattainment areas are required by early 2008

[1] Three of these plants are in Maryland (Morgantown, Chalk Point and Dickerson) and one is in Virginia (the Potomac River Generating Plant in Alexandria).

to submit a SIP to EPA defining the expected methods for reducing the fine particulate matter level in the air and emissions of $PM_{2.5}$ precursors. MWAQC and TAC are in the final stages of completing this plan. It appears that the ongoing activities at the state, regional and local levels will result in attainment of the standard by 2010, much of which will be due to improvements in truck engine designs that have now entered the market and will be the major form of truck propulsion by 2009.

In 2005, the county once again had exceedances of the eight-hour ozone standard and there were more days with exceedant levels than in 2003 and 2004. In addition, exceedances of the one-hour ozone standard returned to the 2003 and 2004 level. As the county moves away from the one-hour standard and into the eight-hour standard, the direct implications of chronic nonattainment, especially of the eight-hour standard, will become a much more serious matter in the region. Fairfax County must continue to work with the MWAQC to develop control measures that can be implemented in the region to attain compliance with the ozone standard and, because of violations within the county, needs to expand its own technical staff in order to promote compliance.

d. Conformity Planning Requirements and Status

The purpose of the air quality conformity analysis is to assure that planning for transportation activities is consistent with air quality attainment/management targets. In non-attainment areas such as the metropolitan Washington area, the Constrained Long Range Plan for transportation and Transportation Improvement Program cannot be fully implemented if, collectively, the projects included in them result in emissions (of certain criteria pollutants) in excess of the limits established by the region's air quality plan, the state implementation plan.

The Metropolitan Washington region was previously designated as a severe non-attainment area, under the one-hour ground level ozone standards. The region had to demonstrate attainment of the standards by November 2005. The region developed a plan to do this and established limits on emissions of volatile organic compounds and nitrogen oxides from the transportation (mobile) sector. The one-hour ground level ozone standard was revoked in June 2005 and replaced with a tougher, eight-hour ground level ozone standard. The region did demonstrate attainment of the one-hour ground level ozone standard by November 2005. The region is classified as a moderate non-attainment area under the new eight-hour standard and has until June 2010 to demonstrate attainment of the standard. The region is currently developing a new plan to demonstrate attainment, which will establish new limits of VOC and NOx emissions from the transportation sector. The plan was completed and submitted to the state air agencies by the June 15, 2007 deadline. The region has continued to perform the conformity analysis on its CLRP and TIP. Per US EPA's conformity regulations, the emissions limits set in the one-hour ozone plan are being used to demonstrate conformity. Once new emissions limits are set by the eight-hour SIP, transportation plans and programs

will have to conform to these new limits. It is expected that the new limits on VOC and NOx emissions limits will be lower than those set under the one-hour plan.

Additionally, in December 2004, EPA designated the Metropolitan Washington region as nonattainment of the standards for another criteria pollutant, Particulate Matter (expressed as "$PM_{2.5}$"). The Metropolitan Washington region will have to demonstrate attainment of the $PM_{2.5}$ standards by April 2010. The region's SIP to attain the $PM_{2.5}$ standards is due to the US EPA by April 2008. The designation as a $PM_{2.5}$ non-attainment area had an immediate affect on transportation planning in the region in that it had a one-year grace period, starting April 5, 2005, in which to demonstrate the $PM_{2.5}$ emissions from transportation sector would not be increasing in future years. If such a conformity demonstration were not completed by April 6, 2006, the CLRP and TIP would have lapsed. This would have halted further federal funding and approval of transportation improvement projects. The Transportation Planning Board, the designated Metropolitan Planning Organization for the region, working with the Metropolitan Washington Air Quality Committee and all three air agencies in this region, and following the U.S. EPA guidelines for conformity analysis, completed its $PM_{2.5}$ conformity analysis in December 2005. This analysis was approved by the Federal Highway Administration and the Federal Transit Administration in February 2006.

The region has plans to develop a detailed plan to demonstrate attainment of the $PM_{2.5}$ standards. This plan will establish new limits on the amount of $PM_{2.5}$ emissions from transportation sector. Once this $PM_{2.5}$ plan is finalized, the region will have to limit $PM_{2.5}$ emissions from the projects in the CLRP and TIP to these new levels.

2. Air Quality Status in Northern Virginia

a. Hazardous Air Pollutants and Enforcement

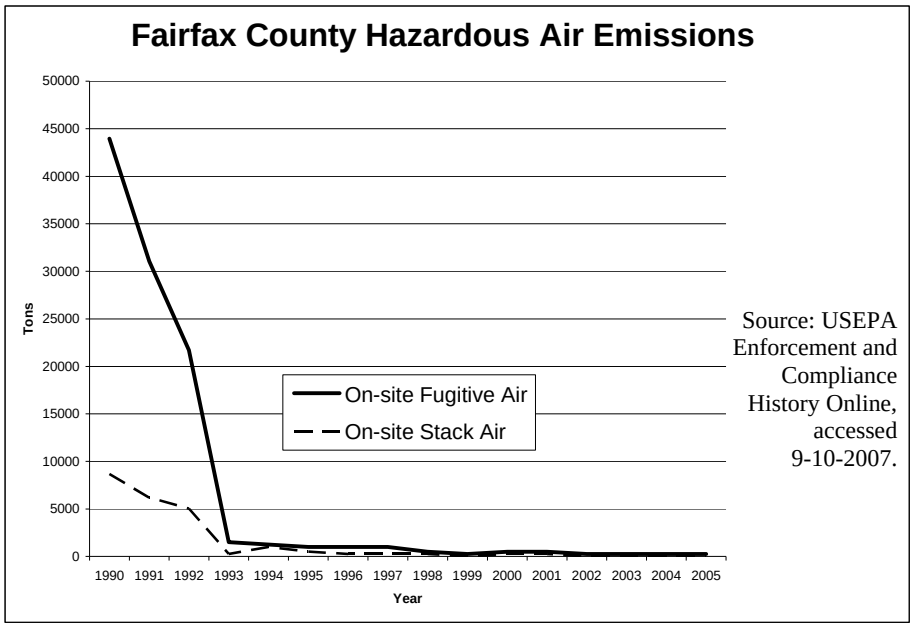
The United States Environmental Protection Agency tracks the emission of hazardous air pollutants from stationary sources, including sources in Fairfax County. Some of these emissions are discharged through smoke stacks and some emerge from the source without treatment and are designated as "fugitive" emissions. All are regulated under law. As of this report, six of the 78 Fairfax County pollution sources that have enforceable permits have violated the emission limits in their permits during 2006. These are:

- U.S. Army – Fort Belvoir (Nitrogen oxides, a precursor to smog)
- Upper Occoquan Sewage Authority (particulate matter, a precursor to smog)
- NEXTEL Communications Of The Mid Atlantic, Inc, (Nitrogen Oxides, Sulfur Dioxide)
- National Air & Space Museum (Nitrogen Oxide)
- Motiva Enterprises LLC, (volatile organic compounds, a precursor to smog)
- George Mason University, (Nitrogen oxides).

Notably, all six of these firms are emitting pollutants that contribute to smog and which cause the metropolitan area to violate the national ozone standard. Unfortunately, the county has no means to enforce against these firms or to lend them technical assistance or otherwise work with them to reduce their pollution. In 1997, Fairfax County returned its enforcement of air pollution regulations to state control and eliminated most air pollution related positions. At this time, the county needs an additional technical staff person to work with violators and to conduct technical outreach to the other facilities that have the potential to pollute the air, many of which are minority-owned small businesses whose owners have little understanding of air pollution requirements and still less expertise with which to deal with them.

Despite these violations, EPA data show a low level of hazardous pollutants in Fairfax County. Figure III-1 displays the most recent information on hazardous air pollutant emissions within the county.

Figure III-1: Hazardous Air Emission Air Quality Trend



b. Ground-level Ozone

The Metropolitan Washington area, including Fairfax County, was classified as a severe non-attainment area for the one-hour ozone standard and a moderate non-attainment area for the eight-hour ozone standard during 2004. The obtain compliance with the eight-hour standard, the three year average of the fourth-highest daily maximum eight-hour average value at each monitoring site in a region

must not exceed 0.08 ppm. Ozone is a precursor to smog and can cause breathing problems for those sensitive to smog, especially those with asthma.

c. Ozone Exceedances in 2006

The U.S. Environmental Protection Agency evaluates compliance with ozone standards by examining the maximum level daily ozone levels at each monitoring site within the Washington metropolitan area. Because there can be unusual ozone levels that are beyond reasonable human control, EPA disregards the three highest days and examines the fourth-highest daily maximum levels at each monitor. It averages these levels for each monitor over three years to determine whether the area has attained the air quality required by the federal ozone ambient air quality standard. Attainment of the ozone standard in the Metropolitan Washington area will require each monitoring site in the region to have a three-year average equal to or less than 0.08 ppm.

Monitors in Fairfax County recorded violations of the eight-hour ozone standard on eleven days during the 2006 ozone season. The Washington region registered 21 days with violations of the eight-hour standard during the 2006 season.

Various studies have shown that much of the Washington Metropolitan area ozone problem originates west of the area and is beyond the control of Virginia, Maryland and the District of Columbia. The purpose of the U.S. EPA Clean Air Interstate Rule is to address these extra-state sources of pollution so that downwind areas can attain national ambient air quality standards. Without controls on those sources to the north and west, the region will not be able to meet the eight-hour ozone standard. Implementation of CAIR will help reduce ozone transport into the region, but staff will have to continue to work with EPA and regional planning groups to ensure that transport is controlled in any way possible. Unfortunately, since the 1996 reduction in force, the county's air program does not have sufficient staff to adequately participate in the many local, regional and state air programs with which the county has a standing duty to cooperate and support.

d. Air Quality Trends

The Metropolitan Washington Council of Governments analyzes monitors air quality data in the metropolitan region. In a recent news release (dated September 2007), COG states that the air quality in this region is improving. COG reports that ozone levels have decreased over the past decade, even on hot, dry summer days when ozone most often forms. In addition, air quality monitors throughout the region have measured lower concentrations of ozone and more monitors are now in compliance with the standard. COG stated that the metropolitan Washington region now has 45 percent fewer days of air pollution from ground level ozone since 2003 than it did in preceding years.

According to COG and the Fairfax County Health Department, in 2006 there were two one-hour ozone exceedances in the Metropolitan Washington Region, both in Fairfax County (Figure III-2). However, the eight-hour ozone standard is making it more difficult for the region to meet the federal standard (Figure III-3, Figure III-4 and Table III-1). This indicates that the county needs to expand its air quality planning and technical support efforts.

Figure III-2: Air Quality Trends in Relation to a One-Hour Ozone Standard

Ozone Exceedant Days
One-Hour Standard
Source: Fairfax County Health Department

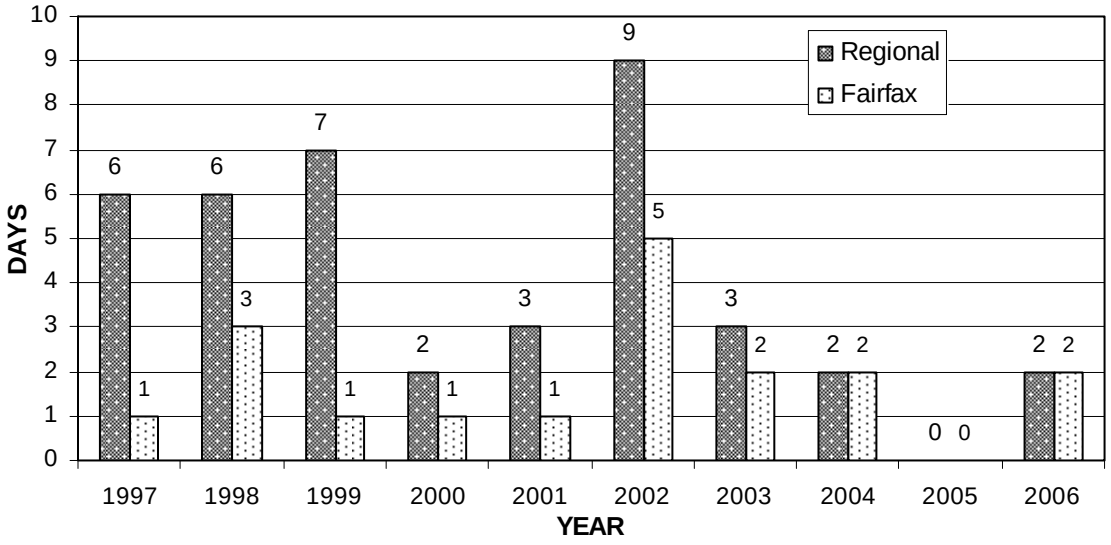
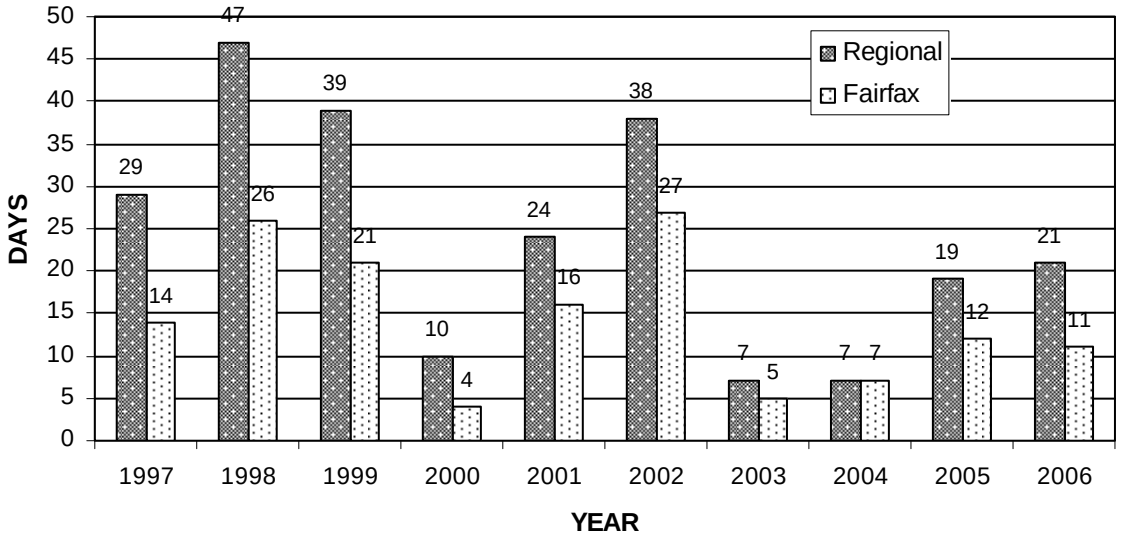


Figure III-3: Air Quality Trends in Relation to an Eight-Hour Ozone Standard

Ozone Exceedant Days
Eight-Hour Standard
Source: Fairfax County Health Department



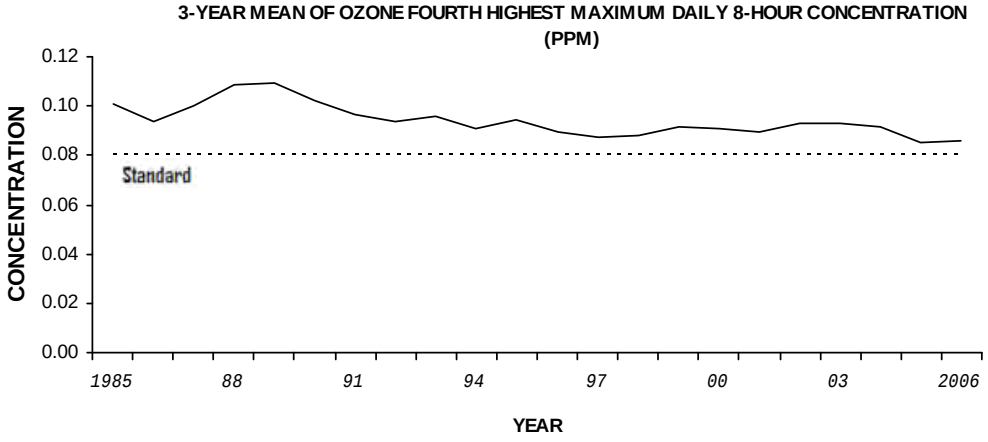
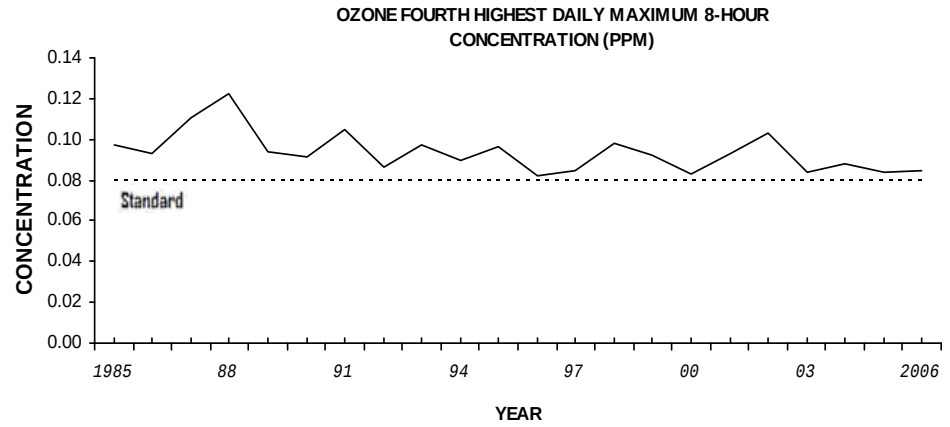
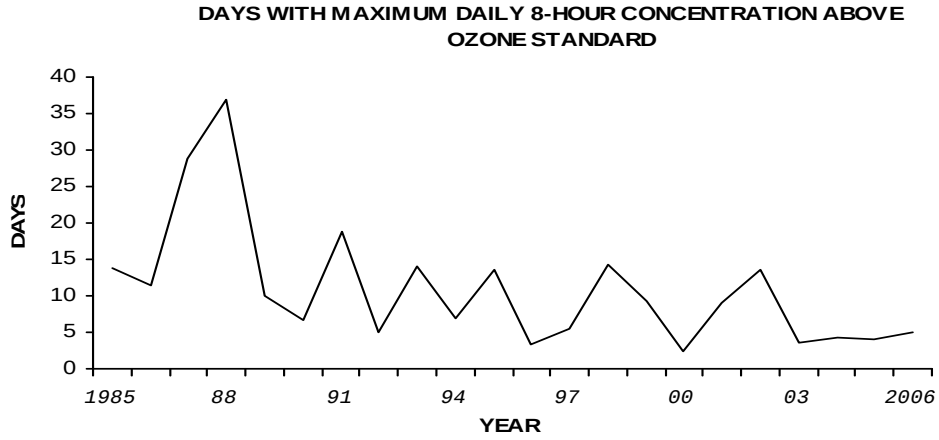


Figure III-3: Air Quality Trends in Relation to an Eight-Hour Ozone Standard (continued)

Source: Fairfax County Health Department/Fairfax County Monitoring Sites, VDOT





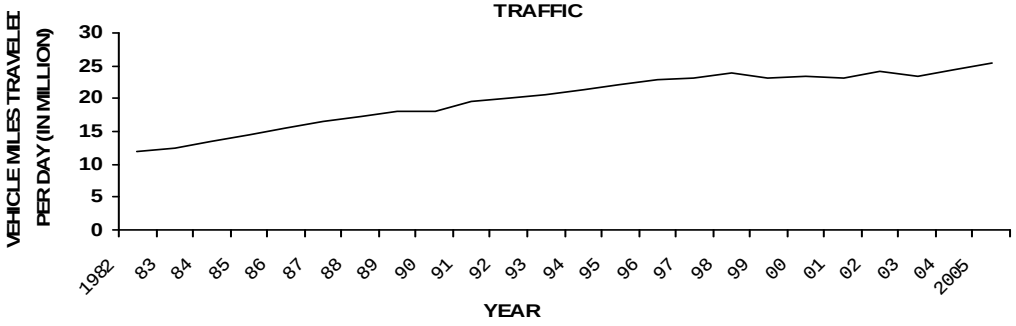


Table III-1: Regional Eight Hour Ozone Exceedances, 2006		
Date	**Number of Stations that Exceeded the Standard**	**Maximum Values in the Metropolitan Statistical Area; Maximum Eight-Hour Ozone (ppm)**
5/29/2006	3	0.088
5/30/2006	12	0.102
5/31/2006	10	0.102
6/1/2006	5	0.098
6/17/2006	2	0.091
6/18/2006	2	0.090
6/21/2006	1	0.091
7/11/2006	1	0.086
7/17/2006	10	0.116
7/18/2006	8	0.125
7/19/2006	6	0.100
7/31/2006	1	0.086
8/1/2006	2	0.100
8/6/2006	1	0.088
8/16/2006	1	0.085
8/17/2006	1	0.086
8/18/2006	1	0.086
8/23/2006	6	0.090
8/24/2006	2	0.086
8/25/2006	7	0.087
8/26/2006	1	0.090

Source: Metropolitan Washington Council of Governments.

B. MAJOR PUBLIC AGENCY RESPONSIBILITIES

1. Introduction

Although compliance with National Ambient Air Standards and resulting air quality management responsibilities is a function of federal law, in Fairfax County these responsibilities have been split between the commonwealth of Virginia and the regional metropolitan planning organization, on which Fairfax County holds a seat and which the county staff is required to support. MPOs are set up under the Clean Air Act in metropolitan areas with populations in excess of 50,000. In more difficult situations, MPOs are multi-jurisdictional, as is the case in the Washington MPO. Members of MPOs are appointed by the governors and mayors of affected jurisdictions to represent areas included in the MPO. The MPO works with state departments of transportation and transit providers in identifying transportation needs and priorities. They make transportation investment decisions for the metropolitan area and, by default, for the individual regions encompassed within the MPO.

2. Commonwealth of Virginia

a. Virginia State Air Pollution Control Board

This board is authorized to propose policies and procedures for air quality regulatory programs, including emissions standards for landfills and vehicles.

b. Department of Environmental Quality

This department is responsible for establishing or adopting standards for air quality, air quality monitoring and vehicular inspection and maintenance programs. Prior to 1996, Fairfax County held responsibility for enforcement of these state and federal requirements. Thereafter, upon Fairfax County's rejection of this role, DEQ has the default enforcement responsibility.

c. Virginia Department of Transportation

This department is responsible for planning, developing, delivering and maintaining transportation for the traveling public.

3. Region – The Metropolitan Washington Council of Governments, the Metropolitan Washington Air Quality Committee and the National Capital Region Transportation Planning Board

COG is the Metropolitan Washington regional planning group that works toward solutions to regional problems related to air and water quality, transportation and housing. COG also manages other programs such as those responsible for forecasting demographic changes. The MWAQC, which is a part of COG, is responsible for all air

quality planning in the Metropolitan Statistical Area identified under Section 174 of the Clean Air Act. The authority of MWAQC is derived from the certifications made by the Governors of Virginia and Maryland and the Mayor of the District of Columbia. MWAQC was established to conduct interstate air quality attainment and maintenance planning for the Metropolitan Washington region. Members are appointed and Fairfax County currently has three members of the Board of Supervisors on the committee. The Transportation Planning Board serves as the designated MPO for the Washington region and is responsible for regional transportation planning and conformity. The TPB is staffed by the Department of Transportation Planning, which is part of COG. Members of the TPB are appointed, and Fairfax County currently has two members of the Board of Supervisors sitting on the TPB. TPB and MWAQC work together on air quality and transportation issues. COG is also responsible for issuing air quality indices on a weekly basis.

a. MWAQC Technical Advisory Committee

This committee was established to advise and assist MWAQC in planning for and maintaining the region's air quality. Members review technical issues and documents before they are submitted to MWAQC for review and approval.

b. Interstate Air Quality Council

On May 31, 2005, Virginia Governor Mark Warner, Maryland Governor Robert Ehrlich, Jr. and D.C. Mayor Anthony Williams signed a Memorandum of Understanding creating the Interstate Air Quality Council. The council consists of six members: the secretaries of the environment and transportation from each of the three governments. The IAQC provides overall guidance and streamlined planning to ensure the states and the District meet their shared goals of improved air quality, including compliance with new federal standards for ozone and fine particulates, and efficient transportation. The IAQC works in concert with the air quality and transportation committees of COG to achieve its goals.

c. Forecasting Subcommittee

This subcommittee considers how to monitor and report the new eight-hour ozone standard and how to devise guidelines for issuing health alerts during the ozone season.

d. Attainment Subcommittee

This subcommittee considers evidence for the case that the Washington non-attainment area can attain the eight-hour ozone standard with the control measures already adopted.

e. Conformity Subcommittee

This subcommittee reviews Air Quality Conformity Determinations prepared by the TPB to ensure that regional transportation plans are consistent with plans to improve air quality. This includes verifying that estimated emissions from mobile sources, such as cars, trucks and buses, do not exceed the mobile budget, a cap on regional mobile emissions contained in the region's air quality plan.

f. Air Quality Public Advisory Committee

This committee has been established to provide a vehicle to brief residents on actions pending before MWAQC. This committee functions as an important source of feedback from the public on air quality concerns in the metropolitan area.

g. Control Measures Workgroup

This workgroup was established to research control measures and develop a plan of emission reducing control measures for the region to implement in an effort to reach attainment for ozone. With the recent designation of $PM_{2.5}$ nonattainment, this group will add emission-reducing control measures for attainment of this standard to its duties.

4. County of Fairfax

a. Department of Health, Division of Environmental Health, Air Quality Module

The county's Air Quality Section sits within the Department of Health's Environmental Health Division. Due to the 1997 budget (July 1996-June 1997), the section suffered a massive Reduction in Force that has now translated into a skeleton staff unable to meet all existing needs. The staff went from 12 members down to five. The enforcement section was completely eliminated along with the meteorologist position. Regulatory enforcement activities on facilities reverted back to DEQ. In addition, the Air Quality Section had an Air Quality Planner position that had been transferred to the Department of Planning & Zoning in 1982. The RIF completely eliminated this position as well. The section currently has five staff (three technical field inspectors, one data analyst and one program manager) to operate the air program in a county that is larger than seven other states.

This division is authorized by the Fairfax County Code, Chapter 103, in cooperation with federal and state agencies, to conduct an air monitoring program. In the past, this division has provided consultative services to those requesting assistance in indoor air quality issues and other air quality-related matters. If there is a substantial threat to public health, on-site investigations are provided concerning indoor air quality and exposure to toxic substances in non-occupational, indoor environments. A representative from the Health Department now sits as a member of the MWAQC Technical Advisory Committee and functions as a conduit to

communicate with the county on air quality issues of concern to MWAQC. At the present time, the Air Quality Program Manager represents Fairfax County on this committee.

During a time of growing regulatory mandates and the need to coordinate and manage the increasingly complex body of information relevant to air quality planning in Fairfax County, EQAC notes that an Air Quality Program Manager position, alone, is not sufficient to ensure adequate county participation on these planning functions. EQAC also notes the need for greater technical support to county businesses and to the public with regard to both Clean Air Act responsibilities and to energy and climate change agendas being adopted by the commonwealth and the county.

The Air Quality Section continues its monitoring network in the county measuring levels of criteria pollutants in an effort to measure compliance with the National Ambient Air Quality Standards. All of the monitoring data obtained from these sites goes into the National Air Quality Database.

b. Department of Transportation

This agency is responsible for the planning and the coordination of improvements that reduce both congestion and the vehicle miles traveled.

C. PROGRAMS, PROJECTS AND ANALYSES

1. Regional Air Quality Planning

The county's Air Quality Program Manager continues to work closely with the Director of Environmental Health and the Fairfax County Environmental Coordinator to manage air quality efforts on behalf of the county. In light of new regulations for particulate matter, the continuing failure to attain the national ozone standard and the growing demand for assistance regarding the relationship between energy use and greenhouse gases, EQAC notes the need for additional technical staff support within the Air Quality Program.

D. CONCLUSIONS AND OBSERVATIONS

1. EQAC recognizes the increasing responsibilities associated with a growing set of regulatory mandates, continuing failure to attain national ozone and particulate matter standards and growing activities associated with greenhouse gases. EQAC also recognizes that the county now has need of some of the expertise it lost in 1996, specifically with regard to technical compliance assistance staff and a meteorologist.

2. EQAC lauds the county for focusing on air quality management and working with COG and others involved in regional planning, but notes that the county has a greater role to play and cannot meet that responsibility without additional technical staff. EQAC continues to note with gratification the county's SIP (VOC and NOx) emission reduction strategies for both short-term ozone action days and long-term ongoing initiatives, although EQAC again notes that county outreach is severely limited from lack of technical support to local facilities. The pattern of ongoing violations identified above discloses the need for local compliance assistance if the area is to reach attainment of the standard. Although it is recognized that regional planning has attempted to develop control strategies to address this problem, they have not provided compliance assistance to local violators, nor has the commonwealth initiated either informal or formal enforcement against local violators. Thus, county action to reach out to these violators, all of whom are sophisticated enterprises, is needed if we are to reach ozone attainment. Further, to maintain such attainment, the air quality management staff feels, and EQAC agrees, that the county needs a continuing technical outreach capability it does not now have.

3. Based on the discussions that have occurred among EQAC, the ECC and the Planning Commission, EQAC understands the problems and concerns and even the limitations associated with the long-range nature of land use planning as it relates to transportation and air quality. EQAC will continue to interact in that venue to try to constructively address the issues that have been discussed there. Meanwhile, EQAC continues to welcome the opportunity to be as interactive as possible with the Air Quality Subcommittee and its activities.

E. COMMENTS

EQAC offers two new recommendations and reiterates and updates its previous recommendations as presented in the 2006 Annual Report on the Environment:

1. County staff should continue to participate in the regional planning efforts through the Metropolitan Washington Council of Governments in identifying both quantifiable and qualifiable emission reduction measures and strategies to reduce air pollutants so that the Clean Air Act standards can be attained. EQAC continues to recommend close coordination and communication between EQAC and the county on strategies and activities necessary to comply with the ozone and fine particle standard.

2. EQAC is pleased with the work of the county's Air Quality Subcommittee that included a variety of air quality management strategies as shown in the interim report and Clean Air Café menu that was presented to the Board of Supervisors' Environmental Committee. EQAC recognizes that a significant number of projects that are shown in the report and menu have been funded and implemented. EQAC commends the board on its strong support for air quality and recommends that the board continue to fund air quality projects and initiatives that are shown in the county's Environmental Improvement Program.

3. EQAC is also pleased to see the air quality outreach effort that the county has started. By getting the word out to people we can obtain voluntary actions and efforts to help improve the region's air quality. EQAC recognizes that this outreach effort would not be possible if it were not for the board's strong support in funding air quality monitoring equipment replacement and outreach and education efforts in FY 2005 through FY 2007. EQAC commends the board for this effort and recommends that the board continue to fund the air quality outreach program. The Air Quality Subcommittee should continue promoting clean air education programs and initiatives and find ways to expand their audience.

F. RECOMMENDATIONS

1. EQAC recommends that the county add one supervisory staff position to provide needed compliance assistance, program coordination and public outreach in order to help eliminate ozone-related air pollution violations occurring within the county, in order to reach full compliance with PM 2.5 ambient air quality standards and in order to ensure adequate participation in regional planning activities. A supervisory staff position would support: the review of environmental impacts for projects and actions; extension of necessary support to address Board Matters related to Air Quality and the environment; participation in regional planning efforts through the Metropolitan Washington Council of Governments; legislative reviews; program coordination; and expanded outreach efforts to businesses and schools.

LIST OF REFERENCES

2005 Ozone Data Information, Fairfax County Health Department, Air Quality Section, Division of Environmental Health

Agency Responses to the Environmental Quality Advisory Council Recommendations Contained within the 2005 Annual Report on the Environment

Air Pollution Has Declined Significantly Since 2003; Metropolitan Washington Council of Governments News Release dated September 27, 2006

Clean Air Interstate Rule, www.epa.gov/air/interstateairquality/index.html.

Federal Register, Part II, 40 CFR Parts 51, 72 et al, Environmental Protection Agency dated May 12, 2005.

Virginia, Maryland and the District of Columbia Partner to Improve Air Quality, Office of the Governor News Release dated May 31, 2005.

Regional Summit, Interstate Air Quality Council Memorandum, dated May 31, 2005.

Fine Particle Standards, Air Quality Conformity Assessment, Metropolitan Washington Council of Governments dated June 8, 2005.

Transportation Conformity Rule Amendments for $PM_{2.5}$ Standard, www.epa.gov/otaq/stateresources/transconf/index.htm

Virginia DEQ Web site, www.deq.state.va.us/ozone/

Declaration on Air Quality Leadership, (memorandum from the County Executive to senior management team dated February 12, 2003).

Implementation of Available Ozone Action Best Practices, (memorandum from the County Executive to senior management team dated July 21, 2003, describing the background and objectives for the Air Quality Sub-Committee and attaching its Charter).

State Implementation Plan ("SIP" or "Severe Area SIP") to Improve Air Quality in Washington, DC – MD – VA Region, (final SIP and appendices available at the MWCOG Web site (www.mwcog.org/environment/air/).

Air Quality Management/Fairfax County, (memorandum from the Environmental Quality Advisory Council to the Deputy County Executive dated August 28, 2002).

Correspondence dated November 15, 2002, from the Deputy County Executive to EQAC describing the intentions of the county with respect to air quality in response to the August 28, 2002, memorandum from EQAC.

Fairfax County Web site: http://www.fairfaxcounty.gov/airquality

USEPA Enforcement and Compliance History Online (ECHO) http://www.epa-echo.gov/echo/

CHAPTER IV

WATER RESOURCES

IV. WATER RESOURCES

A. ECOLOGICAL OVERVIEW

Water resources include streams, ponds, lakes and groundwater. These resources serve as sources of drinking water, recreation, stormwater conveyance and habitat for numerous organisms. Water quality can be significantly impacted by land disturbances and surface runoff. Over the past several years, Fairfax County has demonstrated a strong commitment to restore and protect its water resources through a variety of management efforts and public outreach initiatives. Unless water resources are managed properly, increasing demands put on watersheds, such as rapid development, can create many problems.

1. Watersheds

A watershed is a discrete area of land that drains to a common stream, river system or larger body of water. Watersheds include both surface water and groundwater. Everyone lives in a watershed. Large watersheds typically have sub-watersheds. There are 30 separate watersheds in Fairfax County (Figure IV-1). The largest watershed is Difficult Run (58 square miles) with ten streams that drain into the main stream, Difficult Run, which, in turn, drains into the Potomac River. The Potomac River watershed is a sub-watershed of an even larger watershed, the Chesapeake Bay watershed, which has an area of 64,000 square miles and includes portions of the states of New York, Pennsylvania, Delaware, West Virginia, Maryland and Virginia as well as the District of Columbia. All Fairfax County streams are in the Potomac River watershed and subsequently the Chesapeake Bay watershed.

2. Streams

Fairfax County is criss-crossed by a number of streams, often called runs or creeks. These streams are important aquatic habitats. Rainfall soaks into the earth and drains to low points in the surrounding land, and then emerges from the ground as seeps, springs and trickling headwaters. These small streams join with others in the same drainage area to create a stream system. There is a natural progression in size from the smallest tributaries to the largest rivers into which they eventually flow. Perennial streams flow throughout the year and intermittent streams flow only part of the year. There are approximately 860 miles of perennial streams in Fairfax County. One-third of the land in the Fairfax County Park system, approximately 7,000 acres, is comprised of stream valleys. These stream valleys are significant corridors for wildlife and the county trails system.

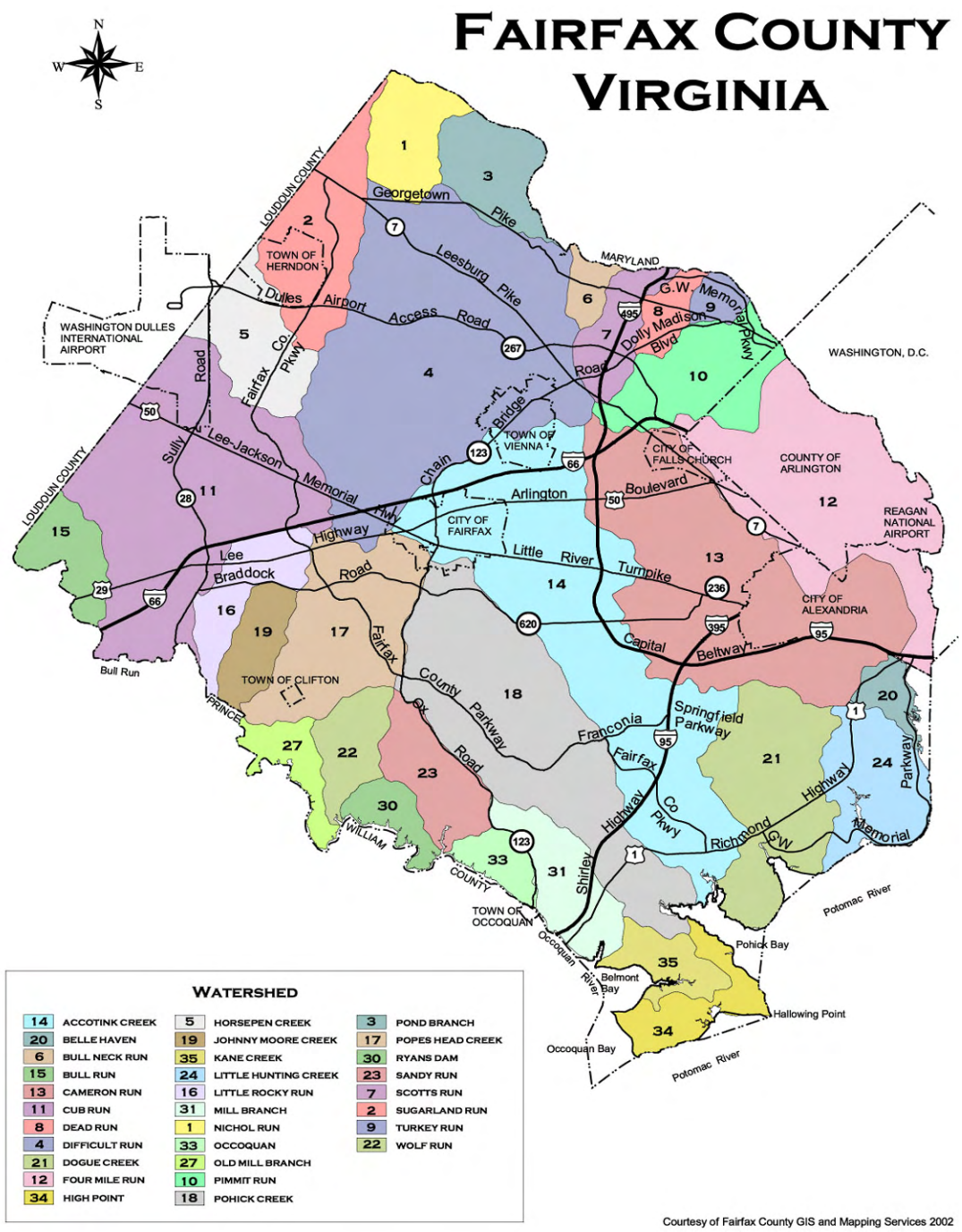


Figure IV-1: Fairfax County Watershed Map

The bottom, or bed, of a stream can consist of boulders, cobbles, gravel, sand and/or silt. The type and amount of substrate in a stream makes up the in-stream habitat. Within a stream are shallow, fast flowing areas called riffles. Dissolved oxygen levels are high because water is flowing over rocks, mixing air into the tumbling water. Alternating with riffles are deeper pools and runs where flows slow and particles of inorganic and organic matter fall to the bottom and oxygen levels are reduced. Streams support a diverse community of plants and animals that spend all or part of their life cycles in the water.

The aquatic food chain begins with leaves and other decaying plant and animal material called detritus. These materials are carried into the stream from the surrounding forests and fields by wind and water runoff. Aquatic vegetation such as algae is also an important food source. Benthic (bottom–dwelling) macro (large) invertebrates (without a back-bone) eat this organic matter. Benthic macroinvertebrates include aquatic insect larvae such as stoneflies, mayflies, caddisflies and true flies as well as snails, clams, aquatic worms and crustaceans such as crayfish. Fish, birds and other streamside wildlife, such as frogs, salamanders and small mammals, eat these macroinvertebrates.

3. Riparian Buffers

The area of trees and other types of vegetation adjacent to and lining the banks of streams is called a stream buffer or a riparian area. These areas are essential for healthy streams. The temperature in a stream greatly affects how much oxygen it can hold. Since cooler water holds more oxygen, shade providing trees and vegetation are vital along the edges of streams to help maintain cooler water temperatures so the water will hold more oxygen.

Tree cover provides food and shelter when leaves and branches fall into a stream. Streamside forests offer food, nesting sites and protection to a great diversity of wildlife, including birds, turtles, beaver and snakes. Tree roots help stabilize stream banks and provide cover for fish, crayfish and aquatic insects. Riparian areas help slow down and filter runoff. Excess nutrients carried in runoff are absorbed by vegetation.

B. IMPACTS ON WATER RESOURCES

1. Point and Nonpoint Source Pollution

Water pollution originates from either nonpoint or point sources. Nonpoint sources include surface runoff, atmospheric deposition and groundwater flow. Because of their diffuse and intermittent nature, nonpoint source pollution is difficult to control. Nonpoint source pollutant loads are greatest following rainfall and high flow events. A significant part of the nonpoint source load consists of nutrients, including nitrogen and phosphorus (organic matter, fertilizer), which stimulates algal growth. Other nonpoint source pollutants are sediment (from erosion, construction sites, eroded stream banks,

road sand), toxics (oil, paint, pesticides, chemicals and metals), pathogens and bacteria (animal waste, failing septic systems and leaking sewer systems) and trash.

Point sources are specific locations that discharge pollutants such as a discharge pipe. Because they are relatively constant and provide a steady flow of pollutants, they are easier to monitor and control. In the Potomac River watershed, most point sources are wastewater treatment plants or industrial discharges. Unlike nonpoint sources, point sources contribute relatively small portions of the nutrient loads during high flows and the majority during low flows.

2. The Effect of Imperviousness

As development occurs, natural areas that once had vegetative cover capable of absorbing water and filtering pollutants are replaced by impervious surfaces such as roads, driveways and buildings. With the increase in impervious surface and loss of vegetative cover, there is a concurrent increase in the amount and speed of stormwater runoff flowing into streams. Increased uncontrolled runoff causes stream erosion, resulting in scouring, down cutting and over-widening of stream channels and loss of streamside vegetation. Loss of shade results in increased water temperatures. During summer storms, runoff from heated impervious surfaces also raises water temperatures. In urban and suburban watersheds, rain flows off impervious surfaces such as parking lots and highways, carrying oil and other automobile wastes into streams. When stream channels become incised from down cutting, they become disconnected from their floodplains. Water cannot get out of the banks onto the adjacent floodplain where flows can be dissipated and drop their sediment loads. High flows stay in the channel, resulting in increased erosion. Silt and sediment from erosion smother the stream bottom and destroy in-stream habitat for sensitive benthic macroinvertebrates.

Simultaneously, this results in an increased number of floods in downstream areas, due to the increased volume of water. Over time, increased erosion, flooding and sediment deposition leads to habitat loss, water quality problems and damage to utilities and infrastructure.

C. SURFACE WATER MONITORING AND ANALYSES

The Fairfax County Department of Public Works and Environmental Services, Fairfax County Park Authority, Virginia Department of Environmental Quality, local water treatment plants and other organizations regularly conduct water quality monitoring and testing. The Audubon Naturalist Society and Northern Virginia Soil and Water Conservation District also coordinate volunteer water quality monitoring programs. All of these data help provide a comprehensive understanding of the condition and health of Fairfax County's water resources.

1. Countywide Watershed and Stream Assessments

a. Stream Protection Strategy Baseline Study

The Stream Protection Strategy Baseline Study, published in 2001, provides a holistic ecological base-line assessment of county streams. The study provides information on fish taxa, benthic macroinvertebrates, general evaluation of watershed and stream features and calculations of the percent impervious cover within each watershed. The Stream Protection Strategy Baseline Study can be viewed online at: www.fairfaxcounty.gov/dpwes/environmental/sps_main.htm.

b. 2006 Annual Report on Fairfax County's Streams

This annual report provides results from sampling conducted in 2005. The report provides data from monitoring efforts and analyses of *E. coli* bacteria, water chemistry, benthic macroinvertebrates and fish. Monitoring sites are randomly selected using a probability-based stratification model or stratified random approach. Most county streams are in the "fair" to "very poor" condition or "unacceptable" based on fish and benthic macroinvertebrate monitoring data. The percentage of streams rated as "good" or "excellent" showed a slight decline from 2004. In 2005, there was an increase in sites that had better conditions for fish communities.

In 2005, fewer sites exceeded the water quality standard for *E. coli* bacteria than in 2004. Ten percent of the bacteria monitoring sites had concentrations that were consistently below state water quality standards (235 cfu/100 mL). Water quality chemical parameters that were monitored included pH, water temperature, specific conductance, nitrate, total phosphorus and dissolved oxygen.

Sampling results indicated that three-quarters of the county's stream ecosystems are impacted or impaired. Future sampling sites will continue to be randomly selected throughout the county. Project specific monitoring will also occur as more stream restoration and low impact development projects are implemented throughout the county. The 2006 Annual Report on Fairfax County's Streams can be viewed on-line at: www.fairfaxcounty.gov/dpwes/stormwater/streams/streamreports.htm.

c. Physical Stream Assessment

Completed in 2004, the Stream Physical Assessment Study provides field reconnaissance data for the county's watershed management plans including information on habitat conditions, impacts on streams, general stream characteristics and geomorphic classification of stream type. The Countywide Stream Assessment can be obtained by contacting the Fairfax County Stormwater Planning Division at 703-324-5500.

d. Perennial Stream Mapping

In 2003, the Board of Supervisors adopted a revised Chesapeake Bay Preservation Ordinance in order to comply with amendments to the state's Chesapeake Bay Preservation Area Designation and Management Regulations. The ordinance incorporated changes to the designation criteria for Resource Protection Areas to include water bodies with perennial flow, resulting in a significant expansion to the county's RPAs.

On November 17, 2003, based on the Perennial Streams Identification and Mapping program conducted by DPWES staff, the Board of Supervisors adopted new Chesapeake Bay Resource Protection Area maps, increasing the amount of stream miles protected by 52 percent (from 520 to 860 miles).

In 2004, the Quality Assurance/Quality Control Study of the Perennial Streams Identification and Mapping was conducted. A total of 10 percent of the streams initially surveyed between 2002 and 2003 were selected for the QA/QC study. The results of the QA/QC Study were presented to the Board of Supervisors in 2005 along with revised Chesapeake Bay Preservation Area Maps, which were approved.

The Fairfax County Stream Classification Protocol, Field Data Sheets, QA/QC study and the county's revised map of Chesapeake Bay Preservation Areas are available online at: www.fairfaxcounty.gov/dpwes/watersheds/perennial.htm.

2. Volunteer Water Quality Monitoring Programs

The Northern Virginia Soil and Water Conservation District and the Audubon Naturalist Society coordinate and manage volunteer stream monitoring programs in Fairfax County.

NVSWCD volunteers conduct biological and chemical monitoring and a habitat assessment, using the Save Our Streams protocol four times a year. The District added bacterial and temperature monitoring programs in 2005. There were 25 active monitoring sites in 2006. Information about the NVSWCD volunteer monitoring program can be found at http://www.fairfaxcounty.gov/nvswcd/monitoring.htm.

The ANS program uses a modified version of the EPA's Rapid Bioassessment II protocol, which includes assessment of in-stream and streamside habitat parameters and a survey of benthic macroinvertebrate populations. There are five monitoring stations in Fairfax County.

Both programs include training and certification of volunteer monitors, equipment, data management and analysis and quality control. Data are forwarded to Fairfax County, Virginia Department of Environmental Quality, Virginia Save Our Streams and other interested organizations. This program helps supplement the county's monitoring programs including the Annual Report on Fairfax County's Streams.

3. Fairfax County Park Authority Stream Monitoring

The Park Authority continues to support volunteer stream monitoring programs through partnerships with NVSWCD and ANS. Stream monitoring is conducted by staff and volunteers at Ellanor C. Lawrence, Riverbend, and Lake Accotink Parks.

Water quality monitoring was conducted at seven sites in Huntley Meadows Park in 2006 using the Rapid Bioassessment II protocol. Fifteen samples were collected, six from Dogue Creek and nine from Barnyard Run. On Dogue Creek, two samples were rated "good", three were "fair" and one was "poor". On Barnyard Run, one sample was rated "good", two were "fair" and the remaining six samples were "poor".

4. Virginia Department of Environmental Quality

DEQ performs long-term trend monitoring at 14 streams that are either in Fairfax County or border the county. DEQ has eight monitoring stations in the county. Monitoring was conducted from 2004 through 2006. DEQ staff conducts biological monitoring at four stations in the county. Failure to meet designated water quality standards may result in a stream being placed on the 303(d) list for impaired state waters.

5. Metropolitan Washington Council of Governments--The Chain Bridge Monitoring Program

Since 1983, the Metropolitan Washington Council of Governments has contracted with the Occoquan Watershed Monitoring Laboratory to operate the Chain Bridge monitoring station on the Potomac River. The purpose of this monitoring station is to measure water quality in the Potomac River as it crosses the fall line and enters the Potomac estuary. Parameters collected include dissolved oxygen, biological oxygen demand, turbidity, temperature, conductivity, total suspended solids, fecal and total coliforms, chlorophyll-a and nutrients.

The Chain Bridge monitoring station consists of an automated sampler that simultaneously monitors the river stage at Little Falls while directly sampling at Chain Bridge, about 1.5 miles downstream, in response to changes in river flow volume. Base and storm event samples are taken throughout the year and a storm event is monitored using a series of discrete samples taken incrementally at equal river flow volumes throughout the storm. These samples are combined into one composite for laboratory analysis. Grab samples are taken directly from the river on a weekly to biweekly basis (these are combination base flow or discrete storm event).

6. Occoquan River

The Occoquan River straddles the southern border of Fairfax County and the northern border of Prince William County. The river has been dammed near the town of

Occoquan. The Occoquan Reservoir, created by the damming, serves as one of two primary sources of drinking water for Fairfax Water, which operates a facility along, and withdraws water from, the reservoir. Because of its use as a drinking water source, water quality in the reservoir is highly monitored and water from a sewage treatment plant upstream of the reservoir is carefully treated.

a. Occoquan Watershed Monitoring Laboratory

The Occoquan Watershed Monitoring Program is administered by the OWML and has been in operation since 1972. It is funded by Fairfax Water and the six jurisdictions within the watershed: Fairfax, Prince William, Loudoun and Fauquier Counties; and the cities of Manassas and Manassas Park. The program consists of nine stream monitoring stations (automated flow monitoring at all and storm sampling at most) and four Occoquan Reservoir stations. Base flow sampling in the streams and all sampling in the reservoir is done manually. In addition to surface and bottom water samples, profiles of DO, temperature and pH are also obtained at the reservoir stations. Sampling is done weekly during the growing seasons and biweekly or monthly (if ice is present) in winter. Past water quality data indicate little change in water quality in the watershed. The Lake Manassas program is used for monitoring water and sediment at seven stream stations and eight lake stations. The eutrophication status of the Occoquan Reservoir and Lake Manassas is moderately eutrophic.

The OWML monitors quarterly for synthetic organic compounds in the watershed in a program established under the recommendation of EQAC in 1982 for water samples. In 1988, the OWML began monitoring for SOCs in sediment and fish samples within the reservoir. The Lake Manassas program also funds SOC monitoring. The most frequently detected SOC is atrazine, usually detected in springtime and early summer when it is being land applied. Concentrations “are usually lower” than the maximum contaminant level of three micrograms/liter for drinking water. The pesticide dual (metolachor) and phthalates are regularly found in concentrations one or more order of magnitude below the MCL.

7. Kingstowne Monitoring and Stream Restoration

During the July 2004-2005 monitoring period, storm events and base flow samples were collected and analyzed to determine pollutant loads in Dogue Creek. Based on the monitoring data, sediment removal efficiencies for the 1,148 acre watershed were achieved for all storm events. The phosphorus removal rate did not meet the 50 percent removal requirement of the South Van Dorn III permit. DPWES is working with the Army Corps of Engineers to resolve the problem.

In 1999, DPWES, Northern Virginia Soil and Water Conservation District, the USDA Natural Resources Conservation Service, the Friends of Huntley Meadows, and the Citizens Alliance to Save Huntley formed a partnership to restore a stream in the Kingstowne area, with the help of a grant from the Virginia Department of

Conservation and Recreation. The Kingstowne stream is a tributary of Dogue Creek, receives runoff from a 70 acre watershed and is upstream of Huntley Meadows Park. Monitoring and testing have substantiated that the stream segment is stable, erosion has been brought under control and water quality and habitat in the stream are improved.

8. Gunston Cove Aquatic Monitoring Program

Gunston Cove is the site of the outfall of Fairfax County's Noman M. Cole, Jr. Pollution Control Plant. The primary objective of this George Mason University program is to determine the status of the ecological communities and physical-chemical environment in the Gunston Cove area of the tidal Potomac for evaluation of long-term trends. This helps provide the basis for well-grounded management strategies to improve water quality and biotic resources in the tidal Potomac. Twenty years of data from Gunston Cove and the nearby Potomac River provide valuable long-term trends that will aid in the continued management of the watershed and point source inputs.

For a copy of the "Ongoing Aquatic Monitoring Program for the Gunston Cove Area of the Tidal Freshwater Potomac River 2004 & 2005" Final Report (Draft October 17, 2006), contact R. Christian Jones, Professor and Project Director at George Mason University.

9. Total Maximum Daily Loads

A Total Maximum Daily Load is a watershed-specific plan for bringing an impaired water body into compliance with the Clean Water Act goals. A 1999 Consent Decree required the state to develop TMDL plans for all impaired streams listed on the 1998 303(d) Impaired Waters List by 2010.

A total of 19 water bodies in Fairfax County are included in Virginia's listing of impaired waters. Ten of the water bodies are multi-jurisdictional. Of the listed water bodies, 12 are riverine systems totaling 58.45 miles, six are estuarine with a total area of 23.23 square miles and one is a drinking water reservoir (Occoquan) with an area of 1,700 acres. The cause of the impairment for the majority of riverine systems is either fecal coliform bacteria or impacts to benthic macroinvertebrates. For the estuarine water bodies, the cause of impairment is bacteria and/or PCBs in fish tissue. According to the schedule, seven water bodies require TMDL studies to be completed by 2010, nine by 2014 and three by 2016.

Bacteria TMDLs have been established for three stream segments in the county, including one section of Four Mile Run and two sections of Accotink Creek.

Bacteria and benthic TMDL plans have been or are being developed for seven tributaries to the Occoquan River. EPA approved TMDLs for Popes Head Creek, Bull Run and the Occoquan River in 2006. TMDLs for the lower section of Accotink Creek and for Difficult Run are to be developed by 2008.

The county is participating in a cooperative effort between Maryland, the District of Columbia and Virginia to develop a TMDL for PCBs for the Tidal Potomac River. County staff tracks developments of new TMDLs and addresses impairments on streams segments located within the county. Watershed management plans advocate best management practices to address uncontrolled stormwater runoff and associated pollutant loading to streams.

a. Accotink Creek TMDL

Due to high levels of fecal coliform bacteria, a 4.5 mile segment of Accotink Creek in Fairfax County, beginning at the confluence of Crook Branch and Accotink Creek to the start of Lake Accotink, was placed on the 1998 Virginia 303(d) TMDL list. A United States Geological Survey study was initiated in August 2001 to identify and isolate specific sources of human fecal coliform bacteria found in Accotink Creek. The study focuses on storm drains that flow during dry periods and sampling of locations with elevated fecal coliform bacteria levels. The results of these studies will be used to identify "hot-spots" for remedial work and inclusion in the TMDL implementation plan. The USGS paper on sampling Accotink Creek can be viewed on-line at: http://water.usgs.gov/pubs/wri/wri034160/wrir03-4160.htm.

An extensive Dry Weather Screening program has been undertaken in the Accotink Creek Watershed as part of the ongoing efforts to detect illicit connections and improper discharges.

b. Four Mile Run TMDL

Due to high levels of fecal coliform bacteria, Four Mile Run was listed in 1996 and 1998 on the 303(d) Impaired Waters List. Although only the very upper reaches of Four Mile Run are located in Fairfax County, it is important to note the existence of a TMDL study for Four Mile Run and the participation of Fairfax County in the Four Mile Run TMDL study and implementation plan.

The Four Mile Run Fecal Coliform Study, which identified the sources of fecal coliform bacteria in the watershed using DNA testing, was completed in 2000. The study found that waterfowl contribute over one-third (31 percent) of those bacteria that could be matched. Eighteen percent of the bacteria originated from humans, 13 percent from dogs, six percent from deer, 19 percent from raccoons and 13 percent from other sources. Bacteria from humans appear to be highly localized. There were indications in that, without regard to specific host animals, E. coli bacteria seem to regenerate, through cloning, within the storm drains and stream sediments, which in turn perpetuates bacteria levels.

In 2002, the bacteria TMDL study for Four Mile Run developed by the Northern Virginia Regional Commission and the VA DEQ was approved by the EPA. NVRC, under a grant from VA DEQ, worked with four jurisdictions (Fairfax and

Arlington counties and the cities of Falls Church and Alexandria) to develop an implementation plan for the TMDL study. Completed in 2003, the plan focuses on reducing bacteria contamination from human and pet sources in the watershed and includes several initiatives from community outreach efforts to large capital projects. The plan can be viewed on-line at: www.novaregion.org/bacteriaimplementation.htm.

10. Pond and Lake Monitoring and Management

There are a number of significantly sized private and public ponds and lakes throughout the county. All ponds and lakes in Fairfax County are man-made by excavation and/or the damming of streams. The majority of these ponds and lakes serve as stormwater management facilities for developments and have houses along their shorelines. There are also numerous smaller ponds associated with commercial developments, golf courses or farm properties.

These open water impoundments provide habitat for a number of aquatic organisms and waterfowl as well as recreational opportunities for humans. Due to increased runoff from development, these water bodies are often subject to heavy sedimentation, which requires frequent dredging in order to maintain pond or lake depth. Heavy nutrient loading results in large algal blooms during warmer months. Other problems that plague urban ponds and lakes include thermal stratification, reduced water clarity, decreased dissolved oxygen levels, trash and nuisance invasive vegetation.

a. Reston Lakes

The Reston Association, the homeowners association for the planned community of Reston, has an active watershed and lake management program. Four lakes, Audubon, Anne, Thoreau and Newport, as well as two ponds, Bright and Butler, are monitored. Dissolved oxygen, dissolved oxygen saturation, temperature, pH, conductivity, total phosphorus, Secchi depth transparency, chlorophyll a, phytoplankton and zooplankton are monitored. Fecal coliform and *E. coli* bacteria testing have been conducted in Lake Audubon for annual swimming events. Detailed monitoring information and data can be found in the 2006 Reston Lakes Annual Monitoring Report. This report and other information about Reston's lakes can be obtained by contacting the association's watershed manager at 703-435-6560 or visiting the Web site: www.reston.org.

b. Pohick Watershed Lakes

The six Pohick watershed lakes (Barton, Braddock, Huntsman, Mercer, Royal and Woodglen) are inspected annually for dam structure but are not monitored for biological or chemical parameters.

c. Lake Barcroft

The Lake Barcroft Watershed Improvement District is a local taxing district authorized under Virginia law for conservation purposes. In 1999, the WID dredged approximately 15,000 cubic yards of sediment from the lake. In order to avoid the costs associated with hauling it to a landfill, the WID rented a huge topsoil screening machine and excavator to load it, converting the waste material into topsoil by filtering out all the sticks, stones and trash. The topsoil was then made available to local residents. The WID is in the progress of planning another large-scale dredging project. Given the significant amount of sediment that needs to be removed, there are concerns with the lack of adequate local disposal areas. For more information about Lake Barcroft, contact the Operations Director at 703-820-1300 or see the Web site: www.lakebarcroft.org.

d. Lake Accotink

Lake Accotink is owned and managed by the Fairfax County Park Authority and is a key feature of Lake Accotink Park. Similar to other urban lakes and ponds, Lake Accotink has been significantly impacted by accelerated sedimentation, which has reduced the average depth of the lake to less than four feet. Project funding in the amount of $6.15 million was included in the 1998 Park Bond Program to dredge the lake and make repairs to the dam. The current plan includes hydraulically dredging 161,000 cubic yards of sediment from the lake and pumping the material to Virginia Concrete off-site. Mobile Dredging and Pumping Company is conducting the dredging operation. Mobilization began in October 2005 and the pipe line installation in January 2006. Dredging began in June 2006. The project also includes expanding and enhancing existing wetlands. The project was scheduled to have been completed in October 2007.

11. Groundwater Monitoring

The United States Geological Survey maintains a series of wells throughout the nation to monitor groundwater levels and drought. Two wells are located in Virginia; one such well (Site 385638077220101) in Fairfax County has been maintained since 1976. This well provides continuous real-time data that is used to assess ground water levels. Information on this well is available on-line at: http://groundwaterwatch.usgs.gov.

a. Leaking Underground Storage Tanks

In 2006, there were 123 new release cases investigated by the Virginia Department of Environmental Quality. As of June 2007, there were a total number of 2,238 cases, of which 86 remain open.

D. WATERSHED MANAGEMENT

1. Watershed Master Plans

In 2003, the Stormwater Planning Division of the Fairfax County Department of Public Works and Environmental Services commenced a watershed planning program to develop management plans for all 30 county watersheds. Data from the Physical Stream Assessment, Stream Protection Strategy Baseline Study and other monitoring information are being used in the development of the watershed plans. The plans encourage public involvement; provide an assessment of stormwater conditions; recommend protection strategies and improvement projects including stream restoration, riparian buffer restoration, installation of low impact development practices, and retrofitting and improving existing stormwater management facilities and infrastructure; and recommend modifications to the County Code and Public Facilities Manual.

Four watershed management plans (Little Hunting Creek, Popes Head Creek, Cub Run/Bull Run, and Difficult Run) have been completed and are being implemented. Plans for Cameron Run and Pimmit Run/Middle Potomac watersheds are in the final draft phase. Combined these six plans cover 11 watersheds and 50 percent of the land area in the county. Plans for the remaining watersheds in the county (Accotink Creek, Dogue Creek, Little Rocky Run/Johnny Moore Creek, Pohick Creek, Sugarland Run/Horsepen Creek, Lower Occoquan Watersheds and Nichol Run/Pond Branch) will be initiated in 2007. The completion of all watershed plans is expected by 2010.

2. Restoration Efforts

In 2006, Fairfax County completed construction on ten stream restoration and stabilization projects throughout the county. A number of additional projects were started and are scheduled to be completed in 2007. Many of the projects involved partnerships between DPWES, the Fairfax County Park Authority, the Northern Virginia Soil and Water Conservation District and private property owners. The 2006 Fairfax County Stormwater Status Report contains a full list and details of each project. The report can be viewed on-line at:
http://www.fairfaxcounty.gov/dpwes/stormwater/ms4reports.htm#2006Report.

a. Riparian Buffer Restoration

In 2006 Fairfax County continued its countywide riparian buffer restoration project in collaboration with volunteers and various other partners to help lessen the impacts of stormwater runoff on local streams. An evaluation of the inventory of buffer deficiencies from the countywide stream physical assessment was conducted to develop a planting priority list and schedule. Fourteen stream buffers were restored in 2006 and approximately 1,800 trees and shrubs were planted at sites throughout the county. The Fairfax County Park Authority, Fairfax ReLeaf and the

Virginia Department of Forestry conducted additional stream buffer restorations. FCPA planted 5.6 acres of county parkland with over 1,500 trees and shrubs.

b. Difficult Run Stream Valley Park

DPWES worked with FCPA to stabilize several hundred feet along two sections of Difficult Run near Georgetown Pike. The project involved a combination of structural and bioengineering techniques.

c. Huntley Meadows Park - Barnyard Run

In June 2006, the Fairfax County Park Authority and DPWES completed a stream stabilization and stormwater control improvement project on Barnyard Run above Huntley Meadows Park. The project involved creating a number of step pools in the stream to reduce energy and erosive force and stabilization of several hundred feet of stream bank using bioengineering techniques and native plant seedlings.

d. Reston

In 2006, Reston Association worked with Northern Virginia Stream Restoration, L.C., to establish the Reston stream mitigation bank. The restoration bank was approved in March 2006. Aerial photography of watersheds and surveying/tagging of thousands of trees in the stream valleys was conducted as part of establishing the groundwork for future restoration projects. The project will implement the recommended stream restoration projects outlined in the Reston Watershed Management Plan. A team of regulatory agencies, including the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish & Wildlife Service and the Virginia Department of Environmental Quality, will oversee the progress of the bank.

e. Little Pimmit Run

The Fairfax County Park Authority partnered with NVSWCD and several private property owners to restore 300 linear feet of Little Pimmit Run. Project features included j-hook weirs and large imbricated rock walls to direct flow and protect stream banks from high storm flows from the surrounding intensely developed watershed.

3. Support Programs

a. Northern Virginia Soil and Water Conservation District

The Northern Virginia Soil and Water Conservation District is a political subdivision of the commonwealth of Virginia that has the same boundaries as Fairfax County. The district's goal is to promote clean streams and protected natural resources. NVSWCD works to lessen the impacts of urban/suburban

activities on land and water resources in Fairfax County by working with government agencies, industry and the general public and providing technical assistance and outreach programs.

NVSWCD provides information, educational programs, volunteer opportunities and newsletters to residents on many aspects of water quality, erosion and drainage, nonpoint source pollution and stream health. NVSWCD reviews and provides comments to the county's Department of Planning and Zoning on rezoning and special exception applications, with particular attention to the properties of soils, the potential for erosion, the impact on drainage, stormwater management and the surrounding land uses and environment. The District has partnered with many groups to implement several stream restoration and LID projects.

b. Virginia Department of Forestry

The Virginia Department of Forestry helps protect water quality and forest resources in Fairfax County. In 2006, VDOF partnered with a number of organizations and volunteers including the Potomac Conservancy, FCPA, Earth Sangha, Fairfax ReLeaf, the Chesapeake Bay Foundation, eagle scouts and students to plant approximately 5,500 seedlings along 3,020 linear feet of streams throughout Fairfax County.

VDOF, FCPA and DPWES are partnering on a stream buffer restoration project that will replenish areas along streams with deficient riparian vegetation. Areas will be determined based on data from the Stream Physical Assessment Study, which identified deficient buffers along over 800 miles of streams.

E. STORMWATER MANAGEMENT, ENFORCEMENT AND INSPECTIONS

1. NPDES Municipal Separate Storm Sewer System Permit

Fairfax County's National Pollutant Discharge Elimination System) Municipal Separate Storm Sewer System permit (known as the "MS4 permit") requires the county to prevent the discharge of pollutants such as oil, fertilizer, pet waste and trash from the stormwater management system into waterways to the maximum extent practicable. The permit also prohibits non-stormwater discharges into the storm drain system, such as from sanitary sewer connections or illegal dumping. It also requires storm event monitoring and assessment of the effectiveness of stormwater controls being used in the county.

The Stormwater Planning Division and the Maintenance and Stormwater Management Division manage a comprehensive stormwater management program, which includes comprehensive watershed management planning, long term biological monitoring, infrastructure mapping, inspections and maintenance, retrofitting developed areas with

water quality control facilities and public outreach and education. Inspections of privately owned stormwater management facilities are conducted on a regular basis (every five years). Water quality is monitored at selected storm sewer outfalls four times per year (seasonally). Outfalls are monitored during dry weather to determine the presence of illicit discharges.

The Virginia Department of Conservation and Recreation administers the MS4 permit as part of the Virginia Stormwater Management Program Permit. DCR is currently in the process of updating VPDES permits. The county's current MS4 permit expired in January 2007; however, the county is operating under an administrative extension while the county and state work on the next permit. In July 2006, the county submitted its proposed NDPES permit for 2007-2012 to DCR. County staff members have been working with DCR and other municipalities on the development of the new permit requirements.

Fairfax County MS4 reports can be viewed on-line at:
www.fairfaxcounty.gov/dpwes/stormwater/ms4permit.htm.

2. Regional Stormwater Management Program

Since the early 1980s, the county's Public Facilities Manual has included a provision that encourages the concept of regional stormwater management. As opportunities arose, major developers and county staff pursued regional stormwater management primarily through the development process. A plan identifying the most appropriate locations for regional facilities was needed to improve this process.

The Regional Pond Subcommittee, an ad hoc subcommittee of the Fairfax County Environmental Coordinating Committee, reviewed the county's stormwater management plan and developed recommendations. The Board of Supervisors tasked the subcommittee in January 2002 to examine the role of regional ponds as well as other alternative types of stormwater controls as watershed management tools. The report, which identified 61 recommendations to improve Fairfax County's stormwater management program and to clarify the role of regional ponds, was submitted to and accepted by the Board of Supervisors. The Regional Stormwater Management Plan is being replaced as countywide watershed management plans are being developed.

3. Stormwater Management Facilities and Infrastructure

Fairfax County maintains more than 1,200 stormwater management facilities, 1,400 miles of pipe and 45,000 drainage structures designed to protect the county's streams. The county completed over 27 improvement and retrofit projects in 2006. There are over 2,200 private stormwater facilities in the county. The county inspected all county facilities and approximately 20 percent, or 457, of the privately maintained facilities in 2006. The county's inventory of stormwater management facilities and infrastructure is being tracked through the use of the county's GIS databases. The county is working on

Infrastructure Reinvestment Infrastructure Program that includes digitizing the storm sewer inventory.

The 2006 Fairfax County Stormwater Status Report provides updated information on the number and types of public and private stormwater management facilities in the county as well as detailed information about the types of projects being undertaken to improve and protect water quality.

4. Low Impact Development Techniques

Environmentally sensitive site deign and low impact development practices serve to minimize impervious cover and replicate natural hydrologic conditions. The county is recommending and encouraging that "Better Site Design " development techniques and LID practices be used to the full extent allowed by the PFM.

Six low impact development practices (bioretention basins and filters, vegetated swales, tree box filters, vegetated roofs, permeable paving and reforestation) were developed for inclusion in the Public Facility Manual in 2006. In 2007, the Board of Supervisors adopted the amendments. The county is continuing its work with the Engineering Surveyors Institute, Northern Virginia Regional Commission and other local jurisdictions on developing a design and construction standards manual for LID applications. The manual will be recommended for adoption into the county's PFM. The county contributed to the design and implementation of ten LID projects in 2006. The county will soon be implementing a number of LID demonstration projects including several vegetated roofs.

With the addition of these important techniques comes the challenge of what will be a significant increase of small stormwater management facilities that will need to be inspected and maintained.

5. Erosion and Sediment Control

DPWES continues to make improvements to the county's erosion and sediment control program, resulting in a greater emphasis and a higher quality of inspection services. DPWES developed a quality assurance program and trained field specialists on how to handle erosion and sediment control violations. DPWES also developed a prioritized inspection program, in accordance with guidelines established by the Virginia Department of Conservation and Recreation, that will consider slope, soil type, proximity to streams and extents of buffer areas to determine an overall rating for any given site. In June 2006 the Virginia Department of Conservation and Recreation accepted this program as being "fully consistent with the requirements of the Virginia Erosion and Sediment Control Law and Regulations."

Also in 2006, DPWES and the Engineers and Surveyors Institute conducted a class and workshop on constructability issues. In addition, in February 2006, a Letter to Industry was issued to announce the addition of two amendments to the PFM. The first clarified

the requirements for drainage divides; the second clarified the adequate outfall requirements.

In 2006, 886 E&S plans were submitted and approved for projects that would disturb one acre or more of land. Land Development Services staff conducted 38,052 Erosion and Sediment control inspections, totaling over 3,170 inspections per month on average. Approximately 45 percent of these projects consisted of bonded site plans and subdivision plans. The remaining 55 percent consisted of individual residential grading plans and minor site plans. In 2006, the County issued 385 violations.

6. Illicit Discharges

In 2006, the Hazardous Materials and Investigative Services Section of the Fairfax County Fire and Rescue Department responded to 395 complaints involving hazardous materials; 347 involved reported spills, leaks or releases.

F. WASTEWATER TREATMENT

Wastewater is primarily treated two ways in Fairfax County. In most cases it is collected from homes and commercial sites and carried through the sanitary sewer pipe system to large treatment facilities that release the treated waters into local waterways. For a small percentage of Fairfax County residents, wastewater is treated on-site via septic systems where the water infiltrates into ground and ultimately reaches groundwater.

1. Treatment Facilities

a. Upper Occoquan Sewage Authority

The following information has been provided by UOSA:

UOSA operates an advanced water reclamation facility in Centerville, Virginia and serves the western portions of Fairfax and Prince William counties, as well as the cities of Manassas and Manassas Park. The water reclamation plant includes primary-secondary treatment followed by advanced waste treatment processes: chemical clarification, two-stage recarbonation with intermediate settling, multimedia filtration, granular activated carbon adsorption, chlorination for disinfection and dechlorination. The plant's rated capacity is 54 million gallons a day.

UOSA operates under a Virginia Pollutant Discharge Elimination System Permit, which is issued by the VA Department of Environmental Quality. The permit limits and 2006 plant performance are listed in Table IV-1.

Table IV-1. UOSA Permit Requirements and 2006 Performance		
Parameter	**Limit**	**Performance**
Flow	54 mgd	29.6 mgd
Fecal Coliform	<2 / 100 mg/l	<1.1 / 100 mg/l
Chemical oxygen demand	10.0 mg/l	<5.0 mg/l
Turbidity	0.5 NTU	<0.1 NTU
Total Suspended Solids	1.0 mg/l	<0.1 mg/l
Total Phosphorus	0.1 mg/l	<0.1 mg/l
Surfactants	0.1 mg/l	0.010 mg/l
Total Kjeldahl Nitrogen	1.0 mg/l	0.3 mg/l
Dissolved Oxygen	>5.0 mg/l	8.1
Disinfection Minimum Chlorine Residual	>0.6 mg/l	0.8 mg/l
Dechlorination Chlorine Residual (mg/l)	Non detect	Non detect

Source: Upper Occoquan Sewage Authority

The influent highest rolling 30-day flow was observed during the 30-day rolling period ending on July 2, 2006 at 37.6 mgd.

UOSA produces and treats two types of residuals: biosolids from conventional treatment and lime solids from chemical treatment. UOSA produces exceptional quality biosolids utilizing a dryer-pelletizer process. These biosolids have commercial potential in the horticultural and agricultural markets. As a back up to the exceptional quality biosolids process, UOSA produces Class B biosolids through a combination of digestion and dewatering or digestion and dewatering followed by lime stabilization. Thickened lime residuals are gravity thickened and dewatered on recessed chamber filter presses. All lime solids are disposed of on site in a permitted industrial landfill.

b. Noman M. Cole Jr. Pollution Control Plant

The NMCPCP, located in Lorton, is a 67 million gallon per day advanced wastewater treatment facility that incorporates preliminary, primary, secondary and tertiary treatment processes to remove pollutants from wastewater. The original plant, which began operation in 1970 at a treatment capacity of 18 million gallons a day, has undergone three capacity and process upgrades to meet more stringent water quality standards. After treatment, the wastewater is discharged into Pohick Creek, a tributary of Gunston Cove and the Potomac River. The plant operates under a VPDES permit. The plant is required to meet effluent discharge quality limits established by the Virginia Department of Environmental Quality. Table IV-2 presents the facility's performance and current effluent monthly limitations.

Table IV-2 NMCPCP Permit Requirements and 2006 Performance Averages		
Parameter	**Limit**	**Performance**
Flow	67 mgd	42.0 mgd
$CBOD_5$	5 mg/l	< 2 mg/l
Suspended Solids	6 mg/l	1.0 mg/l
Total Phosphorus	0.18 mg/l	0.09 mg/l
Chlorine Residual	0.008 mg/l	< 0.008 mg/l
Dissolved Oxygen	6.0 mg/l (minimum)	9.0 mg/l
pH	6.0-9.0 (range)	6.9
E. coli Bacteria	126/100mls*	< 1/100mls*
Ammonia Nitrogen	1.0 – 2.2 mg/l (seasonal)	< 0.12 mg/l
Total Nitrogen	No Limit	< 5.2 mg/l

*Geometric mean Source: Department of Public Works and Environmental Services

The last major construction was completed in July 2005. This project included process upgrades to remove ammonia to less than one mg/l and total nitrogen to less than eight mg/l in order to meet Virginia Water Quality Standards and the Chesapeake Bay Program goals for total nitrogen. Also included in the project were: flow equalization tanks; a new/upgraded laboratory for water quality testing; upgraded odor control systems; new instrumentation and control systems; and a new septage receiving facility.

In 2006, 57,079 wet tons of sludge were generated and incinerated. Inert ash from the process was disposed of in a monofill at the county's I-95 campus.

In 2006, the Virginia Department of Environmental Quality issued a new general permit for nutrient discharge limits for sewage treatment facilities in Virginia's portion of the Chesapeake Bay watershed. These proposed changes will further limit nutrient discharges from the NMCPCP and require substantial modifications by 2010. Design and construction f the new modifications have begun.

2. Septic System Permitting and Repairs

Approximately 25,000 homes and business are served by septic tank systems in Fairfax County. The county's Health Department reported that, in fiscal year 2007, 162 new sewage disposal permits were issued for single family residences. There were 159 new sewage disposal systems installed, 51.6 percent were alternative type systems and 48.4 percent were conventional systems. Approximately 636 sewage disposal system repair permits were issued (repairs ranged from total replacement of the system to minor repairs such as broken piping or pump replacement). There were 4,079 septic tank pumps outs.

Sustainability of existing onsite sewage disposal systems and areas of marginal or highly variable soil remain concerns for future failing septic systems. Areas of the county with marginal or highly variable soils that were once deemed unbuildable in the past are now being considered for development utilizing alternative onsite sewage disposal technology. Alternative systems are also becoming the norm for developers who desire to maximize lot yield from properties. Alternative systems require more aggressive maintenance on a regular schedule for the systems to function properly. Some require maintenance contracts as part of the permitting process. Homeowners are not typically aware of their responsibilities for maintaining these systems. Education is essential for ensuring that maintenance is conducted to prevent system failure.

The Health Department is currently working with a private contractor to complete a feasibility study for the formation of a management entity to ensure that proper and required maintenance are conducted on private on-site sewage disposal systems.

3. Sanitary Sewer Maintenance and Repair

The Wastewater Collection Division within the Department of Public Works and Environmental Services manages the county's infiltration abatement program. Closed circuit television inspection is used to inspect trunk sewer mains to identify defective lines in need of repair. In 2006, 246 miles of old sewer lines and 22 miles of new sewer lines were inspected. Approximately 75,000 feet of sanitary sewer lines were rehabilitated. Over the past nine years, 233 miles of sewer lines have been repaired and 30 dig-up and 123 trenchless point repairs were completed.

G. DRINKING WATER

The county's water supply comes from the Potomac River, the Occoquan Reservoir, Goose Creek, community wells and private wells. Fairfax Water provides drinking water to most Fairfax County residents. Fairfax Water also provides drinking water to the Prince William County Service Authority, Loudoun County Sanitation Authority, Virginia America Water Company (City of Alexandria and Dale City), Town of Herndon, Fort Belvoir and Dulles Airport. However the City of Fairfax receives its water from the Goose Creek Reservoir in Loudoun County, and the City of Falls Church buys its drinking water from the Washington Aqueduct's Dalecarlia Plant on the Potomac River.

With the exception of some wells, water must be treated prior to use. Fairfax Water provided 57.349 billion gallons of drinking water in 2006.

Federal regulations require water suppliers to provide annual reports on the quality of the drinking water to their customers through the Consumer Confidence Report Rule. The 2006 Water Quality Report is available for review on the Fairfax Water Web site at www.fairfaxwater.org.

Table IV-3 Fairfax Water -Water Supply Sources, 2006	
Sources	Gallons (in billions)
Occoquan Reservoir (Lorton/Occoquan)	25.918
Potomac (Corbalis)	31.295
Wells	0.000
Purchased	0.023
Untreated	0.113
TOTAL	57.349

Source: Fairfax Water

1. Wells

The Fairfax County Health Department has developed and maintains an extensive data base and GIS layer of all water well systems installed in the county. The Health Department permits and inspects all new well construction, existing well repairs, and well abandonments. In FY 2006 there were 96 new well approvals, 25 well repairs, and 467 total well samples taken.

The Virginia State Health Department Office of Drinking Water regulates 78 public well water supplies in Fairfax County. The operators of these systems are required to conduct quarterly water sampling and analysis.

a. Fairfax Water and Public Wells

Fairfax Water no longer operates public wells. All former well systems have been permanently removed.

b. Private Wells

There are approximately 12,000 single family residences and businesses that are served by individual well water supplies in Fairfax County. In 2006, 104 New Well Permits were issued for single family residences.

2. Source Water Assessments

The 1996 Amendments to the Safe Drinking Water Act provided for source water assessment and protection programs designed to prevent contamination to drinking water. Under SDWA, states are required to develop comprehensive Source Water Assessment Programs that identify areas that supply public tap water, inventory contaminants and assess water system susceptibility to contamination. Fairfax Water

has completed an inventory of potential sources of contamination and a survey of land use activities within the Potomac and Occoquan Watersheds.

Fairfax Water's Source Water Assessment is available on-line at: www.fairfaxwater.org.

3. Treatment Facilities

a. Occoquan Water Treatment Plant (Griffith WTP)

The Griffith plant is currently treating 120 million gallons per day (mgd). The plant is designed for an ultimate capacity of 160 mgd. In addition to flocculation and sedimentation, the Griffith Water Treatment Plant includes advanced treatment processes of ozone disinfection and biologically active, deep bed, granular activated carbon filtration.

b. Potomac Water Treatment Plant (Corbalis WTP)

The Corbalis plant, located near Herndon, is currently treating up to 150 mgd taken from either an onshore or offshore intake on the Potomac River. A third 75 mgd phase, which will bring the plant capacity up to 225 mgd, is currently under construction and scheduled to be in service in 2008. The plant is designed for an ultimate capacity of 300 mgd. The plant uses ozone as a primary disinfectant, flocculation-sedimentation, biologically active filters with carbon caps and chloramine final disinfection.

c. Water Quality Monitoring at Corbalis and Griffith Plants

Trihalomethanes are by-products of chlorination water treatment and are suspected carcinogens at elevated levels. The 2006 distribution system averages continue to be below the Federally mandated Maximum Contaminant Levels for total trihalomethanes. In addition to the TTHM, haloacetic acid levels, another by-product of chlorination, continue to be below the required MCL. The presence of chlorine in drinking water supplies remained below the required Maximum Residual Disinfectant Level. Fairfax Water also tests for the following regulated elements: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium and zinc. The levels of these metals in 2006 continued to be below their MCLs. The concentration levels for unregulated metals were within the expected range. Test results are available on-line at: http://www.fairfaxwater.org.

4. Tap Water Monitoring

In 2006 Fairfax Water monitored 3,306 taps for coliform bacteria. The monthly monitoring results were within EPA required limits. Fairfax Water also monitored

surface source water and finished drinking water for 42 volatile organic compounds and 39 synthetic organic compounds. No VOCs were detected in source waters. In finished waters, TTHMs (a subset of VOCs) were detected. Specific information on these programs can be found at: www.fairfaxwater.org.

5. Regional Cooperative Water Supply Agreements

In order to protect the Potomac River ecosystem during low flow periods, the three major water utilities in the Metropolitan Washington area developed water allocation agreements for water use during low flow periods. Two upstream dams, Jennings-Randolph on the Potomac River and the Savage River Dam, along with Seneca Lake in Montgomery County, Maryland, are storage facilities for drinking water supplies during low flow periods. While the Potomac River has flows that average above 7,000 million gallons a day, the river has often reached flows well below that, usually in late summer and early fall. The lowest recorded flow in this region was 388 mgd at Little Falls in September during the drought of 1966. This is an adjusted figure that does include the withdrawal allocation of 290 mgd (e.g., with the adjustment, the flow would be 98 mgd). In 1981, the three major metropolitan water utilities, including Fairfax Water, signed the Low Flow Allocation Agreement, which creates a protocol for allocation of water from the Potomac during periods of low water. The current environmental flow recommendations are 300 mgd downstream of Great Falls and 100 mgd downstream of Little Falls. In 2002, the Maryland Department of Natural Resources revisited this issue of the flow level necessary to support aquatic habitat in the Potomac River and was unable to replicate the methodology used to create the present low flow requirements in the agreement. Droughts that occurred in 1999 and 2002 called attention to the concern that these flows, derived by the 1981 study (which was conducted during a period without extreme low flows), needed to be revisited in light of new scientific methods and low-flow information. During the drought of 2002, the Maryland Department of Natural Resource's Power Plant Siting Program assembled teams of biologists from its staff and Versar, Inc, with assistance from Montgomery County, Maryland and the Interstate Commission on the Potomac River Basin, which performed habitat assessments during that year's low flow conditions.

On April 8, 2003, the Maryland Power Plant Research Program and the Interstate Commission on the Potomac River Basin sponsored a one-day workshop with a panel of nationally recognized experts on habitat assessment to investigate and develop methods to evaluate the environmental flow-by requirements. Their conclusion of the present low-flow agreement is that: "Existing biological data and understanding are inadequate to support a specific, quantitative environmental flow-by." At this workshop, members of the special panel collectively considered and debated the various methodologies applicable to the Potomac River to address the flow-by issue. The final product of the workshop is a set of recommendations for 1) the best method or approach, given current financial resource limitations, to address the Potomac Flow-by Study objectives and the level of confidence associated with their recommendations and 2) an alternative long-term method or approach which could better accomplish

those objectives, yet might exceed current resources or available data, and recommended guidelines for achieving the objectives in a longer time-frame.

In September 2003, the Maryland Department of Natural Resource's Power Plant Siting Program issued a report entitled Habitat Assessment of the Potomac River From Little Falls to Seneca Pool (Final Document #PPAD-03-1), which provided substantial background information describing the history of current low-flow requirements, a review of the studies conducted to support those requirements and a report on habitat assessment conducted during low-flow conditions in 2002. The assessment included development of a habitat map, a field survey of habitat types and measurements of hydraulic and water quality conditions, spanning the period of July through October 2002 when flows were as low as 151 million gallons per day at the gage at Little Falls Dam.

In November 2004, ICPRB convened an update meeting to discuss recent developments in USGS mussel studies and further defining desired hydrological regimes. The next step will be a workshop with regional and national aquatic biologists to develop targeted species and guilds for re-evaluating ranges of tolerance during low-flow events in the study area.

Full reports on these activities can be viewed at:
www.esm.versar.com/pprp/potomac/default.htm.

In December 2005, Fairfax Water adopted a revision to the Occoquan Reservoir Shoreline Easement Policy, which places limits on what may be done within the utility's easement surrounding the reservoir. The policy prohibits construction of any structures other than piers and floats. Removal of any vegetation, storage of fuels or chemicals, application of pesticides and placement of debris are also prohibited in this area. The policy is intended to protect the reservoir's riparian buffer.

The State Water Control Board's Water Supply Planning Regulation (9 VAC 25-780) requires all cities and counties in the commonwealth to submit water supply plans to the Virginia Department of Environmental Quality. Each water supply plan must include a description of existing water resources and water use, projected demands, a description of water management actions/conservation measures, segment of need for future supplies and alternative analysis and local government resolution approving the plan. Fairfax County is participating in a Regional Water Supply Plan, which is required to be submitted to DEQ by November 2011.

a. Interstate Commission on the Potomac River Basin Cooperative Water Supply Operations

The ICPRB plays several important roles in providing for the region's current and future water supply needs. The Cooperative Water Supply Operations Section facilitates the agreement among the three major water utilities (including Fairfax Water) that requires water suppliers to coordinate resources during times of low

flows in the Potomac River. The Water Resources Section also provides technical water resources management assistance to the jurisdictions throughout the basin. Flow in the Potomac River was more than adequate to meet drinking water withdrawal needs by the region's major utilities in 2005. No releases from upstream reservoirs to augment water supplies were needed. The ICPRB annually coordinates a weeklong drought management exercise that simulates water management operations and decision making under drought conditions for the Metropolitan Washington area. Annual simulation allows for renewal of coordination procedures with the water suppliers and other agencies, opportunities for public education and outreach and review and improvement of operational tools and procedures.

Information on water supply status, recent streamflow, reservoir storage, water supply outlooks and precipitation maps can be found on-line at: www.potomacriver.org/water_supply/status.htm.

The 2006 study is available on-line at:
www.potomacriver.org/water_supply/coop-pubs.htm.

b. Metropolitan Washington Area Council of Governments Water Supply and Drought Awareness Plan

In response to the droughts of 1998 and 1999, COG brought together a task force in May, 2000 to coordinate regional responses during droughts to reduced availability of drinking water supplies. The plan consists of two components: (1) a year-round plan emphasizing wise water use and conservation; and (2) a water supply and drought awareness and response plan. The Interstate Commission on the Potomac River Basin handles the administration of the coordinated drought response for water withdrawals from the Potomac River and during low flows. Additionally, the Cooperative Water Supply Operations Section works with COG and the Drought Coordination Committee to assist in providing accurate and timely information to residents during low-flow conditions.

COG is also looking at issues such as effects of chemical environmental pollutants, specifically endocrine disruptors, in the Potomac River and their impacts on wildlife and humans. COG staff is working with members and other stakeholders to organize workshops over the next year that will address subjects such as endocrine disruptors in the Chesapeake Bay watershed and contaminants of emerging concern in the Potomac and Anacostia Rivers.

H. REGULATIONS AND LAWS

1. The Virginia Chesapeake Bay Preservation Act and Regulations

The Virginia Chesapeake Bay Preservation Act was passed as part of Virginia's commitment to the second Chesapeake Bay Agreement's goals to reduce nonpoint source phosphorus and nitrogen entering the Bay. In November 2004, the Board of Supervisors adopted an amendment to the Comprehensive Plan to ensure it was consistent with the Act and satisfied all requirements. The amendment included revisions to text in the environment section of the Policy Plan as well as the incorporation of a Chesapeake Bay Supplement. In March 2005, the Chesapeake Bay Local Assistance Board determined that the Comprehensive Plan, as amended, is fully consistent with the Chesapeake Bay Preservation Act and Regulations. The Chesapeake Bay Exception Review Committee was formed to hear requests for exceptions to the regulations. The Committee is composed of 11 county citizens appointed by the Board of Supervisors, one member from each magisterial district and two at-large members. As part of the exception review and approval process, public notice and a public hearing is required. In 2006, the committee heard and denied one exception request.

The Chesapeake Bay Program is a cooperative arrangement among three states (Virginia, Pennsylvania and Maryland), the District of Columbia and the federal government (represented by the Environmental Protection Agency) for addressing the protection and restoration of the water quality, habitats and living resources of the Chesapeake Bay and its tributaries. Each state determines how it will meet the various commitments, and the approaches to implementation often vary greatly among states. All streams in Fairfax County are tributaries of the Potomac River, which flows into the Chesapeake Bay.

2. Stormwater Legislation HB 1177

This legislation, signed on April 8, 2004 by Governor Warner, encourages jurisdictions to adopt stormwater management ordinances that use the concept of Low Impact Development to the maximum extent practicable. The bill also transferred regulatory authority of the National Pollutant Discharge Elimination System programs associated with municipal separate storm sewer systems and construction activities from the State Water Control Board to the Soil and Water Conservation Board and transferred oversight of these programs from the Department of Environmental Quality to the Department of Conservation and Recreation. As a result, DCR is responsible for the issuance, denial, revocation, termination and enforcement of NPDES permits for the control of stormwater discharges from municipal separate storm sewer systems and land disturbing activities under the Virginia Stormwater Management Program. The legislation allows the state to transfer the administration of the Erosion and Sedimentation permitting for land disturbing activities to jurisdictions, allows these jurisdictions to charge permitting fees for review and establishes that jurisdictions must transmit 30 percent of these fees to the state.

3. Virginia Stormwater Management Program (Chapter 60)

Changes to the Virginia Stormwater Management Program (Chapter 60) became effective in July 2006. The legislation requires that "*stormwater management programs maintain post-development runoff rate of flow and characteristics that replicate, as nearly as practicable, the existing predevelopment runoff characteristics and site hydrology, or improve upon the contributing share of the existing predevelopment runoff characteristics and site hydrology if stream channel erosion or localized flooding is an existing predevelopment condition. Any land-disturbing activity that provides for stormwater management shall satisfy the conditions of this subsection if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or manmade channels.*"

The legislation is available on-line at: http://www.dcr.virginia.gov/lawregs.shtml

I. PROBLEMS

Fairfax County streams and watersheds continue to be impacted by several problems, including uncontrolled stormwater runoff, erosion, high levels of bacteria and sedimentation. Progress has been made with modifications to the Policy Plan section of the county's Comprehensive Plan; watershed and stream protection, however, need to be maximized in land use planning and site design decisions. The cumulative effects of land use decisions on Fairfax County's streams still need to be effectively considered. Only a few streams, such as Walney Creek in E. C. Lawrence Park, remain undisturbed and excellent examples of healthy streams in Fairfax County.

Stormwater runoff and erosion continue to have the greatest detrimental impacts on Fairfax County streams. **A key requirement for controlling stormwater discharge is to limit post development runoff to that which does not exceed pre-development runoff rates.** Most Fairfax County streams have increased runoff flows that exceed the capacities of their stream channels. This has created an ongoing erosion cycle that includes eroding stream banks, heavy sediment loads and sediment-smothered stream bottoms. Streams can become damaged by the changes brought about by changes in stream hydrology and increased flow during the pre-development clearing phase. The stream sees an overall increased flow due to the increased runoff caused by the clearing. This is not just the increase in peak flow, but the increase in the total volume of the water entering the stream. These increased flows start the cycle of damage, and once the stream is damaged it may

take years or decades for the stream banks to revegetate and restabilize. This has resulted in erosion problems throughout the county that impact trail systems, homeowners' back yards, parks, utilities and infrastructure. Sediment on stream bottoms results in reduced habitat and diversity, which compromises the stream ecology and food chains.

Sediment also compromises the quality of, and increases the expense of, treating surface drinking water supplies. Poor land use planning, inadequate enforcement of erosion and sediment control laws and inadequate stormwater management have significantly contributed to erosion problems and impaired water quality. Prevention of such damage would not only be good for the environment but would also be cost effective. Strict monitoring and enforcement of adequate stormwater management and erosion and sediment controls prior to construction can help prevent damage from erosion and sediment.

In addition to problems created in streams, runoff and erosion have resulted in numerous ponds and lakes having enormous sediment deposition. Stormwater management ponds are designed to protect downstream water quality. Ponds also provide additional amenities including recreation (boating, fishing), aesthetics and wildlife habitat. Depending on the size of the surrounding drainage area, the land uses in that area and the volume of runoff, a pond can fill up with sediment, trash and organic debris in a relatively short period of time. Although dredging is a necessary management component to remove accumulated materials and help protect water quality downstream, private pond owners are experiencing increasing difficulty conducting dredging operations given the significant expense and lack of local, adequate disposal areas.

Much credit needs to be given to Fairfax County for its comprehensive watershed management efforts, including stream restoration and protection, adequate monitoring of water resources and adding new tools such as LID and other innovative practices to its stormwater management program. All of these efforts indicate a significant change in county policy and practice towards the protection and restoration of county streams. However, as long as the rate of stream degradation surpasses stream protection and restoration efforts in Fairfax County, the trend will continue to be a downward one.

J. ACCOMPLISHMENTS

Over the past several years, Fairfax County has demonstrated a clear commitment to improve, restore and protect the county's water resources. 2006 was another significant year for watershed protection in Fairfax County.

- EQAC would like to commend county staff for its timely and effective response to the flooding event that occurred in June 2006.

- The Environment Agenda (Environmental Excellence for Fairfax County: 20-Year Vision) adopted in 2004 continues to have significant impacts on water quality protection and environmental stewardship efforts in the county. In 2006, in response to the Board of

Supervisors' directive for follow up action on the plan, the Environmental Coordinating Committee prepared the FY 2007 Environmental Improvement Plan. The EIP addresses environmental and policy needs and assists county officials in making decisions regarding environmental funding and project planning. The EIP supports environmental initiatives and objectives identified in the Environmental Agenda. The ECC anticipates updating the EIP annually prior to the development of the county budget to provide sufficient time for funding decisions. Additionally, the plan will report on progress made and additional needs.

- In February 2006, the Board of Supervisors adopted amendments to the Public Facilities Manual's provision for adequate drainage. The amendments provide greater protection to receiving streams and areas downstream from areas being developed. The county requires that plans proposing land-disturbing activity must include an analysis of the adequacy of all outfalls from the site during the construction phase in addition to the requirements already in place for the developed site. This analysis helps decrease adverse impacts to outfalls and receiving streams during construction.

- Six low impact development practices (bioretention basins and filters, vegetated swales, tree box filters, vegetated roofs, permeable paving and reforestation) were developed for inclusion in the Public Facility Manual in 2006. In 2007, the Board of Supervisors adopted the amendments.

- The county continued developing and completing watershed management plans for each of the county's 30 watersheds. Watershed management plans have been adopted for Little Hunting Creek. Popes Head Creek, Cub Run/Bull Run, and Difficult Run watersheds. Final drafts have been prepared for Cameron Run and the Middle Potomac (Bull Beck Run, Scott's Run, Dead Run and Turkey Run) watersheds. The remaining plans are to be initiated in 2007. It is anticipated that this countywide watershed planning effort will be completed in 2010. These plans will serve as guidance for all stream restoration and protection efforts in the county. Implementation of these plans is estimated to occur over the next twenty-five years.

- At times, high levels of fecal coliform bacteria, particularly *E. coli* bacteria, occur in various streams throughout the county. The county has begun a public outreach and information campaign to increase awareness about potential health hazards from coming in contact with impaired surface waters needs to be developed.

- In 2006 the Fairfax County Park Authority revised its policy for evaluating all forms of stormwater related projects to include conservation easements, stream restoration, stream buffer enhancement, LID facilities and stormwater ponds.

K. COMMENTS AND ONGOING CONCERNS

1. EQAC commends the Board of Supervisors for its actions the past four years authorizing one penny of the real estate tax to be dedicated to the stormwater management program.

The amount increased from $21 million for FY 2007 to $22.7 million for FY 2008. This additional funding is a significant contribution to implementing the recommendations outlined in the county's comprehensive watershed management plans, including retrofitting and rehabilitating existing and aging stormwater management facilities and infrastructure. EQAC continues to encourage the creation of a sustainable and stable funding source for watershed improvement initiatives.

2. EQAC commends the county for developing and adopting amendments to the Public Facilities Manual's provision for adequate drainage that require analysis of adequacy of outfalls during the construction phase. This is another enforcement tool that will protect streams during the construction phase. However, EQAC cannot over-emphasize the importance and need for increased monitoring of predevelopment stormwater management controls and for enforcement action to ensure inadequate controls are corrected prior to construction and, if necessary, during construction. It is also important that the county hire the appropriate number of staff to handle the estimated inspection workload.

3. EQAC continues to support the full funding and implementation of the comprehensive countywide watershed management program. EQAC strongly endorses the ongoing work of county staff on the watershed planning and public outreach efforts and the comprehensive stream monitoring program. EQAC continues to support continued assessments of watersheds and development of a stream protection and restoration program that has adequate sustainable funding. EQAC continues to stress that equal importance should be devoted to environmental protection, restoration and monitoring as compared to infrastructure improvement and maintenance.

4. EQAC commends the county for its existing stream protection requirements for perennial streams. EQAC further encourages the Board of Supervisors to support future protective measures for intermittent and headwater streams such as the establishment of protective buffers.

5. EQAC is pleased to note the MS4 requirement to develop a long-term watershed monitoring program to verify the effectiveness and adequacy of stormwater management goals and identify areas of water quality improvement or degradation is being implemented. While EQAC understands that a comprehensive countywide program to monitor effectiveness can be cost-prohibitive, data are still needed, as it is still unclear as to which structures and requirements are effective and working well.

6. EQAC continues to encourage Fairfax County (the Board of Supervisors, the Planning Commission, the Board of Zoning Appeals, the Fairfax County Park Authority and various county agencies) to coordinate efforts and develop a protocol for assessing the impacts and cumulative effects of land use considerations and decisions on the county's water resources. EQAC urges these groups to use and disseminate information to protect the county's watersheds. EQAC commends the Board of Supervisors for adopting Residential Development Criteria that include supporting the provision of adequate outfall drainage and innovative water quality measures.

7. As sedimentation of stormwater management ponds from upstream bank erosion continues, the need to dredge facilities becomes more frequent. Facility owners are having difficulty conducting necessary dredging operations given rising expenses and lack of local, adequate disposal areas. EQAC commends the county for establishing an interagency work group to explore options, such as creating spoil disposal/recycling areas in various parts of the county to assist private facility owners and help protect water quality. EQAC is pleased that staff will investigate the pros and cons of dredging, hauling, and disposal options and will present its findings and recommendations to the Board of Supervisors by the end of Fiscal Year 2008.

8. Given the anticipated increase in the number of small individual LID facilities that will be installed throughout the county, EQAC recognizes that the county will have an additional challenge of developing a program to inspect and ensure adequate maintenance of these LID facilities.

L. RECOMMENDATIONS

1. The single most important thing Fairfax County should do is to continue to adequately fund and implement its ongoing water resource monitoring, management, restoration and educational stewardship programs.

2. EQAC is aware that approximately 12,000 single-family residences and businesses are served by individual well water supplies in Fairfax County, and that approximately 30,000 homes and businesses have septic systems that ultimately infiltrate into groundwater. Areas of the county that have been unbuildable in the past now are now being developed and are using alternative onsite sewage disposal technology. These alternative systems are often more difficult to maintain and are therefore subject to failure. The Health Department staff and the American Water/Applied Water Management are developing a report, which will establish a framework for ensuring that proper and timely septic system maintenance is preformed. EQAC supports the efforts and recommends that this report include the requirement that owners with alternative septic systems be required to file a maintenance plan for their systems and provide evidence of compliance.

LIST OF REFERENCES

2006 Stormwater Management Status Report on the Multiple Separate Storm Sewer System for Fairfax County, Virginia. Stormwater Planning Division, Department of Public Works and Environmental Services

2006 Annual Report on Fairfax County's Streams, Stormwater Planning Division, Department of Public Works and Environmental Services

2007 Fairfax County Stormwater Status Report, Stormwater Planning Division, Department of Public Works and Environmental Services, July 19, 2007

Audubon Naturalist Society Water Quality Monitoring Brochure

Bacteria Source Tracking and TMDL Development in Accotink Creek, Douglas Moyer & Kenneth Hyer, U.S. Geological Survey, Richmond, VA

Biology (Fifth Edition), Helena Curtis, 1989, Worth Publishers, Inc.

Ecological Study of Gunston Cove 2003-2004, Department of Environmental Science and Policy, George Mason University, R. Christian Jones and Donald P. Kelso, Final Report, June 10, 2005

Estimating Nonpoint Fecal Coliform Sources in Northern Virginia's Four Mile Run Watershed. George Simmons, Donald Waye, Sue Herbein, Sharon Myers and Ellen Walker

Fairfax County Staff Response to the Environmental Quality Advisory Council's Annual Report on the Environment 2006, Prepared by the Environmental Coordinating Committee, Submitted by Anthony Griffin, County Executive, March 19, 2007

Fairfax County Coordinating Committee Report, February 4, 2002, Status *of Total Maximum Daily Load (TMDL) for Accotink Creek*

Fairfax County Health Department, Suggested Information for the 2007 EQAC Annual Report, 2006

Fairfax County Department of Public Works and Environmental Services, Stormwater Planning Division, Perennial Streams Mapping Project Report, 2004

Fairfax County Department of Public Works and Environmental Services, Wastewater Planning and Monitoring Division, Report on Noman M. Cole Plant, 2007

Fairfax County Land Development Service (including Code Analysis) Update, 2007

Fairfax County Park Authority, Response to Request for Input for EQAC's Annual Report on the Environment, Timothy White, Acting Director, July 1, 2007

Fairfax County Stream Protection Strategy Program, January 2001

Fairfax Water 2007 EQAC Report on the Environment, June 2007

Fulfilling the Promise: The Occoquan Watershed in the New Millennium (Task Force Recommendations), January 27, 2003

Interstate Commission on the Potomac River Basin, 2006 Update and Revisions, Jim Cummins and Erick Hagen, e-mail correspondence, 2007

Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System, Washington Council of Governments Board Task Force on Regional Water Supply, Updated May 2, 2001

Metropolitan Washington Council of Governments documents: Regional Wise Water Use Campaign, Water Resources Technical Committee Reports, Chesapeake Bay Policy Committee, Potomac River Submerged aquatic vegetation, Jim Shell, Principal Water Resources Planner, June 30, 2003

Metropolitan Washington Council of Governments Update for the Annual Report

Northern Virginia Regional Commission Report, Fecal *Coliform TMDL (Total Maximum Daily Load) Development for Four Mile Run, Virgini*a, Northern Virginia Regional Commission, February 15, 2002

Northern Virginia Regional Commission EQAC Update, Doug Pickford, August 17, 2007

Northern Virginia Regional Park Authority, 2005 Update for the Annual Report on the Environment, 2006

Reston Association EQAC Water Resources Update, Nicki Foremski, Watershed Manager, Reston Association and *2006 Reston Lakes Monitoring Synopsis,* Aquatic Environment Consultants Inc., 2007

U.S. Geological Survey Office of Groundwater, US Department of the Interior

Upper Occoquan Sewage Authority Update Report, August 16, 2007

Virginia Department of Conservation and Recreation, Division of Soil and Water, Information for the EQAC Annual Report, August 7, 2006, Gary E. Switzer, Stormwater Compliance Specialist, Potomac Watershed Office

Virginia Department of Environmental Quality, Northern Virginia Regional Office, Bryant Thomas, Water Resources Planner and Monitoring Supervisor, 2005

Virginia Department of Forestry Contribution to the Fairfax County Annual Report on the Environment, James McGlone, 2007

Virginia Department of Transportation, William C. Cuttler, Assistant District Engineer for Preliminary Engineering, July 13, 2007

CHAPTER V

SOLID WASTE

V. SOLID WASTE MANAGEMENT

A. ISSUES AND OVERVIEW

Fairfax County's Solid Waste Management Program had another productive year in FY 2007. As it has for the past 16 years, the county met its minimum annual waste delivery obligations to Covanta Fairfax Inc., owner and operator of the I-95 Energy/Resource Recovery Facility. During this same period, the program also provided waste collection and recycling services to over 43,000 homes in designated County Sanitary Districts, and moved a daily average of 150 tractor-trailer loads of municipal solid waste from the I-66 Transfer Station to the E/RRF or other appropriate disposal locations. In addition to these disposal activities, recycling in the county increased to 35 percent for all solid waste generated (as reported to the state), exceeding the state requirement of 25 percent by weight.

1. Energy/Resource Recovery Facility and Landfill Capacity

The E/RRF continued to serve as the primary disposal location for county municipal solid waste, processing approximately 1,060,000 tons of waste in FY 2007. Due to routine maintenance outages at the facility, the county bypassed approximately 30,000 tons of waste to landfills during the year, using contingency contracts that were in place. This is a 33 percent decrease from the amount of waste that was bypassed to landfills in FY 2006.

As in recent years, the E/RRF received a declining amount of waste from jurisdictions outside the county. Approximately seven percent of waste sent to the E/RRF was from local jurisdictions such as Prince William and Loudoun Counties and the District of Columbia. The remaining tonnage of waste processed at the facility was generated in Fairfax County. This increase, anticipated in the county Solid Waste Management Plan, is a primary reason why the county's recycling program must be expanded: by reducing the amount of municipal solid waste that needs to be disposed, the county can extend the capacity of the E/RRF to process materials that cannot be recycled.

2. Solid Waste Management Plan Implementation

The Solid Waste Management Plan was approved by the Board of Supervisors in 2004. Highlights of the implementation actions include:

a. Substantially Revised Solid Waste Management Ordinance

The Solid Waste Management Program completed a comprehensive revision to the county's solid waste management regulations (formerly Chapter 109), now found in Chapter 109.1 of the County Code. The new ordinance was promulgated by the Board of Supervisors after a public hearing on July 10, 2006; it expands the county's recycling requirements, as described later in this section.

b. Non-Residential and Multi-Family Residential Recycling Requirements

The Solid Waste Management Program implemented the new recycling requirements established in the revised county solid waste management code. These changes to the code require all non-residential properties in the county to recycle paper and cardboard, no matter the size of the building. All existing multi-family properties (constructed prior to July 2007) are required to recycle paper and cardboard and all multi-family properties constructed after July 2007 are required to recycle paper and cardboard as well as cans and bottles. These new recycling requirements will help the county reduce its waste stream to ensure adequate capacity for refuse disposal in the county system.

A significant public outreach and education effort accompanied the implementation of these new county-wide recycling requirements. Staff created the document known as the "Recycling Requirements Guide" with information describing the program and information worksheets intended to help the regulated community understand the requirements. The guidance document included a CD with an audio/visual presentation (viewable on a computer) that explains the program. The CD also contained an electronic version of the newly revised Chapter 109.1 and other accompanying documents. Approximately 2,500 copies of the document have been distributed to Fairfax County businesses. A similar document for multi-family residential properties was also prepared and distributed to about 400 apartment and condominium complexes.

c. Resources for Recycling Construction/Demolition Debris

The Solid Waste Management Program worked with the Metropolitan Washington Council of Governments to create the "Builder's Guide to Reuse and Recycling". This handbook, which is available free of charge, provides the locations where builders can recycle construction materials in Virginia, the District of Columbia and Maryland. Also, Chapter 109.1 requires that beginning July 1, 2007, construction and demolition contractors must recycle corrugated cardboard.

d. Remote Household Hazardous Waste Collection Events

In addition to its permanent collection sites at the I-66 and I-95 Complexes, the Solid Waste Management Program conducted five remote household hazardous waste events during FY 2007. The collection events were held at locations in the Mount Vernon, Mason, Dranesville, Hunter Mill and Braddock Districts. Additional events were held in the months of September and October 2007. These events are also part of the county's Environmental Improvement Program, and are dependent upon separate funding by the Board of Supervisors on an annual basis.

e. Environmental Excellence

The Solid Waste Management Program continued to maintain its Environmental Enterprise (E2) certification with the Virginia Environmental Excellence Program,

administered by the Commonwealth's Department of Environmental Quality. It also maintains its membership in the "Businesses for the Bay" program, a regional initiative supported in Virginia by VDEQ.

f. Solid Waste Management Award from the Solid Waste Association of North America.

Fairfax County's Solid Waste Management Program was awarded a national excellence award from the Solid Waste Association of North America. The award is for excellence in the category of "Integrated Solid Waste Management Systems" where the county was recognized for its superior performance in the management of the entire countywide solid waste management program.

3. Solid Waste Disposal Fee

The contract waste disposal fee, offered to companies that sign agreements with the county, was $46.95 per ton in FY 2007 and increased to $49.95 in FY 2008. The increase helped to offset rising operational costs due to escalating fuel prices and contractual payments. The contract disposal fee covers transportation and disposal of waste, but does not fully cover the cost of all community benefit programs (e.g. recycling education, household hazardous waste, and enforcement) provided by the Solid Waste Management Program. In FY 2007 and FY 2008, the General Fund transfer to partially offset the cost of these community benefit programs was $2.5 million. Prices for all disposal of materials are posted on the county's Web site and at the facilities.

B. PROGRAMS, PROJECTS, AND ANALYSIS

1. Waste Disposal Program

a. I-95 Sanitary Landfill and Citizens Disposal Facility

i. Groundwater Monitoring

Groundwater Protection Standards were established for the I-95 Landfill on November 20, 2000, through an amendment to the facility permit. In accordance with Waste Management Regulation 9 VAC 20-80-250.D.6.g, an Assessment of Corrective Measures report was submitted to VDEQ in August 2002. The VDEQ commented on the report and the county addressed VDEQ's comments by submitting a revised report and Corrective Action Plan on April 30, 2004 for approval. The reports describe the nature and extent of groundwater contamination, provide a risk assessment for these conditions, and establish a proposed program of corrective action. The county has proposed to implement a five-part remedy for groundwater at the I-95 Landfill. Proposed components of the program consist of:

- Institutional controls,
- Engineering controls,
- Monitored natural attenuation,
- Accelerated bioremediation (reductive dehalogenation), and
- Direct oxidation.

The county will implement institutional controls in accordance with the closure and post-closure care plan. A variety of engineering controls (leachate collection, landfill gas system, and placement of cover) will be used. As presented in the Assessment of Corrective Measures report, the concentration of most regulated constituents began to attenuate relatively abruptly after engineering controls were implemented during the 1990s. Natural attenuation will be enhanced by injection of food grade material that will enhance microbial activity via reductive dehalogenation. Direct oxidation will be employed in one area of the facility. Two common forms of permanganate (potassium and sodium) will be used. Both are strong oxidizing agents. This will be done in the selected areas. A Corrective Action Monitoring Plan has been submitted to VDEQ along with the Corrective Action Plan.

As part of the investigation, the county has drilled and sampled 16 additional monitoring wells to further delineate and remediate any groundwater problems. Staff will continue to perform the groundwater monitoring to comply with the VDEQ's requirements of assessment monitoring. Further, staff will monitor the additional parameters at supplemental locations as specified in the Corrective Action Plan. These proactive steps will be used at the I-95 Landfill to assure protection of the groundwater resources. These advanced steps are believed to be among the first used at a Virginia landfill.

ii. Landfill Closure

Closure construction work continued during FY 2007 for the areas where municipal solid waste was previously disposed. Final closure consists of capping the landfill with a thick, low permeability soil layer to minimize surface water infiltration. Additional landfill gas control systems are being installed as part of the closure design. Placement of the closure cap is expected to be completed by September 2007. To date, the final cap has been placed over 105 of 135 acres to be closed. The project was awarded Project-of-the Year by the VA-DC-MD Chapter of the American Public Works Association.

Partial closure of Phase I of the ash landfill was continued during FY 2007. Side-slopes of filled cells are capped by using a synthetic landfill cap.

iii. Landfill Gas System and Air Emissions

The I-95 Landfill operates one of the largest landfill gas collection systems in Virginia, with over 300 installed wells extracting landfill gas for energy recovery. Approximately 3,000 cubic feet per minute (cfm) of this landfill gas

is distributed to a variety of energy recovery systems, including the six-megawatt Michigan Cogeneration Systems electric generating facility, and the 3-mile landfill gas pipeline that provides fuel as a substitute for natural gas at the Noman M. Cole Pollution Control Plant. The landfill gas pipeline project continues to provide significant energy cost savings at the NMCPCP.

During FY 2007, county staff continues to install new landfill gas wells to replace existing wells that cease to function properly due to normal landfill settlement.

County staff has also converted space heating at the landfill shop facility to landfill gas (the original heating system used bottled propane gas). This conversion is expected to save approximately $6,000 per year in heating costs. In 2006, the project was given a National Award by the USEPA's Landfill Methane Outreach Program.

During the reporting period, the county continued its solid compliance history with Virginia's air pollution and landfill gas control regulations. Quarterly methane gas surface emission and perimeter monitoring were conducted as required and annual air emission reports were submitted to the Virginia Department of Environmental Quality. VDEQ has found all submittals to be acceptable.

iv. Ash Landfill

Ash resulting from the E/RRF combustion process reduces the processed waste to only 10 percent of its original volume and about 25 percent of its original weight. Therefore, ash disposal requires significantly less landfill space than that which is consumed by the disposal of raw municipal solid waste. Incinerator ash from the E/RRF, a similar Covanta facility serving the City of Alexandria and Arlington County and the Noman M. Cole Pollution Control Plant is disposed at the I-95 Ash Landfill. Ash is placed in a double-composite lined landfill, controlled by state-of-the-art leachate collection and detection systems.

Phase IIB of the ash landfill (the third cell) began accepting ash in May 2005. Approximately 1,000 tons of ash is placed daily in the cell, which has capacity for ash disposal for three years and four months. Approximately 6,000 tons of shredded tires were used as a protective layer for the cell. Using this material not only recycled the tires, but also saved approximately

$86,000 in the cost of gravel and other aggregate materials. Construction of Phase IIIA of the Ash Landfill began in June 2007, and should be completed by December 2007.

The E/RRF's suite of pollution control equipment includes a dolomitic lime system that chemically treats the ash to reduce the possibility of metals leaching from the ash after landfilling. During FY 2007, ash produced at the Covanta facilities was analyzed by an independent lab and was found to be within the regulatory limits for all constituents (i.e., it is non-hazardous).

A metallic constituent of the E/RRF's ash of particular concern is cadmium. The Solid Waste Management Program supports and actively publicizes efforts to collect rechargeable nickel-cadmium batteries separately for recycling. Through a partnership with the Rechargeable Battery Recycling Corporation, large retailers such as Wal-Mart, Radio Shack and Best Buy are collecting old batteries as new ones are sold. The batteries are recycled at a permitted waste management facility specifically designed to recover these metals. This effort is anticipated to significantly reduce the amount of cadmium present in E/RRF ash.

v. Citizens Disposal Facility

The CDF allows county residents and small businesses to bring their municipal solid waste directly to the I-95 Complex for disposal. The CDF offers a full range of recycling opportunities, as well as household hazardous waste disposal service. Recycling is free to residents. In FY 2007, users visited the I-95 CDF over 75,000 times.

b. Energy/Resource Recovery Facility

i. Overview

E/RRF operations continue to meet or exceed accepted industry standards, as evidenced by the annual independent engineering report prepared by Dvirka and Bartilucci Consulting Engineers in October 2006. This report states, "CFI has complied with the requirements of the Service Agreement, as amended, and has complied with the Facility's various environmental permit and regulatory obligations."

The E/RRF continued to produce up to 80 megawatts of electricity that was sold to Dominion Virginia Power. This is enough energy to power approximately 75,000 homes.

ii. Quantity of Waste Processed

The county has guaranteed to provide and the E/RRF has agreed to process at least 930,750 tons of municipal solid waste per year. In FY 2007, the E/RRF processed approximately 1,060,000 tons of waste (over 88,000 tons per month). Approximately 960,000 tons of this waste originated in Fairfax County, with the remainder coming primarily from Prince William County.

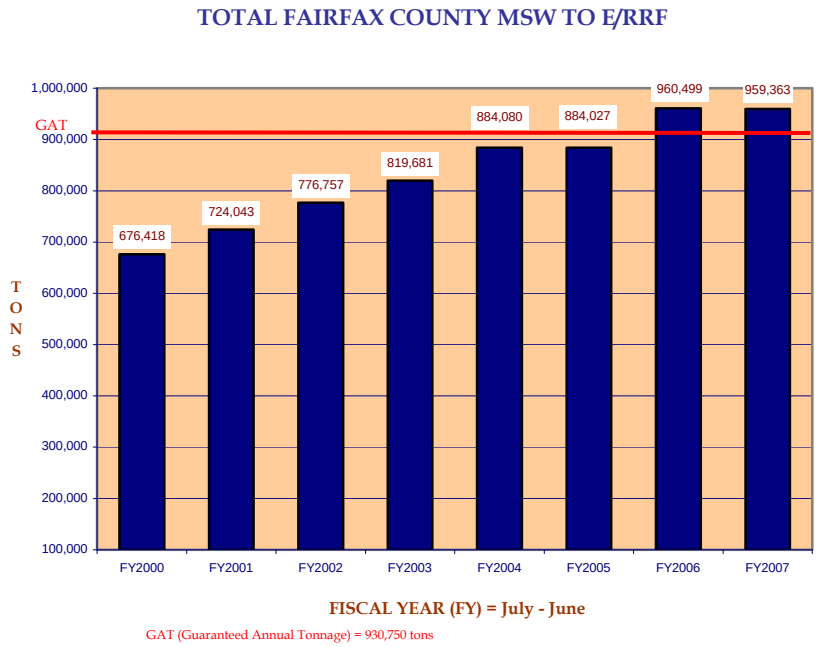


Figure V-1. Total Fairfax County municipal solid waste to the Energy/Resource Recovery Facility, FY 2000-2007

iii. Air Quality

The E/RRF's continuous emissions monitoring system samples flue gas from the combustion process and alerts Covanta operating personnel when emissions are approaching the concentration limits specified in the facility's air pollution control permits. Permit excesses must be reported to the VDEQ, with an explanation as to the circumstances of the event and proposed solutions, as warranted. The E/RRF continues to operate well under its air permit limits. Table V-1 summarizes the stack emissions that were documented by an independent lab test in June 2007 and reported to VDEQ.

Table V – 1 Energy/Resource Recovery Facility Emissions Results June, 2007[1]		
Parameter	**Permit Limit**	**Average E/RRF Result**
Sulfur Dioxide	29 ppm	5.25 ppm
Carbon Monoxide	100 ppm	6.5 ppm
Nitrogen Oxides	205 ppm	194.75 ppm
Hydrochloric Acid	29 ppm	10.64 ppm
Particulate Matter	27 mg/dscm	4.66 mg/dscm
Mercury	0.080 mg/dscm	0.00178 mg/dscm
Dioxin/Furans	30 ng/Nm3	0.646 ng/Nm3

ppm = parts per million mg = milligram ng = nanogram
Dscm = dry standard cubic meter

iv. Material Recovery

In addition to recovering energy from municipal solid waste to generate electricity, metals are recovered from the ash residue and recycled. In FY 2007, 18,021 tons of ferrous metal and 36 tons of non-ferrous metal were recovered from the ash and sold for recycling. The non-ferrous metal process was not operating during most of the year and Covanta has proposed to replace the system.

c. I-66 Transfer Station & Citizens' Recycling and Disposal Facility

The I-66 Transfer Station continues to handle approximately 75 percent of the county's municipal solid waste destined for disposal. The Transfer Station consolidates waste delivered by individual collection vehicles into large transfer trailers, hauling these trailers over the road primarily to the E/RRF for final disposal. As mentioned previously, an average of 150 loads were hauled from the facility each day in FY 2007. Primary benefits from this type of transfer system are a reduction in the number of vehicles traversing the county to reach the E/RRF and reduced operating costs for the county's solid waste management system as a whole. Further, the Transfer Station plays a pivotal role when waste needs to bypass the E/RRF to landfills; in FY 2007, approximately 30,000 tons of waste were hauled from the Transfer Station to alternative disposal sites.

[1] Covanta Fairfax, Inc, Annual Compliance Stack & RATA Test Reports, (COV Report No. 3194), 08/07/07.

The VDEQ regulates the Transfer Station, and it is inspected by this agency on a quarterly basis; during all inspections of the facility during FY 2007, the VDEQ found the facility to be in full compliance.

i. Citizens Disposal Facility

The Transfer Station Complex also has one of the county's two Citizens' Recycling and Disposal Facilities, where residents and small businesses can self-haul their wastes and recyclables. In FY 2007, users visited the I-66 CDF more than 237,000 times. The CDF is being redesigned to accommodate growing demands for disposal and recycling services at that location. New scales and booths, improved entrance and egress, and more technology are being planned, to improve customer service and reduce wait times. These changes are not likely to be in place until FY 2008.

ii. Transfer Operations

The main responsibility of the Transfer Station is to move waste from northern and western parts of the county to the E/RRF. With increased development and population growth, waste collection companies are bringing more and more waste to the Transfer Station. Moreover, advanced technologies used by collection companies to control their costs have resulted in collection vehicles that can pack on and deliver more waste per trip. As the daily tonnage being managed by the transfer operations has grown, and in the face of a prohibition on new staff positions, the county has come to rely upon trucking contractors to supplement the county's fleet of tractor trailers.

The county vehicle fleet, including the transfer trucks at the Transfer Station, now uses ultra-low-sulfur diesel fuel. This reduces air emissions as much as possible, while performing the mission of transporting increased amounts of waste.

An automated truck wash system has been installed in the existing truck wash building. The state-of-the-art system will better recover and recycle water, discharging minimal amounts to the sewer, while reducing manpower requirements to wash large vehicles. Other county vehicles, including waste collection vehicles, are washed here as well.

d. Household Hazardous Waste Program

Information regarding the Household Hazardous Waste Program and the Conditionally Exempt Small Quantity Generator service is provided in the Hazardous Materials chapter of this report.

e. Other Relevant Activities

All solid waste collection companies in Fairfax County must hold a Certificate to Operate and individual vehicle permits, both issued by the Solid Waste Management Program. Approximately 35 firms hold county CTOs. An integral requirement of these permitting programs is that permitted collectors comply with all applicable provisions of Chapter 109.1, the county's solid waste management ordinance. As mentioned earlier, Chapter 109.1 came into effect in July 2006, and is an extensive rewrite of the original solid waste ordinance, Chapter 109.

The Solid Waste Management Program, therefore, has responsibility for enforcing Chapter 109.1 and to resolve any potential violations observed by Program staff. In addition to this responsibility, the Solid Waste Management Program also coordinates with other county agencies as necessary to lead enforcement of relevant provisions from other Chapters of the County Code, related to the solid waste management aspects of public health menaces, nuisance noise, and debris landfills.

2. Waste Reduction and Recycling Programs

a. Overview

The Solid Waste Management Program's Division of Solid Waste Collection and Recycling assumes the lead role regarding the management and implementation of the countywide recycling program. The VDEQ is responsible for establishing the regulations that require all municipalities in the Commonwealth to recycle a certain percentage of the total volume (by weight) of municipal solid waste generated in the jurisdiction. These regulations are codified as 9 VAC 20-130-10, and Fairfax County is responsible for meeting a 25 percent threshold. Smaller communities, with low population or low employment statistics across the Commonwealth, are required to meet a lower threshold set at 15 percent. Reports documenting the recycling rate for the preceding calendar year are required to be sent to the VDEQ each year in the spring. Fairfax County's recycling rate for calendar year 2006 was 35 percent, which represents a full 10 percentage points above the required rate of 25 percent.

Chapter 109.1 requires annual reports on the tonnages of recyclables collected by solid waste collection companies, non-residential businesses and commercial establishments, Material Recovery Facilities and other entities operating in Fairfax County. These reports are evaluated, and their data compiled to calculate the countywide recycling rate. Figure V-2 depicts the historical quantities of

recyclables collected in the county since calendar year 2000. Since the recycling program's inception in 1988, the county has recycled approximately six million tons, and continues to exceed the state-mandated requirement.

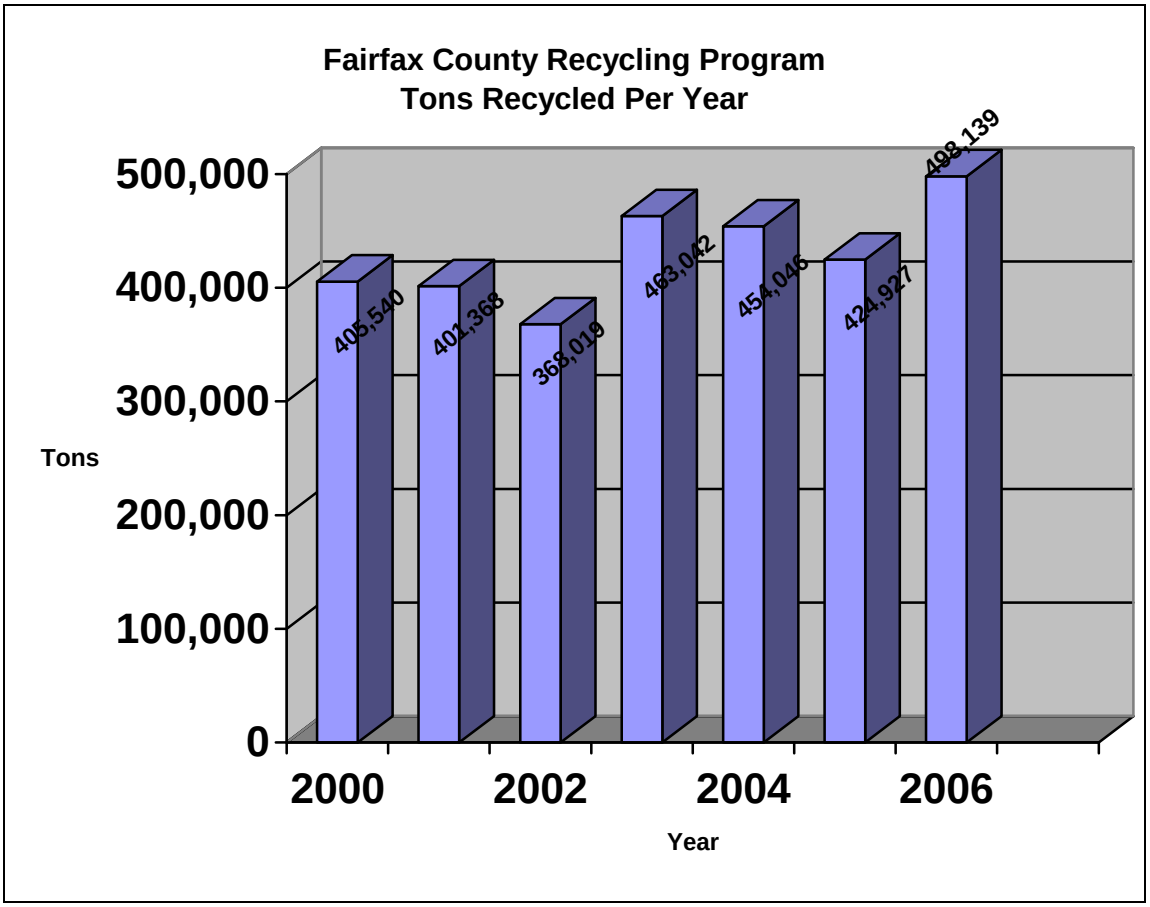


Figure V-2 - Historical Quantities of Materials Recycled in Fairfax County

b. Changes for 2006

As discussed earlier, the county promulgated a substantially-revised solid waste management ordinance, Chapter 109.1. The revised code now requires recycling as described below.

- All non-residential entities in the county are required to recycle mixed paper and flattened cardboard. All non-residential entities that generate a Principal Recyclable Material other than mixed paper and cardboard will be required to recycle that material in addition to the mixed paper and cardboard.

- All multi-family buildings in existence prior to July 2007 are required to recycle mixed paper and flattened cardboard.

- All multi-family buildings constructed after July 2007 are required to recycle mixed paper, flattened cardboard, metal food and beverage containers, glass food and beverage containers and plastic bottles and jugs. Appliances from these properties are also required to be recycled.

- All schools and institutions are required to recycle mixed paper and cardboard by July 2007.

- All refuse and recycling collection companies providing curbside service to residential customers are required to collect mixed paper, flattened cardboard, metal food and beverage containers, glass food and beverage containers and plastic bottles and jugs.

- All construction and demolition contractors are required to recycle cardboard by July 2007.

c. Review of Collection and Recycling Programs

In addition to countywide recycling program management, the Solid Waste Management Program is responsible for the:

- Collection of refuse and recyclables from about 44,000 residences, primarily on the east side of the county in designated areas entitled Sanitary Districts.
- Collection of refuse and recyclables from county-owned buildings.
- Seasonal curbside vacuum leaf collection for approximately 20,000 residences.
- The management of eight Recycling Drop-Off Centers.
- Refuse removal due to evictions and other court orders.
- Assistance in the removal of materials damaged by storm, floods or other emergency situations.
- Public outreach and education on recycling and waste management.

Two additional service programs were instituted in 2006 and continued in 2007: the "Megabulk" program and the "Clean Streets Initiative" program.

The Megabulk program was originally established for county refuse and recycling customers in Sanitary Districts, providing collection service for oversized piles of refuse and yard debris. Customers schedule this service and pay an additional fee for the collection of oversized quantities of materials that are not part of the basic level of service for routine weekly collections. The service now is being made available countywide, based upon equipment and personnel availability.

Working in conjunction with the Fairfax County Health Department, the Solid Waste Management Program's Clean Streets Initiative is designed to address complaints from residents about piles of refuse that are placed in neighborhoods

where the property owner does not take responsibility for its timely removal, or where no responsible party can be found. Under this initiative, the property owner is notified that the refuse must be removed. If the property owner fails to respond in a timely manner or refuses to cooperate, the Clean Streets Initiative program removes the refuse and bills the property owner for removal of the material. If the property owner refuses to pay the county for the removal of the material, a lien is placed on the property.

i. Yard Waste

Recycling of yard waste (brush, leaves, and grass) is required for residential units in Fairfax County. Curbside collection of yard waste is required to be provided by all refuse collection companies operating in the county, from March through December of each year. The revisions to Chapter 109.1 clarified that yard waste collection would begin in March each year, and that no special separation would be required during January and February, other than Christmas tree collection.

Townhouse communities may be exempted from the requirement to recycle yard waste because the lawns are typically small and these communities contract with landscaping firms that groom common areas. In 2006 and continuing in 2007, Fairfax County required all townhouse communities that had been exempted from the requirement to recycle yard waste to reapply for the exemption. Over 800 requests for re-application were sent to townhouse communities.

Woody materials, referred to as brush, comprise a significant portion of the yard waste collected in the county. Brush is managed at either the I-66 or I-95 facility, and is ground into mulch. The mulch from these facilities is available free to county residents who can self-haul the material to the end use location. Typically, mulch is used as a top-dressing around decorative plantings to reduce weed growth and to maintain soil moisture.

Leaves and grass comprise the balance of the yard waste managed in the county. This material is generally collected in bags or by curbside vacuum collection and is sent to either of two composting facilities where the material undergoes biological decomposition to turn it into compost. Typically, compost is used as a soil amendment or substitute. In 2006, approximately 180,000 tons of yard waste were recycled in Fairfax County.

Leaves collected in the fall by the county for customers receiving (and paying for) curbside vacuum leaf collection are ground during the vacuuming process. These ground leaves are taken to several Fairfax County parks where the ground leaf mulch is available for use by the Park Authority and by residents who can haul it away themselves for use in their yards.

ii. Recycling Drop-Off Centers

Fairfax County operates eight Recycling Drop-Off Centers at various locations throughout the county. The RDOCs are unmanned facilities, open 24 hours, and there is no fee to use them. No new RDOCs have been added to the county system in approximately 10 years but the existing facilities are used frequently by residents and about 6,000 tons of recyclables are collected in the drop-off centers. Recycling Drop-Off Centers continue to play an important role in supporting recycling in the community, serving patrons in multi-family units and small businesses.

iii. County Agency Routes

All county agencies receiving refuse collection and recycling services from the Solid Waste Management Program participate in the county recycling program. In calendar year 2006, county agency locations recycled approximately 740 tons of material. The Solid Waste Management Program provides the necessary support to ensure adequate communication of the recycling requirements, as well as operational support for general programs or special events as needed.

iv. Electronics Recycling

Fairfax County offers residents the opportunity to recycle computers and obsolete electronics four times each year. In 2006, about 436 tons of electronics were recycled from Fairfax County in partnership with the Keep It Green program, a partnership between Fairfax County and ServiceSource. ServiceSource is a non-profit organization that finds employment for persons with disabilities. It has partnered with a computer recycling firm that uses ServiceSource's labor pool to disassemble computers and peripherals. ServiceSource will take used electronic equipment at no charge ***except*** for computer monitors. It asks for a $10.00 donation for each computer monitor to pay for the management of the leaded glass that is contained in the cathode ray tube in the monitor. The leaded glass in the monitor is the material that the Solid Waste Management Program is trying to keep out of the county's waste stream.

v. Document Shredding

Fairfax County offers residents the opportunity to shred personal documents at certain locations around the county usually in conjunction with electronic recycling events or household hazardous waste collection events. This service is offered to help residents protect their personal financial information while directing the shredded paper to a recycling facility.

vi. Public Education and Outreach

Public education and outreach are key components of any successful municipal recycling program. To that end, the Solid Waste Management Program has focused on developing creative education programs that take advantage of its partnerships with county agencies, Fairfax County Public Schools, community organizations (e.g., Scouts, Youth Groups, Jaycees), commercial businesses and privately-owned collection companies. Outreach programs consist of activities and displays at county festivals, the support and advertisement of several days throughout the calendar year that are specifically dedicated to recycling, public speaking opportunities and technical support in the research of recycling technologies and issues.

The Solid Waste Management Program partnered with the Fairfax County Wastewater Treatment Program in their educational effort entitled "Sewer Science". This program is a hands-on class that Wastewater Management employees have introduced into Fairfax County high schools. The program teaches high school students about municipal wastewater treatment through a week-long laboratory that simulates wastewater treatment processes. Sewer Science, which supports the Virginia Standards of Learning for biology and chemistry, is taught by the science teacher with assistance and support from county employees.

Both the county's stormwater program and the solid waste management program have been invited to assist the in the Sewer Science program to teach high school students about how stormwater is managed and what happens to refuse and recyclables in the county. Staffs from all three of these county environmental programs collaborate with high school science teachers to tailor information to meet the educational needs of the students. To date, the Solid Waste Management Program has made 20 presentations to Fairfax County high school students about how trash and recycling are managed in the county.

The Solid Waste Management Program continues to work closely with the Northern Virginia Regional Commission on a regional public information program entitled "KnowToxics". The purpose of this program is to educate business owners about their responsibility to comply with federal and state regulations that require proper disposal or recycling of spent fluorescent lamps, rechargeable batteries and computers and related electronics. The program is centered on its Web site: www.KnowToxics.com which provides a resource where businesses can learn how to legally and appropriately manage these materials.

The Solid Waste Management Program has also continued a rechargeable battery recycling program, in collaboration with the Rechargeable Battery Recycling Program. RBRC is an industry-funded program where rechargeable batteries can be collected and sent for recycling at no charge. Collection boxes for rechargeable batteries are now located at all Fairfax County Board of Supervisors' offices and major county buildings. A complete listing of collection locations is on the county Web site at:

http://www.fairfaxcounty.gov/dpwes/recycling/mat-bat.htm

Also, as mentioned earlier, the program partnered with MWCOG to produce the Builder's Guide to Refuse and Recycling.

Annually, the Solid Waste Program participates in Celebrate Fairfax and Fall for Fairfax. The Fairfax County Solid Waste Management Program won the "Best in Show" award in 2007 at Celebrate Fairfax for its booth at the event. Both of these events are a major portion of the county's overall public outreach campaign, and provide the program with opportunities to disseminate technical guidance and practical information on using the county's solid waste management system.

The Solid Waste Management Program is a proud sponsor of the annual Earth Day/Arbor Day celebrations promoted by Clean Fairfax Council. This year, the Solid Waste Management Program supported the Johnie Forte Jr. Environmental Scholarship, which awarded twelve $500 grants to applicants from the Fairfax County Public Schools. Student groups receiving the grants are invited to make a presentation regarding their use of the grant in front of members of the Board of Supervisors, at the annual Earth Day/Arbor Day celebration at Northern Virginia Community College. The annual Fairfax County Business Recycling Awards are also presented at this same event, recognizing businesses that excel in their recycling efforts.

This scholarship program is a portion of SCRAP, the Schools/County Recycling Action Partnership. The SCRAP partnership was created by the Fairfax County Public Schools and the Solid Waste Management Program to provide opportunities for the students of Fairfax County Public Schools to learn about recycling and other environmental issues and to enhance recycling throughout the system. The Solid Waste Management Program developed the scrapbook, a resource tool distributed to all science teachers in the FCPS system, that details all of the opportunities provided by the Solid Waste Management Program and the Clean Fairfax Council to aid in the instruction of students, including training and presentations, tours and how to apply for the Johnie Forte grant award.

The Solid Waste Management Program also supports the county's Employee Recycling Committee. The ERC meets monthly and works on projects designed to encourage county employee participation in recycling. The group coordinated the county employee's Earth Day Expo celebration and the Employee Recycling Committee Recycler of the Year Award (a.k.a., the ERICA).

The county Earth Day Expo is held annually at the Government Center in conjunction with another event for all administrative assistants in the county. Many county agencies with responsibility for environmental protection and stewardship in the county participate, with informational booths staged in the Government Center during the lunch hour. These booths provide an opportunity for attending employees to better understand the services provided by these agencies.

America Recycles Day 2006 was celebrated on November 4, 2006 with the Community Recycling Road show at Herndon High School. Over the course of the day, approximately 361 cars came through a collection line at Herndon High School. About 270 pairs of eyeglasses were collected for the Lion's Club of Fairfax; OAR of Fairfax collected 117 cellular telephones; Safeguard Shredding reported shredding 2,500 pounds of paper documents; and Bikes for the World reported receiving over 100 bicycles. ServiceSource and CDM eCycling reported receiving 22 tons of computer and peripheral equipment (including several televisions, CD and DVD players and

telephones). Art for Humanity was able to collect 20 boxes of shoes, bed sheets, pillowcases and towels, along with 10 microwaves. Finally, about 62 pounds of rechargeable batteries were collected on behalf of the Rechargeable Battery Recycling Corporation.

Another aspect of the Solid Waste Management Program's public outreach and education effort is active involvement in community events and public speaking opportunities, and support to various community special interest groups such as the Lorton Citizens Alliance Team, the Business Advisory Committee and the Citizens' Advisory Committee on Solid Waste.

The Solid Waste Management Program also utilizes the Internet by posting pertinent information about timely subjects on the program's Web site. Information about the program's involvement in community events, as well as new information about solid waste matters, can be found at:

www.fairfaxcounty.gov/living/recycling.

Staff completed a reorganization of the entire Solid Waste Management Program Web site in 2006 to improve its ease of use for residents and businesses. All publications are now available on the county Web site to allow easier access and distribution.

The Solid Waste Management Program also published an electronic e-mail to county collection customers, to automatically send updates to customers on the program, as well as updates regarding service changes due to inclement weather. A similar "listserv" tool was developed to give vacuum leaf collection customers the most up-to-date information on the exact date that the leaf collection will be conducted on their street in order to ensure that residents have time to rake their leaves to the curb.

3. Clean Fairfax Council

Clean Fairfax Council is a private, nonprofit (501(c)(3)) corporation dedicated to the education of the residents of Fairfax County on issues relating to litter prevention and recycling. Environmental education is provided to students and adults throughout the county. All of the council's informational brochures are translated into the six major foreign languages used in Fairfax County: Korean, Spanish, Urdu, Farsi, Vietnamese and Chinese.

The council has many programs relating to litter, the primary one being the sponsorship of spring and fall cleanups. These cleanups are accomplished by the council sending information regarding the cleanups to all homeowner associations, public schools and assorted churches and businesses. The council asks volunteers to plan their cleanup by selecting a site, gathering volunteers and setting a date and time. Then, if they fill out a sign-up form and send it to the council, they are provided trash bags, recycling bags, vests and safety tips along with an automobile litter bag and a memento for each participant.

The council also sponsors an "Adopt-A-Spot" program whereby residents can adopt a spot for two years and pledge to clean it up four times a year. Additionally, the council produces the Fairfax County Earth Day/Arbor Day Celebration held in late April.

There are many other programs offered by the Clean Fairfax Council, including programs that are beyond litter prevention/control aspects. For more information, please visit the Web site at www.cleanfairfaxcouncil.org.

C. RECOMMENDATIONS

1. EQAC recommends that the county explore the possibility of establishing mechanisms to ensure that recycling efforts in county schools will be as rigorous as the efforts now required of county businesses.

2. EQAC recommends that, in order to improve residential recycling rates and reduce unsightly and litter-producing open recycling bins, the county establish a test program to determine the effectiveness of requiring the use of single, large closed containers for curbside pickup of all recyclable materials.

REFERENCES

Much of the narrative and illustrations were supplied by the following agencies of the Department of Public Works and Environmental Services:

- Division of Solid Waste Collection and Recycling.
- Division of Solid Waste Disposal and Resource Recovery.

The information about the Clean Fairfax Council was provided by Rosemary Byrne, Executive Director, Clean Fairfax Council

CHAPTER VI

HAZARDOUS MATERIALS

VI. HAZARDOUS MATERIALS

A. ISSUES AND OVERVIEW

1. Overview

Fairfax County hazardous materials concerns may be considered less significant as compared to other jurisdictions; the industrial base within the county is relatively "clean." Nevertheless, the county does have its share of problems. The main concerns are hazardous materials incidents involving spills, leaks, transportation accidents, ruptures or other types of emergency discharges. Secondary is the use and disposal of hazardous materials in either daily household activities or by small quantity commercial generators. The final concern is the clean up and regulation of hazardous materials.

Although the news media are constantly reporting industrial and transportation related hazardous materials incidents, there is a general lack of awareness by the public of health and safety risks associated with the use, storage and disposal of common household hazardous materials. Educating the public on the implications of these hazardous materials on peoples' lives remains a significant goal.

2. Hazardous Materials Incidents

a. Overview of 2007 Hazardous Materials Incidents

In CY 2007, the Fire and Rescue Department's Hazardous Materials and Investigative Services section received 395 complaints involving hazardous material (189 fewer than the previous year), 347 of which were reported spills, leaks or releases of hazardous materials. There were 60 hydraulic oil spills/releases (mostly from trash trucks), 73 fuel oil or home heating oil releases, 43 gasoline releases and 32 diesel fuel releases. There were 66 responses to incidences which had the potential to discharge, or did discharge, hazardous materials into storm drains or surface water. (1)

b. Hazmat Response Team Information

The Fire and Rescue Department's Operations and/or Hazardous Materials and Investigative Services Section respond to all reported incidents of hazardous materials releases, spills and discharges. The county has a well-equipped hazardous materials response team. The primary unit operates from Fire Station 34 in Oakton, and three satellite units are stationed at Fire Station 1 in McLean, Fire Station 11 in Alexandria area of Fairfax County and Fire Station 26 in Springfield. These units are strategically positioned to provide rapid response and adequate coverage throughout Fairfax County.

Response personnel are trained and equipped to initiate product control and mitigation measures to prevent or minimize the adverse environmental impact and damage. All units are staffed 24 hours per day, seven days per week. (2)

The Hazardous Materials Response Team responded to 406 incidents in CY 2005 (a reduction of 33 cases from the previous year). The primary unit now operates from the Fairfax Center fire station. (1)

In addition to the efforts of the Operations Division and Hazardous Materials Investigative Services Section personnel, the Fire and Rescue Department maintains a contract with a major commercial hazardous materials response company to provide additional support for large-scale incidents. The Fire and Rescue Department has stressed its commitment to protecting the environment and residents through proper enforcement of the Fairfax County Fire Prevention Code and through rapid identification, containment and cleanup of hazardous materials incidents. (2)

3. Hazardous Materials in the Waste Stream

The disposal of household and small quantities of non-household hazardous materials into the waste stream continues to be a concern. Unlike hazardous materials incidents, the immediate impact is not as dangerous. However, the long-term impact can be just as severe. Hazardous materials in the waste stream are contaminating landfills. Sometimes hazardous materials are dumped illegally, which leads to stream and groundwater pollution and soil contamination. Household hazardous wastes are products used in and around the home that are flammable, corrosive, reactive or toxic. These hazardous materials potentially can cause a safety problem if various household chemicals become mixed when disposed of with the regular trash. By disposing of household hazardous wastes separately in the appropriate manner, these materials can be properly handled and packaged to minimize exposure to potentially harmful chemicals and decrease the likelihood that these chemicals will enter the environment.

a. Used Automotive Oil and Fluids

According to a recent study, more than 50 percent of motorists change their own oil. Some of the oil is disposed of properly at a used-oil recycling center. Millions of gallons of used motor oil are being disposed of in garbage cans, sewers, storm drains and backyards – practices that can contaminate soil and local streams, rivers and bays. The U.S. Environmental Protection Agency believes that the largest single source of oil pollution fouling our nation's waters come from do-it-yourselfers. (4)

As a part of its ongoing effort to educate all Americans on environmental responsibility, the EPA launched the **"You Dump it, You Drink It"** campaign, aimed at the Hispanic automotive repair and service industry and consumers. Despite the fact that about half of all automotive mechanics in the United States are Hispanic, little if any Spanish-language materials exits for the automotive repair industry and those consumers who change their own motor oil. EPA hopes to fill this void through a wide-scale distribution of these materials, which include posters, brochures and bumper stickers. These materials are available to download from the EPA Web site. (5)

The recycled used motor oil is used for many purposes. Reprocessing is the most common method of recycling used oil in the United States. Seventy-five percent of used oil is being reprocessed and marketed to asphalts plants, industrial boilers, utility boilers, steel mills and others. Fourteen percent of used oil collected is turned over to re-refiners who return used oil to its original virgin oil state. Eleven percent of used motor oil collected is used in specially designed space heaters in automotive bays and municipal garages. (4)

Lynn Cooke, a service station owner in Washington, D.C., demonstrates quality control measures for used motor oil recycling to representatives from EPA, District of Columbia and API.

(American Petroleum Institute Web site: www.recycleoil.org [4])

b. Dumping into Storm Drains

Storm drains carry stormwater runoff from streets (see the Water Resources chapter of this report). This water is not treated and goes directly into local streams. All streams in Fairfax County eventually flow into the Potomac River, which empties into the Chesapeake Bay. Anything dumped down a storm drain will follow the same path as the stormwater runoff. (6)

The cleaning up of animal wastes and the disposal of such wastes down storm drains, as well as the disposal of leaves down the storm drains, are attempts at doing a service that have the effect of introducing pollutants directly into county streams. There are deliberate disposals of chemicals, oils and other items into the storm drains as "out-of-site, out-of-mind." In either situation, there is a misperception that the storm drains are part of the

county sewage system and that the disposal of materials down these drains does not provide a direct impact to the environment.

4. Pipelines

The following was reported by the Fairfax Joint Local Emergency Planning Committee:

> "More than 3,000 companies operate some 1.9 million miles of natural gas and hazardous liquid pipelines in the United States. The pipeline network includes 302,000 miles of natural gas transmission pipelines operated by 1,220 firms, and 155,000 miles are hazardous liquid transmission pipelines operated by 220 outfits. In addition to transmission pipelines, 94 liquefied natural gas facilities operate in the United States."

Pipelines traverse Fairfax County, carrying refined petroleum for two companies and natural gas for three companies. The Office of Pipeline Safety in the U.S. Department of Transportation regulates pipeline design and the construction, operation and maintenance of pipelines to ensure safe transportation of hazardous liquids and natural gas. (7)

5. Rail Transport of Hazardous Materials

Chemicals and materials that are hazardous have regularly been transported by rail. Accidents or leaks have been, and continue to be, a cause for concern. Additional concerns have been introduced as a result of the September 11, 2001 terror attacks.

Potential future shipments of nuclear radioactive waste by rail (and by truck) will travel through parts of the Washington, D.C. metropolitan area. Should an accidental or intentional incident occur, the effects and impacts could extend beyond that initial area.
The July 18, 2001 CSX Train fire in a Baltimore, Maryland tunnel was an unintended incident involving a train car with hazardous materials and had wide-range, long-term consequences. Major sections of the downtown were closed, businesses were impacted, Orioles' games had to be rescheduled, and portions of a major street were closed for five weeks. (7)

Rail through Fairfax County is in the eastern and southern portions of the county and does not include tunnels. Residents are generally not located as close to the rails in Fairfax County as in other jurisdictions. However, some hazardous materials, alone or in combination, when released can affect areas up to miles from the initial site of the incident. It is conceivable that Fairfax County residents could be impacted with hazardous materials from a rail incident in another jurisdiction.

B. PROGRAMS, PROJECTS AND ANALYSES

1. Fairfax Joint Local Emergency Planning Committee

Local Emergency Planning Committees are required by Section 301[c] of Title III of the Emergency Planning and Community Right-to-Know Act, a freestanding provision of the Superfund Amendments and Reauthorization Act of 1986. The main thrust of SARA is to identify and clean up waste sites that are potentially toxic. Title III has two important provisions: 1) it provides for emergency response planning to cope with the accidental release of toxic chemicals into the air, land and water; and 2) the community right-to-know provisions of Title III help to increase the public's knowledge and access to information on the presence of hazardous chemicals in their communities and releases of these chemicals into the environment. Under Title III, states are required to organize into planning areas and to establish local Emergency Planning Committees.

The FJLEPC is comprised of representatives of the city of Fairfax, the county of Fairfax, the town of Herndon and the town of Vienna. Committee members include local government officials, police, fire and rescue officials, environmental and governmental planners, public health professionals, hospital officials, public utility and transportation officials, representatives of business organizations, professional societies, civic organizations and the media. These representatives meet six times per year. The FJLEPC: (1) collects information about hazardous materials; (2) develops and updates, on an annual basis, the Hazardous Materials Emergency Response Plan; and (3) provides information to the public about the use, storage and manufacture of hazardous materials. The Plan also contains notification procedures in the event of an incident, on site means of detecting incidents, evacuation routes, clean-up resources and identification of parties responsible for the site. The Annual Plan exercise was conducted in October 2005. (2, 13)

FJLEPC provides education and outreach to the public. Information is disseminated through public meetings, brochures, newsletters and a Web site: www.lepcfairfax.org. The newsletter, which is mailed to civic and homeowner associations, focuses on emergency preparedness, disaster planning and fireworks safety. FJLEPC produced a video about shelter in place. The video is available through any of the Fairfax County public libraries as well as online through the county's "video on demand" service at www.fairfaxcounty.gov/cable/channel16/vod.htm. (8) LEPC members are available to speak to businesses or residents' groups, as requested.

2. Railroad Transportation Plan

The CSX Transportation, Hazardous Material Systems, has a hazardous material emergency response plan. A written copy of that plan is on file with FJLEPC and the Fairfax County Fire & Rescue Hazmat Station 34. The Web site for CSX is: www.csx.com.

On the Web site, CSX reports a 50 percent increase in all of its hazardous material loads in the last decade. Of the 518,000 hazardous materials rail cars in 2004, CSX reports only nine released any portion of their contents as a result of derailments. (9) There was no mention if there were releases not resulting from derailments.

3. Storm Drain Education Program

The Northern Virginia Soil and Water Conservation District has coordinated storm drain education in Fairfax County for over a decade. In 2006, with funding from Fairfax County and the Chesapeake Bay License Plate fund, the district expanded this water quality improvement program. Instead of using stencils and paint, volunteers now use an adhesive to apply pre-printed multi-colored labels to the cover of storm drains. The new labels read "No Dumping – Drains to Potomac River" or may be customized to reflect the name of the local watershed. The new labels are quicker and easier for volunteers to apply and the improved program has been enthusiastically received by volunteers, homeowner and civic associations, agencies and organizations.

The goal of the expanded program continues to be educating the community about the water quality impacts of storm drain dumping. The program also focuses on non-point pollution prevention. This is water pollution caused by our everyday activities. Each project includes a mandatory education component which must be completed prior to the storm drain labeling and involves distributing information about how to properly dispose of used motor oil, yard debris, household and pet waste to each home in the neighborhood. For schools and organizations, the district works with the project leader to come up with a unique way to educate the larger school or organizational community. In 2006, this program involved 283 volunteers and educated over 50,000 residents about the connection between the storm drain and our streams.

NVSWCD also publishes a quarterly newsletter, *Conservation Currents*, with articles on environmental topics. The June 2005 issue focused on hazardous waste reduction and included an article entitled "Healthy Homes, Healthy Communities: Household Hazardous Waste Reduction in Fairfax County." The article included information on how to determine which home products are hazardous waste and provided information on safe disposal. (6)

Pictures of storm drain marking by local volunteers (provided by NVSWCD (6))

4. Household Hazardous Waste Program

As a part of the suite of recycling and disposal services offered to Fairfax County residents, the county's Solid Waste Management Program operates two permanent Household Hazardous Waste collection facilities, one at the I-66 Transfer Station and the other at the I-95 Complex. Information on the locations, hours of operations and types of wastes accepted and how to dispose of the wastes can be found on the county's Web site at www.fairfaxcounty.gov/dpwes/trash/disphhw.htm or by calling a recorded 24 hour information line at 703-324-5068.

I-66 TRANSFER STATION
Thursday: 1:00 p.m. – 5:00 p.m.
Friday: 8:00 a.m. – Noon
Saturday: 8:00 a.m. – 4:00 p.m.
Sunday: 9:00 a.m. – 4:00 p.m.

I-95 LANDFILL
Thursday: 8:00 a.m. – Noon
Friday: 1:00 p.m. – 5:00 p.m.
Saturday: 8:00 a.m. – 4:00 p.m.

The HHW program provides an overall community benefit, and therefore residents are not charged when they use the program. The program receives its funding through the Solid Waste Management Program and from the General Fund. In FY 2006, materials deposited by residents for disposal or recycling primarily consisted of antifreeze, motor oil, lead acid batteries and latex paint. It is germane to note that none of these materials is regulated as hazardous waste.

In FY 2007, 21,958 users participated in the HHW program, disposing of 428,064 pounds of HHW. This represents a two percent increase in the number of users compared to FY 2006 but a three percent decrease in the weight of HHW disposed over FY 2006 data. Program details are provided in Table VI-1 below (11).

TABLE VI-1 Fairfax County Household Hazardous Waste Program: Record of Fiscal Year Disposal			
Fiscal Year	**Participation (# of users)**	**HHW (pounds)**	**Cost per household**
FY 2007	21,958 households	428,064	$27.77
FY 2006	21,471 households	440,076	$26.32
FY 2005	22,866 households	411,315	$18.84
FY 2004	18,600 households	373,220	$22.92
FY 2003	16,140 households	359,840	$23.30
FY 2002	16,272 households	368,060	$20.97
FY 2001	15,312 households	356,275	$18.75
FY 2000	15,564 households	330,325	$18.33

Source: Fairfax County Department of Public Works and Environmental Services, Division of Solid Waste Disposal and Resource Recovery, excludes remote HHW events.

It is anticipated that the amount of HHW entering the county program will continue to increase; however, capacity is available at the existing facilities to meet county needs well into the future.

5. Commercial Hazardous Wastes

In FY 2006, the SWMP conducted three Conditionally Exempt Small Quantity Generator waste collection events at the I-66 Transfer Station Complex. A CESQG is, according to federal hazardous waste regulations, any business that generates less than 220 pounds or 27 gallons of hazardous material per month. CESQGs pay a disposal fee for the hazardous material they bring to these events. This fee is generally lower than what it would cost to have an appropriate contractor pickup the waste at an individual business location. This allows the CESQGs to be able to afford to participate in an environmentally responsible program. Commercial hazardous waste generators that do not qualify as CESQGs must rely on commercial hazardous waste disposal companies for their disposal needs. Information about the CESQG program and a list of commercial hazardous waste disposal companies are available on the county's Website at www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm.

The SWMP also spearheaded development of the Know Toxics program, managed regionally by the Northern Virginia Regional Commission staff and Waste Management Board, www.KnowToxics.com (14).

6. Rechargeable Battery Recycling

In addition to the SWMP's battery collection activities described in the Solid Waste chapter of this report, the SWMP also collects mercury and lithium batteries for recycling at its HHW facilities. Non-rechargeable household

batteries are not accepted by the program, and can be safely thrown away. NiCad and other rechargeable batteries (commonly found in cordless tools and appliances, computers, camcorders, cameras and toys) are also accepted by the HHW program. The program has put rechargeable battery containers at each of the Board of Supervisor's offices, and program staff collects these batteries on a routine basis.

As described in the Solid Waste section of this report, the SWMP also participates and actively supports the recycling service provided by the Rechargeable Battery Recycling Corporation (14).

7. Fluorescent Lamps

Compact fluorescent lamps have become popular for residential use due their energy savings potential. However, these lamps contain minute quantities of mercury which classify them as HHW when they are disposed. These types of lamps are accepted for proper management from residents at both of the county's HHW facilities and at the remote HHW events.

Small businesses that generate less than the regulated quantity of fluorescent lamps may bring them to the business hazardous waste collection events. Other larger businesses that generate regulated quantities of these materials must comply with federal and state regulations regarding their proper disposal or recycling of the lamps (14).

8. Remote Household Hazardous Waste Events

As an adjunct to the permanent HHW facilities, and as described in the Solid Waste chapter of this report, the SWMP has received special funding through the county's Environmental Improvement Program to conduct a series of remote HHW collection events at locations throughout the county. In FY 2007, five of these events were conducted in the: Mount Vernon, Mason, Dranesville, Hunter Mill and Braddock Districts. These events require the use of an outside contractor to augment county staff as the events are held on Saturdays, which is the same time that county permanent sites receive maximum use. The cost of the remote events is approximately $12,000 per event. They are provided at no cost to county residents and, therefore, dependent upon the special funding from the Board of Supervisors (14).

C. REPORTING ENVIRONMENTAL CONCERNS AND ISSUES

Environmental issues affect everyone living and working in the county. All environmental concerns and events negatively impacting the county should be reported. A list of contact information relating to environmental crimes is provided in Table VI-2 below.

Table VI-2

HOW TO REPORT ENVIRONMENTAL CRIMES

Type of Incident	Phone Number
ANY ACTIVE RELEASE OF MATERIALS INTO THE ENVIRONMENT If the dumping of any substance into a stream, into a manhole, into a storm sewer or onto the ground is witnessed, assumptions regarding the contents of the materials should not be made. 911 should be called immediately. When calling 911, be prepared to provide specific information regarding the location and nature of the incident. The local office of the U.S. Environmental Protection Agency (703-235-1113) can be called in addition to (but not instead of) 911.	**911**
HAZARDOUS MATERIALS-DANGEROUS If a suspected hazardous substance is being released, if lives are in danger or if property is threatened, 911 should be called immediately. It is also appropriate to call 911 anytime an active release is witnessed.	**911**
HAZARDOUS MATERIALS-NO IMMEDIATE DANGER If a known discharge of hazardous materials has occurred in the past and no lives or property are in immediate danger; this must be reported to the Fairfax County Fire and Rescue Department's Hazardous Materials and Investigative Services Section at this number (includes Towns of Clifton, Herndon and Vienna). If there is any question about whether a release may still be active or whether there may be any immediate danger, 911 should be called.	During working hours, call: **703-246-4386** After hours, call: **703-691-2131**

Table VI-2 (continued)

HOW TO REPORT ENVIRONMENTAL CRIMES

Type of Incident	Phone Number
RELEASE OF ANY MATERIAL INTO THE ENVIRONMENT Any release of materials into the environment, whether hazardous or not, should be reported to the Northern Regional Office of the Virginia Department of Environmental Quality at the above number. If the release is an active one, call 911.	**703-583-3800**
EROSION AND SEDIMENTATION If the illegal removal of trees, the illegal clearing of land and/or the illegal dumping of fill is suspected, contact Fairfax County's Code Enforcement Division at this number. This number should also be contacted if siltation and other harmful effects of construction activity are occurring or observed on neighboring lands and waterways. All calls received during non-working hours will be responded to during the next business day.	**703-324-1937**
HEALTH HAZARDS In addition to the above contacts, if a health hazard is suspected, contact the Environmental Health Administration at this number. The Health Department's Community Health and Safety Section (703-246-2300) can also be called. Asbestos-specific releases should also be reported to the Health Department.	**703-246-2205**

D. LEGISLATIVE UPDATE

There are no legislative updates for this year's report.

E. COMMENTS

EQAC reiterates its recommendations from the 2006 Annual Report on the Environment:

1. EQAC continues to recommend an aggressive public education campaign on how to properly dispose of household/residential, commercial and industrial hazardous waste. Continuous partnering with the Northern Virginia Board of Realtors and

solid waste haulers to distribute information to all new residents in the county is suggested. New residents would be anybody buying or renting a house, townhouse or condominium. Waste removal companies could be asked to include an information letter with their mailings to their customers. Creative use of other organizations is also encouraged.

2. EQAC recognizes the county's ability to collect rechargeable batteries at the I-66 transfer station, the I-95 solid waste site and special programs with the business community. Schools and other organizations should be encouraged to come up with creative initiatives to promote significant increases in recycling rechargeable batteries. Possible sites to house recycling drop off bins should be explored, such as outlying areas of parking lots. With the growing popularity and use of rechargeable battery products, especially cellular phones, EQAC recommends an aggressive program to promote recycling of NiCad rechargeable batteries.

3. EQAC recommends continuing to advertise and educate the public regarding the types of hazardous materials and other environmental situations residents are requested to report, including whom they are to contact. Possible avenues are community association newsletters, press release stories to the media and age appropriate material sent home through the schools. Avenues that are not connected with environmental information should be explored to reach people not drawn to environmental events.

F. RECOMMENDATIONS

No new recommendations are proposed this year.

REFERENCES

1. Fairfax County's Office of the Fire Marshal, Captain Ramiro H. Gálvez, CEFI, July 2007 e-mail

2. Fairfax County Fire & Rescue, Chief Michael P. Neuhard, 17 June 2004 memo

3. Briefing presentation given to FJLEPC, Deputy Chief John Caussin, Fairfax County Fire & Rescue, 12 February 2004

4. American Petroleum Institute, *Used Motor Oil Collecting and Recycling*, www.recycleoil.org , viewed 16 August 2005

5. U.S. Environmental Protection Agency, Wastes-Used Oil Management Program, www.epa.gov/epaoswer/hazwaste/usedoil/ , viewed 16 August 2005

6. Summary provided by the Northern Virginia Soil & Water Conservation District, October 13, 2006.

7. Fairfax Joint Local Emergency Planning Committee, www.lepcfairfax.org

8. Fairfax County News Release, 24 June 2005, http://fairfaxcounty.gov/news/2005/05167.htm

9. CSX, www.csx.com , viewed 16 August 2005

10. Fairfax County Web site; viewed 1 September 2005 www.fairfaxcounty.gov/dpwes/trash/recyclingtrash.htm

11. Fairfax County Department of Public Works and Environmental Services, 18 October 2006 e-mail from Jeff Smithberger, Director, Division of Solid Waste Collection and Recycling

12. Fairfax County Government, Business Hazardous Waste Web site, October, 2006, www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm

13. Fairfax County Fire & Rescue, Carolyn Ford, 1 November 2006 e-mail

14. Division of Solid Waste Disposal & Resource Recovery, Joyce Doughty, P.E., 24 August 2007 e-mail

15. Previous EQAC authors of this chapter and material

CHAPTER VII

ECOLOGICAL RESOURCES

VII. ECOLOGICAL RESOURCES

This chapter summarizes the status of ecological resources and the actions of public agencies and citizen groups in the management and preservation of these resources.

A. ISSUES AND OVERVIEW

Open space and natural habitat continue to be reduced in Fairfax County, primarily because of development (both residential housing and commercial buildings) and road building. As this resource is reduced, increased emphasis must be placed on protecting, preserving and enhancing the remaining open space and natural habitat in Fairfax County.

Fairfax County contains a total of about 227,750 acres. Of this total, about 28,108 acres (12.3 percent) are in parks and recreation as of January 2004. Another approximately 25,712 acres (11.3 percent) are vacant or in natural uses. This compares to the about 26,700 acres (11.7 percent) that were vacant or in natural uses as of January 2003. However, not all this acreage can be considered as open space that is valuable for natural habitat. First, the park acreage consists of active recreation (ball fields, etc.) as well as passive recreation (stream valley parks, nature centers, etc.) Ball fields, while greatly needed in Fairfax County, do not do much for protecting natural habitat. In a like fashion, much private open space consists of mowed areas and isolated trees (not woodlands). Again, this does little for protecting natural habitat. Both active recreation areas and private open space, however, if properly designed can help the environment by reducing storm water runoff (by allowing storm water to infiltrate into the soil).

Second, while vacant land is often wooded, this land is subject to development. Considering the continuing rapid pace of development in Fairfax County, much of this land will soon become residential space, office space, retail space, etc., and not provide much in the way of protecting natural habitat. In 1980, vacant land accounted for 32.2 percent of the total land in Fairfax County. By 1990, this had dropped to 19.5 percent and the figure was 11.3 percent as of January 2004.

Therefore, Fairfax County needs to undertake stronger efforts in order to protect, preserve, and enhance the environmentally sensitive open space in the county. These efforts should include the establishment of a countywide Natural Resource Inventory, followed by a countywide Natural Resource Management Plan. Additionally, the county needs an aggressive program seeking easements on privately owned environmentally sensitive land and, as opportunities arise, to purchase environmentally sensitive land.

Recently, two significant efforts have occurred that should help in the County's preservation and protection of natural resources. First, as reported in the 2004 Annual Report on the Environment, the Fairfax County Board of Supervisors adopted an environmental vision for Fairfax County – *Environmental Excellence for Fairfax County: a 20-Year Vision*. This vision cuts across all activities in Fairfax County and outlines guidelines that hopefully will be followed in future planning and zoning activities in Fairfax County.

Second, as also reported in the 2004 Annual Report on the Environment, the Park Authority approved the Natural Resource Management Plan for park properties. Again, if this plan is implemented, improved preservation and protection of environmentally sensitive land should be the result.

EQAC continues to commend a number of organizations for their activities in protection, preservation, and enhancement of environmentally sensitive areas. These organizations include: the Northern Virginia Soil and Water Conservation District, the Virginia Department of Forestry, the Northern Virginia Conservation Trust, Fairfax ReLeaf, the Fairfax County Department of Public Works and Environmental Services, and the Fairfax County Park Authority and its staff. EQAC especially commends the Fairfax County Board of Supervisors for its vision and activities in environmental areas.

B. PROGRAMS, PROJECTS, AND ANALYSES

1. The Fairfax County Board of Supervisors

In past years, this chapter of the Annual Report mentioned various organizations and programs supporting environmental efforts in Fairfax County. However, the Fairfax County Board of Supervisors, while mentioned many times, did not have a section in this chapter. This changed in the 2005 Annual Report when a section was included on the board. The actions and decisions of the BOS do affect the county's natural resources. These actions and decisions include land use planning and zoning, transportation planning, allocation of staff resources, etc. The BOS has enacted a number of policies that do benefit the environment and many of these polices are embedded in county ordinances and the Policy Plan. However, there never has been an overarching vision dealing with the environment. This has now changed. As reported in the 2005 Annual Report on the Environment, the BOS has now adopted such an overarching vision -- *Environmental Excellence for Fairfax County: a 20-Year Vision*.

This vision is organized into six sections that cut across all areas in the county:

- Growth and Land Use
- Air Quality and Transportation
- Water Quality
- Solid Waste
- Parks, Trails, and Open Space
- Environmental Stewardship.

Some recommendations in this document that impact ecological resources include:

- Create more community parks for active and passive recreation – open spaces with native vegetation to sustain local wildlife and to create areas for walking, meditating or bird watching.
- Continue to acquire open space before it is too late through direct purchase or conservation easements to create more trails, connect trails and provide passive and active recreation areas.
- Provide adequate resources to maintain and appropriately develop our parks for passive and active recreation.
- Encourage conservation easements for open space and trails either to private organizations, such as the Northern Virginia Conservation Trust and The Potomac Conservancy, or to government agencies like the Fairfax County Park Authority or the Northern Virginia Regional Park Authority.
- Encourage organizations, for example, those that work on stream monitoring and stream valley restoration, to involve schools and residents of all ages in their work.
- Encourage community-based watershed stewardship groups and help them to work with all stakeholders to protect, enhance and improve the natural resources, and hence, the quality of life in their watersheds.
- Establish an aggressive program of community groups to adopt natural areas such as parks, trails, and stream valleys.

The summary of the document can be viewed at: http://www.co.fairfax.va.us/dpwes/environmental/env_excel.htm and the complete document is at: http://www.co.fairfax.va.us/chairman/environmental_plan.htm

This document is very significant in its potential for protection, preservation, and restoration of the county's natural resources. EQAC continues to commend the Board of Supervisors for adopting this vision and for the steps it is taking to implement these recommendations.

2. Department of Public Works and Environmental Services

a. Stream Restoration

DPWES was involved in a number of stream restoration projects. Bioengineering techniques are being used were possible. The following projects were in progress or completed in 2006:

- **English Hills:** Stabilization of 175 linear feet of stream bank at 7820 Manor Drive. Construction is complete.
- **Haycock Longfellow Park:** In partnership with FCPA, a bioengineered solution was designed on approximately 270 feet of stream that featured large boulder cross-veins with step pools, a reestablished floodplain and native plantings while only requiring the removal of one tree. Construction is complete.
- **Hollington Place:** Stabilization of 150 linear feet of stream bank using bioengineering techniques to alleviate erosion at 7926 Hollington Place. A proposal for the final design has been received from the Architectural/Engineering firm and is currently being negotiated.
- **Hunters Branch:** Stream bank stabilization. Purchase Order negotiations are under way.
- **Runnymeade Subdivision:** Stabilization of 1,200 linear feet of stream bank using bioengineering techniques. Construction is complete.
- **Clarke's Landing:** Stabilization of 280 linear feet of stream bank using bioengineering techniques. In construction.
- **Poplar Springs Court:** Restoration of 1,100 linear feet of stream bank using bioengineering techniques. A Design Task Order has been approved.
- **Beach Mill Road:** Stabilization of 200 linear feet of stream bank using bioengineering techniques. In construction.
- **Bridle Path Lane:** Stabilization of 1,200 linear feet of stream bank using bioengineering techniques. Design review is underway.
- **Swinks Mill Road:** Stream bank stabilization to provide structural protection at 819 Swinks Mill Road. Construction is complete.
- **Balmacara Phase II:** Stabilization of 200 linear feet of stream bank to provide structural protection. Construction is substantially complete. Plantings scheduled for early fall, 2007.
- **The Colonies at Scott's Run:** Stabilization of 180 linear feet of stream bank. Construction is complete.
- **Mount Vernon Estates:** Restoration of 600 linear feet of streambank using bio-engineering techniques. In construction.
- **Hope Park Road:** Restoration of 1,000 linear feet of stream bank plus removal of an unauthorized landfill. Design negotiations are under way.

- **Huntley Meadows:** Stream bank stabilization project using bioengineering techniques. This project is 100 percent complete, with good results, insofar as the stream bank withstood the record flooding of the June 2006 storm event and emerged mostly intact.
- **Kirby Road:** Stabilization of 200 linear feet of stream bank. Design negotiations are under way.
- **Difficult Run Stream Valley Park, Area 3, Upstream:** Partnered with FCPA to install root wads, large boulder revetments, a rock vane and vegetated geo-grids in the upstream portion of Difficult Run in order to recreate the natural meander of the channel while stabilizing the toe and banks. Construction is complete.
- **Difficult Run Stream Valley Park, Area 3, Downstream:** Flow was redirected with large boulder revetments and two rock vane structures. The bank was shaped and graded, a vegetated geo-grid was placed on the banks, and existing scour areas were filled to stabilize the eroding embankment toe adjacent to the parking area. Construction is complete.
- **Little Pimmit Run:** Emergency repairs were performed to a sanitary sewer line, including a temporary pump around sanitary flow, construction of 125 linear feet of new 24" sanitary sewer main, stream bank stabilization by gabion walls and riprap and restoration. Construction is complete.
- **Pleasant Ridge:** The streambank was restored and stabilized and a stormwater outfall was repaired. Construction is complete.
- **Governor's Run Phase II:** This project entails streambank stabilization and forebay construction. Construction is 95 percent complete. Planting of trees, shrubs, live stakes and final restoration of disturbed areas was to have commenced in fall, 2007.
- **Woodland Avenue:** This project entails stabilization of 120 linear feet of streambank to provide structure protection. Construction is 95 percent complete.
- **Dolly Madison Library:** Approximately 1,400 linear feet of streambank are to be stabilized using soil bioengineering technology. An A/E proposal has been approved and concept design was to have been provided in the summer of 2007.
- **Hollington Place:** Approximately 730 linear feet of streambank are to be stabilized using bioengineering techniques to alleviate sever erosion. The project is in the final design phase.
- **Clifton Creek:** Approximately 1,500 linear feet of streambank are to be stabilized using bioengineering techniques. The project is in the design phase.
- **Clifton Road:** Spot streambank stabilization is to be pursued using bioengineering techniques. The project is in the design phase.

b. Green Roof Technology

There are several vegetated roofs soon to be implemented by Fairfax County, one on an existing structure and two on new buildings. A vegetated roof demonstration project will be installed on part of the Herrity Building parking garage and is currently under construction. This project is being managed by the Facilities Management Division with support and funding provided by Stormwater Management. This demonstration project is intended to provide an easily accessible example of different vegetated roof technologies and methods for educational and research purposes. Government staff and those in the building industry, as well as residents and students of all ages, will benefit from this educational installation. Capital Facilities, also with support and funding provided by Stormwater Management, will be installing vegetated roof pilot projects on two new buildings. These buildings, Fairfax County's Bus Operations Center on West Ox Road and the Wolf Trap Fire Station, are both currently in the design phase.

Vegetated roof implementation will also be encouraged in an upcoming Public Facilities Manual amendment. Vegetated roofs are one of six Low Impact Development techniques currently in the process of being added to the Public Facilities Manual. Lists of suggested plants for both extensive (low-profile) and intensive (deep-profile) type roofs will be included in order to further facilitate design and implementation.

Additionally, Stormwater Management has several vegetated roof monitoring projects in the works. The demonstration roof on the Herrity parking garage will be monitored for several parameters, as will the currently functioning demonstration roof at the Providence District Supervisor's office. Stormwater is also giving support to a graduate student who is monitoring the privately owned Yorktowne Square Condominium vegetated roof/conventional roof comparison study site.

3. Fairfax County Park Authority

The Fairfax County Board of Supervisors created the Fairfax County Park Authority in 1950, authorizing the Park Authority Board to make decisions concerning land acquisition, park development, and operations. As a result, Fairfax County has a system of parks that serve a number of uses, including active recreation such as sports, historic sites and buildings, and preserving environmentally sensitive areas such as forests and stream valley lands. For current information on the county's parks, visit the FCPA Web site at http://www.fairfaxcounty.gov/parks/.

a. Acquisition of Park Land by FCPA

The FCPA added 281 acres between July 2006 and July 2007. This brings the parkland inventory to a total of 23,969 acres (which equates to 9.4 percent of the land mass of Fairfax County) as of July 2007.

FCPA purchased the following properties:

- Joseph and Bonnie Frey, 4.1461 acres. This parcel in Sully District was the last privately-owned property within the boundaries of E. C. Lawrence Park.
- Royal Pool Association, 1.0 acres. FCPA plans to demolish the existing pool and incorporate this property into Kings Park Park in Braddock District.
- Lawrence Doll and Dominion Hills Development, LLC, 1.562 acres. The addition of this parcel to Pimmit Run Stream Valley Park will permit construction of a stream valley trail.
- Crestwood Construction Corporation, 8.6535 acres. This acquisition of ecologically sensitive floodplain in Braddock District was added to Woodglen Lake Park.
- McCue and McCue Limited Partnership, 104.1681 acres. One of the largest parcels of underdeveloped land remaining in Mount Vernon District, this acquisition contains the archeological remains of the colonial town of Old Colchester.
- NVP, Inc., 3.6786 acres. Cultural resources associated with this property in Sully District are potentially eligible for inclusion in the National Registry of Historic Places.
- Ronald and Mary Beth Cuigan, 35.0 acres. FCPA used funding from the Coastal and Estuarine Land Conservation Program for this acquisition in Sully District.
- Daniel Garber, Neil Garber, John Garber, Geraldine Rigney, Mitchell Tolson, Jr., and Marta Ross, 31.5208 acres. This property in Mount Vernon District with Revolutionary War historical importance will be added to Mason Neck West Park.
- Kenneth Hall, Brian Hall, Bruce Hall, Alan Hall, Stephen Hall, and Nancy Hall Morris, 1.4975 acres. This parcel in Dranesville District provides a critical link for the Pimmit Run Stream Valley Park.

FCPA acquired the following properties through dedications:

- Ogelthorpe Limited Partnership, 1.651 acres. This property became part of Sully Woodlands in Sully District.
- Rosewood-Hooes, LLC, 0.7797 acres. This property in Mount Vernon District was added to Accotink Stream Valley Park.

- Carlyle 9B1 Fairfax, L.P., 12.3328 acres. This floodplain in the Sully District and within Cub Run Stream Valley became an addition to Sully Woodlands.

FCPA acquired the following properties through transfers:

- United States of America, 12.3287 acres. The Department of the Army transferred four ball fields and associated amenities known as McNaughton Fields Park in Mount Vernon District to FCPA in exchange for 20.9492 acres of the Berman Tract.
- Fairfax County Board of Supervisors, 3.9804 acres. This former right-of-way will be incorporated into Huntley Meadows Park, ensuring the preservation of two champion swamp chestnut oak trees and one champion pin oak tree.
- Fairfax County Board of Supervisors, 40.6108 acres. The former Clermont School Site, now Clermont Park, was transferred to FCPA after the placement of a conservation easement for the buffering of adjacent neighborhoods.

b. Natural Resource Management Plan

In past reports, EQAC recommended that the Fairfax County Board of Supervisors develop and implement a countywide Natural Resource Management Plan. EQAC noted that in order to do this, two tasks need to be accomplished first: complete a countywide Baseline Natural Resource Inventory and adopt a unified Natural Resource Conservation Policy.

EQAC's past recommendation on developing a countywide Natural Resource Management Plan has been partially fulfilled by FCPA. On January 14, 2004, the Park Authority Board approved the Natural Resource Management Plan for Park Authority property. The NRMP contains seven elements:

- Natural Resource Management Planning
- Vegetation
- Wildlife
- Water Resources
- Air Quality
- Human Impact of Parklands
- Education.

The complete NRMP can be viewed at http://www.fairfaxcounty.gov/parks/nrmp.htm.

The second year of the implementation of the NRMP was completed June 30, 2007. Some of the highlight of year three included:

- Policy and Best Practices
  - Completed revision to stormwater policy.
  - Drafted a non-invasive plant policy for plantings on parkland.
  - Revised and clarified beaver management procedures.
- Partnerships
  - Continued partnerships with Environmental Coordinating Committee, Environmental Quality Advisory Council, Department of Public Works and Environmental Services, Northern Virginia Soil and Water Conservation District, Virginia Department of Forestry, Earth Sangha, and others.
  - In partnership with Earth Sangha created a native arboretum at the Marie Bulter Leven Preserve.
  - In partnership with Earth Sangha, NVSWCD, and VDOF, built a rain garden at the Marie Butler Leven Preserve.

- NRMP Program
  - Secured $300,000 for invasives management and $150,000 for stewardship education the FY 2006 Carryover.
  - Secured $200,000 for invasives management and $50,000 for stewardship education in the FY 2008 budget.
  - Continued to enhance collaboration with other divisions of the FCPA on resource management issues.

- Resource Assessments and Planning
  - Developed scope for the Resource Assessment Toolkit.
  - Developed NRMP for Riverbend.
  - Developed scope for the GIS-based Ecological Modeling project.

- Resource Management
  - Park Authority staff conducted a burn of the meadows on Pleasant Valley Road in Sully Woodlands as well as at Huntley Meadows Park.
  - Two managed deer hunts at Sully Woodlands.
  - Worked on Natural Landscaping Committee and developed county policy language an implementation documents for the use of natural landscaping practices at public facilities.
  - Continued to restore riparian buffers in cooperation with DPWES.
  - Established temperature monitoring to evaluate buffer planting effectiveness at Lake Fairfax.

- Invasive Non-native Species
  - Continued and expanded the Invasive Management Pilot Program.
  - Developed scope for a countywide survey and prioritization report.

- Water Resources and Low Impact Development
  - Worked with DPWES to refine the process of reviewing, coordinating and implementing watershed plan projects.
  - Two rain gardens constructed at Cub Run and Mount Vernon RECenters.
  - LID features planned at five park sites in conjunction with upcoming infrastructure improvements.

- Stewardship Education
  - Produced three full-sized brochures (Wildlife Conflict, Pets in Parks, and Native Plants), plus five highway cards (Deer, Beaver, Coyote, Fox, and Dead Wood).
  - Conducted stewardship awareness exercises at every staffed park site and area.

While the Park Authority has made a great step forward with the adoption of the NRMP, more resources (people and funds) need to be devoted to the implementation of the plan. Furthermore, inventories of all parks need to be accomplished. The inventory needs to be extended to cover all of Fairfax County so that future planning for acquisition of sensitive lands can take place.

Unfortunately, insufficient staffing and funding are limiting implementation of the NRMP. The Fairfax County Park Authority staff lacks a number of functions and capabilities in regard to the NRMP: natural land managers, ecologists, restoration specialists, water resource specialists, wildlife specialists, planners and project managers. EQAC does support increased funding for this purpose, but also notes that obtaining some of the needed positions from within internal resources also can be done. EQAC recognizes that personnel cannot just be transferred from another job (and skill set) to this program, but increased staffing can be accomplished by hiring a new person with the right skills when normal attrition happens elsewhere on the FCPA staff.

c. Green Infrastructure/Natural Resource Mapping Effort

The goal of this project is to develop a framework for modeling ecologically significant resources to support land use and development decisions in Fairfax County. This information will also be used as needed by FCPA to provide for informed land acquisition decisions as well as to support park

planning processes. The successful achievement of this effort will satisfy a long-standing EQAC recommendation.

A demonstration model will be conducted for the Sully Woodlands region and the results used to refine the model protocol. Development of the model for the entire county will be considered based upon the results of this study and the availability of funding. The scope of work is developed and the project should be underway in 2007 with a late 2008 completion date.

d. Invasive Plant Control Efforts

Invasive plants are a problem because they can out compete and replace native species. This change in vegetation disrupts the life cycles of many flora and fauna that depend on native vegetation. The Park Authority's Strategic Plan includes a strategy to develop invasive plant guidelines for consideration by the Environmental Coordinating Committee as a countywide standard.

The Invasive Management Area Program is in the second year of a two-year pilot program. A number of volunteers have enabled the program to be established at 36 sites with 41 trained volunteer leaders. This program works on plots of land, typically ½ acre, to remove priority invasive species. Initial funding came from the Board of Supervisors Carryover budget support for the Environmental Improvement Program. The National Fish and Wildlife Foundation also provided FCPA with a grant.

The Invasive Conservation Corps is an internship opportunity that was to have been offered by FCPA for the first time in summer 2007. Nine graduate and undergraduate interns were to have performed mechanical control of invasive plants at 21 sites.

FCPA continues with outreach and education in this area. Another brochure, *Native Backyard Plants*, adds to two brochures (*Invasive Backyard Plants* and *Invasive Forest Plants*) already developed and distributed.

EQAC continues to commend the volunteers and the Park Authority staff who are cooperating in removing invasives; an increased effort should be established using dedicated funds for this purpose.

e. Riparian and Bioengineering Projects

The Fairfax County Park Authority, along with and in partnership with other agencies, continues to work on stream stablization/bioengeering projects. See the Water Resources Chapter of this report for descriptions of these

projects. The stream restoration projects were the Barnyard Run at Huntley Meadows Park encompassing about 300 linear feet, and the Little Pimmit Run project, which included over 300 liner feet.

f. Environmental Stewardship

FCPA does offer a number of opportunities for volunteers and EQAC encourages county residents to take advantage of these opportunities. Information about these opportunities is available at http://www.fairfaxcounty.gov/parks/volunteer.htm.

More information about FCPA and its programs is available at these Web sites: http://www.fairfaxcounty.gov/parks/resources/stewardship.htm and http://www.fairfaxcounty.gov/parks/resources.

g. Fairfax County Park Foundation

Fairfax County citizens can donate to the Fairfax County parks through the Fairfax County Park Foundation. The Fairfax County Park Foundation is a 501(c)(3) not-for-profit organization and donations are tax deductible to the fullest extent allowed by law. The Foundation's mission is to raise funds to support the parks and land under the stewardship of the Fairfax County Park Authority. Less than half of the Park Authority's annual operating funds come from tax support. The Foundation's goal is to bridge the gap between income from tax support and user fees, and the cost to operate, maintain and preserve the county's park system. Those interested in giving tax-deductible donation to the Foundation, can contact the Foundation at:

Fairfax County Park Foundation
12055 Government Center Parkway
Fairfax, VA 22035
(703) 324-8581
SupportParks@aol.com
http://www.FairfaxCountyParkFoundation.com

4. Northern Virginia Regional Park Authority

Three Northern Virginia counties (Fairfax, Loudoun and Arlington) and three cities (Alexandria, Fairfax and Falls Church) participate in the Northern Virginia Regional Park Authority. NVRPA was founded in 1959 and owns and operates 19 regional parks and owns 10,256 acres of land throughout the region.

Current information about the Northern Virginia Regional Park Authority can be found on its Web site, http://www.NVRPA.org/.

5. Fairfax ReLeaf

Fairfax ReLeaf is a non-profit (501(c)(3)), non-governmental organization of private volunteers who plant and preserve trees, restore forest cover, restore habitat and improve community appearance in Northern Virginia. Members have testified to county officials and politicians that an unacceptably rapid rate of tree loss in Fairfax County continues. They state that the county has not taken effective steps to stem this loss of forest infrastructure. Fairfax ReLeaf is very active in tree plantings and is always eager to sign up new volunteers.

These tree plantings lead to a number of benefits:

- Maintenance and improvement of air quality
- Reduced heat island effects
- Reduction of noise
- Preserved human and wildlife habitats
- Reduction of energy use
- Reduction of surface runoff and improvement of water quality.

Fairfax ReLeaf remains very active in its efforts. The organization planted 2,027 trees in 2006 and volunteers spent about 150 hours removing invasives from trees. Some specific activities were:

- Distribution of seedlings for planting in both October and November
- Continuation of work in Pine Ridge Park, clearing out invasive species, planting trees, and mulching
- Planting of trees on the traffic circles at the new interchange at Route 28 and the exit to the Air and Space Museum
- At the annual Earth Day Arbor Day celebration, Fairfax ReLeaf did its first "RIP" (Remove Invasive Plants) at the campus of NVCC-Annandale Campus. Volunteers removed invasive English Ivy from a seriously overgrown natural area.

For further information on Fairfax ReLeaf, visit its Web site at http://www.fairfaxreleaf.org. The organization can be reached at:

Fairfax ReLeaf
12055 Government Center Parkway
Suite 703
Fairfax, VA 22035
Telephone: (703) 324-1409
Fax: (703) 631-2196
Email: trees@fairfaxreleaf.org

6. Northern Virginia Conservation Trust

Past EQAC reports recommended that the Fairfax County Board of Supervisors form public-private partnerships for the purpose of obtaining easements on environmentally sensitive land. EQAC pointed out that entities such as The Nature Conservancy use easements very successfully as a way of protecting environmentally sensitive properties. With the signing of a Memorandum of Understanding on June 20, 2001 between the Fairfax County Board of Supervisors and the Northern Virginia Conservation Trust, such a public-private partnership now exists. The partnership is now in its seventh year with recent funding for FY 2008.

NVCT was founded in 1994 as the Fairfax Land Preservation Trust. In 1999, the Trust changed its name to The Northern Virginia Conservation Trust to better reflect the regional scope of the service area. NVCT is a 501(c)(3) nonprofit land trust dedicated to preserving and enhancing the natural and historic resources of Northern Virginia. NVCT also has formed public-private partnership with Arlington County and the City of Alexandria, and owns properties or easements in Arlington, Fairfax, Loudoun, Prince William and Stafford Counties and in the cities of Alexandria and Fairfax.

From the time NVCT accepted its first easement in 1999 through June 2007, NVCT has preserved about 650 acres of open space in Fairfax County through easements, fee simple ownership, and partnerships. Between July 2006 and June 2007, NVCT permanently protected more than 75 acres on the Potomac River Gorge through three conservation easements. (One of the Gorge easements was partially funded through a $208,000 NOAA federal grant secured by NVCT.) The Gorge is the 15-mile scenic Potomac River section that lies between Great Falls south to Theodore Roosevelt Island. This stretch serves as a habitat for a variety of species, including 15 globally rare species, 100 state-rare species and 30 different vegetation communities, as well as an important river viewshed for National Parks and other public river vistas.

Tables VII-1, VII-2 and VII-3 provide details on all these properties.

NVCT also has a public outreach program – Adventures in Conservation – to bring hands-on volunteerism and environmental education opportunities. These activities included the planting of native trees, the removal of invasive plants, birding trips and guided hikes. NVCT naturalist-led kayak tours, part of its innovative environmental and conservation education program, "floating classrooms," continue to be a huge success.

NVCT was listed in this year's Catalogue of Philanthropy as one of the best small charities in Northern Virginia and was so recognized by the Board of Supervisors.

Table VII-1. Easements Obtained by the Northern Virginia Conservation Trust

District	Location	Acreage	Recordation
Braddock	Annandale	2.6	5/28/2004
Dranesville	Great Falls	5.6	12/1/2000
Dranesville	Great Falls	5	12/22/2005
Dranesville	Clifton	5.3	5/27/2003
Dranesville	Great Falls	14.07	7/3/2003
Dranesville	McLean	62.7783	11/20/2006
Dranesville	McLean	7.7717	11/20/2006
Dranesville	McLean	1.9	12/14/2005
Dranesville	Great Falls	4.2	12/22/1999
Dranesville	Great Falls	5.1	8/14/2001
Dranesville	Great Falls	5	12/28/2000
Dranesville	Great Falls	5	7/18/2001
Dranesville	McLean	41	12/27/2005
Dranesville	McLean	6	8/1/2002
Dranesville	Great Falls	5	8/14/2001
Dranesville	McLean	5.03	12/18/2006
Hunter Mill	Vienna	0.39	3/28/2003
Mason	Alexandria	1.58	12/27/2002
Mt. Vernon	Lorton	33.73	5/18/2002
Mt. Vernon	Alexandria	0.4	
Mt. Vernon	Alexandria	0.92	6/20/2003
Mt. Vernon	Mason Neck	9	12/19/2003
Mt. Vernon	Alexandria	0.34	6/6/2005
Providence	Falls Church	1	4/14/2004
Providence	Falls Church	2.5797	3/10/2003
Providence	Falls Church	1.98	3/10/2003
Providence	Falls Church	1.56	3/10/2003
Providence	Falls Church	1.12	3/10/2003
Springfield	Springfield	0.87	10/30/2002
Springfield	Springfield	0.77	11/26/2002
Sully	South Riding	226	12/19/2003
Sully	Fairfax	1.51	7/17/2003
	Total	**465.0997**	

Source: *EQAC Annual Report*, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, August 1, 2007.

Table VII-2. Fee Simple Properties Owned by the Northern Virginia Conservation Trust			
Property/District	**Location**	**Acreage**	**Recordation**
Clifton Property/Dranesville	Clifton	8.66	Gift 6/2003
Davenport/Pimmit Run/ Dranesville	McLean	1	Gift 8/2000
Mason	Springfield	0.001	Gift 3/2005
Little Hunting Creek/ Mt. Vernon	Alexandria	2.01	Gift 2002
	Total	**11.671**	

Source: *EQAC Annual Report*, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, August 1, 2007.

Table VII-3. Land Turned Over to Local Government and Associated Acreage			
Property/District	**Location**	**Acreage**	**Recordation**
Bannister Outlots/Springfield	Springfield	0.6	12/2001
	Total	**0.6**	
Assisted Acreage			
Property/District	**Location**	**Acreage**	**Recordation**
Turner Farm/Dranesville	Great Falls	17	1998/99
FCPA Elklick/Sully	South Riding	157	12/2003
	Total	**175.2**	

Source: *EQAC Annual Report*, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, August 1, 2007.

EQAC encourages all landowners whose property contains environmentally sensitive land such as wetlands, stream valleys and forests to consider contacting NVCT and learning more about easements. If these landowners grant easements, they will not only protect sensitive land, but can realize some financial benefits. A perpetual easement donation that provides public benefit by permanently protecting important natural, scenic and historic resources may qualify as a Federal tax-deductible charitable donation. Under the Virginia Land Conservation Act of 1999, qualifying perpetual easements donated after January 1, 2000 may enable the owner to use a portion of the value of that gift as a state income tax credit. Fairfax County real estate taxes could also be reduced if the easement lowers the market value of the property.

Additional information on NVCT can be found on its Web site, http://www.nvct.org.

7. The Nature Conservancy

The Nature Conservancy has a very successful program of obtaining easements from property owners for conservation. Its program was the inspiration for EQAC's past recommendations for Fairfax County to seek conservation easements as a measure of protecting ecological valuable property. (This recommendation led to the public/private partnership with the Northern Virginia Conservation Trust mentioned above.) The Nature Conservancy does not hold any easements in Fairfax County at present; however, it owns one preserve (the Fraser Preserve) of approximately 233 acres on the Potomac River. For further information on The Nature Conservancy, see http://www.nature.org.

8. The Potomac Conservancy

Other organizations also hold easements in Fairfax County. This and the following paragraphs report on these organizations. One of these is the Potomac Conservancy. This organization was formed in 1993 by individuals concerned about inappropriate development, clear cutting and other activities that were beginning to have a negative impact on the unspoiled character of the Potomac Gorge. This led to the formation of the nonprofit land trust now known as the Potomac Conservancy. The Conservancy was incorporated on August 24, 1993 in Maryland as a nonprofit corporation. The Conservancy is registered in Maryland, Virginia and West Virginia, and is an easement holder in Maryland's Conservation Reserve Enhancement Program.

The Potomac Conservancy currently holds easements of four properties in Fairfax County. These properties total 13.46 acres with 0.14 of that being river frontage. For further information on the Potomac Conservancy, see http://www.potomac.org.

9. The McLean Land Conservancy

The McLean Land Conservancy was formed to promote and foster the preservation, protection, conservation and balanced use of the McLean area's unique natural, cultural, recreational and historic resources. MLC's main objective is to preserve open green space.

MLC has worked to raise awareness of the value of protecting natural resources. A healthy balance of land use will maintain and enhance the character and quality of life in McLean, as well as the economic sustainability of the region in the face of rapid build-out.

MLC is a 501(c)(3) land trust organization that was incorporated in the Commonwealth of Virginia in January 2000 and recently became a "full-fledged" land trust in Virginia, with the ability to hold conservation easements. As a result, the conservation easements MLC identified and negotiated before July 2004 were deeded to Fairfax County, but with MLC assigned as the easement monitor.

MLC has concentrated on the preservation of riparian buffers on privately owned land. Successful projects include the protection of one acre adjacent to the headwaters of Four Mile Run, important because the health of the headwaters is critical to the health of a stream, and 2.77 acres on Pimmit Run in a pristine wooded area. These two easements are held by Fairfax County but monitored by MLC.

10. The National Park Service

Another holder of conservation easements in Fairfax County is the National Park Service. NPS holds 38 easements covering 326.67 acres. A future Annual Report on the Environment will provide more details on these easements.

11. The Virginia Outdoors Foundation

The Virginia Outdoors Foundation was created by an Act of the Virginia General Assembly (Chapter 18 of Title 10.1) in 1966. VOF is defined by the Act as a 'body politic' of the Commonwealth and is governed by a seven member Board of Trustees appointed by the governor. The Attorney General's Office has opined that VOF is both a State Agency and an independent instrumentality. The VOF was established "…to promote the preservation of open-space lands and to encourage private gifts of money, securities, land or other property to preserve the natural, scenic, historic, scientific, open-space and recreational areas of the Commonwealth." The primary mechanism for accomplishing VOF's mission is through open-space easements. Open space easements allow land to continue to be privately owned but restricted to serve and protect land for the public good.

The Virginia Outdoors Foundation currently holds six easements in Fairfax County as shown in Table VII-4.

Additional information about VOF can be seen at its Web site: http://www.vofonline.org/.

Table VII-4. Easements Held by the Virginia Outdoors Foundation in Fairfax County		
Original Donor*	**Acreage**	**Date Recorded**
Thayer, Virginia Pratt and Robert H.	59.33	10/30/1969
American Horticultural Society	8.15	10/03/1978
McCormick-Goodhart, Nita Emma et al.	26.665	06/13/1988
McCormick-Goodhart, Nita Emma et al.	5.25	06/13/1988
McKee-Bennett, Thistle	20.47	12/28/1990
Ridder, Marie W. and Albert Andrews, Jr., trustees	7.858	12/23/1998
Total Acreage under Easement	**127.723**	

Source: File from Virginia Outdoors Foundation to Noel Kaplan, Department of Planning and Zoning, Fairfax County, Virginia, July 3, 2007.

***** Note that the original donors listed may not be the current landowner of record as the eased property may have been sold since the deed of easement was recorded.

12. Northern Virginia Soil and Water Conservation District

The Northern Virginia Soil and Water Conservation District continues to provide leadership in the area of bioengineering techniques in streambank stabilization and in the general area of erosion and stormwater control. NVSWCD works in partnerships with other agencies and organizations. For example, it has partnered with the Fairfax County Park Authority, Virginia Department of Forestry, the Fairfax County Department of Public Works and the Reston Association. See the Water Resources chapter in this report for descriptions of stream stablization/bioengeering projects for which NVSWCD has provided leadership.

All Agricultural and Forestal Districts are required to have a conservation plan. NVSWCD develops soil and water quality conservation plans that comply with the Chesapeake Bay Preservation Act guidelines. They include best management practices to reduce sediment pollution erosion, to reduce excess nutrients from animal waste and fertilizers, and to prevent the misuse of pesticides and herbicides. The plans also include the establishment and maintenance of vegetated riparian buffers next to all streams and within Resource Protection Areas. Plans are updated and technical assistance is provided as needed. Soil and water quality conservation plans were prepared for 169 acres, which included stream buffers for 6,430 linear feet. Several of the conservation plans were developed to meet the county's requirements for Agricultural and Forestal Districts. All plans meet the county's requirements for

the Chesapeake Bay Preservation Ordinance. One composting facility was constructed for a horse operation, with the help of state cost-share funding.

NVSWCD's annual seedling program emphasizes the role of vegetation in preventing erosion, conserving energy, and decreasing and filtering stormwater runoff. Those planted in riparian areas also help to protect stream channel stability and stream water quality, as well as improving the surrounding habitat. This seedling program offered citizens a package of native tree and shrub seedlings for a small cost. In 2007, NVSWCD distributed a variety of 8,250 native tree and shrub seedlings (including ferns where were very popular), mainly in packages of 16.

NVSWCD is the local sponsor of Envirothon, a hands-on competition among high school teams to demonstrate their knowledge of natural resources – forestry, soils, wildlife, aquatic ecology – and special issue topics, such as urban-rural interface and recreational stress on natural resources. There are local, regional and national competitions.

In the spring and summer of 2007, NVSWCD launched a Neighborhood Ecological Stewardship Training program, a series of adult education opportunities designed to connect people to their local environment. Over the course of many weeks, 140 participants engaged in classes and activities that included watershed explorations on land and by water, soils art, journaling, stream ecology courses, and evening bat observations. More than 35 organizations partnered with NVSWCD to support and carry out the program.

a. Stream Restoration

Stream restoration projects are discussed elsewhere in this annual report, and NVSWCD participates in many of them. However, one is worth some additional discussion. NVSWCD, in partnership with many others, completed the Little Pimmit Run stream restoration project (657 feet, mainly on parkland) in June 2007. This 675-foot segment of degraded stream channel (stream and riparian area) was restored, using the principles of natural stream channel design and innovative techniques. The goal was to make this area stable and aesthetically pleasing, to include a trail crossing that functioned in harmony with the other measures, and to protect threatened sanitary sewer lines next to and crossing the stream. The resulting effort is interesting for two reasons – it is a good demonstration of natural stream channel design and construction, using some innovative ways to protect threatened sewer lines, plus it shows how a public-private partnership can achieve successful stream restoration. The partners included NVSWCD, homeowners with property adjacent to the stream and park, Vanasse Hangen Brustlin engineering firm, Angler Environmental Construction, DPWES Waste Water Collection Division, the Park Authority

and the Dranesville District Supervisor's office. The project is a good demonstration of how citizens and government can work together to solve environmental problems – and the citizens paid a significant portion of the cost.

Since completion, the stable channel has successfully carried stormwater flows. Today, a blue heron can be seen fishing in the pool full of small fish, the riffles are home to a growing abundance and diversity of aquatic insects, and a mother duck and her ducklings were seen riding out a storm in a pool. The riparian zones are taking root, and as they mature, they increasingly will provide both buffer and rich habitat. Thus are the results of an ecologically excellent design and a good partnership.

b. Fairfax Soil Survey and Soil Scientist

Fairfax County used to have soil scientists on the staff, but in a budget cut several years ago, the office was abolished. In past Annual Reports, EQAC deplored this move and recommended that soil scientist expertise be bought back to the county staff. While the Board of Supervisors did not exactly follow this recommendation, it did satisfy the intent of EQAC's recommendation by funding NVSWCD to finish the county's soil survey. The funding for this became available to NVSWCD in Fiscal Year 2004 and continued through Fiscal Year 2007. The field surveys will be complete in 2007 and the final reports and maps will be available in 2008.

The resulting database and maps will incorporate the new information and scientific knowledge acquired about soils in the last 30 years. However, the updated maps will not eliminate the need for site-specific surveys when construction or changes in site use occur. The maps will better describe, characterize, and define the properties of the soil components within existing delineations. The map will also show that inclusions of other soil types can exist, but will not show the extent of smaller inclusions. Site-specific surveys will be need for this fine detail.

One new effort that is being done under the soil survey is the characterization of man-made soils (urban soils). The characteristics of urban soils can be quite different from native soils. One significant difference is the ability of water to infiltrate urban soils (much less than many native soils). Knowing where urban soils exist and the type of urban soil can be critical to stormwater control efforts that incorporate infiltration of water (rain gardens, grassy swales, etc.).

The NVSWCD soil scientist also provides additional services to Fairfax County. He conducts infiltration studies for proposed infiltration practices,

such as rain gardens, porous pavers and underground detention. Additionally, the NVSWCD staff provided soils information to consultants, developers, realtors, homeowners and the public. Because of the continuing need for site-specific surveys, and because of the value of the other services the soil scientist provides, EQAC recommended in its 2005 and 2006 Annual Reports on the Environment that the Board of Supervisors continue funding for the soil scientist.

The Board of Supervisors did provide FY 2008 funding to NVSWCD to cover the cost of a soil scientist, thereby satisfying EQAC's recommendation. EQAC thanks the board for funding this important function.

The importance of having the expertise of a soil scientist available is illustrated by a special research project conducted by NVSWCD. The project evaluated the physical characteristics of the soil medium in rain gardens that have been installed in the county during the past two to five years. The report includes findings and recommendations for improving the design, installation and maintenance of rain gardens.

The use of rain gardens as a component of the overall stormwater management system on newly developed construction is a relatively new phenomenon. To justify and promote such use, monitoring of existing rain gardens to assess operational standards is very important. At present, most of such monitoring is concentrated on the chemical performance of these facilities and is based on the analysis of pollutants coming into the rain garden in stormwater and exiting the rain garden through the under drain system. What is missing is adequate monitoring of the physical performance of rain gardens in the years after the initial installation. Rain gardens function by providing adequate infiltration capacity to allow the incoming runoff to pass through the filter medium inside within a reasonable amount of time. The physical performance of the filter medium might change with time and therefore affect the rain garden's ability to function as a stormwater Best Management Practice. NVSWCD conducted a study of twenty rain gardens in Fairfax County to determine the infiltration capacity; the relation that capacity has to other physical properties of the filter media such as soil texture (percentages of sand, silt and clay), organic matter content, and bulk density; and the compatibility of the actual facilities with the original approved design specifications. Results of the assessment were varied. Some rain gardens were built in exact accordance with the plans submitted to and approved by the county and functioned very well. Others had physical features that differed from the approved plans and resulted in lower performance. Other rain gardens were inadequately maintained which resulted in lower performance. Three rain gardens, or 20 percent of those studied, had inadequate soil mixes that failed

to infiltrate any water during testing. This was the most serious problem encountered.

Of the recommendations made as a result of the findings of this study, perhaps the most important are as follows:

- Improve construction oversight of rain gardens by developing a training and certification regimen for site inspectors. More knowledge of the proper functioning of rain gardens would result in fewer poorly designed facilities passing final inspections.

- Improve the construction of rain gardens by developing a training and certification regimen for private contractors. The Virginia Department of Conservation and Recreation and qualified Soil and Water Conservation Districts are in a good position to help with development of a training program.

- Eliminate the use of geo-textile fabric between the planting soil and gravel layer and as a protective wrap around the under drain. Over time, geotextile fabric can clog with fine particles and reduce the infiltration capacity of the rain garden.

- Educate the owners of privately maintained rain gardens on the proper form and functioning of the facilities. The study found that publicly maintained rain gardens were generally in better shape than privately maintained facilities. Better knowledge of the proper functioning of rain gardens would result in better maintenance of privately maintained facilities.

13. Fairfax County Wetlands Board

If you own property on the waterfront in Fairfax County, you may need a permit from the Fairfax County Wetlands Board before you build or make improvements on your property. These activities, known as land disturbing activities, often require a permit if done in an area that has been identified as a tidal wetland. Land disturbing activities that may require a permit from the Wetlands Board include the following:

- Any construction project on or adjacent to a tidal body of water
- Any construction project in which fill material is placed in or near tidal wetlands
- Projects designed to protect property adjacent to shorelines.

The Wetlands Board adopted the Tidal Wetlands Mitigation and Compensation Policy in 2005 to ensure conformance with the spirit and the intent of the Chesapeake 2000 Agreement, which seeks, among other things, "to achieve a no net loss of jurisdictional tidal wetlands acreage and function through regulatory programs..." Upon seeking to encourage wetlands permit applicants to avoid, minimize and reduce tidal wetland losses, the Wetlands Board policy provides for compensatory mitigation when impacts are unavoidable. Because Fairfax County has so little tidal land available which could be used for wetland creation or mitigation, the board envisioned that a potential means for wetlands applicants to mitigate and compensate for future tidal wetland losses could be through the establishment of an in lieu fee fund. Thus, the Wetlands Board and the Northern Virginia Regional Park Authority have entered into a Memorandum of Understanding so that NVRPA can accept in lieu fees from future wetlands permit holders as the compensatory mitigation for unavoidable tidal wetlands impacts. On May 22, 2006, the Wetlands Board voted to adopt a Memorandum of Understanding between the Northern Virginia Regional Park Authority and the Wetlands Board.

To support the Wetlands Board's Mitigation and Compensation Policy, the Board voted on the following details pertaining to the implementation and the administration of the Policy during the February 22, 2007, meeting:

- Mitigation for every one square foot of wetlands lost will be replaced or compensated at a 1:1 ratio.
- A mitigation/compensation fee of $28 per square was established for permitted wetland impacts.
- The $28 per square foot assessment shall apply to both vegetated and non-vegetated tidal wetlands because all tidal wetlands are considered valuable.
- Riprap is considered to have habitat value as shoreline stabilization, therefore only the landward 50 percent of a riprap revetment footprint is considered as a wetland loss.
- When living shoreline stabilizations are properly designed and sited such stabilizations provide an overall enhancement to wetland function and value. The mitigation compensation shall fee not be charged for such stabilizations.

Of the three wetlands ordinance violations which the Wetlands Board was seeking to resolve in 2006, two violations have been resolved in 2007 and one violation is still in the process of being resolved.

Of four wetlands permit applications which have been reviewed by the Wetlands Board in 2007, three denials for permits were rendered and one permit application request was approved by the Wetlands Board.

Two permit denials will be appealed to the Virginia Marine Resources Commission in November 2007.

At the April 2007 Wetlands Board Meeting, the Wetlands Board voted to approve a Living Shoreline Policy for shoreline stabilizations. Both the Living Shoreline Policy and the Wetlands Mitigation Compensation Policy will be added to the Board's Submission Guidelines.

For further information, contact the Wetlands Board at:

Fairfax County Wetlands Board Staff
Department of Planning and Zoning, Planning Division
12055 Government Center Parkway, Suite 730
Fairfax, VA 22035-5504
(703) 324-1210
http://www.co.fairfax.va.us/dpz/environment/wetlands.htm

14. Virginia Department of Forestry

The Virginia Department of Forestry has provided forestry related services in Fairfax County for over 30 years. VDOF is also participating in several efforts aimed at improving riparian zones. In these efforts, VDOF partnered with the Northern Virginia Soil and Water Conservation District, the Department of Public Works and Environmental Services and the Fairfax County Park Authority.

The Virginia Department of Forestry is the lead state agency to oversee the planting and recordation of forest buffers planted in the state of Virginia. In 2006, approximately 5,500 seedlings were planted along 3,020 linear feet of stream corridors under the leadership of the Virginia Department of Forestry in Fairfax County. Partners involved in these plantings were Eagle Scouts, Earth Sangha, Elementary School Children, private landowners and Fairfax ReLeaf.

The Virginia Department of Forestry participates in the Fairfax County Arbor Day on the last Saturday in April each year. The County earned again, for the 24th year, the Tree City USA award. This award is given for having a planting plan, management plan, a Tree Board/Commission, and sponsoring an Arbor Day Celebration. The award is applied for by the Fairfax County Urban Forest Management Division and given through the State Department of Forestry. Tree seedlings are distributed by VDOF to citizens attending the Arbor Day celebration. In 2006, 550 seedlings were distributed for planting by residents in their communities.

The Virginia Department of Forestry sponsored a drop-off site in Fairfax County for the Growing Native project. This project involves the collection of tree seeds (acorns, hickory nuts, black walnuts etc.) which are transported to

VDOF nurseries where the seeds are planted and seedlings are grown. In 2006, approximately two pick-up truckloads of seeds were collected. Each year 500-700 seedlings are given to citizens for planting on public lands in Fairfax County.

The conservation of the forested land base in Fairfax County is a part of the VDOF plan. The Fairfax County office works closely with the Northern Virginia Conservation Trust to review easements for the conservation of forests. Also, Agricultural and Forestal District forest management plans are prepared by VDOF; these efforts support the management of forested land for conservation purposes. Six A&F plans covering 202 acres were prepared in 2006. VDOF also provides forestry management advice to Home Owners Association and Civic Groups. In 2006, three community forestry plans were prepared covering 75 acres.

The Virginia Department of Forestry also helps protect water quality and forest resources in the county by reviewing and commenting on rezoning applications and development plans. VDOF reviewed 47 applications and plans in 2006. In addition, VDOF annually inspects dry hydrants to make sure they are available to fight wildfires in the county.

The department maintains an active public education and out reach program. Audiences range from school groups to adults. Topics range from general discussion of the importance of urban forests for environmental quality to technical training in planning and installing rain gardens and forested riparian buffers. In 2006, VDOF conducted 13 talks on the general benefits of urban forests and 3 workshops on rain gardens and buffers.

15. Virginia Department of Transportation

The Virginia Department of Transportation mitigates unavoidable impacts to water resources within Fairfax County that occur during highway construction projects as required by federal and state laws and regulations. VDOT has created six such wetland mitigation sites in Fairfax County:

- Approximately 0.5 acres off southbound Route 28 adjacent to Dulles Airport
- Approximately 2 acres off westbound Route 7 adjacent to Sugarland Run
- Approximately 0.2 acres off southbound Route 29 adjacent to Big Rocky Run
- Approximately 2 acres off northbound Route 6197, Roberts Parkway adjacent to the Burke Railway Express Station
- Approximately 2.5 acres off northbound Route 228, Dranesville Road adjacent to Surgarland Run

- Approximately 2 acres off northbound Richmond Highway (Route 1) adjacent to an unnamed tributary of Cameron Run (Belle Haven).

These sites were created to mitigate unavoidable wetland impacts from construction of Route 28 widening, Fairfax County Parkway, Roberts Parkway Bridge Overpass, the Springfield Interchange Improvements, the Route 29 Bridge replacement over Big Rocky Run, and the Woodrow Wilson Bridge Replacement. The Dulles and Sugarland sites have met wetland performance criteria and the remaining sites are undergoing five-year monitoring as required by Federal and State permits. VDOT completed three years of monitoring at the Dranesville and Big Rocky Run sites and the fourth year of monitoring is in progress. The second full year of monitoring is complete at the Roberts Parkway and Belle Haven sites and the third year of monitoring is in progress. Wetlands establishment at all these sites have been impressive. VDOT performs on-going maintenance activities to ensure performance criteria are met. These sites provide a water quality benefit in these watersheds as well as habitat for a host of amphibians, birds and mammals.

Federal and state water quality regulations are now requiring mitigation of streams impacted by transportation projects. VDOT estimates the need for mitigation of about 6,000 linear feet over the next three years. This number would increase if more funds for construction became available. However, VDOT notes that opportunities for stream restoration credit or competitive purchase of commercial bank credits within the watersheds of Fairfax County are limited. Therefore, VDOT is interested in discussion of opportunities for potential stream restoration sites within and beyond the state's right-of-way. This could include partnering with Fairfax County agencies and private property owners. Another possible partner would be the Northern Virginia Soil and Water Conservation District. EQAC urges county staff and NVSWCD to explore such possibilities.

VDOT, in partnership with the Virginia Transportation Research Council and the University of Virginia, had been involved in several environmental research studies. Further details of each of the projects below are available at http://vtrc.virginiadot.org/default.htm.

- *Identification of Wildlife Hotspots along Roadways in Virginia's Costal Zone*: Completed in November 2006, this project was an expanded analysis of the wildlife crossing study from the previous year (see http://www.virginiadot.org/vtrc/main/online%Freports/pdf/06-r2.pdf) which included two wildlife underpasses on the Fairfax County Parkway. This new study used mapped wildlife corridor information to identify locations on roads that may be appropriate for mitigation measures to reduce animal-vehicle collisions.

- *Understanding Cattail (Typha spp.) Invasion and Persistence in VDOT Mitigation Wetlands*: The proposed work is intended to help identify the environmental conditions that enable *Typha spp.* to rapidly colonize primary succession on created mitigation wetlands. Understanding these conditions may help to minimize or eliminate this rapid colonization in created wetlands.
- *Optimal Selection & Design of Stormwater BMP Facilities in a Highway Setting*: The purpose of this research is to develop a stormwater management BMP document that will supplement the recently updated VDOT Manual of Practice for Stormwater Management. (EQAC urges VDOT to consult with Fairfax County Department of Public Works and Environmental Services in this study to take advantage of DPWES's knowledge and experience in this area.)
- Recycling of Salt-Contaminated Storm-Water Runoff for Brine Production at VDOT Road-Salt Storage Facilities: This study investigates the use of recycling the salt-contaminated stormwater runoff at the facilities for on-site brine production. This brine could potentially be used for both prewetting purposes and direct application for VDOT snow removal operations.

VDOT will be participating in a joint pilot project with VTRC and the Fairfax County Department of Transportation on the use of low impact development measures for the proposed Lorton Connector Road in the Laurel Hill development. This five-year pilot project will monitor the effectiveness of LIDs in managing stormwater runoff from the roadway.

VDOT continues to include landscaping in several construction projects to enhance road improvements. Fairfax County projects include

- Ox Road between Burke Lake Road and Davis Drive (completed April 2004 and the three-year establishment period was completed spring 2007)
- Gambrill Road Park and Ride Lot (completed June 2005 and the two-year monitoring period was completed spring 2007)
- Richmond Highway widening from Lorton Road to Telegraph Road (completed October 2005 and the landscaping is in the second year monitoring of a three-year establishment period)
- Ox Road between Davis Drive and the Prince William County Line (completed May 2006 and the landscaping is in the second year monitoring of a three-year establishment period)
- Lorton Road between Richmond Highway and Silverbrook Road (completed August 2006 and the landscaping is under a one-year establishment period).

VDOT is including landscaping in projects currently underway or scheduled to start in 2007/2008:

- Backlick Road Park and Ride Lot
- Route 50 Pedestrian Bridge at Seven Corners Shopping Center
- Telegraph Road/Capital Beltway interchange improvements associated with the Woodrow Wilson Bridge Project.

Funding for VDOT to plant and maintain wildflower meadows has remained level through the last several years. Therefore, VDOT has refocused effort to manage locations that have performed consistently well and have the best visual advantages for motorists, without compromising safety. VDOT maintains about 17 acres of flowering bulbs, wildflowers, and native grasses planted throughout Fairfax County. These areas are reseeded and controlled for weed invasion as needed throughout the growing season.

VDOT has increased its integrated vegetation control of invasive, non-native vegetation along interstate and primary roads in Fairfax County. One specific problem is bamboo. Many residents plant this species along their property lines with the state right-of-way, but bamboo quickly spreads to interfere with drainage and visibility of highway signs. EQAC encourages property owners to find native alternatives to bamboo since this invasive plant does spread very rapidly and is difficult to control.

16. Urban Forestry

a. Urban Forest Management Division

In 2006, in addition to carrying out its core services relating to land development (see Forest Conservation Branch update) and forest pest management (see Forest Pest Branch update), the Urban Forest Management Division focused on several other projects that included:

- Finalizing the Tree Action Plan: The Tree Action Plan represents a long-range strategic plan for the county's urban forestry program. As directed by the Board's Environmental Committee in September 2005, UFMD worked with the Fairfax County Tree Commission and a stakeholder group called the Tree Action Plan Work Group to develop specific recommendations on how to implement the conceptual-based Tree Commission Tree Action Plan Framework. The Tree Action Plan was finalized by the work group and reviewed by the Board of Supervisor's Environmental Committee in December 2006. The Board publicly endorsed the Tree Action Plan as an official road map to manage and protect the county's tree resources in January 2007. The Tree Action Plan contains 12 core recommendations that relate to three major goals to preserve existing tree assets, to plant new trees and

increase the weight of urban forestry considerations within county policies and planning efforts. The 12 core recommendations are:

1. Engage and Educate (the community)
2. Build Strong Partnerships and Alliances
3. Optimize Tree Conservation in County Policies
4. Improve Air Quality and Address Climate Change through Tree Conservation
5. Improve Water Quality and Stormwater Management through Tree Conservation
6. Use Ecosystem Management to Improve and Sustain the Health and Diversity of our Urban Forest
7. Strengthen State Enabling Authority for Tree Conservation
8. Encourage Sustainable Design Practices
9. Plant and Protect Trees by Streams, Streets and Trails
10. Optimize Tree Conservation in Land Development
11. Optimize Tree Conservation in Utility and Public Facility Projects
12. Support and Refine the County's Urban Forestry Programs

For more information on the Tree Action Plan, please use the following Web link:
http://www.fairfaxcounty.gov/dpwes/environmental/trees.htm.

- Development of Tree Actions in the FY 2008 Environmental Improvement Program. Trees were identified as a special area of interest in the FY 2008 EIP, which was developed during CY 2006. UFMD worked with other agencies in the development of 27 actions that directly or indirectly support the county's efforts to conserve and protect tree resources as follows:

    1. GL08-06(B) Mapping of Fairfax County's Vegetation Ecosystems.
    2. GL08-07(B) Expanded Construction Site Monitoring for Tree Conservation.
    3. GL08-08(B) Establish a Tree Fund.
    4. GL08-09(B) Review and Improve Suggested Tree-Related Proffer Language.
    5. GL08-10(B) Tree Preservation Legislation.
    6. GL08-11(B) Urban Forestry Roundtable.
    7. GL08-12(C) Consider Amending Article 13 of the Zoning Ordinance (Landscaping & Screening).
    8. AQ08-01(B) Regional Urban Forestry SIP Working Group.
    9. AQ08-05(C) Increasing Tree Canopy at Governmental Parking Facilities.
    10. WQ07-4(B) Riparian Buffer Restoration.

11. WQ08-15(B) Benchmarking Watershed Tree Cover Levels.
12. WQ08-4(C) Establishing Tree Cover Goals for Watersheds.
13. SW08-4(C) Recycling Natural Wood Waste.
14. PT07-08(B) Interpretive Signs Along FCPA Trail System.
15. PT07-12(B) Parkland Acquisition.
16. PT07-13(B) Open Space Easements/NVCT Partnership.
17. PT07-14(B) Park Authority Conservation Easement Initiative.
18. PT07-17(B) Park Authority Natural Resource Management Plan Implementation – Encroachment Enforcement.
19. PT08-01(B) Park Natural Resource Management.
20. PT08-03(B) Park Information Systems.
21. PT08-04(B) Developing Natural Landscaping Guidelines and Policies for County Properties.
22. PT08-06(C) Implementing Natural Landscaping Practices on County Properties.
23. PT08-07(C) Planting Trees for Energy Conservation at County Facilities.
24. ES08-08(C) Bayscaping: Improving Water Quality, Increasing Biodiversity, and Enhancing Community.
25. ES08-09(C) Promoting the Use of Natural Landscaping Practices by the Private Sector.
26. ES08-10(C) Partnering with Non Profit Tree Planting Groups in Establishing a Countywide Tree Planting Program.
27. ES08-11(C) Promoting Stewardship Of Urban Forest Resources.

UFMD and other agencies have worked on many of these actions during CY 2006 and 2007; an updated set of actions was presented in September 2007 by county staff in the FY 2009 EIP. For more information on these actions and the Environmental Improvement Program, please use the following Web link:
http://www.fairfaxcounty.gov/living/environment/eip/

- Strengthening Tree Preservation Policies and Procedures: In February 2005, the Board of Supervisors directed UFMD and the Zoning Evaluation Division of the Department of Planning and Zoning to review and strengthen tree conservation policies and procedures used during the review of zoning cases. As part of this effort, a committee consisting of representatives of UFMD; the Zoning Evaluation Division, DPZ; the Office of the County Attorney; the Planning Commission; and the Providence Magisterial District Board of Supervisor staff was formed to examine the effectiveness of model proffer language relating to tree preservation and landscaping. The standardized proffers were

completed by the committee and offered to developers as a resource in 2006. This effort resulted in a suggested approach that developers could apply to tree conservation matters within the context of proposed zoning cases.

While not a codified standard, the new standardized proffer language will help developers communicate very specific intentions regarding tree preservation, conservation and removal efforts within zoning cases, and will improve the county's ability to ensure compliance with proffered commitments during construction activities. In addition, the new language provides an enhanced system of assigning monetary values to trees to be preserved and using these values as the basis for determining tree bonds which a developer will post to help ensure the successful completion of proffered commitments.

- Establishing a county fund for tree preservation and planting: This project established a funding mechanism to facilitate the expenditure of donations from zoning cases and other sources, including the annual Environmental Improvement Program, to fund a countywide tree planting program. On June 20, 2005, the Board of Supervisors directed staff of the Department of Public Works and Environmental Services, the Department of Planning and Zoning, and the County Attorney's Office to investigate the possibility of creating a funding mechanism for a countywide tree planting program through the use of reparations obtained from violations of tree save commitments, cash proffers and in-kind proffer commitments obtained during the land development process.

  In 2006, Land Development Services established criteria to approve, track and report on tree-related projects funded through the Tree Preservation and Planting Fund. It is anticipated that this fund will be used to support tree-related activities such as:

  - Tree planting projects on county properties and on Virginia Department of Transportation rights-of-way.
  - Grants to support the activities of non-profit tree planting groups.
  - Natural landscaping-related projects on county property.
  - Development of educational materials and workshops.
  - Implementation of a local "Heritage, Memorial, Specimen and Street Tree" ordinance.

  The Tree Preservation and Planting Fund and associated standard operating procedure were finalized and put into use in 2006.

- Developing a tree canopy measure for the 2007 Metropolitan Washington DC air quality plans: In response to a June, 2005 Board

Matter directing staff to prepare a report that delineates what urban forestry-related practices, including tree planting, the county can use to improve air quality and how these practices can be included in the air quality management plans, UFMD organized several meetings that gathered urban forestry officials from several Northern Virginia jurisdictions, USDA Forest Service researchers, Virginia Department of Forestry representatives and regional non-government organizations to examine what should be done to build a stronger link between urban forestry practices and Federal Clean Air Act regulations.

From these initial meetings, a more formal group, called the Northern Virginia Urban Forestry SIP Work Group emerged to examine what steps Virginia jurisdictions should do to take advantage of new U.S. Environmental Protection Agency policy approving "tree canopy programs" as "promising and emerging" voluntary measures that can receive limited offset credits (up to six percent of total) in ozone mitigation programs. In 2006, the work group contributed to a larger effort organized by the Metropolitan Washington Air Quality Committee to examine this issue and contributed to the development of a draft Tree Conservation Measure which is expected to be included in the 2007 regional SIP.

- Natural Landscaping Committee: On June 21, 2004, the Board of Supervisors directed staff to identify county properties where natural landscaping could be used to reduce maintenance practices that can cause harmful environmental impacts such as air pollution and reduce the need and expense of mowing, pruning, edging, and using fertilizers, pesticides, and herbicides; staff was directed to prepare a report with a proposed countywide implementation plan. In response, the County Executive tasked UFMD with convening the Natural Landscaping Committee to identify practices, policies and a countywide implementation plan. A final report and recommendations was prepared and presented to the board's Environmental Committee and approved by the BOS on July 11, 2005. The board directed the County Executive to commission a multi-agency group to:

  - Update the palette of natural landscaping techniques and practices as new information and research emerges.
  - Establish formal guidelines for retrofitting the landscapes of county properties both with and without developed facilities.
  - Develop natural landscaping guidelines and specifications for new facilities.
  - Draft a countywide Natural Landscaping Policy to communicate the purpose, goals and importance of natural landscaping features on county properties.

- Implement a five-year natural landscaping plan in an aggressive but cooperative fashion.
- Produce an annual progress report that evaluates the level of cost-effectiveness and benefits that specific natural landscaping practices, techniques and projects are likely to provide.
- Submit natural landscaping projects to the staff Environmental Coordinating Committee for possible inclusion into the annual Environmental Improvement Program.

In 2006, the NLC started work on developing guidelines for retrofitting the landscapes of county properties and started work on developing a countywide Natural Landscaping Policy. This work is expected to be completed in CY 2007.

- Northern Virginia Urban Forestry Roundtable: The lack of regional communication over urban forestry issues is thought to have limited past efforts to obtain tree conservation legislation and to develop other effective programs and practices related to the management of trees and forest resources. The NVUFR was formed in 2005 to bring local environmental groups, tree commissioners and urban forestry officials together to examine ways to cooperate over regional issues such as efforts to obtain tree conservation legislation and to develop urban forestry practices and measures for ozone mitigation. UFMD provided leadership during the formation of NVUFR and has been instrumental in organizing regional conferences on trees and air quality since November 2005. NVUFR activities increased in 2006, resulting in efforts to establish a formalized mission statement and organizational structure which is expected to be finalized during CY 2007.

b. Forest Conservation Branch

In 2006, Forest Conservation continued to serve its traditional customers: citizens, builders, developers, planners, engineers, landscape architects, private arborists and other county staff and agencies, including the Board of Supervisors, Planning Commission, Tree Commission, Environmental and Facilities Review Division, Environmental and Facilities Inspections Division, Department of Planning and Zoning, Office of Capital Facilities, Park Authority and the School Board.

However, staff was also able to also serve some new customers. In the wake of Hurricane Katrina in August, 2005, staff from the Forest Conservation Branch was requested by a consortium of federal and state agencies and professional associations to travel to New Orleans to assist with the assessment of potentially hazardous trees damaged by the horrific storm that swept the region. In March and April 2006, two teams of two

staff each joined professional arborists from all over the country who volunteered to go to the region and helped assess and inventory the conditions of hundreds of trees damaged by the hurricane in an effort to get the Federal Emergency Management Agency to assist with the pruning and removal of trees that potentially threatened the residents of the area. The effort was nationally recognized and federal money was eventually made available to help mitigate the conditions.

In requests closer to home, branch staff was requested to help mediate a utility easement clearing issue in the Dranesville District. After decades of little maintenance, Columbia Gas Transmissions swept through the Herndon area and through parkland bordering the Potomac River, severely trimming back trees anchored on private properties adjoining the gas line easement. The ensuing public outrage precipitated requests from the Board of Supervisors for FC staff to evaluate the conditions of more than 200 trees damaged by the line clearing operation. While fully within their rights to maintain their pipeline easement, Columbia Gas Transmissions was presented with a six-page punchlist of tree pruning and removals to compensate for the damages to adjoining trees caused by their contractors.

In the FY 2007 budget approved by the Board of Supervisors, FC received two additional positions in order to provide more presence on development sites with tree-related proffered conditions. The positions were eventually established as an Urban Forester III and an Urban Forester II, and the personnel regimen was started and position descriptions were created for them in preparation for interviews near the end of the year 2006.

Table VII-5 summarizes the workload of the Forest Conservation Branch based on the requests for assistance that were completed for FY 2004, 2005 and 2006. These figures demonstrate that the number of requests for assistance in 2006 appear to have increased by almost ten percent from the previous years. This may have been due, in part, to improved record-keeping, but it also shows a dramatic increase in requests for site inspections (30 percent), which seems to validate the need for additional staff to handle this increase.

Table VII-5
Urban Forest Management Division Workload,
2004 through 2006

Type of Assignment	Number of Completed Requests		
	2004	***2005***	***2006***
Waivers	64	56	39
Zoning Cases	191	206	264
LDS Requests: Plan Review	677	651	671
LDS Requests: Site Inspections	663	620	807
Other (Bd of Supervisors, Park Auth., Other County Agencies, etc.)	610	431	388
Hazardous Tree Investigations	17	19	5 *
Total Completed	**2,222**	**1,983**	**2,174**

LDS – Land Development Services (intra-agency)
*Completed requests for **Hazardous Trees** do not include nine requests referred to the Virginia Department of Transportation and other County agencies which were inspected by UFMD staff, but for which no correspondence was generated.

c. Forest Pest Management Section

i. Gypsy Moth Caterpillar

The gypsy moth was first detected in Fairfax County in 1981. To avoid the environmental, economic and health hazards associated with this pest the Board of Supervisors enacted an Integrated Pest Management Program to control the gypsy moth. The purpose of the program is to reduce gypsy moth populations below defoliating levels. The goal of the program is to minimize the environmental and economic impacts of the pest by limiting the amount of tree mortality and use of pesticides in the environment. The control methods considered annually are:

- Mechanical: the gypsy moth egg mass Search, Scrape, and Destroy Campaign and Burlap Banding for Gypsy Moth Caterpillars. These are citizen involvement programs.
- Biological: the release and monitoring of gypsy moth parasites and pathogens.
- Chemical: the aerial and ground applications of Diflubenzuron and Bacillus thuringiensis in areas of high levels of infestation.
- Educational: the self-help program and lectures to civic associations and other groups.

In calendar year 2007 gypsy moth caterpillar populations increased dramatically compared to previous years. Insect populations are cyclical

in nature and it is very probable that this increase is a sign that outbreak populations are imminent. For the first time in several years, there was measurable defoliation reported in Fairfax County, the State of Virginia and other states in the northeastern United States. Staff from the Forest Pest Program has determined that there were 50 acres defoliated in Fairfax County during the spring of 2007. According to the Virginia Department Forestry, there were 70,000 acres of defoliated forest in the state. No defoliation numbers are currently available for the United States; however, it is expected that they will dramatically increase. The gypsy moth staff will continue to monitor populations in the fall of 2007 and treatment is very probable in 2008.

ii. Fall Cankerworm

The fall cankerworm is native to the United States and feeds on a broader range of trees than the gypsy moth. Periodic outbreaks of this pest are common, especially in older declining forest stands. The area of the county that had the most severe infestations of fall cankerworm was in the Mount Vernon and Lee magisterial districts. Typically, this insect will defoliate in the early spring when the trees are able to withstand the impacts and little long-term damage is expected; however, tree mortality is possible when combined with conditions that place stress on the trees, such as drought. Nuisance to homeowners occurs when large numbers of caterpillars hang from the trees and migrate to the ground.

The Forest Pest Program conducted an aerial treatment program during the spring of 2003. Staff has monitored for adult female moths throughout the Mount Vernon and Lee Districts since January of 2001. The result of the winter 2006 - 2007 monitoring effort indicated that no aerial treatment was required in the spring of 2007.

The Forest Pest Program will monitor for fall cankerworm again this winter. It is expected that populations of this pest will be low in the near future.

iii. Emerald Ash Borer

The emerald ash borer (Agrilus planipennis) is an exotic beetle from Asia and was discovered infesting ash trees in the state of Michigan in 2002. This beetle is known to attack only ash trees and can kill trees in as little as two years. After it was discovered, the United State Animal Plant Health Inspection Service established a quarantine around the infested area in order to contain the pest. Unfortunately, a tree nursery owner inside of the quarantine area illegally shipped infested ash trees to a nursery in Maryland. During the summer of 2003, 13 of the ash trees

were planted at the Colvin Run Elementary School site (Dranesville District). These trees were removed by the Virginia Department of Agriculture and Consumer Services and incinerated.

The removed trees contained evidence that adult beetles had escaped into the environment. In order to prevent the beetles from becoming established in Fairfax County, APHIS and VDACS conducted an Emerald Ash Borer Eradication Program. It was ordered that all ash trees within a one-half mile radius of the school site be removed and incinerated. This area included a total of 278 ash trees, 90 of which were on 29 privately owned properties. All tree removals were conducted in March of 2004.

On December 12, 2003 the Commissioner of VDACS added the emerald ash borer to the list of insects that can be controlled by service districts. On January 26, 2004, the Board of Supervisors directed Forest Pest Section staff to coordinate with VDACS in implementing the Emerald Ash Borer Eradication Program. Staff of the Forest Pest Program began assisting VDACS shortly after the insect was added to the list and board direction was given. FPP duties included surveying the area around Colvin Run Elementary for ash trees, conducting public notification meetings, preparing maps for tree removal contractors, monitoring contracted services, preparing mailings and responding to media inquires.

Since the trees were removed in 2004, staff has been monitoring for the presence of adult beetles. In 2007, monitoring is being conducted by observing native ash trees in various locations around Fairfax County. Staff will continue to monitor for this pest and provide control if warranted. At the end of the summer, the monitored trees will be examined for life stages of the emerald ash borer. This effort would not have been possible except for the cooperation of the Virginia Department of Transportation.

The Maryland Department of Agriculture has maintained an emerald ash borer monitoring program similar to efforts in Fairfax County. MDA recently examined its sentinel trees in Prince Georges County and found evidence of emerald ash borer larvae. This discovery is significant since it means that the insect is surviving and reproducing in Maryland. It is too early to say what impact this will have on Fairfax County; however, it is of concern due to the proximity of Prince Georges County, Maryland and Fairfax County, Virginia. Staff is waiting for guidance from state and federal agencies in this matter; however, it is likely that monitoring efforts for this insect will continue for the foreseeable future and will likely be expanded.

d. Tree Commission

In 2006, Tree Commission activities focused on generation of the Tree Action Plan that Chairman Connolly charged the commission with developing in December 2004. Tree Commission members co-chaired the Tree Action Plan Work Group and participated in the task groups that developed individual parts of the plan. In addition, the Tree Commission worked with UFMD to prepare proposed language to amend the Board of Supervisors' Environment Agenda so that it would contain specific strategies and recommendations focused on tree conservation. The board approved the new tree language and it was added to the board's Environment Agenda in September 2006. For more information, use the following Web link:
http://www.fairfaxcounty.gov/living/environment/eip/2008eip/section_b.pdf

In 2006, the commissioners continued to use their monthly meetings to research and discuss county tree and landscape issues and policy. Various speakers made presentations to the commission. In addition to participating in numerous public events such as the Fairfax County Earth Day-Arbor Day Celebration and the county's Land Conservation Awards program, commissioners also provided input on various land use and development proposals affecting trees and landscaping. The commission continues to support and advocate for the passage of legislation dealing with tree preservation and the use of native and desirable landscape trees during development.

e. Tree Preservation Enabling Legislation

In light of continued opposition encountered during previous Virginia State Legislative Assemblies to amend the tree replacement provisions of §15.2-961 to include tree preservation requirements, the Board of Supervisors did not forward proposed legislation, but instead forwarded a supporting position for tree conservation legislation as part of the 2006 Legislative Program. The legislative proposal supported two tree conservation bills, SB 939 and HB 2486 that were introduced by State Senator Patricia Ticer and State Delegate David Bulova, respectively. Neither of these bills was enacted, so it is anticipated that the county will include a legislative position supporting tree conservation legislation in the 2007 Legislative Program.

f. Mapping and Analyzing the County's Tree Cover

In 2006, UFMD continued efforts to delineate the distribution of naturally occurring and landscaped vegetation, using the National Vegetation Classification System. However, this project received less attention than in previous years due to staff hours needed to generate the Tree Action Plan. Since the NVCS tree cover mapping is prerequisite to implementing

multiple aspects of the Tree Action Plan and associated Urban Forest Management Plans, it is anticipated that UFMD will need to devote more resources to the mapping effort in 2007 than in 2006.

17. Agricultural and Forestal Districts

Landowners may apply to place their land in special Agricultural and Forestal Districts that are taxed at reduced rates. A&F Districts, which are created by the Commonwealth of Virginia, must have 200 or more acres. A&F Districts of local significance, governed by the Fairfax County A&F District ordinance, must have at least 20 acres and must be kept in this status for a minimum of eight years.

Fairfax County's policy is to conserve and protect and to encourage the development and improvement of its important agricultural and forestlands for the production of food and other agricultural and forest products. It is also Fairfax County policy to conserve and protect agricultural and forestlands as valued natural and ecological resources that provide essential open spaces for clean air sheds, watershed protection, wildlife habitat, aesthetic quality, and other environmental purposes. The purpose of the Local Agricultural and Forestal District program is to provide a means by which Fairfax County may protect and enhance agricultural and forest lands of local significance as a viable segment of the Fairfax County economy and as an important economic and environmental resource. All district owners agree to no intensification of the use of their land for the life of the district.

Since the 2006 EQAC Annual Report on the Environment, there have been only two changes to the A&F Program. The number of local districts increased from 43 to 45 while the number of state districts remained constant at two. The two new districts are in Great Falls (about 45 acres). Total acreage in A&F districts increased from about 2,934 acres to about 2,979 acres.

18. Gunston Cove Ecological Study

Gunston Cove is a tidal freshwater embayment of the Potomac River located approximately 20 miles south of Washington, DC. The cove is formed by the juncture of Pohick Bay and Accotink Bay, though which the waters of Pohick Creek and Accotink Creek flow to the Potomac River.

An ecological study of Gunston Cove, conducted by the Department of Environmental Science and Policy at George Mason University, and supported by the Department of Public Works, continued during 2005. This study is a continuation of work originated in 1984 at the request of the county's Environmental Quality Advisory Council and the Department of Public Works (now the Department of Public Works and Environmental Services). This on-

going monitoring program was established to determine impacts from local point sources and nonpoint sources and to evaluate the status of the Gunston Cove ecosystem. Information from this study is intended to form the basis for well-grounded management strategies for maintenance and improvement of water quality and biotic resources in the tidal Potomac.

The executive summary of the 2004-2005 report by Jones and Kelso summarizes details from their report and covers water quality, phytoplankton biomass, zooplankton, fish larvae and fish, and benthic organisms. The following is extracted from this summary.

Chlorophyll *a* exhibited a distinct seasonal pattern in both cove and river in both years. The main difference was that values were higher in both areas in 2004 than in 2005.

Cyanobacteria dominated phytoplankton density in both years and in both areas due to their small cell size, but diatoms were clearly most important in terms of phytoplankton biovolume (and probably biomass). Green algae were also important in terms of biovolume on certain dates in the cove.

In the river, most indicators of phytoplankton have not exhibited a significant change over the period since 1983/84. However, since about 2000, chlorophyll *a* has shown a distinct downward trend nearing 10 ug/L. Phytoplankton density has remained rather constant over the past several years. Major and substantial decreases have been observed in all forms of nitrogen and VSS and BOD have made significant declines since 1983/84. Dissolved oxygen has also shown an increase over the whole study period, but not in recent years.

Rotifers were the most abundant zooplankton and followed a typical seasonal pattern of much elevated summer abundances in both years. In 2004 the high levels were reached in the cove in late May and were sustained through most of the summer while in 2005 it was early July before similar levels were attained. In the river, levels were substantially lower than in the cove and had a different seasonal pattern between the two years with a spring maximum in 2004 and a summer maximum in 2005.

Cladocerans were present at substantial numbers, but mainly during restricted periods. *Bosmina* attained higher levels in 2004 than in 2005 in both areas. The other cladocerans *Diaphanosoma*, *Daphnia*, *Ceriodaphnia*, *Moina*, and *Leptodora* were much more common in 2005 than in 2004 in both areas. Copepod nauplii were present in similar densities in cove and river in 2004, but were substantially higher in the cove in 2005. The calanoid copepod *Eurytemora* exhibited a strong spring peak in abundance in the river in 2004 and in the cove in 2005. *Diaptomus* was much more common in the cove than

in the river in 2005 and visa versa in 2004. Other calanoids were generally present at low levels except for late June 2004 in the river.

Many zooplankton groups in the cove and some in the river have demonstrated a significant linear increase since 1990. Rotifers peaked in about 2000 and have started a slight decline, but are still well above 1990 levels. The decline has been steeper in the river than in the cove. The small cladoceran *Bosmina* has remained steady in recent years, while the most common larger cladoceran *Diaphanosoma* and the very large predaceous cladoceran *Leptodora* have declined. This decline may be due to the increase in planktivorous fish like blueback herring and alewife in the past few years. Daphnia and chydorids have held their own. Copepod nauplii have continued a steady increase in the cove, while adults have remained flat. Again, this may be related to fish predation.

Trawl collections differed in species dominance between the two years. In 2004, Blueback herring were the most common fish species collected in trawls representing 78 percent of all fish caught. The normally dominant white perch represented eight percent, followed closely by alewife (eight percent), then spottail shiner (two percent), channel catfish (one percent), and blue catfish (one percent). In 2005 white perch returned to the top spot (36 percent), followed by alewife (22 percent), blueback herring (ten percent) and blue catfish (ten percent).

In the cove, the trend line for trawl catches indicates a leveling of a long-term decline that began in the 1980s. Adult and juvenile white perch continued a downward trend that began in about 2000. The mean catch per trawl of blueback herring, alewife, bay anchovy, and tessellated darter has increased in recent years, making up for the shortfall in white perch.

In the river, trawl catches have been on the rebound since about 1999 with the trend line approaching that of the cove. White perch continue to make up about half of the total catch, but are increasing more slowly than the total catch. Larger numbers of channel catfish, blue catfish, bay anchovy, and spottail shiner have helped to make up the difference.

Banded killifish was the most common species collected at seine sites in both years comprising 33 percent of the total catch in 2004 and 61 percent of the total catch in 2005. Alewife, white perch and spottail shiner were the main subdominants.

In seine samples, the catch of banded killifish remained strong and continues to dominate all other species. White perch has recovered somewhat after reaching record lows in 2003. Blueback herring, alewife, spottail shiner, and inland silversides were caught in numbers comparable to most previous years.

Neither alewife nor blueback herring were observed to spawn in Pohick Creek in 2005 or 2006. Gizzard shad were the only species observed. Larvae samples have not been processed yet. Since 1996, either adult alewife or alosine larvae have been collected in Pohick Creek every year except 2002. Alewife adults were also observed in the creek in 2004, though identification of larvae caught there is still in progress. No blueback herring adults were caught in Pohick Creek in either 2003 or 2004 continuing the record since 1988. Gizzard shad adults were caught in Pohick Creek in all years between 2003 and 2006. Larval gizzard shad were also caught in 2003, and spawning certainly occurred in the creek in 2003 and probably in 2004, too.

Water quality in Pohick Creek remains good enough to support spawning by alewife and gizzard shad. Perhaps consideration should be given to modifying the creek environment to encourage more spawning or better survival of the young larvae and to protect the adult fishes from fishermen.

The 20-year record of data from Gunston Cove and the nearby Potomac River is starting to reveal many interesting long-term trends that will aid in the continued management of the watershed and point source inputs. The studies should continue to get a better idea of long-term trends.

C. COMMENTS

1. The Fairfax County Board of Supervisors has endorsed the goals and actions within the Tree Action Plan, adopted a new tree canopy cover goal for the county of 45 percent coverage by the year 2037 and adopted a tree conservation ordinance to strengthen tree preservation policies and procedures. In addition, trees were identified as a special area of interest in the FY 2008 Environmental Improvement Program.

   EQAC commends the Board of Supervisors for its progressive approach to improving the retention and expansion of this valuable ecological resource. It is imperative that these programs not be allowed to weaken or be given less priority in future years. EQAC feels that continued emphasis of tree actions in the Environmental Improvement Program document is necessary to assure continued emphasis and eventual meeting of goals.

2. In past Annual Reports, EQAC recommended that the Board of Supervisors emphasize public-private partnerships that use private actions such as purchase of land and easements by existing or new land trusts to protect forests and other natural resources, including champion/historic trees. With the signing of a Memorandum of Understanding between the Board of Supervisors and the Northern Virginia Conservation Trust, such a public-private partnership came into being.

Thus, EQAC's recommendation has been satisfied. EQAC continues to commend the Board of Supervisors for this action and recommends continued support for this partnership. EQAC notes that the MOU was for a three-year period and this period is over. While the Board of Supervisors continues to fund the public-private partnership with NVCT, no new MOU has been put into place by Fairfax County. Since this interjects uncertainty into the future of this program, and the program has proved its value, EQAC feels that an MOU covering a three-year or five-year period should be put into place.

3. In past Annual Reports, EQAC recommended that the Board of Supervisors develop and implement a countywide Natural Resource Management Plan – an ecological resources management plan that can be implemented through the policy and administrative branches of the county government structure. Two necessary tasks should be accomplished first -- prepare and adopt a unified Natural Resource Conservation Policy, and complete a countywide Baseline Natural Resource Inventory. EQAC notes that slow progress is being made in this area due to efforts by the Fairfax County Park Authority staff in its efforts to establish a natural resources baseline inventory. The FCPA has developed a countywide green infrastructure map that appears to be a basis for a Natural Resource Inventory. Additionally, the Urban Forest Management Division is continuing efforts to devise a countywide map for use as a layer on the county's GIS that will delineate the distribution of naturally occurring and landscaped vegetation. However, these efforts must be supplemented by an inventory of the county that accounts for flora and fauna. The Park Authority has now prepared a Natural Resources Plan for management of the county's parks. EQAC also notes the accomplishment of the Park Authority in preparing and publishing a Natural Resources Plan for management of the county's parks and urges the Park Authority to fully implement this plan. EQAC fully supports these efforts, urging that they culminate in a countywide Resource Management Plan. EQAC's intent is that Fairfax County should have all the tools in place (the policy and the data) to create a plan that will support the active management and conservation of the county's natural resources.

D. RECOMMENDATIONS

1. The Fairfax County Park Authority approved a Natural Resource Management Plan in 2004. This partially fulfills a long-standing EQAC recommendation to develop and implement a countywide Natural Resource Management Plan. However, most of this plan cannot be implemented without additional staff and funding for the FCPA. While EQAC recognizes and commends the board for funding well over $1 million towards Environmental Agenda projects that support the goals and objectives in the FCPA's Natural Resource Management Plan over the past three carryover budget years (FY 2004 thru FY 2006), the FCPA staff estimates that implementation of the plan will require $3 million plus per year. A more phased approach will allow FCPA to begin to manage 10 percent of parklands and set up

the program to be phased in over time. Phase 1 with this approach would require $650,000 and six positions. EQAC strongly feels that the plan needs to be implemented. Therefore, EQAC recommends that the Board of Supervisors provide funding and some staff positions to implement Phase 1. EQAC recommends that some of the six staff positions should be found from internal FCPA staff assets.

2. Despite continued opposition encountered during the 2002, 2003, 2004, 2005 and 2006 Virginia State Legislative Assemblies, EQAC continues to recommend that the Virginia State Code §15.2-961 be amended to include tree preservation requirements. Mature trees provide a number of benefits to the environment and the quality of life in Fairfax County. These benefits include improved air quality and improved stormwater management. The value of preserving trees during the development process (versus cutting them and replacing with small plantings) is too great to give up on fighting to get tree preservation legislation. Major opposition to tree preservation legislation comes from the Home Builders Association of Virginia. Staff suggests in its responses to EQAC's 2006 recommendations that Fairfax County facilitate meetings with the local building industry to build consensus over tree preservation. EQAC endorses this approach.

LIST OF REFERENCES

Fairfax County Land Use Information – Existing Land Use: Methodology, http://www.fairfaxcounty.gov/demogrph/demrpts/report/section10.pdf.

Fairfax County Board of Supervisors, *Environmental Excellence for Fairfax County: a 20-Year Vision*, http://www.co.fairfax.va.us/dpwes/environmental/env_excel.htm.

EQAC Information, File from Stormwater Management, Department of Public Works and Environmental Services, Fairfax County, Virginia, July 19, 2007

Request for Input for Environmental Quality Advisory Council's Annual Report on the Environment, 2007 Report, Letter from Timothy White, Acting Director, Fairfax County Park Authority, Fairfax County, Virginia, to James P. Zook, Director, Department of Planning and Zoning, Fairfax County, Virginia, July 1, 2007.

Leaves of Green, Fairfax ReLeaf Newsletter, Fairfax ReLeaf, Fall 2006.

2006 Annual Report, E-mail from Kay Fowler, Executive Director, Fairfax ReLeaf, Fairfax County, Virginia, to Robert McLaren, February 15, 2007.

File from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, Noel Kaplan, Department of Planning and Zoning, Fairfax County, Virginia, July 3, 2007.

EQAC Annual Report, E-mail from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, August 1, 2007.

File from Virginia Outdoors Foundation to Noel Kaplan, Department of Planning and Zoning, Fairfax County, Virginia, July 3, 2007.

EQAC-ARE, E-mail from Diane Hoffman, Northern Virginia Soil and Water Conservation District, to Robert McLaren, September 13, 2007.

EQAC-ARE, E-mail from Diane Hoffman, Northern Virginia Soil and Water Conservation District, to Robert McLaren, September 13, 2007.

Summary of Rain Garden Study, Attachment to e-mail from Diane Hoffman, Northern Virginia Soil and Water Conservation District, to Robert McLaren, September 19, 2007.

The Little Pimmit Run Stream Restoration Project, Attachment to e-mail from Diane Hoffman, Northern Virginia Soil and Water Conservation District, to Robert McLaren, September 19, 2007.

EQAC-ARE 2007 - Ecological Resources, email from Diane Hoffman, Northern Virginia Soil and Water Conservation District, to Robert McLaren, September 22, 2007.

Virginia Department of Forestry Contributions of Fairfax County Annual Report on the Environment 2006, File from James McGlone, Urban Forest Conservationist, Virginia Department of Forestry, July 11, 2007.

Letter from William C. Cuttler, Assistant District Engineer for Preliminary Engineering, Commonwealth of Virginia Department of Transportation to James P. Zook, Director, Department of Planning and Zoning, Fairfax, Virginia (containing VDOT's inputs for EQAC's 2007 Annual Report on the Environment), July 13, 2007.

R. Christian Jones and Donald P. Kelso, *An Ecological Study of Gunston Cove, 2004-2005*, Draft Final Report, Department of Environmental Science and Policy, George Mason University, October 17, 2006.

A&F Annual Report, E-mail from Jonathan Papp to Noel Kaplan, October 18, 2007.

EQAC, E-mail from Mary Ann Welton to Noel Kaplan, October 18, 2007.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VIII

WILDLIFE AND THE ENVIRONMENT IN FAIRFAX COUNTY

VIII-1. IMPACTS OF DEER IN FAIRFAX COUNTY

A. OVERVIEW

The adverse impacts of white-tailed deer in Fairfax County are readily recognized as a problem by many of its residents. While the "problem" is seen from a variety of perspectives, there is a general consensus that the root cause is "overabundance" of deer in many local areas. There is also a general public perception that a deer management program is needed to address the "problem".

The road to an acceptable deer management solution, however, is not so easily determined. Some of the factors essential to a solution are subject to strenuous debate and attract a wide spectrum of opinion. For example, what is the optimum population level, and if population reduction is required, what means shall be used? The sport hunting community, recreational nature lovers, residential property owners, environmental preservationists and animal rights/welfare groups have differing viewpoints on these issues.

B. BACKGROUND

1. Are Deer Overabundant in Fairfax County?

Caughly (1981) defined four contexts in which the term "overabundance" can be understood when referring to an animal species population. These definitions have since been widely used by most serious scholars in the wildlife management field and by public administrators responsible for wildlife management programs.

1. When the animals threaten human life or livelihood.

2. When the animals depress the density of, or destroy, particular favored species.

3. When the animals are too numerous for their own good.

4. When their numbers cause ecosystem dysfunction.

Where does Fairfax County stand vis-a-vis these four criteria? The available data strongly (even overwhelmingly) suggest that:

1. We experience an unacceptable number of deer-vehicle collisions resulting in deaths, injuries and major property damage. Owners of commercial agricultural and nursery enterprises suffer substantial damage.

2. In many areas of the county, deer routinely leave their enclaves of "natural" habitat to forage in nearby gardens and yards, causing widespread damage to landscaping

and thus major economic loss to property owners. Through voracious browsing, deer are rapidly eradicating numerous threatened and endangered botanical species from the "natural" habitat. In addition, this loss of plant habitat is adversely affecting numerous vertebrate and invertebrate species of smaller physical size, such as many bird species, that are unable to compete with large herbivores.

3. Data for Fairfax County, based on Virginia Department of Game and Inland Fisheries assessments spanning ten years, indicate that its various deer herds showed a single individual in excellent condition, a very few in good condition, most about evenly split between fair and poor condition and a few emaciated individuals. This shows quite clearly that no longer can the available habitats meet the minimum nutritional requirements that would maintain the deer population in sound health. A 125-pound deer requires approximately 6.5 pounds of forage per day, or some 2,370 pounds of vegetation per year.

4. Many of our parklands and stream valleys show severe browse lines, nearly total eradication of understory and loss of numerous species upon which the continuous process of woodland regeneration is dependent. These changes in turn lead to the inevitable loss of a wide variety of animal species. Thus, our remaining natural ecosystem is being severely deformed through the eruption of a single species that has become overdominant in the food chain.

According to each of Caughly's four criteria, it is apparent that Fairfax County has a serious overabundance of deer. In recognition of the public perception of a significant problem, the Board of Supervisors directed county staff to develop a plan for deer management. In October of 1997, county staff contracted with a consulting firm to "study and review existing data on deer, deer-habitat interactions, deer-human conflicts, and deer management proposals within the county." Staff also asked the consultants to recommend suitable methods for addressing the various problem areas. These studies and recommendations were presented in the Consultants Report (Natural Resource Consultants, December 1997). In 1998, the county created a new position and appointed a Wildlife Biologist who had broad experience with Fairfax County parks and parkland issues. In the summer of 1999, the County Executive convened an ad hoc Deer Management Committee of experts and stakeholders to discuss and evaluate the plan drawn up by the staff and the early implementation efforts. The report of this committee and its recommendations were forwarded to the Board of Supervisors in September, 1999 in advance of the season of peak deer problems, which occurs in the fall. The Board of Supervisors approved recommended measures to reduce the deer population to more sustainable and less destructive levels. Since then, the deer management program has made substantial progress in achieving significant population reductions in some of our most threatened parklands.

2. A Description of the Problem

a. Data on Deer Abundance in Fairfax County

To begin this discussion, the terms overabundance and overpopulation should be distinguished. Overabundance refers to population levels that have adverse impacts on the community and other species, while overpopulation refers to population levels of the species that are an imminent danger to itself through disease and starvation. This latter phenomenon is responsible for the population eruption and subsequent collapse of deer herds that has been a topic of scientific study for the past 60 years. While the following information supports a conclusion that deer are overabundant in Fairfax County, neither the data nor experts from a variety of sources have indicated that a level of overpopulation exists, though the relatively poor health of the county's deer suggest that we may be approaching overpopulation.

Data from the Virginia Department of Game and Inland Fisheries deer density surveys in Fairfax County parks prior to the county's deer management program showed deer densities from 90-419 deer/sq. mile (Table VIII-1-1).

Table VIII-1-1
Deer Density Baseline Surveys

Location	Est. Deer/Square Mile
Huntley Meadow Park	90-114
Riverbend Park	213
Meadowlark Gardens Park	90-115
Bull Run Regional Park	419
Fort Belvoir	90
Mason Neck NWR	-

(Source: W. Dan Lovelace, Wildlife Biologist, Virginia Department of Game and Inland Fisheries.)

While the many of the data are limited, taken collectively, the observations of professional park staff, poor health of evaluated deer and high deer densities indicate that deer are overabundant and are negatively impacting the ecology of sizeable areas

of Fairfax County. Unfortunately, there are few reliable data available for densities and extent of damage on private lands and the adjacent small islands and corridors of natural habitat. Even though the information available is primarily anecdotal, it is voluminous, and there is a general public perception of a significant and growing problem of deer overabundance.

b. Causes of Overabundance in Urban/Suburban Areas

i. Urbanization/Changes in Habitat

Over recent decades, Fairfax County has transformed from a largely agrarian and woodland area to a multifaceted employment, residential and retail area. Over 1,000,000 people reside in the 395 square miles of the county. Of these 395 square miles, about 140 square miles are wooded and open land and some three square miles are remaining agricultural land. This change from an agrarian area to a developed one has markedly decreased the amount of land usually regarded as suitable for deer habitat and has changed their food sources and movement patterns. This urban/suburban habitat of the county provides a fairly good nutritional base for deer, including manicured lawns, athletic fields, college campuses, golf courses and landscaped residential communities.

Overabundance is particularly common where the course of development has left protected "islands" or "corridors" of deer habitat in or near urban and suburban areas. As the development process reduces the area of natural habitat, deer are forced into these remaining islands and corridors at very high population densities. Because the deer then deplete the forage plants in these enclaves, they venture out into the surrounding developed community in search of food. In such situations, conflicts with humans frequently arise in the form of deer-vehicle collisions and depredations on gardens and ornamental plantings (Flyger et al, 1983; Cypher & Cypher, 1988). Moreover, in such situations, natural predators (e.g., wolves, bobcats, mountain lions) have normally long since been eliminated and hunting is usually prohibited.

ii. Loss of Predators

The precolonial levels of deer in Virginia could be attributed to predation by bobcats, black bears, eastern gray wolves and eastern mountain lions, in addition to the number taken by Native American hunters. While none of these predators depended solely on deer, the deer/predator interactions and the added effects of hunters kept the population levels low and well within the carrying capacity of the land. Increasing human populations and land development has virtually eliminated wildlife predators from the county. In the first half of this century, hunting had reduced the deer population to very low levels. However in the latter half of this century, with growing human population and reduction of huntable habitats,

recreational hunting has almost disappeared in the county. While the number of deer harvested through "Out of Season Kill Permits" has increased in recent years (Table VIII-1-2), the combination of seasonal hunting and out-of-season kill permits does not affect the deer population at sufficient levels to prevent significant deer/human conflicts or ecological damage.

Table VIII-1-2
Out of Season Kill Permits Issued For Deer Damage in Fairfax County
Virginia Department of Game and Inland Fisheries

Year	Permits	Number Taken
1989	5	25
1990	3	4
1991	19	41
1992	18	43
1993	42	222
1994	31	131
1995	65	193
1996	165	244
1997	147	310
1998	157	297
1999	216	377
2000	197	263
2001	148	398
2002	187	249
2003	173	311
2004	217	279
2005	191	219
2006	168	258

(Source: Susan Alger, Matt Knox, Mark Pritt and Jerry Sims, Virginia Department of Game and Inland Fisheries.)

It should be noted that, while the number of out-of-season permits declined markedly in 2001, the number of deer taken increased even more dramatically. A similar pattern occurred in 2003. This is quite consistent with intensification of problems in a smaller number of areas as land clearing for development squeezes the deer population into smaller and more isolated patches of habitat.

c. Problems Created by Overabundance

i. Ecological Impact

Effects of a persistent and overabundant deer population include the loss of biodiversity and a negative effect on ecological and biotic systems. These can be seen in a declining understory (lower height plants and shrubs that serve as a food source for birds) and the appearance of browse lines, which occur when deer eat almost all the vegetation within their reach and the woods develop a "line" at the top of their reach. While few detailed deer/forest impact studies have been performed in the county, in a report to the Animal Services Division, Fairfax County Police Department, the Superintendent of Administration of the Northern Virginia Regional Park Authority noted that "the ever present browse line had now become a common sight in most of our parks. The deer have eaten all of the herbaceous and woody plant growth within their reach. This has eliminated an entire stratum of habitat from the parks."

The browse line and loss of understory are not the only indications of this ecological impact. There is an abundance of technical literature reporting the effects of a high deer population on plant communities when the lower ecosystem carrying capacity (see page 218) is exceeded. However, the apparent poor health of the county's deer indicates a level of deer density that reportedly exceeds even the higher biological carrying capacity. There are also numerous studies documenting the negative effects of overabundant deer on wildlife species. For other vertebrates, this may occur through direct competition for food sources or more often by altering the habitat. For example, in some areas of the county, the number of species of birds has markedly diminished through loss of the necessary habitat due to excessive browsing by deer.

As noted in the 1997 Consultant Report and throughout the scientific literature, "the consequences of a persistent, overabundant deer problem can be long-term loss of biodiversity and negative impact to functioning ecological and biotic processes." We have already begun to see a loss of biodiversity that will ultimately lead to a loss of ecosystem stability, with far more widespread and serious effects than the shorter-term effects of overabundant deer.

ii. Property Loss and Damage (Vehicular, Plantings)

Nationally there are 1.5 million deer-vehicle collisions annually that cause more than $1 billion in damage and kill several hundred people. The Insurance Institute for Highway Safety ranks Virginia as the state with the seventh largest number of such collisions. The IIHS data shows the average insurance claim for vehicular damage is $2,600 but with injuries the total average claim rises to $11,000. The Fairfax County Police Department does an excellent job of analysis of the data on

deer-vehicle collisions that require a police presence in their aftermath or that are otherwise reported. The numbers appear to have increased, but the data (Table VIII-1-3) do not show a consistent trend. For those accidents tabulated from January 1998 through 2002, the average damage per vehicle was about $2,300. Over this same period, the Virginia Department of Transportation picked up 4,507 carcasses of deer killed in vehicular collisions from rights-of-way in the county. In 2002, VDOT picked up 1,057 deer carcasses from the roadway and immediately adjacent right-of-way in Fairfax County, which represents a small increase from earlier years. This increase most likely represents normal variation from year to year.

Table VIII-1-3
Deer-Vehicle Collisions in Fairfax County

Year	Non Injury	Injury Crashes	Fatal Crashes	Total
1993	154	6	0	160
1994	149	10	0	159
1995	127	6	0	133
1996	157	20	0	177
1997	168	17	1	186
1998	144	23	0	167
1999	177	18	1	196
2000	144	17	0	161
2001	143	22	0	165
2002	122	10	0	132
2003	160	19	0	179
2004	122	14	1	137
2005	151	13	1	165
2006	115	14	0	129*

* 41 percent of these crashes occurred in October and November

(Source: Report 1993-2001, Michael Uram, Fairfax County Police Department.
Report 2002-2004, Earl Hodnett, County Wildlife Biologist.
Report 2005, Emily Yance-Houser, FCPD.)

Police and highway experts estimate that only 20-25 percent of deer impacting vehicles die at the scene (i.e., on the road itself or in the right-of-way); many receive injuries that are soon fatal, but die in the woods or in a nearby yard. Thus, a reasonable estimate would indicate some 18,000-22,500 deer-vehicle collisions

in the county during the 1998-2002 period. One can reasonably infer that many, if not most, of these collisions result in property damage to the vehicle. In addition to these crashes which required a police presence, in 2002 there were 1,057 reported deer-vehicle collisions, and in 2003 the number increased to 1,371 reported collisions.

County personnel report an increasing number of complaints of damage to native and ornamental plants in Fairfax County. Referring again to the "Out of Season Kill Permits Issued for Deer Damage" (Table VIII-1-2), an indication is given of homeowner attempts to address property loss primarily thought to be ornamental in nature. Further, although numerous deer management programs are available, such as planting less preferred species and fencing, the effectiveness of these methods declines dramatically with increased deer densities, leading to declining food sources and willingness of deer to eat even undesirable plants. These activities may also tend to increase vehicular incidents, as deer must look farther afield for food sources.

iii. Disease

Another problem associated with deer overabundance is the prevalence of Lyme Disease. See Section VIII-3 below in this chapter for a discussion of Lyme Disease.

C. ISSUES IN ADDRESSING THE PROBLEM

To effectively manage the deer population, the implications and interrelationships of population dynamics, carrying capacity, public opinion and methods for management must be understood and incorporated into the program.

1. Understanding Population Dynamics

The concept of population dynamics is crucial to understanding the current problem and the development of a workable solution. There are no simple mathematical models that can be applied to determining the growth of the population of a species in a particular area, and the least complex deer management models and programs based on solely on nutritional deer carrying capacity (see section on carrying capacity below) consider neither the deer population's interactions with the human population nor its interactions with a biodiverse ecosystem.

One important concept to understand is that of home range. Deer show a strong attachment to a home range, and it has been shown that deer forcibly relocated often die of malnutrition even if food is accessible in their new habitats. When natural dispersal from

the home range occurs, it is usually the younger males that migrate. This has four implications for Fairfax County deer management:

1. Deer often occupy a home range that can include both a park and the surrounding community or islands and corridors of "natural" habitat plus the yards and gardens of adjacent residential communities.

2. A dramatic decrease in one area will not necessarily result, in the short term, in an increased dispersal of deer from other areas into the depleted area, with a consequent lessening of population density in those other areas.

3. Deer cannot be eliminated from the county under today's conditions, because the deer surviving in surrounding home ranges will, in the long term, undergo natural dispersal and repopulate the depleted areas. This implies that parks and the surrounding areas must be managed as a unit and that solving the problem in one area does not automatically translate to another area.

4. The recent emergence of epizootic hemorrhagic disease, a viral disease fatal to deer but posing no threat to humans, may be a significant factor in natural reduction of the deer population over the next several years. EHD has sometimes been implicated as a significant factor in the boom-bust cycle observed within deer populations that have been the subject of long-term study. Within the past year, 53 deer fatalities due to EHD have been diagnosed in the southeastern portion of the county, and these diagnosed cases probably represent only a small fraction of those succumbing to the disease. Weather, the size and compactness of deer herds and the overall health of the deer play a major role in EHD transmission. Thus, it is not possible to predict the future course of this disease within the county, except to note that it usually takes several years to run its course within a deer population and we appear to be in the early stages of an outbreak.

Other concepts that affect population dynamics include compensatory reproductive responses, survival and predation. Again, it must be noted that deer management is not a simple mathematical equation; it must take into account many biological and behavioral factors, many of which are not fully understood, especially in an environment such as Fairfax County. For example, in many cases, as the size of an animal population decreases, the number of offspring increases, despite the fact that food is becoming less adequate. This phenomenon leads to the population eruption-crash cycles that are widely discussed in the scientific literature. More complete data and an improved understanding of the unique characteristics of Fairfax County must be collected and considered as the management program evolves.

2. Determining Carrying Capacity Goals

Carrying capacity is the level of a population that can be supported by an ecosystem or tolerated by the community. To determine the appropriate population level as a goal for a management plan, it is essential to distinguish among the following:

1. Biological carrying capacity, i.e., a species specific level that is primarily concerned with the population that can be supported with the available nutritional resources

2. Cultural carrying capacity, i.e., a level that is driven by human concerns (the population that can be tolerated by the community at large)

3. Ecosystem carrying capacity, i.e., the population level that can be supported by an ecosystem without disturbance of its stability or reduction of its biodiversity.

The biological carrying capacity is a traditional view that has been widely used by fish and game departments where a primary concern is to maintain adequate stocks of deer for sport hunting, but it does not adequately account for the effects of relatively high population levels on the ecosystem in which the species resides. The cultural carrying capacity is defined by Ellingwood and Spingnesti (1986) as the maximum number of deer that can coexist compatibly with local human communities before conflicting with some human interest. This level is driven by human values, economics and desires independent of ecological considerations. DeCalesta (1998) used the term diversity carrying capacity in a more restrictive sense than ecosystem carrying capacity, but both concepts consider the maximum species population density that does not negatively impact diversity of fauna or flora, including diversity of habitat structure as well as species richness. He contends that deer impacts on biodiversity occur at population densities well below traditional definitions of ecosystem carrying capacity.

Thus, biological carrying capacity is the highest population density and is considerably in excess of cultural carrying capacity (human societal tolerance), which in turn accepts notably higher densities than ecosystem carrying capacity. Finally, diversity carrying capacity has the smallest maximum population density.

3. Considering Public Opinion

Goals for management and methods to use to reach those goals are very different issues; consensus or conflict among groups of constituencies may occur at either or both levels. Goals may vary from a biological carrying capacity level that meets hunting concerns to a much lower carrying capacity level based on an ecological or biodiversity perspective. Cultural carrying capacity may run the gamut of levels, depending on the varying values and tolerances of different constituencies within the community. Even where there is agreement on the level of deer density desired, the methods to reach those goals may be in

dispute. Some groups may have a zero-tolerance for lethal means, whereas others may readily support managed hunts or sharpshooters.

As indicated in the 1997 Consultant Report, deer control action by the county should not be undertaken until it is determined that there is sufficient community and political support for it. Again, the need for data, this time in the form of public opinion surveys, is stressed. Additionally, the need to adequately educate the public about the issues is needed to ensure well-informed constituent responses. This is one of the purposes of the extensive tutorial at the beginning of this section ---- to give the general public sufficient information on deer population biology that they can make a well-informed judgment.

D. METHODS FOR DEER POPULATION MANAGEMENT

1. Population Reduction Approaches

a. Let Nature Take its Course - Eruption/Collapse

This approach is based on using no human intervention to affect the deer population one way or the other. This has been studied by wildlife biologists for more than half a century. The findings are that the population goes through an eruptive phase with explosive population growth until it is far above biological carrying capacity. This is followed by eruptions of parasitic and infectious diseases (such as EHD) and by large-scale starvation, which causes the population to crash to perhaps 15-25 percent of its peak level. Thereupon, the herd recovers to begin the cycle anew. Some populations have been followed through five or six successive cycles. Although the deer population of Fairfax County can be considered to be in the early stages of the eruptive phase, it is well short of a peak. Public concerns about the current and expected future impacts on the community rule this out as an option.

b. Lethal Methods

i. Managed Hunting

Experiences with managed hunts over the past year indicate they have been highly cost effective, in that revenue has exceeded costs for personnel and materials. This is in sharp contrast to their initial use in 1998, when costs were high and relatively few deer were taken. The dramatic upturn in the learning curve is very encouraging. Necessarily, managed hunts are conducted primarily in parkland, and while the amount of deer population reduction in these local areas is no doubt ecologically beneficial, in terms of absolute numbers it has been insufficient to make an immediate noticeable difference in the overall problem.

ii. Archery Hunting

Archery hunting has proven an effective and acceptable means of deer control in residential areas where use of firearms is deemed too hazardous. Archery is a quiet and short-range method, with most deer being taken within less than 100 feet. During the 1998 public hunting season, 789 deer were taken in Fairfax County, of which 597 were taken by archery and the remainder by shotgun. In 1999, archery accounted for 686 of the total of 1,046 deer, and in 2000 accounted for 626 of 1,028 deer. With out-of-season kill permits, archery can be used year-round, even in residential neighborhoods. In 2003, the organized Urban Archery Program harvested 119 deer and an additional 854 were taken with archery equipment by individuals.

iii. Traditional Public Hunting

Under current restrictions outlined by VDGIF, the above figures show that traditional public hunting is not sufficient to address the problem, based on hunters' limited access to deer habitat and preference for antlered deer. Moreover, the habitat that is accessible is not where the major problem areas are located.

iv. Trap and Kill

This method has usually been conducted by darting with anesthetics and dispatching the animal by gunshot or a lethal drug. The former is less effective than sharpshooters while the latter leaves the meat unfit for human consumption. The use of drop nets and stun guns is explained in the 1997 Consultant Report as a possible lethal method. This method allows for release of non-targeted males and results in meat uncontaminated by drugs but is very cost inefficient.

v. Sharpshooters

The use of professional animal control personnel, police experts, or qualified and experienced volunteers has been proved to be a safe, cost-effective and successful means of management if lethal methods are employed. Earlier experience with this method in Fairfax County has led to significant refinements and greatly improved cost-effectiveness, with a cost per deer taken ranging from $4.15 to $22.97. Once again, the number of deer removed from the population by this method is not sufficient to have more than a modest local effect. The sharpshooter program has been so effective in our larger parks that vegetation has begun to recover and the focus can now shift to some of our smaller parks.

vi. Reintroduce Predators

The reintroduction of the usual species of deer predators into an urbanized setting such as Fairfax County is biologically unworkable and publicly unacceptable.

c. Nonlethal Methods

i. Trap and Relocate

Experiments with this approach have been largely unsuccessful due to high initial mortality (up to 85 percent) of the relocated deer. Moreover, there are few locations within a reasonable distance of this area that would accept relocated deer, since most nearby areas have similar problems. The use of drop nets and stun guns is suggested in the 1997 Consultant Report as a possible method for deer capture. More traditional methods use anesthetic darts. This method is considered infeasible for Fairfax County.

ii. Contraception

Steroidal/hormonal contraception has proved very costly and difficult to implement and only very marginally effective. Immunocontraception (where the female's immune system is stimulated so as to prevent fertilization of eggs), on the other hand, holds some promise for deer management, but it is currently in an experimental stage. The Humane Society of the United States is conducting field studies at the enclosed National Institute of Standards and Technology site in Montgomery County, but due to difficulty with marking deer, the Humane Society is not yet conducting studies for free-ranging deer such as those in Fairfax County. The recent technical literature discusses requirements for sites chosen for pilot tests. All indications are that this is not a near term solution for the county but might hold promise for limiting populations in the future, once they have been reduced to desired levels.

2. Conflict Mitigation Approaches

Conflict mitigation is directed toward reducing the direct impacts of deer on the human population and thereby increasing the tolerance of the community for the existing deer population.

a. Supplemental Feeding

Conceptually, this approach is supposed to divert deer from the landscape plantings in gardens and yards. Supplemental feeding might somewhat improve the health of the existing deer population but would almost certainly drive it to even higher levels.

Thus, consideration of this approach would be counterproductive for Fairfax County, since it does nothing to reduce the excess deer population.

b. Fencing

Fencing is only rarely effective, since deer are noted for leaping even eight foot fences. Thus, fencing is a costly and ineffective solution, especially when deer are seeking out preferred plant species.

c. Repellants

In the past repellants have had limited success and are generally costly and most require frequent replenishment. Also, many of them have odors that are no more acceptable to humans than they are to deer. However, repellants containing denatonium benzoate have been used very successfully by commercial tree farms and are now available through retail nurseries. Denatonium benzoate is the bitterest-tasting substance known to science and is usually compounded in a polymer latex emulsion (such as Tree Guard™) which is sprayed on plants and will last for approximately three months and will not wash away in rains. Because it is simply bitter-tasting and not poisonous, it may be safely used on any vegetation not destined for human consumption.

d. Roadside Reflectors

Roadside reflectors divert light from vehicle headlights toward the sides of the roadway and are intended to frighten the deer away from the road, thereby reducing the likelihood of vehicle collisions. The method is potentially most useful in the evening and early morning hours when the majority of deer-vehicle collisions occur. While expensive, this technique has shown some promise in tests. The Virginia Department of Motor Vehicles gave the county a $40,000 grant to conduct studies of the effectiveness of roadside reflectors. The first test site was a section of Telegraph Road that has had a high incidence of deer-vehicle collisions. The initial results show limited promise but are confounded by three other factors: (1) construction activity in the area may have driven many deer away; (2) a high incidence of epizootic hemorrhagic disease that may have naturally reduced the population; and (3) an archery hunting program at Fort Belvoir that definitely reduced the population in that area. The county staff identified and began testing at additional test sites, but these also had problems that rendered data interpretation extremely difficult.

e. Underpasses

Construction of underpasses has been suggested as a way of providing deer with a safe means of getting to the other side of busy roads. Not only is it exceedingly costly, but

there are no data available now or expected in the future that would pinpoint likely sites. Consequently, this approach is regarded as wholly impractical.

f. Use of Less-Favored Plants

Landscaping with plant species that are less favored by deer has been advocated as a way of reducing depredation of yards and gardens. However, as Cypher & Cypher (1988) and numerous other wildlife biologists have shown, when deer populations exhaust the preferred plant species, they readily turn to those less-preferred. Thus, in the short term this approach might seem to work, but longer term experience indicates that it is relatively ineffective.

E. PUBLIC EDUCATION PROGRAM NEEDS

As noted above, an educated public that has an understanding of the population dynamics of deer, the concepts of carrying capacity, the different management options and an understanding of the various values of the community in addressing ongoing management is essential to the successful implementation of a deer management program. The recommended public education program should encompass the following:

- The county Deer Management Web site already serves as a primary vehicle for making much of the information mentioned below more readily available and updatable. See: http://fairfaxcounty.gov/comm/deer/deermgt.htm

- Develop pamphlets that are easily read, easily mailed, available through various county offices and through the local Supervisors' offices. These should include information on:

  - Deer and deer biology
  - Ecosystem and population dynamics in general, and as they relate to the interaction between deer and other species of both plants and animals
  - Methods of population management, including their relative feasibility and cost-effectiveness for achieving both short-term and long-term goals
  - The deer management program
  - Permits required for implementation of private control measures
  - Fencing and repellents
  - Safe driving and how to avoid deer on the road
  - Lyme disease and its prevention (See Section VIII-3 of this report)
  - Who to contact for additional information.

- Establish networking among the following agencies for provision of consistent public information:

  - Fairfax County Government offices
  - Fairfax County Supervisors district offices
  - Fairfax County Wildlife Biologist
  - Fairfax County Animal Services Division
  - Nature Centers
  - Health Departments
  - State agencies, particularly Virginia Department of Game and Inland Fisheries and the Virginia Department of Transportation
  - The Humane Society.

- Compile and make available a comprehensive bibliography of literature on deer management in urban environments. (The references attached to this section provide a limited example.) Make this information available to schools, civic and technical groups and interested individuals.

- Establish an archive of evidence documenting how deer can change the characteristics of a landscape. This should show:

  - Habitat characteristics before deer damage
  - Habitat characteristics during and after deer damage
  - Habitat characteristics during regeneration after deer population is reduced
  - Statistics and trends for vehicle/deer collisions, number of injuries/fatalities and types of damage.

- Create a visual display of the above for use at schools, fairs, libraries, etc., and develop presentations for use at public meetings and meetings of civic groups.

- Establish a county self service telephone number for wildlife problems and public information. This could be a menu-driven hotline that would direct people to the proper location on the information network or to the appropriate county office.

F. PUBLIC AGENCY RESPONSIBILITY

The Animal Services Division of the Fairfax County Police Department has been assigned primary responsibility for deer management by the Board of Supervisors. However, due to the legal concept that ownership and disposition of wildlife is vested in the state, the Virginia Department of Game and Inland Fisheries exercises significant regulatory and permitting functions that affect Fairfax County's deer management activities. The County Wildlife Biologist and the Animal Services Division, in coordination with applicable land-holding agencies (e.g., Northern Virginia Regional Park Authority, Fairfax County Park Authority) and other public authorities, implements the Integrated Deer Management Plan on public lands. In addition, the County Wildlife Biologist and the Animal Services Division advise private

business and residents in addressing deer management on privately owned parcels in Fairfax County. Deer management on federally owned tracts of land within Fairfax County (e.g., Mason Neck National Wildlife Refuge, Fort Belvoir, etc.) is the responsibility of the respective federal agencies and is subject to the applicable federal policies and regulations.

G. PROGRAM IMPLEMENTATION ACTIVITIES

An Integrated Deer Management Plan was developed by county staff subsequent to the Consultant Report received in December, 1997. The Board of Supervisors in November, 1998 directed that program implementation activities commence. Subsequently, in the summer of 1999, the County Executive convened a Deer Management Committee comprised of experts and various stakeholders to evaluate the plan and initial implementation efforts and to prepare recommendations for the Board of Supervisors for further implementation of the plan during the fall and winter of 1999-2000. This committee meets annually to review progress in program implementation and to make recommendations on additional approaches. The County Wildlife Biologist and the Animal Services Division of the Police Department prepare the annual Fairfax County Deer Management Report to the Board of Supervisors that contains extensive data on the program. The county Web site http://fairfaxcounty.gov/comm/deer/deermgt.htm provides additional material.

On December 8, 1997, the Fairfax County Board of Supervisors approved managed hunts for Riverbend Park and the Upper Potomac Regional Park, both in the Dranesville District. Plans by the County Wildlife Biologist and the Animal Services Division were approved by the Northern Virginia Regional Park Authority and the Fairfax County Park Authority for four managed hunts for each of the two locations. The hunts were planned for January and February of 1998. The managed hunts conducted in 1998 were largely unsuccessful in achieving planned program objectives and had associated costs that were difficult to justify. However, some of these costs could be attributed to greater-than-necessary safety measures that experience now indicates would not be needed in the future. In contrast, four managed hunts, involving 132 hunters, conducted in the fall and winter of 1999-2000 were very cost effective, with 195 deer taken at a cost per animal of $9.51. The seven managed hunts conducted in the fall and winter of 2000-2001 involved 223 hunters, who took a total of 351 deer at a cost per animal of $17.94. Of the 351 deer taken, 222 were donated to a program that feeds needy families. For 2001-2002 hunt season, the program returned a profit of $7.28 per animal because the permit fees collected exceeded program costs. This was also true in the 2002-2003 season, with a profit of $79.60 per animal taken.

The sharpshooter program, which utilizes Police Department Special Operations tactical teams, has been cost-efficient from the outset. These teams must engage in extensive marksmanship training on a regular basis in order to maintain the required proficiency. Instead of practicing on a target range, they are utilizing this required training time in a field setting with the deer more closely resembling operational targets. The harvested deer are

collected by a charitable organization that provides meals to the needy. Even in the early part of the learning curve, this program has shown satisfactory harvest rates. Whereas, similar programs in most mid-Atlantic jurisdictions have harvests listed in hours per deer taken, Fairfax County in 2000 had a harvest rate of 1.54 deer per hour. From late December, 1999 through late January, 2000, fourteen sharpshooting sessions over a total of 41 hours were conducted, with a total harvest of 89 deer at a cost of $4.15 per animal. In the same period of 2000-2001, there were 23 sharpshooter sessions, totaling 94.75 man-hours, which took 146 deer, at a cost per deer taken of $22.97. In the 2002-2003 season, the sharpshooter program took 248 deer. In 2001, the cost per animal rose to $44.99 if all costs were attributed solely to the Deer Management Program, but this would be fallacious due to the fact that this activity represents proficiency training for the police tactical units which must be conducted anyway. A major reason for this increase in cost per animal is that most of the sites this year represented repeat visits to locations first addressed last year and the year before. As the herd population density decreases, the time expended on each animal increases, and this is further increased by the increased wariness of the surviving members of the herd. Thus, the costs are very much in line with expectations and will drop once again as more new sites are brought into future years' mix of new and old locations.

Clearly, the managed hunt and sharpshooter programs must be conducted largely in parkland due to safety considerations, but this is also where some of the most substantial benefits are to be achieved. From the outset, the Northern Virginia Regional Park Authority has taken a position of active involvement and has reaped corresponding benefits. **It is very important that the Northern Virginia Regional Park system continue to be a full participant in these efforts, otherwise the regional parks will act as a reservoir for deer herds that will emerge to adversely impact nearby residential communities and Fairfax County parks.**

The Fairfax County Park Authority has been actively involved and availed itself of the clear benefits offered by the program to the ecology of its parks. The FCPA reported in June, 2003 significant regeneration of the vegetative understory in two of our parks that were among the most overgrazed and have had herd reduction measures used for two successive years. This degree of success is very encouraging, and it is hoped that the FCPA will continue its active involvement in the program and thereby exercise the ecological stewardship that is so necessary to the biotic health of our parks and parkland. By mid-year 2004, the thinning of the herd in several of our larger parks had led to significant regeneration of vegetation so that the emphasis will now shift to smaller parks and those that have not yet had program activities implemented.

Out-of-season kill permits have, for some years, been one of the few legal avenues open to private property owners to permanently remove deer that are causing serious damage to their properties. Such permits are issued by the Virginia Department of Game and Inland Fisheries after verification of the damage. Generally, however, permits are only issued for holders of larger property parcels because of safety considerations. Fairfax County should work in coordination with the VDGIF to make these permits available on a wider basis to qualified residents.

Archery hunting is quite effective in suburban areas since it is much safer than the use of firearms due to the short range of the projectiles. In addition to those residents who have the necessary skills and equipment, there are several commercial firms that offer specialized deer removal services. For the most recent year, 854 deer were harvested using archery equipment. Another 119 deer were taken under the county's Urban Archery Program. This reduction of the county's deer herd by 973 individuals demonstrates the effectiveness of archery as a tool in meeting program goals and as a method that can be safely employed in even heavily populated areas.

The use of roadside reflectors (strieter-lite technology) that reflect automobile headlights into wooded areas bordering the roadside has been suggested as a method of discouraging deer from crossing roadways in the evening and early morning hours, when most deer-vehicle collisions occur. In mid-November, 1999, the Board of Supervisors approved $10,000 for a pilot program to test strieter-lite reflectors in selected locations. In addition, a grant of $40,000 was received from the Virginia Department of Motor Vehicles for testing and evaluation of this technology at several locations in Fairfax County. Unfortunately, all of the test locations experienced confounding factors such as roadway modification, adjacent development, deer herd reduction through hunting and disease, etc, that made it difficult to draw reliable inferences from the collected data. In addition, the manufacturer of the reflectors has apparently discovered that the initial design was reflecting light in a part of the spectrum to which deer's eyes are relatively insensitive, and the design is now being changed. Such inferences as can be drawn from the data suggest that there is only a slight reduction in deer-vehicle collisions due to the use of reflectors. This conclusion appears to be borne out by tests in other eastern areas where there was an absence of confounding factors. The tests in Fairfax County have shown this technology to have so little promise that it cannot be recommended for continuance.

Even though Fairfax County has not conducted a pilot project to test the feasibility of immunocontraception, this technology has shown a limited potential for the future. A program being conducted by the Humane Society of the United States on the fenced campus of the National Institute of Standards and Technology in Montgomery County is being carefully monitored for possible applicability to Fairfax County. After the deer population has been reduced to generally acceptable levels, this methodology might provide a feasible method of sustaining these levels in some local herds for the long term, but with the important caveat that it appears workable primarily on closed, fenced parcels. In mid-November, 2000, the Board of Supervisors approved $10,000 to develop a pilot demonstration program on deer contraception, but results of this technology have shown little promise.

H. CONCLUSIONS

The need for a comprehensive deer management program for Fairfax County is not in serious dispute. However, there is perhaps a somewhat wider array of opinion about the appropriate

context for determining carrying capacity level for the management program and the particular methodologies to employ in reaching program goals.

As noted in much of the reference literature, deer have traditionally been viewed as livestock and woodlands and meadows as pasture. Deer management models and programs have been based largely upon nutritional deer carrying capacity that does not consider issues of biodiversity, altered natural processes, natural herd demographics and behavior, or adverse impacts on mankind. The discrepancy of views can be seen in comparing a report by the Virginia Department of Game and Inland Fisheries with the Consultant's Report. The VDGIF report states that deer densities ranging from 90-419 deer per square mile have been reported in various county parks and that ideal deer densities are 15-20 deer/sq. mile of suitable habitat. However, the 1997 Consultant Report and much of the scientific literature argues that a deer density of no more than 8-15 deer/sq. mile is required to meet a biodiversity goal of deer management. Many of the assumptions upon which the Integrated Deer Management Plan for Fairfax County is based require adjustment based on continued environmental assessment of the county and to meet more precisely defined ecological goals.

It is evident that, while deer in Fairfax County have not reached a state of overpopulation (as earlier defined), they are near biological carrying capacity as shown by their poor physical condition and their relentless foraging outside their "natural" habitat. It is equally evident that, for the majority of residents, deer have greatly exceeded cultural carrying capacity in terms of representing a serious vehicular hazard and their depredations on both private landscaping and our public parklands. There is now substantial evidence documenting the fact that ecological and biodiversity carrying capacities have long since been exceeded.

In light of the Environmental Quality Advisory Council’s role as an advocate for protection of environmental quality, it is EQAC’s view that a biodiversity approach is needed in Fairfax County. However, as cautioned in the 1997 Consultant Report, EQAC too cautions against attempts to move forward with a response without adequate data, a clearly articulated plan and education and consensus building of all major stakeholders. While moving quickly may assuage the concerns of some vocal groups, a true solution must address the problem with a long-term approach, considering all major stakeholders. Management must address an ecological goal that is based on sound science and considers the value system of an educated community.

All of these caveats having been noted, the problem is of such proportions that every feasible approach must be employed not only to keep the burgeoning deer population in check, but more important, to systematically reduce it to sustainable levels. It is evident that the current managed hunt and sharpshooter programs have reached an admirable level of cost-effectiveness but are not reducing the countywide deer population at a rate sufficient to achieve the recommended biodiversity carrying capacity. Thus, it is incumbent upon the Board of Supervisors to continue to take increased and decisive action to address this problem over the long term, while recognizing that it is not going to be possible to please all of the people all of the time. It is likewise essential that the Fairfax County Park Authority continue

its active participation in the deer management program in order to exercise the necessary stewardship of the ecological well-being of the county's parkland, which now constitutes nine percent of the land area of the county. The regeneration of parkland where the program has been implemented for several years shows clearly the benefits to be derived and makes it possible to schedule other parks for program activities.

I. COMMENTS

The comments provided below address only the first section of this chapter (deer management issues). Comments and recommendations addressing geese and wildlife borne disease issues are found beginning on pages 241 and 251, respectively.

1. It has just recently come to EQAC's attention that there has been a reorganization of the Animal Services Division of the Police Department that has demoted the wildlife management program under the County Wildlife Biologist and made it a subordinate unit within the Animal Control Section. This type of arrangement was certainly not what had been envisioned by EQAC and the Deer Management Committee when the program was implemented in 1999-2000. Rather, the County Wildlife Biologist role was envisioned as somewhat like that of the Environmental Coordinator, i.e., as a function that could interact broadly with a variety of county and outside agencies to address and implement program goals. Major interactions occur with, among others, Fairfax County Park Authority, Northern Virginia Regional Park Authority, Fairfax County Health Department, Virginia Department of Game and Inland Fisheries, Virginia Department of Natural Resources, U.S. National Park Service, U.S. Department of Agriculture, U.S. Fish and Wildlife Service. The only real interaction with the Fairfax County Police Department is with the Special Operations Tactical Team in the Operations Support Bureau. Suffice it to say that EQAC finds the current arrangement unacceptable in several ways. EQAC feels that the program functions and personnel should be relocated elsewhere in the county structure and at a level consistent with the broad range of required coordinative functions. EQAC, following further investigation, plans to submit a separate special resolution on this matter to the Board of Supervisors.

2. The recent addition of an Assistant Wildlife Biologist to the county staff, as recommended last year by EQAC, is enthusiastically endorsed and should materially enhance the deer management program. This person will have major responsibilities for:

   - Implementation of all necessary measures for reduction of the deer population in order to return the size of the local herds to sustainable levels consistent with the long term carrying capacity of their particular local habitats.

   - Protection, restoration and enhancement of the natural areas and environments that have been subjected to degradation by deer overabundance.

- Deer management based on a sound ecological approach that emphasizes biodiversity without preferential treatment of particular species.

- Deer management based on an "in perpetuity" perspective that does not trade long-term interests for short-term gains.

- Interfacing with the Fairfax County Park Authority and the Northern Virginia Regional Park Authority on the overall Deer Management Program.

- Serving as an intermediary between private property owners and county and state agencies to address increased attention to the problems of small private (mostly residential) property owners who are suffering serious impacts from deer and develop means for them legally to exercise effective control measures.

- Acting as a spokesperson to: 1) receive ongoing public input into the plan, including surveys of public opinion; 2) serve as the interface with major stakeholders (home owners, environmental preservationists, public safety experts, wildlife biologists, public health experts, sport hunting groups, animal rights groups, etc.) in the continued refinement and implementation of the plan; and 3) articulate program goals and the ongoing management approach to the varied community groups.

J. RECOMMENDATIONS

There are no specific recommendations at this time. However, EQAC plans, after further investigation, to submit a separate resolution with regard to comment 1) above.

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Emily Yance-Houser, Fairfax County Police Department.

Susan Alger, Virginia Department of Game and Inland Fisheries.

Matt Knox, Deer Biologist, Virginia Department of Game and Inland Fisheries.

LIST OF REFERENCES

NOTE: Most of the references listed below contain extensive bibliographies. The two symposia of 1997 contain between them 83 papers, each with its own separate bibliography, which, in the aggregate, offer hundreds of additional references for those wishing more detailed information on a variety of specific topics.

Animal Services Division, Fairfax County Police Department. Fairfax County Deer Management Report to the Board of Supervisors, September, 2001.

Caughly, G. 1981. Overpopulation. In: Jewell, P. A. & Holt, S. (Eds.). Problems in management of locally abundant wild mammals. pp. 7-20. Academic Press, New York.

Cypher, B. L. & Cypher, E. A. 1988. Ecology and management of white-tailed deer in northeastern coastal habitats. Biological Report 88 (15) U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC 20240.

DeCalesta, D. S. 1998. Effective diversity carrying capacity: An expanded concept for deer management. U.S. Forest Service Report, U. S. Department of Agriculture (Northeastern Forest Experiment Station, P.O. Box 928, Warren, PA).

Ellingwood, M. R. & Spignesi, E. 1986. Management of an urban deer herd and the concept of cultural carrying capacity. Transactions of the Northeast Deer Technical Committee 22: 42-45.

Flyger, V., Leedy, L. & Franklin, T. M. 1983. Wildlife damage control in eastern cities and suburbs. Proceedings of the Eastern Wildlife Damage Control Conference, 1: 27-32.

McShea, W. J., Underwood, H. B. & Rappole, J. H. (Eds.) 1997. The science of overabundance: Deer ecology and population management. Smithsonian Institution Press, Washington and London. [400+ pages, 23 peer-reviewed papers presented at a symposium organized by the Smithsonian Institution Conservation and Research Center, available in the book section of the National Museum of Natural History gift shop.]

Natural Resource Consultants, Inc. Fort Hill, PA. December, 1997. Deer Management Recommendations for Fairfax County, Virginia.

Warren, R. J. (Ed.) 1997. Deer Overabundance. Wildlife Society Bulletin 25 (2) (Special Edition) pp. 213-577. [60 peer-reviewed papers presented at a special symposium organized by the Wildlife Society. Available from the Wildlife Society, Washington, D.C.]

VIII-2. IMPACTS OF GEESE IN FAIRFAX COUNTY

A. OVERVIEW

Canada geese, once almost exclusively migratory, have to an increasing extent become year-round residents in Fairfax County. Although these resident populations are not evenly distributed throughout the county, many of our ponds and lakes, both large and small, and their adjacent shore areas have been occupied as permanent habitat. Geese have also become an increasing problem on parkland, golf courses and similar facilities. The problem is not so much the animals *per se* but rather the fecal contamination they bring to our water bodies and watercourses and their fouling of grassy open areas. Geese wastes are a well-documented source of fecal coliform bacterial contamination, which has reached alarming levels in many ponds, lakes and reservoirs, even those forming part of our domestic water supply. An additional problem is the damage resident geese cause to our marshes, where they feed on sprouting plants so voraciously that some once plentiful botanical species have all but disappeared. Addressing these problems inevitably requires reducing the goose population, but this is complicated, because geese are protected by federal migratory waterfowl laws.

B. BACKGROUND

1. Origins of the Goose Problem in Fairfax County

In earlier times, the Canada goose was a strictly migratory bird with its nesting range in wilderness areas of Canada and its winter range well to the south of our area. Geese passed through our area twice a year on their migrations. By the late 1960s, some Canada geese had begun to establish resident populations in this region. This is thought to have begun with birds that were propagated to stock local hunting preserves. Since that time, local Canada goose populations have undergone a dramatic upsurgence. This increase now includes numerous populations of geese that have become permanent residents in the mid-Atlantic region rather than migrating. These permanent populations have become quite obvious in many parts of Fairfax County. Wildlife biologists estimate that the Canada goose population is increasing at about 15 percent annually, which indicates that problems associated with resident goose populations soon will increase to critical levels unless remedial actions are undertaken.

2. Environmental Impact of Geese

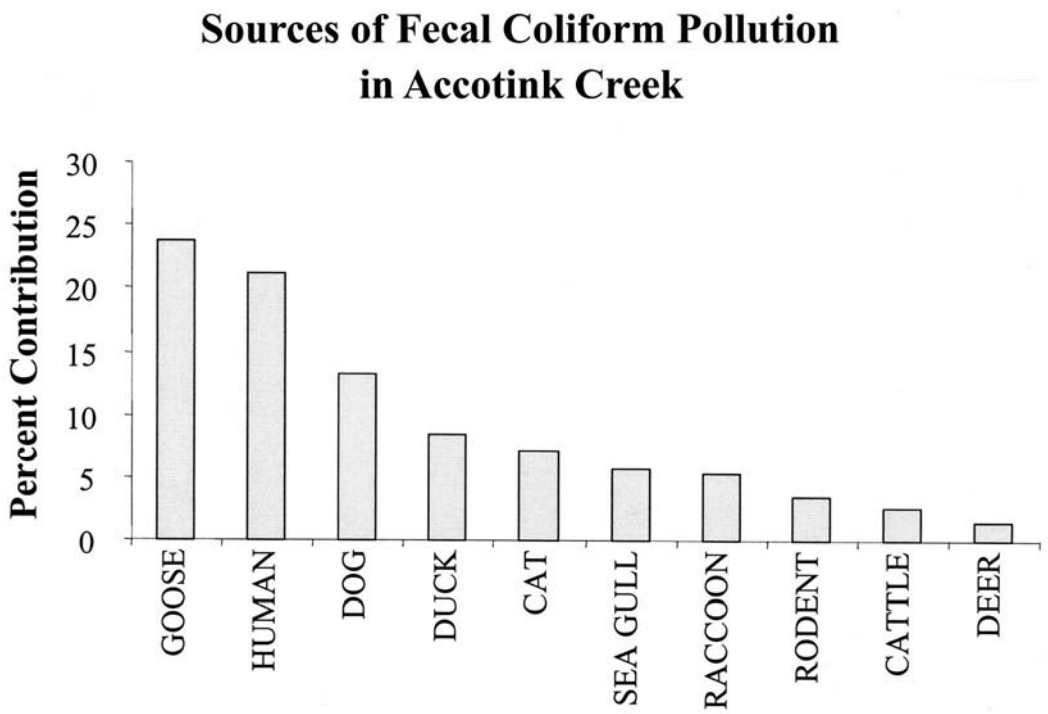
A primary impact of geese is environmental pollution, particularly pollution of streams, ponds and lakes with fecal coliform bacteria from their wastes. The magnitude of the problem is illustrated in two examples below.

Several years ago, when the Evans Farm property in McLean was in the process of being rezoned for residential development, the farm pond, which was a prominent feature of the site, was extensively sampled to determine if it contained significant levels of pollution. It was known that a resident population of Canada geese was a major contributor to any pollution of the pond. Depending on where the water samples were taken in the pond, the levels of fecal coliform bacteria were found to be from 21 to 27 times those allowable in surface waters in the Commonwealth of Virginia. Drainage from this pond passed through an under-the-road culvert to a much larger pond on the other side of the highway that had two families of resident geese. This pond had fecal coliform counts about three times the allowable level.

More recently, an environmental pollution study was conducted to determine the total maximum daily load of fecal coliform contamination that should be permitted in a portion of Accotink Creek that feeds Lake Accotink. Federal Environmental Protection Agency standards indicated that 98 percent of current levels of pollution should be eliminated, a truly draconian expectation. DNA tests to determine the sources of the extant fecal coliform bacteria pollution revealed that anseriform waterfowl (i.e., geese and ducks) accounted for 32 percent and other wildlife for about 17 percent of the total (see Figure VIII-2-1). With waterfowl being federally protected species and other wildlife largely beyond our control, half of the current pollution load is effectively beyond the power of the county to eliminate in the near term.

Another major impact of resident geese is significant alteration of the ecology of our marshlands. While migratory geese visited marshes on their twice-yearly trips through our region, the stopovers were brief and were timed so that plants had either not yet sprouted or had matured sufficiently that they were not destroyed by feeding activity. However, populations of resident geese are permanent voracious foragers that feed on newly sprouting plants to the point that some plant species are nearly eliminated from the habitat. This is particularly true of plants such as wild rice, which reseed themselves annually and provide food to many animal species. When all of the sprouting plants are consumed before they can mature and produce seeds, there will be no new plants the following year. For example, where wild rice was once an abundant species, many of our marshes are now nearly devoid of it. Thus, because of the ways in which geese change the ecology of marshes they have caused loss not only of key plant species but also of the animal species that are dependent on those plants.

Figure VIII-2-1



C. ISSUES IN ADDRESSING THE PROBLEM

1. Goose Population Biology

Canada geese are large birds weighing 20-25 pounds, with a life expectancy of some 20 years. Geese mate for life and remain together as pairs year-round. If one of the pair dies or is killed, the other will find a new mate. Mating season is from early February through early April, with nesting season from late March through mid May. Geese begin to nest at three years of age. Eggs are laid approximately one per day until there is an average of five eggs per nest. Incubation (sitting the eggs) does not begin until all eggs have been laid. Eggs not being incubated are cool to the touch. Incubation time is 28-30 days. Normally, all eggs hatch on the same day. Maturation of goslings occurs from early May to early July.

Geese prefer isolated sites near water to nest, with small islands being a favored location. Nests usually are built on the ground in the open, but occasionally are located in brushy or marshy areas if flooding is not a problem. If chased from their accustomed area or if the nesting area has too many pairs, they will find alternative sites, sometimes farther away

from water, sometimes near other ponds in the vicinity, and occasionally on rooftops or other unlikely locations.

Migration is a learned process with which resident geese have not become familiar. Geese return to the general area of their birth to nest, sometimes to the exact site and at least to a nearby pond or lake. Migratory geese nest in Canada while geese nesting in our area are resident geese that were born here. Whereas migratory geese have a flight range of 2,000-3,000 miles, resident geese rarely venture more than 100-200 miles and then only in search of food, water, or safety. Migratory geese do not become resident unless they are injured and can no longer fly for long distances.

Molting season runs from early June to late July. Flight feathers are lost in June and the birds are unable to fly for several weeks, but by early August new flight feathers are fully developed and all birds (except for those injured) are able to fly again. During the molting period, geese need to be near water so they can escape from predators by swimming. They also need an easily accessible food supply during this time.

Natural predators of geese include foxes, raccoons, large owls, snapping turtles and, more recently, coyotes.

2. Considerations of Public Opinion

Many residents find considerable aesthetic reward in having a few geese in areas where they can be observed and feel that the presence of such attractive wildlife creates a pleasant ambience. While this may be true, many others find the fouling of yards, open space and water bodies to be unacceptable, especially where geese congregate in appreciable numbers. Moreover, most of the public is unaware, or at best only dimly aware, of the extent to which geese are major polluters of our ponds, lakes and reservoirs, including some of our water supply sources. As the general public becomes better informed about the pollution aspects of goose populations, greater consensus on remedial approaches should result.

3. Federal Limitations on Remedial Action

Geese, as migratory waterfowl, are protected by federal laws administered by the U.S. Fish and Wildlife Service. Therefore, population reduction by lethal measures applied to adult or juvenile geese is generally not an option. The Fairfax County Park Authority has its own egg addling permit applicable to its parklands. In situations where adult birds are creating an extreme nuisance, the Department of Agriculture Wildlife Service can send staff to round up and relocate them. However, the Fish and Wildlife Service does issue permits for egg addling (including egg oiling) programs as a means of population stabilization. Fairfax County holds such a permit for programs anywhere in the county under supervision and/or monitoring by the County Wildlife Biologist. Use of trained

Border Collies to harass geese into leaving an area is not regulated so long as they do not directly attack or kill the geese.

D. METHODS FOR POPULATION MANAGEMENT

Population management methods that utilize immediate population reduction are not an option due to stringent federal regulations against killing geese once they are hatched. However, the methods outlined below are permissible and accepted approaches to controlling goose populations. Population stabilization coupled with measures that discourage geese from future nesting in an area has proved effective in longer term reductions of population.

1. Population Stabilization

Egg addling and egg oiling are quite effective in preventing eggs from hatching. Strictly speaking, egg addling is vigorous shaking of the egg at a fairly early stage in order to homogenize the contents. This will prevent further development of the egg. Egg oiling coats the surface of the shell with a vegetable oil such as corn oil, which will prevent oxygen from getting to the interior of the egg. This also is effective in halting further development of the egg. Sometimes both methods are referred to as "egg addling." When a clutch of eggs is thus treated, the goose will continue to attempt to incubate them for the normal period, but they will fail to hatch, thus limiting the population to the adult geese already present.

2. Population Exclusion

Most nuisance abatement measures are based on population exclusion. For example, trained Border Collies have been successfully employed to herd geese away from areas where they constitute a nuisance. The geese soon learn to avoid areas patrolled by the dogs, regarding them as unsafe, and they move to other areas where they do not feel threatened. This method of control has been particularly effective in large, relatively open areas such as golf courses. The major negative aspect of this method is the impact on adjacent properties. When the dogs herd the geese off of one property, they necessarily go to the one next door or in the near vicinity. Thus, while one locale is benefited, adjacent locales are afflicted through transference of the problem.

3. Special Foraging Areas

In some cases, an area can be set aside where a small population of geese can be resident without creating an undue nuisance. However, in such cases the aesthetic appeal of having the geese nearby must be balanced by adequate consideration of the water pollution and other waste problems created.

4. Landscaping Modifications

Altering landscaping can sometimes be an effective tool in discouraging geese from congregating near ponds. Bushy plantings, reeds and tall grasses, strategically placed around a pond, will be perceived by geese as a hiding place for predators, thus discouraging them from using that area.

5. Repellents

There are commercially available, nontoxic chemical repellents that discourage geese from eating grass. The disadvantage to this approach is the necessity for frequent reapplications, since each time the grass is mowed most of the repellent is removed along with the clippings.

6. Prohibition of Feeding

Feeding geese encourages them to become resident and to congregate in areas where a "free lunch" is provided. This exacerbates the very nuisance that one is attempting reduce. Also, feeding bread and various kitchen scraps is harmful to the geese's health even though they will avidly feed on such items.

7. Combined Approaches

Clearly, combinations of several of the above approaches can be far more effective than their use individually. For example, the use of trained Border Collies together with landscaping modifications can be quite effective in creating an "undesirable" habitat. If egg oiling is added to this for the few nests that may be established, significant reductions in usage of this area in following years can be achieved.

E. PUBLIC EDUCATION PROGRAM NEEDS

Public awareness of both the pollution problems caused by geese and of the mating and nesting cycle of geese is the key to being able to effectively address the "goose problem." At present, insufficient attention has been given by the public media to the pollution aspects of the problem. Since this pollution creates significant public health risks, the problem needs coverage on the county Web site and through informative bulletins to local homeowners associations.

F. PUBLIC AGENCY RESPONSIBILITY

The office of the County Wildlife Biologist within the Animal Services Division of the Fairfax County Police Department has been assigned primary responsibility for management of geese by the Board of Supervisors. However, due to the fact that Canada geese are federally protected waterfowl, the U.S. Fish and Wildlife Service exercises significant regulatory and permitting functions that govern Fairfax County's geese management activities. Fairfax County was the first local jurisdiction in the nation to be granted a master permit for egg addling programs and is thereby authorized to train residents, as individuals or groups, to conduct egg addling under its monitoring and control. Except for federally issued hunting permits, intentional killing of hatched geese by humans is prohibited by federal law. In cases where it is necessary for adult geese or hatchlings to be removed from an area, this activity is conducted by the staff of the U.S. Department of Agriculture - Wildlife Services under permit from the U.S. Fish and Wildlife Service.

The population stabilization (egg oiling) program is highly cost effective since, once trained, all labor intensive activities are performed by local citizen volunteers. The only staff activities required are training, monitoring and reporting under the terms of the federal permit.

G. PROGRAM IMPLEMENTATION ACTIVITIES

Goose management programs have been implemented at a number of locations in Fairfax County. Among the locations and the measures implemented under the Fairfax County permit and monitoring are:

1. Annandale
   a. Northern Virginia Community College - population stabilization and nuisance abatement, seven years
   b. Pinecrest Community - population stabilization and nuisance abatement, six years
   c. Pinecrest Golf Course - population stabilization and nuisance abatement, six years

2. Centreville
   a. Franklin Farms - population stabilization, seven years
   b. Westfields - population stabilization, six years

3. Fairfax County
   a. Lake Barcroft - population stabilization and nuisance abatement, eight years
   b. Fairfax County Parks - population stabilization, eight years
   c. Copeland Pond - population stabilization and nuisance abatement, seven years

d. Brook Hills - population stabilization and nuisance abatement, seven years
e. Waters Edge - population stabilization and nuisance abatement, six years

4. Oakton
   a. Fox Lake - population stabilization, six years

5. Reston
   a. Reston Community - population stabilization, seven years

6. Vienna
   a. Trinity School - population stabilization, seven years
   b. Champion Lake - population stabilization, six years

All of these programs have demonstrated reasonable degrees of success in stabilizing populations. In some cases, populations have actually declined over time due to efforts to discourage geese from further attempts to nest there.

In 2002, there were 275 eggs addled under the county permit and approximately 1,200 under the separate Fairfax County Park Authority permit. In 2003, there were 255 eggs addled at 61 nest sites under the county permit and 674 eggs at 123 nest sites under the FCPA permit. In 2004, due to staffing limitations, there were ten eggs from two nests addled under the county permit and 1,403 eggs from 243 nests under the Park Authority Permit. In 2005 there were 1,403 eggs addled from 243 nests under the FCPA, but none under the county permit, again due to staff limitations. In 2006 the FCPA program addled 509 eggs in 109 nests and the county program addled 299 eggs.

H. CONCLUSIONS

While geese in small numbers are regarded by many as a pleasant addition to the local ambience, large resident goose populations in many areas of the county constitute a major environmental nuisance and public health risk. Resident goose populations tend to congregate near ponds, lakes and slow-flowing streams, which leads to contamination of these water bodies with high levels of fecal coliform bacteria. In addition, they foul the grassy open areas in the vicinity with their feces. The high growth rate of the resident goose population and the limitations on methods of control have raised pollution to levels that are not only environmentally unacceptable but that now constitute a significant public health concern.

While the programs currently in place to address these problems are good, they need to be replicated much more widely in additional areas of the county. Moreover, more intensive public information campaigns and community outreach efforts are badly needed to actively involve a larger number of individuals and community organizations in population control programs. The office of the County Wildlife Biologist is not adequately staffed to conduct and/or supervise these critical functions. This staffing limitation is very unfortunate, since

geese are a major contributor to pollution of the streams and water bodies that are sources of drinking water and are used for recreational purposes and the county is facing increased restrictions in the Total Maximum Daily Load of pollutants that may be present in our surface waters.

I. RECOMMENDATION

The recommendation provided below address only the second section of this chapter (geese management issues). Comments addressing deer management and wildlife borne disease issues are found beginning on pages 229 and 251, respectively.

1. EQAC strongly recommends additional staffing for this program in the form of one full-time equivalent Assistant Wildlife Biologist to undertake:

   - Revitalization and supervision of the program on county sites.

   - Replication of the existing program in additional areas of the county by training additional residents and homeowner groups in goose population stabilization methodology.

   - Enhanced public education outreach to sensitize all Fairfax County residents and owners of nonresidential properties to the pollution problems caused by geese and the programs available for addressing them.

   - Assess the role excessive goose populations play in destruction of our marshland and wetland habitats.

   - Coordination with the Department of Health in monitoring pollution of the county's ponds, lakes, streams and grassland habitats.

ACKNOWLEDGMENTS

EQAC gratefully acknowledges the following individuals who have provided data and information included in this report:

Earl Hodnett, Wildlife Biologist, Animal Services Division, Fairfax County Police Department.

Charles Smith, Resources Management Division, Fairfax County Park Authority.

VIII-3. COYOTES IN FAIRFAX COUNTY

A. OVERVIEW

There have recently been a growing number of reports of coyotes in the Washington metropolitan area, particularly in the western portions. They have begun to invade habitats such as Rock Creek Park, and there have been sightings in Falls Church. Contrary to some public perceptions of coyotes as vicious predators without redeeming features, there are distinct pulses as well as minuses to having them around.

B. BACKGROUND

Biologically, the coyote, *Canis latrans*, is another member of the dog and wolf family. The historical range of the coyote was from the western foothills of the Rocky Mountains to the Mississippi River. In the 1880s they began to spread west and today are endemic to the Pacific shores. In the early 1900s they began to spread eastward and during the last 15 years or so have become established in the mid-Atlantic region. They adapt quite readily to urban and suburban environments as long as there are small semi-secluded habitats from which they can venture forth to hunt and forage. Once they enter an area that meets their habitat requirements they rapidly become endemic and are not easily dislodged.

Coyotes most often hunt and forage as solitary individuals or sometimes as pairs, rarely as packs of several adult animals together. An exception occurs in the case of a female with young pups who are being taught to forage or are led on treks to obtain food from human sources such as improperly stored trash and garbage.

The usual food of coyotes is rodents and other small varmints. Adult coyotes will sometimes prey on small deer fawns but do not attack adult deer because of their size. Occasionally coyotes will opportunistically attack small domestic pets, but this most often occurs when they are foraging for improperly stored garbage and outdoor pet feed dishes around human habitations.

C. ADDRESSING THE PROBLEM

The only action required at this time is monitoring the spread of the coyote population and any adverse incidents that may occur.

D. PUBLIC EDUCATION PROGRAM NEEDS

The public should be kept informed about when and where to expect to see coyotes. While coyotes will sometimes prey on small pets, e.g., cats and small dogs and the public needs to be kept informed on measures to prevent this, the public also needs to develop awareness of the beneficial aspects of coyotes in controlling populations of small rodents and excessive numbers of small deer fawns. Coyotes can also play a beneficial role in controlling populations of Canada geese.

E. PUBLIC AGENCY RESPONSIBILITY

The County Wildlife Biologist has the primary responsibility for monitoring the coyote population and addressing public education needs. The Animal Control Division of the Fairfax County Police Department is responsible for impounding animals that are behaving strangely and may be infected with rabies. The Health Department monitors cases where humans have been bitten or scratched.

F. PROGRAM IMPLEMENTATION ACTIVITIES

No program activities are envisioned at this time except for monitoring and public education activities by the County Wildlife Biologist.

G. CONCLUSIONS

Coyotes have become established in parts of Fairfax County and will spread and become endemic over time. The public needs to develop an understanding of the occasional risks to small pets but also needs to be educated about the beneficial control of a variety of rodents and other varmints that coyotes provide. They may be of particular benefit in controlling the goose population since they are a natural predator not subject to the restrictions of the Federal Migratory Waterfowl Act.

H. COMMENT

There are no recommendations at this time except that the County Wildlife Biologist should monitor the situation and keep the relevant county agencies and the public informed.

VIII-4. WILDLIFE BORNE DISEASES OF CONCERN IN FAIRFAX COUNTY

A. OVERVIEW

There are a number of zoonotic diseases (those in which wildlife serves as a reservoir) that affect humans. Four such diseases of greatest concern in Fairfax County are West Nile Virus, Lyme Disease, Rabies and the complex of diseases caused by fecal coliform bacteria. The causative agents, modes of transmission and means of prevention are briefly discussed below. A new initiative, the Disease Carrying Insects Program, has been undertaken by the Fairfax County Health Department. The reader is referred to their report on West Nile Virus and the Pilot Tick Surveillance Program for additional details in these areas.

B. BACKGROUND

1. West Nile Virus

West Nile Virus is transmitted to humans and other warm-blooded animals by mosquitoes that have fed on birds infected with the virus. Crows have been particularly implicated as a reservoir species, but it is known that many other bird species are also involved. Mosquitoes are intermediate carriers that convey the virus from birds to humans. There have also been several cases in Fairfax County of horses being infected. The principal intermediate carrier is *Culex pipiens*, the common house mosquito. There is currently no evidence for person-to-person transmission (except in the unusual situation of organ transplants or blood transfusions from infected donors). Some people infected with West Nile Virus apparently experience few, if any, symptoms. Others have mild flu-like symptoms such as low-grade fever, head and body aches, skin rash or swollen lymph nodes. In a few cases such as the elderly, children and those with weakened immune systems, the infection may cause encephalitis (inflammation of the brain), meningitis (inflammation of the brain covering) or, occasionally, death. Encephalitis and meningitis symptoms include rapid onset of high fever, severe headache, stiff neck, muscle weakness and coma. The virus is of recent occurrence in this country, having been first identified in New York in 1999. However, it has now spread to every state in the lower 48. The Centers for Disease Control and Prevention of the U.S. Public Health Service predicts that the west coast will be particularly hard hit next year because the disease has recently appeared there, and the usual pattern is an eruption of cases the year or two following first appearance. By the end of 2002, CDC had confirmed 161 cases, including 18 deaths, since 1999. For the year 2003, these figures had jumped to 4,156 reported cases and 284 deaths. This major outbreaks in early 2003 resulted in 2,000 cases in Colorado, 1,000 in Nebraska and 800 in South Dakota. The CDC figures on reported cases show a rapidly increasing

incidence. There is almost certainly major underreporting of incidence, since most of those infected apparently have mild symptoms that do not require a visit to the doctor, and even for those actually infected and seeing a physician, the symptoms may be insufficient to trigger a report without confirmation by serologic tests.

a. Preventive Measures

i. Mosquito Habitat Elimination

An important preventive measure to reduce the chance of infection with West Nile Virus is to eliminate, wherever possible, standing water that provides a breeding habitat for mosquitoes. Any containers such as cans, pails, wheelbarrows, etc., should be emptied and stored in such fashion that water will not collect in them. Bird baths and similar containers should have the water changed every two or three days. Ponds can be stocked with the small fish *Gambusia* that feed on mosquito larvae. There are two species: *Gambusia affinis* and *G. holbrooki*. Both are highly effective in keeping ponds and lakes free of mosquito larvae. *Gambusia affinis*, the most common species, has become endemic in many areas of Eastern Virginia and can be readily transplanted from one pond to another.

ii. Insect Repellents

Since it is nearly impossible to completely eliminate the presence of mosquitoes, some of the most effective preventive measures available for mosquito-borne infections such as West Nile Virus and tick-borne Lyme disease are sprays or lotions containing DEET (N,N-diethyl-meta-toluamide). The active ingredient, DEET, was developed by the U.S. Department of Agriculture in 1946, originally for use by the military. The most convenient method of application to the exposed skin is as an aerosol spray. A recent study reported in the *New England Journal of Medicine* showed that the higher the concentration of DEET in the spray, the longer lasting the protection. In the case of mosquitoes, products containing 20 percent DEET were effective for four hours, those with 25 percent DEET were effective for five hours, and those with 35 percent DEET were effective overnight. It is estimated that there have been more than eight billion applications of DEET over the past 50 years with an excellent safety record. However, a study of DEET by pharmacologists at Duke University, reported in the November 2001 issue of the *Journal of Experimental Neurology*, indicated that frequent and prolonged DEET exposure might cause adverse neurological effects. It was recommended that use be limited to preparations containing no more than 30 percent DEET for adults and lower concentrations for children.

2. Lyme Disease

Lyme Disease, caused by the bacterial spirochete *Borrelia burgdorferi*, is transmitted to humans primarily, if not exclusively, by *Ixodes scapularis,* the common deer tick. Deer ticks are dark brown to black and about the size and shape of a sesame seed. The white-tailed deer appears to be the primary reservoir, but rodents have also been implicated. Lyme Disease was first identified in Lyme, Connecticut, in the mid-1970s when a group of children developed arthritis-like symptoms. Within a few days to several weeks of receiving an infected tick bite, most victims will have a red, slowly expanding "bull's-eye" rash (red in the center, pink at the periphery) and such symptoms as malaise, fever, headache and muscle and joint aches. The longer a case of Lyme Disease persists without treatment, the more severe, debilitating and long lasting the symptoms are likely to be, such as arthritis and neurologic abnormalities. Many of the physicians treating Lyme Disease have found three or four week courses of doxycycline or amoxicillin to be effective treatments for early stages of the disease, but later stages may require intravenous antibiotics for a month or more.

Confirmed cases of Lyme Disease underwent a sharp increase through June, 1997 (Table VIII-4-1). The decrease of the next two years may be attributable to greater public awareness of the threat represented by deer ticks and greater use of proper preventive measures when hiking and working in wooded areas. It is unclear, however, whether a decrease in deer population will lead to a corresponding decrease in Lyme Disease cases, since other animals can act as reservoir species and may inhabit areas within which deer populations decline. However, it is interesting to note that neighboring, semi-rural Loudoun County, which has a large deer population, has the highest per capita incidence of Lyme Disease cases reported in the commonwealth. In 2001, there were 65 cases compared with 29 cases in 1999, according to the Loudoun County Health Department. This suggests a strong upward trend in incidence where there are large populations of white-tailed deer.

a. Preventive Measures

i. Vaccine

In our Annual Report for 1999, we noted that a new vaccine (Lymrix) for the prevention of Lyme Disease had just been released. In our Annual Report for 2000, we noted that there had been adverse reactions to the vaccine and advised consultation with your personal physician about the advisability of being vaccinated. As a result of an increasing number of adverse reactions, this vaccine was subsequently withdrawn from the market. While it is true that vaccination of those persons intensively exposed to deer ticks might have been helpful, for the vast majority of the population, consistent use of ordinary preventive measures should be entirely adequate. When engaged in activities that might result in exposure to deer ticks, proper clothing is a must, preferably long pants tucked into

boot tops or spraying the lower legs, trouser bottoms and sock tops with insect repellent, since most ticks are encountered close to the ground.

Table VIII-4-1
Reported Lyme Disease Cases Meeting Centers for Disease Control (CDC) Case Definition Program

Fairfax County

Period Covered	Reported Cases	Contracted outside of Fairfax County
July 1994-June 1995	14	Not Available
July 1995-June 1996	22	Not Available
July 1996-June 1997	31	Not Available
July 1997-June 1998	16	8
July 1998-June1999	13	9
July 1999-June 2000	50	8
July 2000-June 2001	51	9
July 2001-June 2002	61	33
July 2002-June 2003	87	Not Available
July 2003-June 2004	109	Not Available
****	***	****
January-December 2006	102	Not Available
January-October 2007	158	Not Available

**** The reporting period and methodology changed during this time.
(Source: Fairfax County Department of Health)

ii. Insect repellent

The same DEET-containing repellents recommended for mosquitoes (see West Nile Virus above) are also highly effective for ticks. See the discussion of DEET-containing insect repellents in the West Nile Virus section above.

3. Rabies

Rabies is a viral disease that affects the nervous system and may have a post-infection latent period from a number of days to several weeks. During the latent period, between the time of an animal bite and the onset of overt symptoms, the virus is propagated along the nerve fiber sheaths until it reaches critical areas of the brain. While rabies has been present in this area for many years, it exists at a low level with the incidence appearing to cycle over a period of several years. This is attributed to the fact that infection, when it reaches the symptomatic stage, is uniformly fatal. Thus, an infected animal may infect several others and there will appear to be a relatively high incidence, but when those animals die there are fewer carriers for a period of time during which the incidence appears to be lower. We are currently experiencing a periodic upturn in the rabies cycle, particularly among foxes and raccoons. Rabies is transmitted to humans and other mammals through the saliva of an infected animal almost always in the overtly symptomatic stage, which usually only lasts about ten days. During this time, an infected animal usually exhibits aberrant behavior, such as a nocturnal animal being around during the day, exhibiting signs of confusion, showing an unsteady gait, desperately seeking water but unable to drink, often aggressively approaching dogs and humans, etc. The main wildlife reservoirs in this area (and the number of cases in 2002) are raccoons (52), foxes (9), skunks (9) and, to a lesser extent, some bats. Cases from July 1, 2004, to June 30, 2005, were raccoons (29), foxes (13), skunks (5), bats (6) and groundhogs (1). Domestic animals, e.g., dogs and occasionally cats, may act as secondary transmitters of the disease after having contracted it from a wildlife source. The incidence of rabies in animals fluctuates; for example, Fairfax County had 80 cases in 2002, 47 cases in 2003 and has had 52 cases by the end of July in 2004 and 54 cases by the end June in 2005. In CY 2004 612 animals were tested with 69 testing positive, and through October 2005 35 of the 480 animals tested were positive.

a. Preventive measures

The most important measure for prevention of rabies is to avoid being bitten by or direct contact with an animal that might be infected. If you encounter an animal that is behaving strangely or exhibiting symptoms such as excessive drooling, contact Fairfax County Animal Services Division at **703-830-3310** without delay. This also applies if you find a dead animal that you suspect may have died of rabies. Animal Services will send a professionally trained officer to impound the animal (or carcass) for quarantine and testing. If you are bitten or scratched or come in contact with the animal's saliva, seek immediate medical attention so a determination can be made as to whether you

may require a course of preventive inoculations. The protective serum used for such inoculations has been substantially improved in recent years so that fewer doses are required, and those have fewer unpleasant side effects.

4. Fecal Coliform Bacterial Diseases

Fecal coliform bacterial diseases in humans are caused primarily through ingesting or wading or swimming in contaminated water. There are a number of bacteria that can be responsible, but the thing they share in common is being present in the gut and intestinal wastes of a variety of wildlife and domestic animals. The relatively new science of molecular genetic DNA testing has made it possible to reliably identify the particular animals responsible for the pollution of a given water sample. Studies carried out at several sites in Fairfax County indicate that Canada geese living in and about ponds and streams are principal contributors, while ducks, deer, raccoons, foxes and domestic dogs and cats are also significant sources (see Figure VIII-2-1 on page 235). When the wastes from these animal sources are deposited directly into, or washed into, streams and ponds, the pollution can build up to hazardous levels. For example, one pond in the McLean area, inhabited by Canada geese that had become resident, was extensively tested several years ago and was found to have levels of fecal coliform bacterial contamination that ranged from 21 to 27 times the level allowable in surface waters in the Commonwealth of Virginia. Another occasional source of such contamination is from leaks, overflows, or ruptures in the public sanitary sewer system or private septic systems. While illness from such bacteria is usually not life threatening and is readily treated with antibiotics, exposure to waters that one has reason to believe may be polluted should be scrupulously avoided.

Several years ago, budgetary limitations led to consideration of eliminating the county's Stream Monitoring Program. EQAC intervened in the discussion, pointing out that this monitoring was environmentally critical and not duplicated in any other county programs. As a result, the Board of Supervisors directed that the program be continued. Recently, an agreement has been reached in which the Stream Monitoring Program for bacterial contamination is being reorganized. The collection of samples will now be handled by staff of the Department of Public Works and Environmental Services responsible for the watershed management program, since they are in the field on a regular basis and it is efficient for them to perform this function. Analysis of the samples will continue to be performed by the Department of Health laboratories. It is felt that this arrangement will provide for better and more efficient monitoring of the health and safety of our streams, lakes and ponds.

a. Preventive measures

There is a general solution to this problem in which pollution of our surface waters is prevented in the first place. The main individual solution to the problem is to avoid disease caused by fecal coliform bacteria by not drinking water from sources whose

pollution status is unknown and by not wading or swimming in water that is known to be, or suspected of being, polluted.

C. PUBLIC EDUCATION PROGRAM NEEDS

The Fairfax County Department of Health has available an excellent booklet entitled *Preventing Tick-borne Diseases in Virginia*. They also have a brochure entitled *Rabies and Animal Bites: What you should know and what you should do*. Additional information is available through the Health Department section of the county Web site http://fairfaxcounty.gov/living/healthhuman/health.htm#environmental

With the recent nearly epidemic explosion of West Nile Virus, there is near certainty of it becoming endemic in our area for the long term. Public education materials, comparable to those noted above, are available from our own county Health Department, especially at http://www.fairfaxcounty.gov/fightthebite. In addition, the Centers for Disease Control and Prevention of the U.S. Public Health Service has some recently-developed materials that are quite good. A new initiative, the Disease Carrying Insects Program, has been undertaken by the Fairfax County Health Department. The reader is referred to their report on West Nile Virus and the Pilot Tick Surveillance Program for additional details in these areas.

Because of the frequently changing levels of pollution in our surface waters, it is not practical to create printed materials identifying those streams and ponds that are affected by fecal coliform bacterial pollution. However, our excellent county Web site is an ideal way for the public to receive frequent updates on results of the Stream Monitoring Program and notices about waters that should be avoided due to pollution.

The public media generally do a fairly good job of reporting the finding of rabid animals. Such incidents could also be posted on the county Web site as advisories.

D. PUBLIC AGENCY RESPONSIBILITIES

The primary public agency responsibilities lie in the following areas:

1. Public education
2. Monitoring of disease incidence
3. Monitoring of pollution and exposure hazards
4. Providing animal control services
5. Providing mosquito abatement, where needed.

The Animal Services Division of the Fairfax County Police Department is responsible for animal control activities, such as impounding animals suspected of being rabid and similar wildlife-related activities. The Stormwater Planning Division of the Department of Public Works and Environmental Services will have responsibility for collection of water samples from streams, lakes and ponds. The Health Department has responsibility for most prevention and public education activities, water sample testing and various monitoring and information gathering programs.

E. CONCLUSIONS

The upsurgence of West Nile Virus and Lyme Disease require continual monitoring and public education and are rapidly becoming serious public health issues. Rabies is a continuing low level, more or less steady-state, problem. Waters polluted by excessive levels of fecal coliform bacteria require mitigation, where possible, and monitoring and posting to warn the public against exposure. Malaria, of which a very few scattered cases have been reported, will require careful monitoring and epidemiologic tracking as well as mosquito abatement.

F. COMMENTS

The comments provided below address only the fourth section of this chapter (Wildlife Borne Diseases of Concern in Fairfax County). Comments and recommendations addressing deer management and geese issues are found beginning on pages 229 and 241, respectively.

1. EQAC commends the Board of Supervisors for providing continued active support to the following ongoing programs:

    - The Stream Monitoring Program in which the Stream Protection Strategies Program of the DPWES performs sample collection and field testing and the Health Department performs laboratory testing and analysis functions.

    - Enhanced public education programs and initiatives in key areas, such as control of rabies and of wildlife contributing to pollution of surface waters, epidemiology and abatement of insect borne diseases such as West Nile Virus and Lyme Disease.

    - EQAC commends the Health Department for its excellent public education programs and advocates posting of advisories on the county website when polluted waters are identified.

2. EQAC feels that the Board of Supervisors should monitor these programs by scheduling periodic reports to its Environment Committee by county staff.

ACKNOWLEDGMENTS

EQAC gratefully acknowledges the following individuals and organizations who have generously provided a variety of data and information included in this report and numerous helpful suggestions and recommendations:

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David Lawlor, former Assistant Wildlife Biologist, Animal Services Division, Fairfax County Police Department.

Harriet Calloway, R.N., Epidemiologist, Fairfax County Health Department.

Laura Suzuki, R.N., MPH, Fairfax County Health Department.

John Ruthinoski, Fairfax County Health Department.

Jorge Arias, PhD., Fairfax County Health Department.

LIST OF REFERENCES

Fairfax County Department of Health. Preventing Tick-borne Diseases in Virginia.

Fairfax County Department of Health. Rabies and Animal Bites: What you should know and what you should do.

Fairfax County Department of Health. West Nile Virus Control and Mosquito Management Program. Disease Carrying Insects Program.

WILDLIFE AND THE ENVIRONMENT IN FAIRFAX COUNTY: SUMMARY OF RECOMMENDATIONS

Impacts of Deer in Fairfax County

There are no specific recommendations at this time. However, EQAC plans, after further investigation, to submit a separate special resolution with regard to the problem outlined in Comment 1 of this section.

Impacts of Geese in Fairfax County

1. EQAC strongly recommends additional staffing for this program in the form of one full-time equivalent Assistant Wildlife Biologist to undertake:

   - Revitalization and supervision of the program on county sites.

   - Replication of the existing program in additional areas of the county by training additional residents and homeowner groups in goose population stabilization methodology.

   - Enhanced public education outreach to sensitize all Fairfax County residents and owners of nonresidential properties to the pollution problems caused by geese and the programs available for addressing them.

   - Assess the role excessive goose populations play in destruction of our marshland and wetland habitats.

Coyotes in Fairfax County

There are no recommendations at this time except to have the County Wildlife Biologist monitor the situation and keep the relevant county agencies and the public informed.

Wildlife Borne Diseases of Concern in Fairfax County

There are no recommendations at this time, although EQAC has provided comments in this section recommending active support to a number of ongoing programs and to the monitoring of these programs and reporting to the Board of Supervisors' Environmental Committee.

CHAPTER IX

NOISE, LIGHT POLLUTION AND VISUAL POLLUTION

IX-1. NOISE

A. OVERVIEW

Noise is often considered to be unwanted sound. Sound becomes undesirable when its intensity is such that it interferes with one's ability to hear something more desirable or when there is a desire to not hear anything at all (i.e., “silence is golden”).

Noise is a byproduct of our everyday lives. Residents hear various noises and determine if the noise intensity is such that their quality of life is impacted—it’s often “in the ears of the beholder.” Noise that is perceived as a detriment to our quality of life due to its intensity, timing, duration and/or its source is defined as noise pollution.

One key element of determining noise pollution is the measured intensity of noise and how it impacts society as a whole. Noise is a concern of our society, especially in urban areas. How it is regulated is based on scientific findings and not solely on human perception. Noise is measured by scientific instruments that receive the sound and determine its location and intensity as it radiates from the source. The resulting intensity levels and locations will allow for noise levels to be catalogued so noise can be regulated when society objects to noise pollution.

In a world of constant natural and manmade sounds, those that are perceived as “noise” vary among people in the community. The pivotal issue is the perceived impact or degree of annoyance from noise. To some, loud sounds coming from an airport are the sounds of the economy working and growing, while others feel that this noise deprives them of their privacy and quiet. People can be startled by unexpected noise and usually do not understand why the generation of such noise is necessary.

Recent studies suggest a growing intolerance among residents and communities for noise associated with airports, traffic, construction and athletic events, etc. The impacts of noise on a community include:

- Diminished privacy and quiet at home or at an outdoor recreation experience, vacation or rest site (private cabin at the lake, river or beach)
- Interrupted sleep
- Interrupted entertainment and conversation
- Interruptions at work or school
- Property damage such as broken windows.

In the next sections of this report some key noise pollution concerns will be addressed, followed by recommendations to alleviate their impacts.

B. AIRPORT NOISE

1. Operations and Associated Noise Impacts at Ronald Reagan Washington National Airport and Washington Dulles International Airport

Fairfax County is served by Ronald Reagan Washington National Airport and Washington Dulles International Airport. According to the Metropolitan Washington Airports Authority's Web site, in 2006, 41.5 million passengers traveled through Ronald Reagan Washington National Airport (National) and Washington Dulles International Airport (Dulles) on roughly 655,000 flights. The number of flight operations and passengers at Dulles Airport decreased considerably from 2005 due to the cessation of operations by Independence Air; however, passenger and flight operations figures from the end of 2006 were similar to those at the end of 2005 (when Independence Air was still operational), suggesting that the airport is returning to a steady state of growth. While the number of flight operations at National Airport in 2006 was similar to the number of operations in 2005, the airport set a record in terms of passenger service, with a four percent increase from 2005 and a 16 percent increase from 2004.

On a typical day, over 4,000 airplanes will fly in the skies over the Washington region. Most of these flights are to and from Ronald Reagan Washington National Airport, Washington Dulles International Airport, Baltimore-Washington International Airport or Andrews Air Force Base. Many additional flight operations also occur at the many general aviation airfields in the region. In addition, it is EQAC's perception that low-flying helicopter traffic has markedly increased over Fairfax County's residential neighborhoods in the last several years.

Both National and Dulles Airports are heavily used and are an important part of the region's overall economy. While the number of operations at Dulles Airport decreased in 2006, there was still an average of more than 54,000 total flights conducted per month at these airports in 2006. This activity is made up of commercial flights between the Washington area and 140 domestic and international destinations. At National, most flights are short to mid-range jet aircraft flights operated by major airlines. All types and sizes of aircraft operate at Dulles. The number of daily operations at Dulles Airport varies significantly (for example, daily flight operations ranged from less than 1,000 to more than 1,600 during the last three months of 2005), with weekday operations typically exceeding weekend day operations by several hundred flights. Most flights operate between 7:00 A.M and 10:00 P.M., with many flights in some hours and a relatively small number in other hours. Peaks are typically at 7 A.M., 12 P.M., 5 P.M. and 8 P.M., with low times at 10 A.M., 2 P.M., 6 P.M. and between 10 P.M. and 6A.M.

National has about half as many flights as Dulles, with more than 700 flights on a typical day. Weekday operations are typically greater than weekend day operations.

Most flights occur between 7 A.M. and 10 P.M., with a fairly consistent number of scheduled operations for each hour within this period. National is under the Federal Aviation Administration's High Density Rule, which limits, with some exceptions, the air carriers to 37 scheduled operations per hour and the commuter carriers to 13 scheduled operations per hour.

The Metropolitan Washington Airports Authority, which operates both National and Dulles Airports, has historically monitored aircraft and community noise around the clock at 32 locations in the Washington, D.C. Metropolitan Area. The monitoring equipment has evaluated different sound events and has separated those events likely to have been caused from aircraft from the remaining events, which have been attributed to the community. The Metropolitan Washington Council of Governments' Committee on Noise Abatement and Aviation at National and Dulles Airports and the Airports Authority selected the monitoring sites from recommendations offered by the local governments. Due to the age of the monitoring system, the system became unreliable during 2006, and MWAA discontinued publication of quarterly monitoring reports. MWAA will soon be implementing a new monitoring system, with improved monitoring equipment to replace the existing equipment at each of the 32 locations (with a new site to be identified in the Reston area due to problems with the previous site that were unrelated to the monitoring equipment). In addition, eight new monitoring stations will be established around Dulles Airport; four of the new stations will be sited in Loudoun County and four in Fairfax County. MWAA will work closely with Fairfax County on the identification of new monitoring sites.

Table IX-1-1 contains summary information regarding noise impacts based on noise measurements taken from selected noise monitoring stations north of National Airport. This information has been excerpted from data compiled by Citizens for the Abatement of Airport Noise and does not reflect original data from MWAA. The information provided by CAAN shows pronounced changes in the noise intensity pattern. Decibel levels are measured on a logarithmic scale; thus, an increase of 3.0 dB represents an approximate doubling of sound intensity, while an increase of 10.0 dB represents a ten-fold increase.

Based on the CAAN information, it is immediately apparent that noise levels since the year 2000 (prior to the events of September 11, 2001, which resulted in substantial changes in operations at National Airport) have diminished, in some cases markedly, on the Maryland side of the Potomac River, while in some locations on the Virginia side they have roughly doubled. Some residents have observed changes in flight paths that bring planes at low altitude directly over neighborhoods in Virginia, where prior to September 11, 2001 such low overflights were a rarity. The data presented in Table IX-1-1 appear to correlate with these observations.

Table IX-1-1

Day-Night Average Sound Levels in Decibels for Noise Monitoring Stations North of National Airport

Monitoring Station Location	Year 2000	April 2004-March 2005	April 2005-March 2006	Change between 2004/5 and 2005/6	Change since the year 2000 (pre-9/11/01)
Rosslyn	62.6	59.9	59.9	0.0	-2.7
Chain Bridge	66.6	58.2	57.8	-0.4	-8.58
Langley Forest	52.2	54.1	55.2	+1.1	+3.0
Great Falls	51.5	51.4	53.9	+2.5	+2.4
Chevy Chase	58.3	58.8	51.3	-7.5	-7.0
Cabin John	55.9	58.7	55.7	-3.0	-0.2
Avenal	59.2	60.2	49.0	-11.2	-10.2

Source: Citizens for the Abatement of Airport Noise Web site: **http://www.caan.org/factsfigs.html**

In 2006, the Airports Authority's noise complaint centers at National and Dulles reported receiving 214 noise complaints from 69 different callers. National reported 44 complaints from 26 callers, while Dulles reported 170 complaints from 43 callers.

MWAA reports that National Airport has one of the strictest noise regulations in place at any major airport in the United States. All aircraft operating between 10:00 P.M. and 7:00 A.M. must satisfy the airport's nighttime noise limits or face monetary fines of $5,000.00 maximum per violation. There were 13 violations during the year 2005. Civil penalties were sought for 10 violations and three letters of warning were issued. A total of $16,000 was received from four penalties, with the remaining six cases pending as of the time of publication of MWAA's report.

Resources:

Metropolitan Washington Airports Authority

Community Relations and Noise Abatement	703-417-8745
National Airport Noise Complaints	703-417-8020
Dulles International Airport Noise Complaints	703-572-8215

Federal Aviation Administration

Washington National Airport	703-413-1530
Dulles International Airport	703-471-1270
FAA Noise Ombudsman	202-493-5047

Other Aviation Facilities

Andrews Air Force Base-(auto information line)	301-981-1110
Baltimore-Wash Int'l Airport-complaints	410-859-7021

2. Additions to Washington Dulles International Airport

On October 14, 2005, the Federal Aviation Administration published a Record of Decision for the construction of new runways, terminal facilities and related facilities at Dulles Airport. The publication of this document completed the lengthy Environmental Impact Statement process for this project, providing the Metropolitan Washington Airports Authority with the approval needed to proceed. Two new runways have been authorized: a north-south oriented runway to be constructed parallel to and 4,300 feet west of the westernmost of two existing north-south runways and a runway roughly oriented east-west that will be constructed parallel to and 4,300 feet south of the existing east-west runway.

Construction of the fourth runway began in May 2006. The new concrete runway will be 9,400 feet long and 150 feet wide. The project includes the new runway, a parallel taxiway, connector taxiways and cross-field taxiways that will connect to the terminal and existing airfield areas. As of June 2007, overall construction was 33 percent complete. The fourth runway is scheduled to open in November 2008. Construction dates for the fifth runway will be set in the future.

There are many other projects under way at Dulles Airport, including:

- The construction of an "AeroTrain" system to replace the existing Mobile Lounges with an underground rail system (scheduled to open in 2009)
- Improvements to the airport roadway system and connections to Route 28 and the Dulles Access Road
- Expansion of Concourse B to add 12 new airline gates
- Expansion of the International Arrivals Building.

In addition, the new air traffic control tower became operational in 2007.

3. Part 150 Noise Compatibility Planning for Ronald Reagan Washington National Airport

Portions of the following discussion have been excerpted and modified slightly from the Web site of the Metropolitan Washington Council of Governments:

MWAA has prepared a major update of the Noise Compatibility Study for Ronald Reagan Washington National Airport. This study, conducted in accordance with the provisions of the Federal Aviation Administration's "Part 150" process, has been designed to forecast future noise contours at Reagan National and to propose abatement and mitigation actions to reduce community noise impacts. A study report containing a series of recommended noise abatement and mitigation measures was released in

September 2004. Noise abatement recommendations include, among other things, the application of improved technology to keep arriving and departing aircraft over the Potomac River up to their designated turning points, an improved distribution of turning points from the Potomac River between five and ten miles south of the River and the improvement of the Airport's noise monitoring and flight tracking system. In October 2004, the Fairfax County Board of Supervisors endorsed staff comments concerning these recommendations; the comments were generally supportive of the noise abatement recommendations but recommended a follow-up assessment of the effectiveness of these measures.

Because of the importance of this issue to the community, the Metropolitan Washington Council of Governments' Committee on Noise Abatement and Aviation at National and Dulles Airports partnered with MWAA throughout the process of development of the noise abatement and mitigation recommendations. A Part 150 Study Advisory Committee was established to assist and advise the Airport Authority in this study; indeed the Advisory Committee's recommendations were incorporated into the Part 150 Study document.

MWAA submitted the Part 150 study to the Federal Aviation Administration, and FAA's review of this document has only recently been completed; the MWAA Web site reports that the FAA completed its review and formally accepted the Part 150 Noise Exposure Maps for National Airport in August 2007. EQAC has not reviewed the FAA decision and is therefore not in a position to provide a summary within this report. It is EQAC's understanding, however, that, because the area inside the DNL 65 dBA contour for National Airport does not include residential or other noise sensitive uses, MWAA is not eligible for federal funding for noise abatement measures such as replacement of monitoring equipment (which will occur anyway, but with MWAA funding). EQAC shares concerns of communities both north and south of National Airport regarding noise impacts associated with airport operations and does not feel that noise impacts stop at the DNL 65 dBA contour. EQAC will report on the Part 150 process and its implications more fully in a future Annual Report.

4. The Aviation Policy Committee

The Aviation Policy Committee is a committee of the Metropolitan Washington Council of Governments that provides guidance to the COG Board of Directors on airport and aviation policy-related matters and that has been delegated by the COG Board of Directors to speak on its behalf on noise policy matters. The committee, which changed its name in 2006 from the Committee on Noise Abatement and Aviation at National and Dulles Airports, provides a broad, balanced and integrated perspective on matters relating to airport and aircraft policies.

The APC has collaborated and will continue to collaborate with MWAA in implementing major recommendations resulting from the Part 150 Noise Compatibility Study for Reagan National Airport. The committee will also continue to focus on noise abatement strategies for implementation at both Reagan National and Dulles Airports,

with emphasis on review of emerging national legislation and studies on their impact on local noise strategies. The committee will also focus on the growing role general aviation plays in economic development and quality of life in the region.

The APC will also continue to focus on developing implementation strategies for the recently completed Regional Helicopter System Plan.

C. HIGHWAY NOISE

1. Background

Traffic in the Washington metropolitan area continues to grow, due to ever increasing residential development in and surrounding Fairfax County, especially to the west and north where adjacent counties are allowing almost uncontrolled residential development growth rates which are some of the largest in the country. These increasing rates of residential growth are being allowed with little or no consideration of their impacts on the already over used and limited transportation infrastructure serving the entire metropolitan region. Increasing traffic volumes on the county's roadways have had the consequence of increasing transportation-related noise impacts to residential areas adjacent to these roadways.

The area's traffic ranks consistently as one of the most congested in the country. As more lanes are added and some new roads are constructed, increased traffic generates more noise that creates demands for noise attenuation or abatement measures such as:

- The construction of barriers/walls or raised berms
- The provision of landscaping/vegetation
- The provision of acoustical design techniques.

Barriers have become the most popular choice. Since the early 1990s in Fairfax County, barriers constructed by the Virginia Department of Transportation have consisted of a solid wall of absorptive concrete that breaks the line of sight between vehicles and homes. Although noise barriers have a maximum decibel reduction of 20 dBA, most only provide 10-12 decibel reductions.

Noise is an important environmental consideration for highway planners and designers. The U.S. Department of Transportation and state transportation agencies are charged with the responsibility of optimizing compatibility of highway operations with environmental concerns. Highway noise problems have been addressed by numerous investigations, including evaluations of the following:

- Noise sources and highway noise reference energy mean emission levels
- Noise impacts at receptor locations
- Effects of site geometry, meteorology, ground surface conditions, and barriers on noise propagation
- Alternative methods of mitigating noise impacts.

Precise, uniform, state-of-the-art highway traffic noise measurement procedures for assessing impacts in the vicinity of roadways, and designing effective cost-efficient noise barriers, are recognized needs in the highway noise community.

2. State Policy

Virginia adopted its original noise abatement policy in 1989. The policy established criteria for providing noise protection in conjunction with proposed highway projects in the state. Implementation of the policy has aided in the construction, or construction approval, of more than 100 federally-funded sound barriers. Experience with this policy created considerable feedback from residents and elected officials. As a result, the Commonwealth Transportation Board decided to evaluate the policy for possible changes. The major source of information used was a survey of 15 state departments of transportation in the eastern U.S. The culmination of this process was the adoption of changes to the state policy in November 1996, which became effective in January 1997.

The key changes to the policy were to:

- Raise the cost-effectiveness ceiling from $20,000 per protected receptor to $30,000 per protected residential property based other state practices.
- Clarify that Virginia will not participate in any retrofit project along an existing highway when not in conjunction with an improvement for that highway.
- Add the possibility for third party funding of the amount above VDOT's $30,000 ceiling if the abatement measure otherwise satisfies the criteria.

3. State Projects in Fairfax County

VDOT has constructed the following sound barriers in FY 05-06:

- One sound barrier with 3rd party funding, associated with the West Ox Road widening between Penderbrook Road and Ox Trail.

The following sound barriers have been approved for the following highway construction projects underway in FY 07-08:

- One replacement and enhanced sound barrier associated with the Interstate 95 @ Telegraph Road
- One replacement and four new sound barriers associated with the Interstate 95 4th Lane Widening.

4. Noise Study Submission Guidelines

On July 24, 2000, the Board of Supervisors adopted Zoning Ordinance Amendment ZO 00-330, which permits noise barriers in excess of the Zoning Ordinance fence/wall height limitations where needed to reduce adverse impacts of highway noise on properties adjacent to major thoroughfares, or to reduce adverse noise impacts of

commercial and industrial uses on adjacent properties. Such barriers may be approved by the Board of Supervisors in conjunction with the approval of a proffered rezoning for any zoning district, including P districts, or in conjunction with the approval of a special exception application, or by the Board of Zoning Appeals as a special permit use. Pursuant to Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance, a noise impact study is required to demonstrate the need for the noise barrier and the proposed height and level of mitigation to be achieved by the noise barrier. In conjunction with the adoption of this Zoning Ordinance Amendment, the Planning Commission and Board of Supervisors requested staff to develop standardized noise study submission guidelines, which would be submitted to the Planning Commission for review and comment prior to implementation.

In response to this request, a noise study submission form and guidelines were developed. This form requires the applicant to provide information regarding the assumptions and data used in the noise study, the results of the analysis and a detailed description of the visual impacts of the noise barrier and its effectiveness in providing noise mitigation. Given that the cost of providing this information may be prohibitive for a noise barrier request on an individual residential lot, a second form has been developed which requires less information for noise barrier requests on individual residential properties.

Staff from the Department of Planning and Zoning, Department of Transportation and the Virginia Department of Transportation participated in the review and development of these guidelines. In addition, acoustical engineers from several firms that have submitted noise studies to the county in the past were invited to provide written comments. On two occasions participating consultants met with staff to discuss their issues and concerns regarding the proposed noise study submission guidelines. In addition, the Northern Virginia Building Industry Association and the National Association of Industrial and Office Properties were provided with the opportunity to comment on these guidelines.

On March 14, 2002, the Planning Commission's Environment Committee reviewed and endorsed the Noise Study Submission Guidelines. On March 20, 2002, the Planning Commission endorsed the guidelines.

On April 29, 2002, the Board of Supervisors accepted the proposed guidelines without change.

D. COMMENTS AND ONGOING CONCERNS

1. Continue to support airport noise-compatible land use planning near airports in the county through the implementation of policies and regulations that reference the most current airport noise contour projections for the airports and that are at least as stringent as federal noise compatibility guidelines.

2. Continue to encourage the use of opportunities provided by the Virginia Department of Transportation that allow for third party contributions to noise barrier construction when the VDOT cost criteria preclude VDOT's construction of such barriers. Through this VDOT policy, neighborhoods affected by high levels of highway noise can participate in the funding of barriers that would not otherwise be constructed.

3. Staff should continue to review all airport and highway studies that require Environmental Assessments or Environmental Impact Statements under the National Environmental Policy Act for consistency with county policies addressing transportation-related noise and mitigation and report its findings to the board. In turn, the Board of Supervisors should, when appropriate, adopt resolutions with specific requests and/or recommendations and transmit these to the Metropolitan Washington Airports Authority, Federal Aviation Administration, Commonwealth Transportation Board, Virginia Department of Transportation and other state and federal agencies as applicable.

4. Encourage the retention and planting of noninvasive vegetation to provide visual shielding of residents from highways. Where possible, support the provision of vegetated areas adjacent to highways that are wide enough and dense enough to provide noise reduction benefits to residential areas near the highways. Where feasible and appropriate, pursue such approaches in lieu of noise walls.

E. RECOMMENDATIONS

1. In recognition of the federal approval of construction of new runways at Washington Dulles International Airport, formally request the Metropolitan Washington Airports Authority and the Federal Aviation Administration to evaluate options for the operation of the existing and new runways to identify approaches that will optimize flight operations in a manner that minimizes community noise exposure.

2. Develop and distribute materials to educate the public on airport noise issues, including airport noise contours, noise-compatible planning and regulation, noise changes that may result from new construction and changes in flight frequencies and patterns and noise complaint procedures. Incorporate these educational materials into the county's overall environmental educational efforts.

IX-2. LIGHT POLLUTION

A. OVERVIEW

Light pollution is a general term used to describe light output, primarily from exterior (outdoor) sources, in commercial, residential and roadway settings that is excessive in amount and/or that causes harmful glare to be directed into the path of travel or into residential neighborhoods. Light pollution is thus both a safety issue and a quality of life issue. With the increasing urbanization of Fairfax County, exterior (outdoor) lighting and light pollution in its many forms have become pressing issues to our communities. In the past, Fairfax County had some regulations regarding exterior lighting, but they were minimal and out of date. A major effort was undertaken in 2002 to write a totally new and modern Outdoor Lighting Ordinance that took into account the numerous advances that have been made in lighting technology in recent years. This highly successful effort utilized several workshops, in which EQAC and a number of local experts participated, and came to fruition in the early summer of 2003 with the adoption of the new Outdoor Lighting Ordinance. It is regarded by experts in the outdoor lighting community as being one of the best such ordinances in the mid-Atlantic region and has been cited and largely copied by localities in Connecticut, Illinois and California. However, there are one or two areas that could not be adequately addressed by the new ordinance, since suitable standards and convenient measurement technology were not available. This report will focus on these areas.

B. ISSUES AND PROBLEMS

The main issues and problems of exterior lighting and light pollution may be summarized as follows:

1. Glare

Glare, as defined by the Illuminating Engineering Society of North America, falls into three main categories:

- Disability glare – Disability glare (sometimes less accurately referred to as veiling luminance) is caused by overly bright light sources that shine directly into ones eyes and is dangerous because it is blinding (i.e., it totally overloads the eye's light sensor cells).

- Discomfort glare – Discomfort glare may not necessarily reduce the ability to see an object, but it produces a sensation of discomfort due to high contrast or non-uniform distribution of light in the field of view.

- Nuisance or annoyance glare – Nuisance glare is that which causes complaints such as, "The light is shining in my window."

Glare is a significant and pervasive problem that seriously impairs both safety and quality of life. Glare demands attention in that one's eyes are naturally attracted to bright light, and at night this destroys the eye's dark adaptation (the eye's sensitivity to lower light levels), which is a serious hazard for both drivers and pedestrians. Obtrusive lighting by commercial establishments to attract attention is a serious problem as is selection of inappropriate fixtures for exterior residential lighting. A major problem is the high intensity lighting of sports facilities, such as ball fields and tennis courts, adjacent to residential neighborhoods. Glare and excessive illumination (which are two separate problems) cast into surrounding residential neighborhoods not only detracts from the quality of life but can make it difficult for pedestrians and homeowners to see their surroundings.

2. Light Trespass

Light trespass is the poor control of outdoor lighting such that it crosses property lines and detracts from the property value and quality of life of those whose property is so invaded. It is particularly common when obtrusive commercial or recreational lighting is immediately adjacent to residential neighborhoods or when a homeowner uses inappropriate fixtures, light levels and lighting duration, often in the interest of "security." It is generally categorized in two forms:

- Adjacent property is illuminated by unwanted light.

- Excessive brightness (often called "glare") occurs in the normal field of view.

Both of these forms may be present in a given situation. Illumination, that is, the amount of light energy falling on a surface, is readily measured by simple hand held instruments and is expressed in foot candles. The new ordinance establishes 0.5 foot candles as the limit of illumination at the property line of the property producing the illumination. Illumination levels above that are regarded as prohibited light trespass onto adjacent properties.

Glare or excessive brightness is a more complex and difficult-to-measure phenomenon. It is experienced when the light producing source (the bulb) is directly visible, but also depends on the luminance of the source and on the contrast between that source and the surrounding background. For example, even a very bright light source viewed against a noonday sky doesn't seem particularly glaring or objectionable, but the same source viewed against a night sky is very objectionable and seems so bright as to be almost painful. One of the problems in addressing this kind of light trespass, or more properly glare trespass, is that there have not been good standards for acceptable limits, and instruments to measure this kind of glare are necessarily complex and difficult to operate.

3. Security

Much outdoor lighting is used in the interest of providing security. These safety concerns often result in bad lighting rather than real security. One reason often cited for today's bright lights is that high wattage is needed to deter crime. However, studies have shown that if light is overly bright with excessive glare it makes it easier for a person to hide in the deep shadows created by objects in the harsh glaring light. This might actually encourage crime rather than discourage it. The debate as to whether or not additional light provides more safety has been emotional rather than factual. The few rigorous studies that have been done reveal no connection between higher lighting levels and lower crime rates. This may be due to people with nefarious intent taking more risks in better lit areas. For example, the National Institute of Law Enforcement and Criminal Justice found no statistically significant evidence that lighting impacts the level of crime (Upgren, 1996). Thus, the supposed correlation between a high level of security lighting and reduced crime appears to be nothing more than a popular myth.

4. Urban Sky Glow

Urban sky glow is brightening of the night sky due to manmade lighting that passes upward with the light rays reflected off of submicroscopic dust and water particles in the atmosphere. Although urban sky glow was first noted as a problem by the astronomical community, it is by no means any longer solely an astronomical issue. With the increasing urbanization of many areas of the U.S., all residents in those areas are now being affected. In Fairfax County, which is now a mostly urban county, improper lighting has seriously degraded the darkness of our local night skies into a pallid luminescence that many of our residents find objectionable.

5. Energy Usage

Smart lighting techniques, which direct all of the light generated onto the target area, reduce energy consumption and hence the use of fossil fuels. Several engineering estimates suggest that at least 30 percent of outdoor lighting is being wasted through light energy spilling upward and outward rather than being directed downward onto the target area. Also, many installations are greatly over-illuminated as well as being lighted for unnecessary durations, further compounding the energy wastage. Inefficient lighting incurs both direct financial costs and hidden environmental costs. It has been estimated by national organizations studying light pollution that in excess of $8 billion of electricity is being wasted annually on obtrusive and inefficient outdoor lighting (see data from Virginia Outdoor Lighting Task Force and the International Dark-Sky Association). Since electricity generation in the eastern part of this country is mostly from fossil fuels, every unnecessary kilowatt of electrical energy generated also produces air pollution, unnecessary greenhouse gases and acid rain.

C. CURRENT COUNTY STANDARDS AND REGULATIONS

In EQAC's view, Fairfax County now has an excellent ordinance that prescribes limits for the maximum wattage of light sources and for the amount of illumination and glare in commercial and residential districts. However, existing installations that were noncompliant under the new ordinance are allowed under state law to continue until such time as the fixture requires replacement. Also, these standards do not cover roadways that are under the jurisdiction of the Virginia Department of Transportation, and a number of these roadway fixtures represent a continuing source of glare and light pollution

An important shortcoming of the otherwise excellent ordinance is that the effects of glare into residential neighborhoods from sources such as nearby park lights and lights on nearby commercial buildings and school facilities are not fully addressed.

Fairfax County's *Policy Plan: The Countywide Policy Element of the Comprehensive Plan* (2000 Edition) recognizes the nuisance of light emissions arising from increasing urbanization and recommends that efforts be made to avoid creating sources of glare that interfere with residents' and/or travelers' visual acuity. To put this into practice, the county's Zoning Ordinance contains standards for illumination limits. **However, the issue of glare, as opposed to illumination level, has not yet been addressed adequately.**

D. ADDRESSING THE PROBLEM

While the new ordinance very adequately addresses new and replacement installations of outdoor lighting and fixtures in commercial and residential districts, much roadway lighting remains a problem because it is prescribed by VDOT, which is not subject to local control. The recently passed Virginia law and policy to use henceforth only fully shielded fixtures will eventually mitigate these problems as older fixtures are replaced. Ensuring that new residential installations meet code requirements represents a potentially significant compliance problem and will require that both review and inspection personnel be fully aware of the new code requirements and diligent in the application and enforcement of them.

One of the most common street lights in use, the drop-lens, cobra-head fixture, draws 150 watts. A fixture with reflective backing and shielding can direct all light below the horizontal plane with the same illumination of streets and homes and use only 100 watts. The same possibility exists with the popular 175 watt unshielded mercury vapor lamp. Both the 150-watt cobra-head fixture and the 175-watt mercury vapor lamp cast light laterally as well as down. As a result, substantial glare is often cast directly into the eyes of drivers. This glare destroys drivers' dark adaptation, creating potential safety hazards. In many cases the driver is not able to see the roadway as well as he or she would with lower-wattage properly shielded lights, and in many cases his or her vision is made much worse.

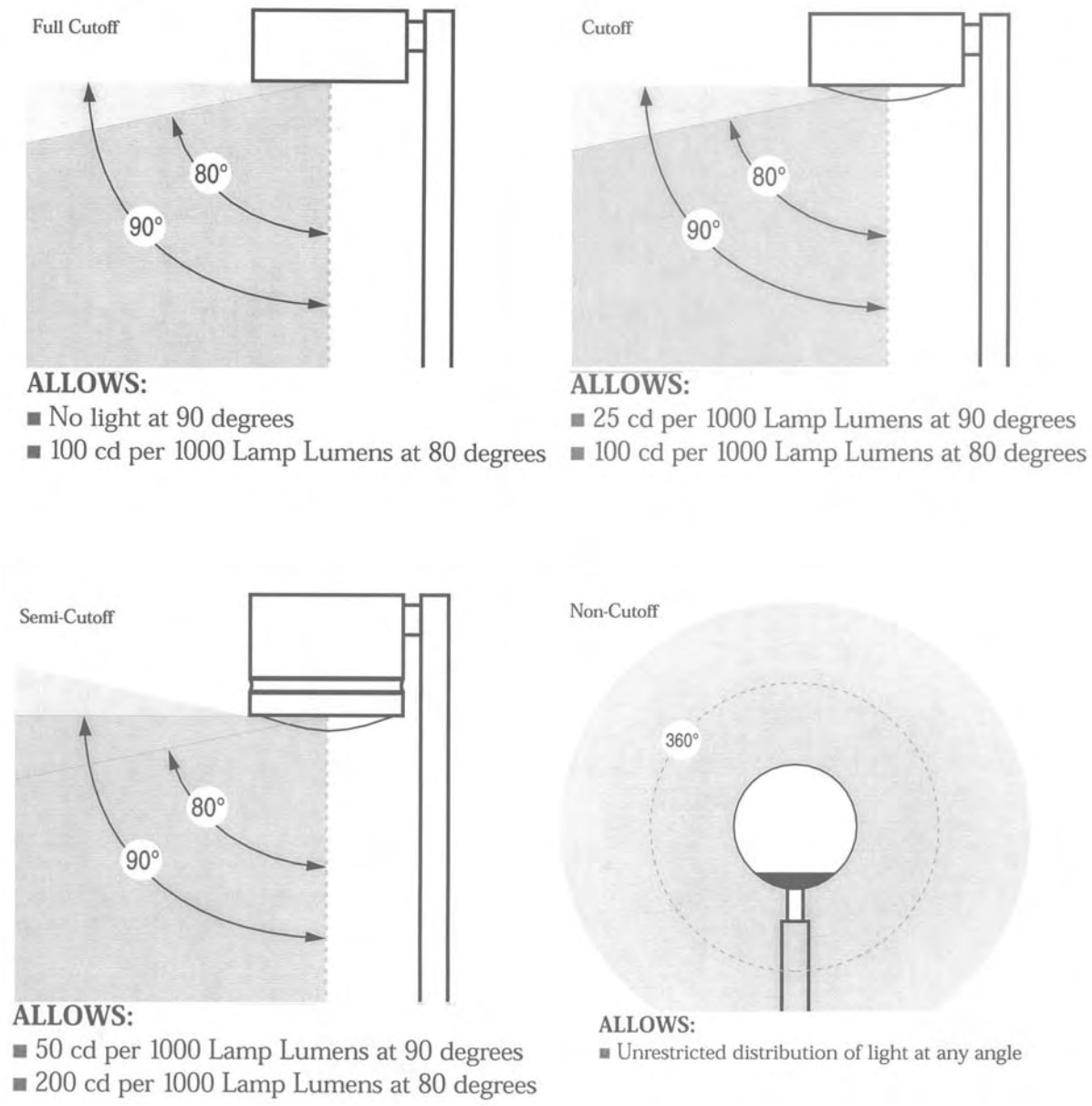
Because they cut down on glare, shielded fixtures not only are safer for drivers, but, according to experts (see references), actually make it easier for pedestrians and home owners to see their surroundings.

By redirecting this wasted energy, lower wattage lights provide the same amount of illumination in the areas where it is needed. These fixtures have reflective backing and full cut-off shielding to direct all light below the horizontal plane, with 90 percent of the light directed below an angle of 20 degrees from the horizontal. For example, a 50-watt metal halide lamp with a reflective shield will provide as much illumination below the horizontal plane as the 150-watt cobra-head fixture or the 175-watt unshielded mercury vapor lamp. These newer types of fixtures, which are recommended by the Illuminating Engineering Society of North America, are widely available and direct all light below the horizontal plane, thereby eliminating lateral glare (see Figure IX-2-1). It is estimated that it takes only three years of energy savings to recoup the initial investment in these fixtures. The lower wattage fixtures provide energy savings, improved driver safety, better visibility for pedestrians and an improved ambiance and security for neighborhoods. Several municipalities, such as Tucson, Arizona, San Diego, California and Sanibel Island, Florida, have adopted street lighting ordinances requiring these newer fixtures.

Most security lighting is overdone, with high wattage lights burning from dusk to dawn. As noted earlier, constant levels of illumination tend to be largely ignored because they are commonplace, and they waste a huge amount of energy. The large amount of glare produced by high intensity sources creates shadows that provide hiding places for intruders. Moreover, the constant glare and light trespass onto adjacent properties is a major source of annoyance to their occupants. On the other hand, lights that are activated by motion within a controlled area attract immediate attention and, at the same time, use very little energy and create intrusion on adjacent properties only when such attention is desired. For example, if one is using 300 watts of security lighting for an average of 10 hours each night and converts to an infrared motion sensor control that turns on the lights only when there is motion in the controlled area, energy cost is reduced to almost nil. In addition, the cost of the added sensor-control hardware can be recovered in as little as two to four months due to the energy saving. At the same time, security is increased rather than decreased and glare and light trespass onto adjacent properties is largely eliminated.

Glare is a significant and pervasive problem, but one that is relatively easily solved by installing “full cut-off”, i.e., fully shielded light fixtures, or in some cases using supplementary shielding panels, to prevent light trespass onto adjacent residential properties. Where it is not possible to completely eliminate glare through the use of shielded fixtures, inexpensive motion detector controls can limit the harsh light to only a few minutes when it is really needed.

Figure IX-2-1
Effects of Cut-off and Non Cut-off Luminaires



(Sources: Paulin, Douglas, *Full Cutoff Lighting: The Benefits*, IESNA Web site, and Shaflik, Carl, *Environmental Effects of Roadway Lighting,* Information Sheet Number 125, International Dark-Sky Association, Tucson, Arizona, August 1997.)

Light trespass is a term of relatively recent origin and denotes (1) glare that is generated by sources on one property that lie within the normal field of view of the occupants of another property and (2) light that spills over the boundaries of one property onto another, thereby producing unwanted illumination of it. Increasingly, such light intrusions are being regarded as trespass violations every bit as serious as physical trespass of a person onto the property of another. Such problems can now be readily avoided by the selection of proper fixtures, intensity levels and the use of timers and sensors/controllers.

Sky glow is also readily addressed by the selection of properly designed modern fixtures for new installations and phased retrofit of current inadequate installations. The cost of such retrofits is normally recoverable within a reasonable time period (usually estimated at about three years) through efficiently placing all of the light onto the desired area and the resulting lower energy usage.

Adherence to the following four principles will do much to mitigate or eliminate light pollution.

- Always illuminate with properly shielded fixtures that prevent the light source itself, and the resultant glare, from being directly visible. This is done by using cutoff fixtures or supplementary shielding that keeps all of the illumination below the horizontal plane and directed onto the target area.

- Do not over-illuminate. Never use more illumination than needed for the task at hand. Using a 400 watt floodlight to illuminate a small parking area or a flag at night is overkill and wastes a great deal of energy. A properly shielded and adjusted 250 watt luminaire (light source + fixture) can illuminate an area just as effectively as an older style 1,000 watt light source.

- Always aim lighting downward, keeping all of its distribution within the property lines and below the horizontal plane so that it is not a source of glare. Light trespass onto adjacent properties is unnecessary, inconsiderate and potentially illegal.

- Do not burn lighting all night long with the intention of improving security. Using infrared motion sensor-controlled lighting that comes on instantly when there is motion in the designated area is far more effective as a security measure. That rapid change from dark to light draws the immediate attention of everyone in the surrounding area, including security and law enforcement personnel on patrol, and may well be unsettling enough to cause illicit intruders to immediately flee. Lighting that stays on all night draws no special attention and is an enormous waste of energy.

E. PUBLIC AGENCY RESPONSIBILITIES

Ensuring compliance with glare standards for residences and other private property is the responsibility of the county's Zoning Enforcement Branch. The county has 18 Zoning Inspectors (two per magisterial district) to oversee all Zoning Ordinance enforcement. Any enforcement activity dealing with light is complaint-driven. Typically, light-related complaints represent about 0.5 percent of total complaints. The county does not respond to anonymous complaints. Complaints are either filed directly with the Zoning Enforcement Branch or are forwarded by the staff of a member of the Board of Supervisors. The causes of the complaints have usually been fast food establishments, security lighting for residences, athletic facilities (e.g., ball fields, driving ranges), or churches. The Zoning Inspectors typically resolve violations with informal enforcement such as a verbal warning that there is a violation and how it may be remedied. A written notice of violation or civil action can be used if needed. Beyond the general glare standards, the county frequently is able to impose additional "before-the-fact" restrictions through the rezoning, special permit and special exception processes

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The Fairfax County Park Authority and the Fairfax County Public Schools are the two largest users of recreational and sports field lighting in the county. Parks and schools by their very nature are usually located in the midst of residential communities where their outdoor lighting, if inadequately designed, can seriously impact the surrounding residents. Schools, particularly high schools, often have sports practice sessions extending into the early evening hours and games that begin after the dinner hour and run into the later evening hours. In addition, schools of all categories often have "security" lights that burn from dusk to dawn. Our park system, faced with increasing demand for team athletic facilities, will necessarily have to turn to synthetic turf and lighting during the evening to enable greater utilization of its existing fields. It is the responsibility of both organizations to utilize better designs and better equipment than employed heretofore in addressing these needs. To do less unnecessarily and unfairly impacts the surrounding neighborhoods and diminishes both property values and quality of life.

One of the most onerous sources of light pollution is the obtrusive lighting of commercial and industrial facilities, particularly commercial retail and service establishments. While their desire to attract attention to themselves is understandable, abusive excesses degrade the overall ambience of our commercial areas and materially degrade the quality of life in adjacent residential neighborhoods. This is of particular concern in the case of "by-right" development, where there are no public hearings (e.g., Planning Commission, Board of Zoning Appeals, Board of Supervisors) at which adjacent property owners and neighborhoods can register their concerns and see approval conditioned on appropriate restrictions. In such "by-right" cases, the initial responsibility would necessarily fall almost entirely upon the Land Development Services function of the Department of Public Works and Environmental Services, which reviews all proposed plans before a building permit is issued and subsequently conducts inspections to ensure that the work is in compliance with regulations. Evaluation of plans for compliance would add a small amount of effort to the review process but would add only a negligible amount to the inspection process.

At this time, the county has no formal policies regarding street lighting. Some neighborhoods within the county prefer to have local streets lighted, while others do not. Whether or not the county provides street lighting is often driven by budget priorities, and, unless there is a demonstrable public safety need, the priority for retrofitting an established community is usually low. More often, street lighting is addressed in the overall planning of new subdivisions. In these cases, the Land Development Services function of DPWES would have responsibilities for both reviewing the plan and inspecting the implementation of it.

Responsibility for the lighting of main roadways is under the jurisdiction of the Virginia Department of Transportation. Historically, local communities and neighborhoods have had to deal directly with VDOT or through their local Supervisor's office over roadway lighting issues. It has proven very difficult to influence VDOT's choice of fixtures and technical standards, even when it can be demonstrated that their proposed implementation will result in unacceptable levels of glare and light trespass in adjacent residential neighborhoods. However, quite recently, encouraging headway has been made in getting VDOT to recognize the severity of the problem and to take some limited first steps to address it.

F. PUBLIC EDUCATION AND AWARENESS NEEDS

The general public needs awareness of the sources and problems of light pollution and of the methods by which these can be best addressed. The county staff has prepared an excellent and very informative 16 page booklet to explain the new Outdoor Lighting Ordinance (available at **www.fairfaxcounty.gov/DPZ/Zoning/lightingbrochure.PDF**). It can also be made available in printed version to individuals, homeowners groups and community associations directly through appropriate county offices and through the district offices of the members of the Board of Supervisors. The complete ordinance in convenient form is available on the Fairfax County Web site at **www.fairfaxcounty.gov/DPZ/Zoningordinance/articles/Art14.PDF.** In addition, the International Dark Sky Association and the Illuminating Engineering Society of North America maintain Web sites with a variety of technical information on lighting issues and technology.

Our county's 16 page booklet provides much of the information that architects, contractors and electricians need to familiarize themselves with our lighting codes and specifically what is not permitted (e.g., unshielded security lights, angle-directed post or building mounted fixtures, wall packs without shielding or baffling, excessive wattage or unshielded floodlights, light-trespass onto other properties, etc.) and what practices are recommended. Our county review and inspection personnel should make sure that members of the development, contractor and building management communities with whom they deal will be fully aware from the outset of the revised standards in the new ordinance and how best to address them.

There is an excellent Web site (**www.qualityoutdoorlighting.com**) that illustrates many examples of good, bad and ill-conceived lighting practices right here in our local area. It can play a central role in education of the public.

G. CONCLUSIONS

The principal means to prevent poor exterior lighting practices is a comprehensive code or ordinance, because this provides well thought out standards for, and enforceable legal restrictions on, specific lighting practices that affect the community and its quality of life. Numerous jurisdictions have adopted codes and ordinances that have proven very effective in reducing light pollution and preventing light trespass. A properly conceived and well written code permits all forms of necessary illumination at reasonable intensities, but requires shielding and other measures to prevent light pollution and light trespass. A good code applies to all forms of outdoor lighting, including streets, highways and exterior signs, as well as lighting on dwellings, parks, schools, commercial and industrial buildings, parking areas and construction sites. A good code also provides for reasonable exceptions for special uses within acceptable time periods and subject to effective standards. In EQAC's opinion, Fairfax County's recently adopted Outdoor Lighting Ordinance is an outstanding example of such a code. As the county has gained experience with application of the new ordinance, some areas have been identified where adjustments and fine-tuning are urgently needed, but the solid foundation has been laid and should serve us well into the future.

The Fairfax County Park Authority, because of its need to increase the hours of utilization of existing sports fields by installing lights to illuminate them, bears a special responsibility to ensure that such lighting systems do not adversely impact adjacent residential properties. The results with a test rectangular field that was outfitted with lights and artificial turf have been very unfortunate. While the illumination of the field surface is excellent and the illumination at the property line with respect to light spillover meets the ordinance standards, the glare from the fully exposed, 1,500 watt lamps on 70 foot poles facing a residential neighborhood is intense (in the range of 12,000 lumens at 200 feet). A second field outfitted with an advanced model of fixtures of the same type shows no improvement in glare. The Park Authority's recently drafted specifications do not begin to address the problem. However, the International Dark-Sky Association in its outdoor lighting handbook has colored illustrations of a field lighted with full cutoff fixtures that has no such glare problem. Specification of such better-engineered fixtures should make it possible for the Park Authority to expand the use of lighting for fields without creating public outrage. This same concern applies equally to the Fairfax County Public Schools, which also uses lighted sports fields and security lighting which burns all night.

The county needs to work closely with VDOT to achieve better lighting practices on roadways within Fairfax County that are under VDOT jurisdiction. Current VDOT lighting and proposed new installations are regarded as being very intrusive by adjacent

neighborhoods. However, it should be noted that a newly enacted law requiring the commonwealth to acquire only shielded fixtures should materially improve VDOT practices in this regard on new installations and as old fixtures are replaced.

Much of the security lighting, both residential and commercial, in Fairfax County is poorly conceived, excessive in intensity and improperly directed and controlled. These deficiencies could be corrected at relatively low initial costs that would be rapidly recovered through the energy savings realized. This will require considerable public education to familiarize the using public with the issues and the available technology.

Much lighting in residential neighborhoods uses old style fixtures (or new but poorly designed ones) that cause excessive glare and light trespass onto adjacent properties. The new comprehensive ordinance and an intensive public awareness campaign should be used to address correction of these problems. Single family dwellings especially need to be brought into compliance with the spirit and provisions of the revised ordinance, for that is where the majority of us live and where our quality of life is most affected by intrusive lighting.

Poor lighting design, particularly in commercial areas, is contributing to excessive and highly objectionable sky glow. The new ordinance and retrofitting or adjustment of fixtures can eliminate the worst of this effect.

H. COMMENTS AND ONGOING CONCERNS

1. **In response to a recommendation in earlier EQAC Annual Reports on the Environment the Fairfax County Park Authority commissioned a study of sports field lighting design and technology. EQAC feels that this study has serious flaws in terms of the study objectives, the methodology and the evaluation criteria. The Park Authority has recently issued a set of specifications, dated November 2006 (and largely based on this study), for new athletic field lighting installations that, in EQAC's view, does not address the issue of glare adequately. The Park Authority also commissioned a consultant to prepare a "White Paper" that would serve to justify the specifications. EQAC feels that this document contained serious scientific errors and thus created confusion rather than clarity.**

2. **The EQAC 2004 Annual Report recommendation that the Department of Planning and Zoning place high on its work plan priorities for 2005 a modest revision of the Outdoor Lighting Ordinance to address the glare issue was not addressed. Unfortunately, following the same recommendation in the 2005 Annual Report, the issue was placed on the "Priority 2" list of the Adopted 2006 Zoning Ordinance Amendment Work Program and has therefore not been addressed.**

3. EQAC recommends that the Board of Supervisors work with VDOT and Virginia elected officials to eliminate unnecessary roadway lighting and to achieve replacement of existing

poorly designed fixtures (under the control of VDOT) on our roadways with full cut-off fixtures.

I. RECOMMENDATIONS

1. EQAC recommends that the Board of Supervisors direct the Department of Planning and Zoning to place work on a revision to the Outdoor Lighting Ordinance high in its "Priority 1" work plan in order to address glare and several minor issues and to have such ordinance revisions ready for Board of Supervisors approval not later than July 2008.

2. EQAC recommends that the Board of Supervisors direct the Fairfax County Park Authority to revise its specifications for athletic field lighting to correct the current deficiencies, including but not necessarily limited to:

   - Inadequate and confusing treatment of glare (as opposed to surface illumination).

   - Overly restrictive and sometimes inappropriate hardware specifications that give the appearance of favoring a particular manufacturer or supplier.

   - Explanatory documentation for public consumption, particularly that posted on the Web site, that contains scientific inaccuracies or confused or confusing subject matter.

LIST OF REFERENCES

Fairfax County Department of Planning and Zoning, *A guide to Fairfax County's Outdoor Lighting Standards*, 16 pp.

Arthur R. Upgren, *Night Blindness*, The Amicus Journal, Winter 1996, page 22-25.

Examples of Good and Bad Lighting Fixtures, Information Sheet Number 122, International Dark-Sky Association, Tucson, Arizona, May 1997.

Douglas Paulin, *Full Cutoff Lighting: The Benefits*, (corrected version), Illuminating Engineering Society of North America Web site, **www.iesna.org**.

Shaflik, Carl, *Environmental Effects of Roadway Lighting*, Information Sheet Number 125, International Dark-Sky Association, Tucson, Arizona, August 1997.

Some Lighting Myths, Information Sheet Number 42, International Dark-Sky Association, Tucson, Arizona, January 1991.

Fairfax County, Virginia, *Policy Plan: The Countywide Policy Element of the Comprehensive Plan*, 2000 Edition.

Fairfax County, Virginia, Zoning Ordinance (Chapter 112 of the *Fairfax County Code*)

Illuminating Engineering Society of North America Web site, **www.iesna.org** (There are numerous subsidiary and related Web sites

International Dark-Sky Association Web site, **www.darksky.org/**

National Electrical Manufacturers Association Web site, **www.nema.org/** (Particularly see their White Paper on Outdoor Lighting Code Issues.)

Virginia Outdoor Lighting Taskforce Web site, **www.volt.org/**.

Quality Outdoor Lighting Web site, **www.qualityoutdoorlighting.com/**.

IX-3. VISUAL POLLUTION AND URBAN BLIGHT

A. OVERVIEW

Historically, the term “pollution” has referred primarily to the fouling of air, water and land by wastes or from the byproducts of human activities. In recent years it has come to signify a wider range of disruptions to environmental quality. Both noise pollution and light pollution issues have been addressed earlier in this chapter. This section focuses on visual blight/pollution issues, including such things as proliferation of signs, billboards, litter, dumps, junkyards and the like, which are important components of visual pollution.

Simply stated, “blight” is something that impairs or destroys appearance and results in a deteriorated condition. In recent times, urban blight has come to include a wide range of visual pollutants that degrade the ambience of our communities, including such things as trash and litter on roadsides, unkempt properties, above-ground power and communications transmission lines, communication towers, intrusive and objectionable advertising signage and other forms of visual impairments. Without doubt, signage that is excessive in amount and inappropriate in placement is the most ubiquitous of these “pollutants.”

B. SIGNS AND BILLBOARDS

Unnecessary signs and billboards, almost always placed as some kind of advertising, have been called "visual pollution," "sky trash," "litter on a stick," and "the junk mail of American roadways." Nothing can destroy the distinctive character of our communities and countryside more quickly or thoroughly than uncontrolled signs and billboards.

Signs in the public rights-of-way have been around for as long as there have been public rights-of-way, but the numbers have spiraled out of control in recent years. Between fields of “popsicle-stick” signs for homebuilders and politicians and signs for weight loss, work-at-home businesses, painting, hauling and other signs plastered on every available traffic sign and utility pole, everyone in Fairfax County has something to hate about the proliferation of signs.

Communities can regain control of their visual environment, preserve their distinctive character and protect natural beauty and the environment by enacting and enforcing ordinances that control signage and billboards. Reducing sign and billboard blight helps communities reclaim local beauty and character. Excellent alternatives to large intrusive signs and billboards, such as wayfinding signs, logo signs and tourist-oriented directional signs, can help people locate local businesses and are minimal in their visual impact.

C. TELECOMMUNIATION TOWERS AND UTILITY TRANSMISSION LINES

In 1996, Congress passed the landmark Federal Telecommunications Act to encourage the rapid development and growth of new telecommunications technology such as wireless telephones and digital television. However, antenna towers, often of considerable height, have been built near people's homes, next to historic buildings, or in rural, scenic areas. Towering above trees, neighborhoods and protruding into the skyline, such towers often have a very unappealing visual impact (see the Web site **www.scenic.org** for examples). Reconciling the requirements of communications engineering and community aesthetics is a difficult and growing problem but one that must be directly addressed if both needs are to be properly served.

The visual blight associated with above ground utility lines besets both our residential and commercial areas. These lines and poles are particularly objectionable in our local shopping areas where they obstruct the vision of drivers and greatly impair the visual attractiveness of the locale.

D. ADDRESSING THE PROBLEM

Creating sign regulations developed with community input encourages business owners to erect less intrusive signs that reflect an area's spirit, contributing to civic pride and helping to revitalize commercial districts. Regulations should encourage signs that quickly communicate their message, complement their surroundings and enhance the visual character of the community. Attractive on-premise signs can help encourage residents and business owners to work together to improve and revitalize local appearance.

The Fairfax County Zoning Ordinance, Article 12, deals with signs and signage regulations. It deals comprehensively and at length with permitted and non-permitted signage and what kind of sign needs a permit versus signage not requiring a permit. **The ordinance appears to cover the subject thoroughly, but the fact that impermissible signage is overabundant indicates that enforcement is lacking and perhaps that county staff functions are not organized in a way that could provide cost effective enforcement**. In addition, the ordinance has a significant shortcoming in Article 12, in that there is no explicit provision therein for civil penalties (i.e., fines) for failure to obey it. Rather, it relies on Article 18-903.1.H and I to deal with Infractions and Civil Penalties. However, these two provisions deal only with Sections 12-301 and parts of 12-104. Thus, the entirety of Sections 102, 103 and part of Section 104 are not addressed. This is very important, since adequate civil penalties can readily pay for an effective enforcement program.

The other key component of an effective enforcement program is the requisite political will on the part of the Board of Supervisors. It is a given that the well-organized real estate and development industries will vigorously resist any enforcement

program that would impose limits, no matter how reasonable, on their current practice of often excessive and obtrusive signage. The many small business enterprises that litter the roadsides and telephone poles with illegally placed signs will complain that enforcement will deprive them of livelihoods. Finally, political campaign signage, in which the lawmakers themselves have a vested interest, is a sensitive issue despite recognition of the current abusive practices.

The Board of Supervisors initiated the Fairfax County Sign Task Force in August, 2000. In September, 2001, the Task Force issued its report, *"Illegal Signs in the Right of Way"* which:

- Examined current Fairfax County practices and enforcement procedures regarding signs within and along the roadways
- Evaluated other jurisdictions' best practices in dealing with illegal signs
- Recommended amendments to the county's sign ordinance and suggested new legislative approaches to address this problem.

Thus far the report and its recommendations have met with inaction.

Communities can do much to regulate the height, number and location of wireless telecommunication towers by enacting strong ordinances. Without good ordinances, communities are at the whim of telecommunication companies that avidly seek sites for towers and property owners who may willingly lease land for a tower. Fairfax County recently prevailed at the Virginia Supreme Court in a decision that required VDOT to reasonably comply with the Fairfax County Zoning Ordinance in siting monopole towers in the VDOT right-of-way within Fairfax County.

E. PUBLIC AGENCY RESPONSIBILITIES

The Sign Task Force concluded that there is no one agency within the county government that is devoted to removing impermissible signs or prosecuting persons who erect the signs in violation of the law. The Task Force concluded that cleanup efforts are inadequate unless a county official receives complaints or VDOT receives complaints. Therefore, it appears that what little effort there is to remove signs is reactive rather than proactive. Some neighboring communities assign specific persons to this job, but Fairfax County does not have such a system. In fact, Zoning Inspectors do have authority delegated to them from VDOT to remove illegal signs. However, on many occasions when county inspectors have removed signs (e.g., on a Friday afternoon), they are back up by Monday morning or sooner.

The ordinance needs to be changed to empower the citizenry to take action, but this would be facilitated by State enabling legislation. Good citizens attempting to help the county by removing signs themselves are not clearly authorized to do so; therefore, they are inviting a liability action when they do remove signs. At present, about the only way the ordinary citizen can be involved with removing signs without some risk of liability action is through

the VDOT Adopt-a-Road Program. In this program, a group agrees to become responsible for keeping a stretch of roadside cleaned of debris and litter and is, in effect, deputized with authority to remove impermissibly placed signs along with other litter. However, this program applies only to VDOT rights-of-way. A comparable program is needed with respect to utility poles which are most often placed within easements.

F. RECOMMENDATIONS

1. EQAC recommends that the county continue negotiations with the commonwealth to enable the county to remove signs from the VDOT right-of-way and to enforce limitations and restrictions on such signage in the same manner as though the signs were covered under the Fairfax County ordinances, including the application of civil penalties.

2. EQAC recommends that the lack of an explicit provision within Article 12-300 of the present ordinance for assessment of civil penalties be rectified at the earliest opportunity. It is recommended that Article 18-903 of the ordinance be amended by deleting items 1.H and 1.I. These provisions should be replaced by new, more comprehensive, language built directly into Article 12. (See Addendum 1 for suggested text.). It is further recommended that the modified ordinance be used in much the same manner as is done by the Department of Public Works and Environmental Services with its "Letter to Industry". When an illegally posted sign is observed by an inspector, or reported by a resident, such a letter, containing the text of the ordinance, including the penalties clause, could be sent to the offending party as a means of strongly discouraging continuance or repetition of the violation.

ADDENDUM 1

Suggested text for a subsection on civil penalties for the Sign Ordinance

PART 4 12-400 VIOLATIONS, INFRACTIONS, AND PENALTIES

12-401 General provisions

1. Any sign erected, placed, or affixed contrary to any of the provisions of this Article or contrary to any provisions of any permit issued under this Article shall be, and is hereby declared to be, unlawful.

2. Any person (whether owner, officer, lessee, principal, agent, employee or otherwise), corporation, or organization who violates any of the provisions of this Article, or permits such violation, or fails to comply with any of the requirements hereof shall be subject to the enforcement provisions of this Part.

3. Upon becoming aware of any violation of any provision of this Article, the Zoning Administrator shall serve notice of such violation on the person committing or permitting the same, which notice shall require the violation to cease within such reasonable time as is specified in the notice. After such notice is sent and such violation is not ceased within such reasonable time as is specified in the notice, then the Zoning Administrator may proceed to remedy the violation as provided in Section 402 below. The Zoning Administrator may also revoke a residential or non-residential use permit to terminate the violation. Any written notice of the Zoning Administrator shall include a statement informing the recipient that a right to appeal the notice of a zoning violation or a written order within thirty days may exist in accordance with Sect. 15.2-2311 of the Code of Virginia and Part 3 of Article 18 of the Zoning Ordinance, and that the decision shall be final and unappealable if not appealed within thirty days. The appeal period shall not commence until such statement is given.

4. In addition to the remedies provided in Par. 3 above, the Zoning Administrator may initiate injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such erection, placement, or affixation in violation of any provision of this Article. Such action may also be instituted by any person who may be aggrieved or particularly damaged by any violation of any provisions of this Article.

12-402 Infractions and Civil Penalties

1. A violation of the provisions of this Article shall be deemed an infraction and shall be punishable by a civil penalty of $100 for the first violation at a specific location; any subsequent violations at the same location arising from the same set of operative facts shall be punishable by a civil penalty of $250 for each separate offense. Any violation arising from the same set of operative facts at the same location which persists for sixty (60) days or more may, at the discretion of the Zoning Administrator, thereafter be subject to injunction, mandamus, or any other appropriate action to prevent, enjoin, abate, or remove such violation.

2. Each day during which any violation of the provisions of this Article is found to have existed at the same location shall constitute a separate offense. However, in no event shall any such violation arising from the same set of operative facts at the same location be charged more frequently than once in any ten day period, nor shall a series of such violations arising from the same set of operative facts at the same location result in civil penalties which exceed a total of $5000.

3. The designation of a particular violation of this Article at a particular location as an infraction pursuant to Par. 1 above shall be in lieu of criminal sanctions except for any violation resulting in injury to any person or persons.

4. After having served a notice of violation on any person committing or permitting a violation of the Zoning Ordinance provisions enumerated in this Article and if such violation has not ceased within such reasonable time as is specified in such notice, then, upon the approval of the County Attorney, the Zoning Administrator shall cause two (2) copies of a summons to be served upon such person.

5. Such summons shall contain the following information:

A. The name and address of the person, corporation or organization charged.

B. The nature of the infraction and the Ordinance provision(s) being violated.

C. The location, date, and time that the infraction occurred or was observed.

D. The amount of the civil penalty assessed for the infraction.

E. The manner, location, and time in which the civil penalty may be paid to the County.

F. The right of the recipient of the summons to elect to stand trial for the infraction and the date for such trial.

6. The summons shall provide that any person, corporation, or organization summoned for a violation may elect to pay the civil penalty by making an appearance in person or in writing by mail to the Department of Finance at least seventy-two (72) hours prior to the time and date fixed for the trial and, by such appearance, may enter a waiver of trial, admit liability, and pay the civil penalty established for the offense charged. Such summons shall provide that the signature to an admission of liability shall have the same force and effect as a judgment of court, however, an admission shall not be deemed a criminal conviction for any purpose.

7. If a person, corporation, or organization charged with a violation does not elect to enter a waiver of trial and admit liability, the violation shall be tried in the General District Court in the same manner and with the same right of appeal as provided by law. A finding of liability shall not be deemed a criminal conviction for any purpose.

8. The remedies provided for in this section are cumulative and not exclusive and shall be in addition to any other remedies provided by law.

NOISE, LIGHT POLLUTION AND VISUAL POLLUTION: SUMMARY OF RECOMMENDATIONS

Noise

1. In recognition of the federal approval of construction of new runways at Washington Dulles International Airport, formally request the Metropolitan Washington Airports Authority and the Federal Aviation Administration to evaluate options for the operation of the existing and new runways to identify approaches that will optimize flight operations in a manner that minimizes community noise exposure.

2. Develop and distribute materials to educate the public on airport noise issues, including airport noise contours, noise-compatible planning and regulation, noise changes that may result from new construction and changes in flight frequencies and patterns and noise complaint procedures. Incorporate these educational materials into the county's overall environmental educational efforts.

Light Pollution

1. EQAC recommends that the Board of Supervisors direct the Department of Planning and Zoning to place work on a revision to the Outdoor Lighting Ordinance high in its "Priority 1" work plan in order to address glare and several minor issues and to have such ordinance revisions ready for Board of Supervisors approval not later than July 2008.

2. EQAC recommends that the Board of Supervisors direct the Fairfax County Park Authority to revise its specifications for athletic field lighting to correct the current deficiencies, including but not necessarily limited to:

    - Inadequate and confusing treatment of glare (as opposed to surface illumination).

    - Overly restrictive and sometimes inappropriate hardware specifications that give the appearance of favoring a particular manufacturer or supplier.

    - Explanatory documentation for public consumption, particularly that posted on the Web site, that contains scientific inaccuracies or confused or confusing subject matter.

Visual Pollution

1. EQAC recommends that the county continue negotiations with the commonwealth to enable the county to remove signs from the VDOT right-of-way and to enforce limitations and restrictions on such signage in the same manner as though the signs were covered under the Fairfax County ordinances, including the application of civil penalties.

2. EQAC recommends that the lack of an explicit provision within Article 12-300 of the present ordinance for assessment of civil penalties be rectified at the earliest opportunity. It is recommended that Article 18-903 of the ordinance be amended by deleting items 1.H and 1.I. These provisions should be replaced by new, more comprehensive, language built directly into Article 12. (See Addendum 1 for suggested text.) It is further recommended that the modified ordinance be used in much the same manner as is done by the Department of Public Works and Environmental Services with its "Letter to Industry". When an illegally posted sign is observed by an inspector, or reported by a resident, such a letter, containing the text of the ordinance, including the penalties clause, could be sent to the offending party as a means of strongly discouraging continuance or repetition of the violation.

APPENDIX A

SUMMARY OF ENVIRONMENTAL BILLS OF INTEREST 2007 VIRGINIA GENERAL ASSEMBLY

Each year, the Virginia General Assembly considers scores of bills that could impact the environment and conservation efforts in the commonwealth. This appendix identifies and summarizes several such bills that were considered by the General Assembly in 2007 and indicates whether they "Passed" or "Failed". For the most part, the summaries are from the Virginia General Assembly Legislative Information System. By going to the LIS Web site (http://leg.1.state.va.us), the entire bill as well as its history and patrons can be reviewed. Unless otherwise noted, the summaries set forth herein describe the bill as originally submitted. Because bills are frequently amended, reference should be made to the LIS Web site for final language of bills of interest.

Senate Bills

SB 771 Virginia Public Building Authority; water treatment. Authorizes the Virginia Public Building Authority to issue bonds in an amount not to exceed $250 million for grants to be used solely for the purpose of funding the installation of nutrient removal technologies at specified publicly owned treatment works and nonsignificant dischargers to implement the Commonwealth's Chesapeake Bay Tributary Strategies. **PASSED.**

SB 817 Zoning; road capacity. Allows a locality to deny or modify a request for rezoning when the existing and future transportation network that will serve the proposed development is inadequate to handle the anticipated transportation impact of the proposed development. **FAILED.**

SB 821 Violation of erosion and sediment control ordinances. Allows localities to adopt an ordinance that assesses a civil penalty between $100 and $1,000 for violation of erosion and sediment control laws. The bill also increases the cap on civil penalties from $3,000 to $10,000. This bill is identical to HB 2568. **PASSED.**

SB 867 Sales tax exemption; energy-efficient products. Provides a sales tax exemption for purchases of certain Energy Star qualified products with a sales price of $2,500 or less made during a four-day period each year in mid-October. The bill also authorizes dealers to absorb the sales and use tax on all other items sold during the same time period and thereby relieve the purchasers of the obligation to pay such tax. Dealers who absorb such taxes are liable for payment of the same to the Tax Commissioner. The sales tax holiday would expire in July of 2012. **PASSED.**

SB 869 Transfer of development rights. Provides that any county and an adjacent city may enter voluntarily into an agreement to permit the county to designate eligible receiving areas in the city if the governing body of the city has also amended its zoning ordinance to designate the same areas as eligible to receive density being transferred from sending areas in the county. The bill also expands the definition of "sending property." This bill is identical to HB 2503. **PASSED.**

SB 870 Income tax credits; machinery and equipment used in recycling process. Extends the sunset date from January 1, 2007, to January 1, 2015, for the income tax credit for machinery and equipment used to produce goods from recyclable materials. The bill would also make the credit available to individual income taxpayers. Currently, only corporate income taxpayers may claim the credit. **PASSED.**

SB 939 Conservation of trees during the land development process for air quality improvement in certain localities. Provides that certain localities may, by ordinance, require conservation of trees during the development process. The bill also provides that the tree conservation ordinance may require that the site plan for any subdivision or development provide for the preservation and replacement of trees on the development site such that the minimum tree canopy or tree cover percentage ten years after development is projected to be as follows: (i) ten percent tree canopy for a site zoned business, commercial, or industrial; (ii) ten percent tree canopy for a residential site zoned 20 or more units per acre; (iii) 15 percent tree canopy for a residential site zoned more than ten but less than 20 units per acre; (iv) 20 percent tree canopy for a residential site zoned more than five but not more than ten units per acre; and (v) 30 percent tree canopy for a residential site zoned one to five units per acre. Finally, the bill mandates that any tree conservation ordinance provide for reasonable exceptions to or deviations from the canopy requirements. **FAILED.**

SB 942 Virginia Land Conservation Fund disbursements. Establishes a threshold that determines how the unrestricted funds in the Virginia Land Conservation Fund will be expended. If, by September, the new deposits in the Fund are less than $10 million, 25 percent of the moneys in the Fund is allocated to the Open-Space Land Preservation Trust Fund and 75 percent is disbursed in the form of grants equally among the following four uses: natural area protection, open spaces and parks (including land for hunting, fishing or wildlife watching), farmlands and forest preservation, and historic area preservation. If the Fund contains $10 million or more, the OSLPTF receives 25 percent of the moneys in the Fund and the remaining funds are awarded equally in the form of grants among five uses: natural area protection, open spaces and parks (including land for hunting, fishing or wildlife watching), farmland preservation, forestland conservation, and historic area preservation. Any OSLPTF funds not disbursed or committed to a project by the end of the fiscal year revert to the Virginia Land Conservation Fund to be redistributed among the authorized uses. This bill is identical to HB 2825. **PASSED.**

SB 1031 Power plant siting. Establishes a pre-application planning and review process for certain gas or electric utility facilities. **PASSED.**

SB 1051 Classification of real property; energy-efficient buildings. Permits localities to tax certain energy-efficient buildings, not including the land on which they are located, at a lower tax rate than that imposed on the general class of real property by creating a separate classification for taxation purposes. An energy-efficient building is any building that exceeds the energy efficiency standards prescribed in the Virginia Uniform Statewide Building Code by 30 percent. Energy-efficient building certification shall be determined by any qualified licensed engineer or contractor who is not related to the taxpayer and who shall certify to the taxpayer that he has qualifications to provide the certification. **PASSED.**

SB 1102 Adjustment or relocation of billboard signs. Provides that the owner of a billboard situated on land acquired due to widening, construction, or reconstruction by purchase or by exercise of eminent domain may relocate the billboard to another location on the same property and may adjust the height or angle of the billboard. **FAILED.**

SB 1199 Office of Intermodal Planning and Investment. Amends the name of the "Intermodal Office" to the "Office of Intermodal Planning and Investment" and provides for additional duties of the Office. **PASSED.**

SB 1211 Virginia Resources Authority. Expands projects that can be financed through the Authority to include programs or projects for land conservation or land preservation. This bill is identical to HB 2694, which incorporates HB 1713. **PASSED.**

SB 1250 Immunity of citizens at public hearings. Provides that any citizen appearing at a public hearing before the governing body of any locality or other political subdivision, or the boards, commissions, agencies and authorities thereof, and other governing bodies of any local governmental entity shall be immune from a civil liability for a violation of § 18.2-499 (willful and malicious injury to another's reputation, trade, business, or profession), or a claim of tortious interference with an existing contract or a business or contractual expectancy, arising from a citizen's statements concerning matters properly before the governing body. **PASSED.**

SB 1254 Denying or modifying an application for rezoning when transportation network is inadequate. Allows a locality to provide in its zoning ordinance for the denial or modification of an application for rezoning when the existing and future transportation network is inadequate to handle the anticipated transportation impact of the proposed development. In determining whether the transportation network is inadequate, the locality shall provide in its zoning ordinance for the consideration of the following: (i) the locality's comprehensive plan, the Department of Transportation's secondary road and other transportation plans, or such other available information regarding the transportation network that will serve the proposed development; (ii) whether the proposed development reduces the level of service in the existing and future transportation network, as determined by the locality in consultation with appropriate transportation agencies; and (iii) whether the design and phasing of the proposed development, the funded capital improvements program, or other combination of public

and private resources will address the anticipated transportation impact of the proposed development. **FAILED.**

SB 1256 Storage of hazardous materials. Permits localities to prohibit the initiation of new storage of hazardous materials in floodplains five stream miles upstream of an intake for a public water supply. However, the provisions of this bill shall not apply to (i) operations of the Virginia Department of Transportation or its contractors concerning the construction, reconstruction, or maintenance of highways, or (ii) all Department of Defense facilities and operations. **FAILED.**

SB 1273 Department of General Services; Green Buildings Act. Requires all major facility projects of state agencies to be constructed to meet United States Green Building Council Leadership in Energy and Environmental Design certification standards, unless granted an exemption by the Director of the Department of General Services. Such projects will not be required to obtain official LEED® certification. Application of the requirement will be phased in over the next three years based on the square footage of the project. The provisions of the bill do not apply to construction projects of public school districts. **FAILED.**

SB 1312 Powers of CTC; highway access management standards. Requires the Commonwealth Transportation Commissioner to develop and implement comprehensive highway access management standards for managing access to and preserving and improving the efficient operation of the state systems of highways. **PASSED.**

SB 1329 Design and construction of public facilities. Allows localities to provide for adoption of guidelines for the design and construction of public facilities, public infrastructure, and other structures within areas of proposed development or rezoning. **FAILED.**

SB 1356 Impact fees for public facilities related to residential development. Provides that any locality that includes within its comprehensive plan a calculation of the capital costs of public facilities necessary to serve residential uses may impose and collect impact fees to cover the costs of issuing permits for residential uses in amounts consistent with the methodologies used in its comprehensive plan to defray the capital costs of public facilities related to the residential development. A locality imposing impact fees pursuant to the provisions of this bill shall allow credit against the impact fees for cash proffers collected for the purpose of defraying the capital costs of public facilities related to the residential development. In addition, a locality imposing impact fees pursuant to the provisions of this bill may require that such impact fees be paid prior to and as a condition of the issuance of any necessary building permits for residential uses. **FAILED.**

SB 1396 Offshore energy. States that it is the policy of the Commonwealth (i) to support federal funding for the Department of the Interior, Minerals Management Service, (ii) to support the inclusion of the area off Virginia's Atlantic coast for further study and analysis and possible lease sales as part of the Department of the Interior's 2007-2012

Five Year Leasing Plan with respect to exploration 50 miles or more off the Atlantic shoreline, and (iii) to urge the President of the United States to revoke the administrative withdrawal from exploratory and leasing activity of submerged lands that are 50 miles or more off the Atlantic shoreline of the Commonwealth. **FAILED.**

SB 1403 Department of Environmental Quality. Consolidates the State Air Pollution Control Board, the State Water Control Board, and the Waste Management Board into one eleven-member citizen board--the Virginia Board of Environmental Quality--with the authority to adopt regulations, including general permit regulations. All other responsibilities of the existing boards, including the authority to issue licenses and permits, shall be transferred to the Department of Environmental Quality. The Department will hold public meetings for the presentation of staff recommendations on major permitting decisions. A citizen appeals board is established and granted the authority to hear appeals on decisions of the Director of the Department of Environmental Quality and to recommend reconsideration by the Director. The bill includes a "reenactment clause" that requires the General Assembly of 2008 to reaffirm the legislation and delays the effective date until July 1, 2008. This bill is identical to HB 3113. **PASSED.**

SB 1416 Electric utility regulation; advances scheduled expiration of capped rate period. Advances the scheduled expiration of the capped rate period from December 31, 2010 to December 31, 2008, establishes a new mechanism for regulating the rates of investor-owned electric utilities and limits the ability of most consumers to purchase electric generation service from competing suppliers. The Virginia General Assembly Legislative Information System provides a summary that is too lengthy to reproduce here; the reader is referred to the LIS Web site (http://leg.1.state.va.us) for the complete summary. **PASSED.**

House Bills

HB 1669 Residential development impact fees. Allows localities to adopt provisions in subdivision ordinances for the assessment of impact fees when existing public safety facilities are inadequate to support a proposed residential development. Such fees shall be a pro rata share of the costs of reasonable and necessary capital improvements attributable to the proposed development. Prior to any such assessment, the locality shall have in place a capital facilities plan that provides a reasonable basis for determining the extent or level of inadequacy of such facilities in the area of the proposed development. Localities may only assess impact fees under this subdivision against persons constructing five or more residential structures per calendar year in such locality. **FAILED.**

HB 1670 Residential development impact fees. Allows localities to adopt provisions in subdivision ordinances for the assessment of impact fees when existing facilities for schools are inadequate to support a proposed residential development. Such fees shall be a pro rata share of the costs of reasonable and necessary capital improvements

attributable to the proposed development. Prior to any such assessment, the locality shall have in place a capital facilities plan that provides a reasonable basis for determining the extent or level of inadequacy of such facilities in the area of the proposed development. Localities may only assess impact fees under this subdivision against persons constructing five or more residential structures per calendar year in such locality. **FAILED.**

HB 1671 Development impact fees. Allows localities to adopt provisions in subdivision ordinances for the assessment of impact fees when existing parks, playgrounds, and recreational facilities are inadequate to support a proposed development. Such fees shall be a pro rata share of the costs of reasonable and necessary capital improvements attributable to the proposed development. Prior to any such assessment, the locality shall have in place a capital facilities plan that provides a reasonable basis for determining the extent or level of inadequacy of such facilities in the area of the proposed development. **FAILED.**

HB 1678 Sales tax exemption; energy-efficient products. Provides a sales tax exemption for purchases of certain Energy Star qualified products with a sales price of $2,500 or less made during a four-day period each year in mid-October. The bill also authorizes dealers to absorb the sales and use tax on all other items sold during the same time period and thereby relieve the purchasers of the obligation to pay such tax. Dealers who absorb such taxes are liable for payment of the same to the Tax Commissioner. The sales tax holiday would expire in July of 2012. **PASSED.**

HB 1689 Regulation of municipal solid waste. Repeals two provisions of the solid waste laws enacted in 1999 that were subsequently found to be unconstitutional by the federal court. The bill repeals the authority of the Solid Waste Management Board to develop regulations governing the commercial transport of nonhazardous municipal solid waste by truck. This section was declared unconstitutional because it imposed certain requirements on large trucks carrying solid waste that violated the commerce clause. The federal court found that the statute placed "disproportionate burdens" on trucks carrying waste from outside of Virginia. The second provision found to be unconstitutional under the commerce clause was the 2,000 tons per day cap placed on landfills for accepting municipal solid waste. This is a recommendation of the Virginia Code Commission. **PASSED.**

HB 1710 Virginia Public Building Authority; water treatment. Authorizes the Virginia Public Building Authority to issue bonds in an amount not to exceed $250 million for grants to be used solely for the purpose of funding the installation of nutrient removal technologies at specified publicly owned treatment works and non-significant discharges to implement the Commonwealth's Chesapeake Bay Tributary Strategies. This bill is identical to SB 771. **PASSED.**

HB 1713 Virginia Resources Authority. Expands projects that can be financed through the Authority to include programs or projects for land conservation or land preservation. This bill has been incorporated into HB 2694. **FAILED.**

HB 1715 Casting garbage. Increases the fine for dumping garbage into the waters of the state from a maximum of $100 to $1,000. **PASSED.**

HB 1724 Statewide transportation impact fees. Imposes a fee for the issuance of a certificate of occupancy for every building or structure that is neither exempt from taxation by law nor actually valued at more than $100,000 at the time such final certificate of occupancy is issued. The fee is due within 90 days of the issuance of such certificate of occupancy. The amount of the fee is equal to five percent of the actual value of such building or structure, exclusive of the first $100,000 of such actual value. The amount of the fee may, however, increase to five percent of the sales price of such building or structure, exclusive of the first $100,000 of such sales price, if no fee has been collected on such building or structure and such building or structure is sold within 90 days of the issuance of a certificate of occupancy; in this event, the amount of the fee is due and payable on the date of the settlement of the sale. Under all circumstances, the fee is capped at $20,000 per building or structure.

An amount equal to two-thirds of the fee is deposited into the Transportation Trust Fund and must be spent in the construction district in which the fee was collected. The Governor may waive the collection of the amount to be deposited into the Transportation Trust Fund if he determines that the economic benefits of the building or structure outweigh any negative impact such building or structure may have on transportation.

Moreover, an amount equal to the remaining one-third of the fee is deposited into a special interest-bearing account of the locality in which the fee was collected, and such amount must be spent on transportation projects within that locality. A locality may waive the collection of the amount to be deposited into its special interest-bearing account if its governing body determines that the economic benefits of the building or structure outweigh any negative impact such building or structure may have on transportation. **FAILED.**

HB 1745 Residential development impact fee assessments; adequate public facilities. Allows localities to adopt ordinances for the assessment of impact fees and acceptance of cash proffers when certain public facilities are inadequate to support a proposed residential development. If the proposed development is for senior residents only, then impact fees may be assessed and cash proffers may be accepted in relation to the adequacy of public safety, or public sewer or water facilities. For all other proposed residential developments, the impact fees may be assessed, and the cash proffers may be accepted, in relation to the adequacy of education, transportation, or public water or sewer needs. Such fees and proffers shall be a pro rata share of the costs of reasonable and necessary capital improvements attributable to the proposed development. Prior to any impact fee assessment or acceptance of cash proffers, the locality must identify the particular public facility needs in its comprehensive plan, and must have in place a capital improvement program that provides a reasonable basis for determining the extent or level of inadequacy of such facilities in the area of the proposed development. If the locality does not apply impact fees or cash proffers paid by a developer to the capital project that

served as the basis for such assessment or acceptance within six years of collection, then the developer may seek a writ of mandamus to compel the locality to do so. Any impact fee ordinance and any cash proffer ordinance shall expire after six years, and may then be adopted for consecutive six-year periods. **FAILED.**

HB 1758 Obstructing or contaminating waters. Increases the penalty for obstructing or contaminating state waters to a Class 1 misdemeanor. Currently, the penalty is a fine of not less than $100 nor more than $500 or confinement in jail for not more than 12 months, or both. **PASSED.**

HB 1804 Solar water heating system pay-as-you-save pilot program. Directs the State Corporation Commission to analyze, and if appropriate, to establish, a pilot program whereby residential customers who install a solar water heating system will be able to pay for the system as an item on their monthly electricity bill. Participation in the pilot program would be voluntary. Participating electricity distributors will be required to submit proposed tariffs for recovery of the costs of the systems over a term not to exceed 75 percent of the expected life of the system, in monthly amounts that are less than the expected reductions in the electricity bill resulting from the installation of the system. This bill has been incorporated into HB 2401. **FAILED.**

HB 1858 Cash proffers; purchase of development rights programs. Provides that a locality that has established a purchase of development rights program may include in its zoning ordinance provisions for the voluntary proffering in writing, by the owner, of reasonable conditions, which shall include the payment of cash to the locality for local purchase of development rights that will be dedicated as easements for conservation, open space, or other purposes pursuant to the Open-Space Land Act. No such proffer shall be accepted by a locality, however, if the owner has already proffered dedication of such easements to that locality. For purposes of this bill, development rights means the level and quantity of development permitted by the zoning ordinance expressed in terms of housing units per acre, floor area ratio, or equivalent local measure. **FAILED.**

HB 1865 Adequate water resources. Permits localities to adopt reasonable provisions allowing the locality to deny or delay subdivision approval or issuance of a building permit or deny a rezoning request if the locality demonstrates that public facilities related to the provision of water are inadequate to support the services that will be required by a proposed subdivision or zoning classification. The locality shall base such determination on its water supply plan as approved by the Department of Environmental Quality and on-demand projections in such plan. **FAILED.**

HB 2067 Virginia Indoor Clean Air Act; penalty. Provides that it shall be unlawful for any person to smoke in any establishment built and operated after July 1, 2008 as a restaurant, unless such establishment is constructed in such a manner that areas where smoking may be permitted are structurally separated from the portion of the restaurant in which smoking is prohibited and such areas contain structurally separated ventilation systems. Additionally, the bill provides that no wait staff or busboys in such restaurants shall be required by the proprietors or person who manages or otherwise controls any

such restaurant to work in smoking areas mandated by this section without consent of such employees. The bill prohibits smoking in any building owned or leased by the Commonwealth or agency thereof or any locality. The bill contains technical amendments. **FAILED.**

HB 2118 Impact fees for public facilities related to residential development. Provides that any locality that includes within its comprehensive plan a calculation of the capital costs of public facilities necessary to serve residential uses may impose and collect impact fees to cover the costs of issuing permits for residential uses in amounts consistent with the methodologies used in its comprehensive plan to defray the capital costs of public facilities related to the residential development. A locality imposing impact fees pursuant to the provisions of this bill shall allow credit against the impact fees for cash proffers collected for the purposes of defraying the capital costs of public facilities related to the residential development. In addition, a locality imposing impact fees pursuant to the provisions of this bill may require that such impact fees be paid prior to and as a condition of the issuance of any necessary building permits for residential uses. **FAILED.**

HB 2128 Adjustment or relocation of billboard signs. Provides that the owner of a billboard situated on land acquired due to widening, construction, or reconstruction by purchase or by exercise of eminent domain may relocate the billboard to another location as close as practicable on the same property and may adjust the height or angle of the billboard. **PASSED.**

HB 2247 Biofuels Incentive Grant Program; production eligibility. Lowers the eligibility requirement of the volume of biofuels produced and sold from ten million gallons to 10,000 gallons per calendar year for a producer to be eligible for a grant. This bill has been incorporated into HB 3089. **FAILED.**

HB 2325 Clustering. Defines several key terms in the existing clustering statute that requires most localities to designate a portion of unimproved land as eligible for clustering of single-family dwellings. Also, "unimproved land" shall apply to residentially zoned land only, rather than residential and agricultural land. **FAILED.**

HB 2326 Clustering of single-family dwellings. Makes the clustering provisions that are slated to become effective July 1, 2007, optional, rather than mandatory. **FAILED.**

HB 2327 Clustering of single-family dwellings. Exempts certain agricultural counties from provisions that require most localities to designate certain areas for potential clustering of single-family dwellings. **FAILED.**

HB 2401 Electric Utility Conservation Programs; created, report. Requires investor-owned utilities and cooperatives providing electric distribution services to develop and implement plans and programs to meet goals to be adopted by the State Corporation Commission that provide for increasing efficiency and reducing consumption of electic energy in the commonwealth. **FAILED.**

HB 2449 Local noise abatement structure ordinances. Requires the governing body of every county, city, and town, no later than January 1, 2008, to adopt an ordinance requiring developers to construct, as part of any development abutting any highway or planned highway, in conjunction with such development, any and all noise walls or other noise mitigation structures that may be required to protect properties within the development from highway noise levels that exceed or will exceed standards established by the Virginia Department of Transportation or the federal government. If a noise impact study is required, such study may be conducted by the county, city, or town, by the Department, or by a reputable business with demonstrated expertise in acoustic engineering pursuant to a contract with the county, city, or town, the Department, or the developer whose development may be subject to noise impacts. **FAILED.**

HB 2486 Conservation of trees during the development process for air quality improvement in certain localities. Provides that certain localities may, by ordinance, require conservation of trees during the development process. The bill also provides that the tree conservation ordinance may require that the site plan for any subdivision or development provide for the preservation and replacement of trees on the development site such that the minimum tree canopy or tree cover percentage ten years after development is projected to be as follows: (i) ten percent tree canopy for a site zoned business, commercial, or industrial; (ii) ten percent tree canopy for a residential site zoned 20 or more units per acre; (iii) 15 percent tree canopy for a residential site zoned more than 10 but less than 20 units per acre; (iv) 20 percent tree canopy for a residential site zoned more than five but not more than 10 units per acre; and (v) 30 percent tree canopy for a residential site zoned one to five units per acre. Finally, the bill mandates that any tree conservation ordinance provide for reasonable exceptions to or deviations from the canopy requirements. **FAILED.**

HB 2500 Conditional zoning; high-growth localities by ordinance may choose to utilize. Conditional zoning. Allows "high-growth" localities to use the "Northern Virginia" form of conditional zoning. This will give high-growth localities greater flexibility including the ability to accept proffers, the need for which is not generated solely by the rezoning. **PASSED.**

HB 2503 Development rights; county and adjacent city may enter voluntarily into an agreement. Transfer of development rights. Provides that any county and an adjacent city may enter voluntarily into an agreement to permit the county to designate eligible receiving areas in the city if the governing body of the city has also amended its zoning ordinance to designate the same areas as eligible to receive density being transferred from sending areas in the county. The bill also expands the definition of "sending property." This bill is identical to SB 869. **PASSED.**

HB 2539 Virginia Water Protection Permit. Restructures the Virginia Water Protection Permit statute by placing the provisions into a separate article of the State Water Control Law titled "Water Resources and Wetlands Protection Program." The provisions are currently included as a section under the general powers of the Water Control Board. Existing permits are exempted from any changes and shall remain in

effect until their specified expiration dates or until they are otherwise amended, modified, repealed, or revoked. **PASSED.**

HB 2555 Department of General Services; Green Buildings Act. Requires all major facility projects of state agencies to be constructed to meet the United States Green Building Council Leadership in Energy and Environment Design silver certification standard, unless granted an exemption by the Director of the Department of General Services. Such projects will not be required to obtain official LEED certification. Application of the requirement will be phased in over the next three years based on the square footage of the project. The provisions of the bill do not apply to construction projects of public school districts. **FAILED.**

HB 2568 Violation of erosion and sediment control ordinances. Allows localities to adopt an ordinance that assesses a civil penalty between $100 and $1,000 for violation of erosion and sediment control laws. The bill also increases the cap on civil penalties from $3,000 to $10,000. This bill is identical to SB 821. **PASSED.**

HB 2614 Construction of electrical utility facilities; review of applications by State Corporation Commission. Requires the State Corporation Commission to conduct an analysis of the facility applicant's assessment of need, load flow analysis, and method of installation. Utilities are required to provide a GIS map of any proposed improvement or extension to the Commission, which shall make the GIS map publicly available on its Web site. **PASSED.**

HB 2618 Classification of real property; energy-efficient buildings. Permits localities to tax certain energy-efficient buildings, not including the land on which they are located, at a lower tax rate than that imposed on the general class of real property by creating a separate classification for taxation purposes. An energy-efficient building is any building that exceeds the energy efficiency standards prescribed in the Virginia Uniform Statewide Building Code by 30 percent. Energy-efficient building certification shall be determined by any qualified licensed engineer or contractor who is not related to the taxpayer and who shall certify to the taxpayer that he has qualifications to provide the certification. **PASSED.**

HB 2679 Chesapeake Bay Preservation Act; imposition and collection of certain fees. Provides that any locality that has designated Chesapeake Bay Preservation areas and that includes within its comprehensive plan a calculation of the capital costs of public facilities necessary to serve residential uses may impose and collect impact fees to cover the costs of issuing permits for residential uses in amounts consistent with the methodologies used in its comprehensive plan to defray the capital costs of public facilities related to the residential development. A locality imposing impact fees pursuant to the provisions of this bill shall allow credit against the impact fees for cash proffers collected for the purposes of defraying the capital costs of public facilities related to the residential development. In addition, a locality imposing impact fees pursuant to the provisions of this bill may require that such impact fees be paid prior to and as a

condition of the issuance of any necessary building permits for residential uses. **FAILED.**

HB 2680 Impact fees for public facilities related to residential development. Provides that any locality that has designated Chesapeake Bay Preservation areas and that includes within its comprehensive plan a calculation of the capital costs of public facilities necessary to serve residential uses may impose and collect impact fees to cover the costs of issuing permits for residential uses in amounts consistent with the methodologies used in its comprehensive plan to defray the capital costs of public facilities related to the residential development. A locality imposing impact fees pursuant to the provisions of this bill shall allow credit against the impact fees for cash proffers collected for the purposes of defraying the capital costs of public facilities related to the residential development. In addition, a locality imposing impact fees pursuant to the provisions of this bill may require that such impact fees be paid prior to and as a condition of the issuance of any necessary building permits for residential uses. **FAILED.**

HB 2694 Virginia Resources Authority. Expands projects that can be financed through the Authority to include programs or projects for land conservation or land preservation. This bill incorporates HB 1713 and is identical to SB 1211. **PASSED.**

HB 2708 Net energy metering; sales of net electricity. Requires the default service provider to enter into an agreement to purchase any excess electricity generated by an eligible customer-generator that is consistent with the minimum requirements for such contracts established by the State Corporation Commission. The measure also makes Old Dominion Power subject to the same net energy metering provisions that apply to other investor-owned electric utilities. Old Dominion Power had been exempt from all provisions of the Electric Utility Restructuring Act. **PASSED.**

HB 2777 Comprehensive plan to include urban development areas. Provides that every county that has adopted zoning shall, and any city or town may, amend its comprehensive plan to incorporate one or more proposed urban development areas, if such locality meets the criteria for high growth. For purposes of this section, an urban development area is an area designated by a locality that is most suited for development due to proximity to transportation facilities, the availability of public water and sewer, and its proximity to a city, town or other developed area. The comprehensive plan shall designate one or more urban development areas sufficient to meet projected residential growth in the locality for the ensuing 20-year period. Any comprehensive plan amended pursuant to this section shall also be amended to incorporate the opportunity for development that includes features that promote an improved quality of life. No county, city or town that has amended its comprehensive plan in accordance with this section shall limit or prohibit development pursuant to existing zoning or any application for rezoning based solely on the fact that the property is located outside the urban development area. Counties shall have until July 1, 2011, to amend their comprehensive plans in accordance with these provisions. **FAILED.**

HB 2796 Impact fees for public facilities related to residential development. Provides that any locality that includes within its comprehensive plan a calculation of the capital costs of public facilities necessary to serve residential uses may impose and collect impact fees to cover the costs of issuing permits for residential uses in amounts consistent with the methodologies used in its comprehensive plan to defray the capital costs of public facilities related to the residential development. A locality imposing impact fees pursuant to the provisions of this bill shall allow credit against the impact fees for cash proffers collected for the purposes of defraying the capital costs of public facilities related to the residential development. In addition, a locality imposing impact fees pursuant to the provisions of this bill may require that such impact fees be paid prior to and as a condition of the issuance of any necessary building permits for residential uses. **FAILED.**

HB 2814 Denying or modifying an application for rezoning when transportation network is inadequate. Allows a locality to provide in its zoning ordinance for the denial or modification of an application for rezoning when the existing and future transportation network is inadequate to handle the anticipated transportation impact of the proposed development. In determining whether the transportation network is inadequate, the locality shall provide in its zoning ordinance for the consideration of the following: (i) the locality's comprehensive plan, the Department of Transportation's secondary road and other transportation plans, or such other available information regarding the transportation network that will serve the proposed development; (ii) whether the proposed development reduces the level of service in the existing and future transportation network, as determined by the locality in consultation with appropriate transportation agencies; and (iii) whether the design and phasing of the proposed development, the funded capital improvements program, or other combination of public and private resources will address the anticipated transportation impact of the proposed development. **FAILED.**

HB 2825 Virginia Land Conservation Fund disbursements. Establishes a threshold that determines how the unrestricted funds in the Virginia Land Conservation Fund will be expended. If, by September, the new deposits in the Fund are less than $10 million, 25 percent of the money in the Fund is allocated to the Open-Space Land Preservation Trust Fund and 75 percent is disbursed in the form of grants equally among the following four uses: natural area protection, open spaces and parks (including land for hunting, fishing or wildlife watching), farmlands and forest preservation, and historic area preservation. If the Fund contains $10 million or more, the OSLPTF receives 25 percent of the money in the Fund and the remaining funds are awarded equally in the form of grants among five uses: natural area protection, open spaces and parks (including land for hunting, fishing or wildlife watching), farmland preservation, forestland conservation, and historic area preservation. Any OSLPTF funds not disbursed or committed to a project by the end of the fiscal year reverts to the Virginia Land Conservation Fund to be redistributed among the authorized uses. This bill is identical to SB 942. **PASSED.**

HB 2850 Office of Intermodal Planning and Investment. Amends the name of the "Intermodal Office" to the "Office of Intermodal Planning and Investment" and provides for additional duties of the Office. **PASSED.**

HB 2854 Financial reports by VDOT and VDRPT. Requires the preparation and dissemination of additional financial information by the Virginia Department of Transportation and the Virginia Department of Rail and Public Transportation. **PASSED.**

HB 3033 Transfer of development rights. Permits the severance and transfer of development rights from a sending property without requiring those rights to be immediately affixed to a specific receiving property. In addition, the bill authorizes the purchase and/or sale of development rights by the locality in order to establish a clearinghouse for the conveyance of development rights. **PASSED.**

HB 3089 Biofuels Incentive Grant Program; production eligibility. Lowers the eligibility requirement of the volume of biofuels produced and sold from 10 million gallons to two million gallons per calendar year for a producer to be eligible for a grant. The bill also amends the definition of producer to include any agricultural cooperative association, as defined in the Agricultural Cooperative Association Act (§ 13.1-312 et seq.). This bill incorporates HB 2247. **PASSED.**

HB 3113 Department of Environmental Quality. Consolidates the State Air Pollution Control Board, the State Water Control Board, and the Waste Management Board into one eleven-member citizen board--the Virginia Board of Environmental Quality--with the authority to adopt regulations, including general permit regulations. All other responsibilities of the existing boards, including the authority to issue licenses and permits, shall be transferred to the Department of Environmental Quality. The Department will hold public meetings for the presentation of staff recommendations on major permitting decisions. A citizen appeals board is established and granted the authority to hear appeals on decisions of the Director of the Department of Environmental Quality and to recommend reconsideration by the Director. The bill includes a "re-enactment clause" that requires the General Assembly of 2008 to reaffirm the legislation and delays the effective date until July 1, 2008. This bill is identical to SB 1403. **PASSED.**

HB 3133 Landfill postclosure document. Requires the Department of Environmental Quality to develop a postclosure guidance document for those landfills that stopped taking solid waste prior to October 9, l993. The document is to be developed by May 1, 2007, and has to include comments made by the public. **PASSED.**

HB 3178 Funding for upgrades of wastewater treatment plants. Provides for a direct appropriation to the Water Quality Improvement Fund of no more than $500 million for grants to upgrade wastewater treatment plants and provides three methods for the payment of that sum: (i) current funding in the WQIF; (ii) future deposits to the WQIF; and, (iii) the use of Virginia Public Building Authority bonds. The bill provides for the payment of these grants to 89 publicly-owned wastewater treatment plants according to

the methodology specified in in the Water Quality Improvment Act, with a minimum grant amount of 35 percent of the costs for the design and installation of nutrient removal technology. Should any grant be prorated, the bill prioritizes the use of any year-end revenue surplus or unappropriated general fund balances deposited to the WQIF be used to offset any proration. **FAILED.**

HB 3194 Civil immunity; persons speaking at certain public hearings. Provides that any person appearing at a public hearing called by the governing body of a locality or political subdivision, or an agency, authority, board, commission, or other governmental entity shall not be liable for any civil damages for a claim for violation of § 18.2-499 (conspiracy to injure another in trade, business, or profession), for a claim for tortious interference with a business or contractual expectancy, or for statements made in bad faith or with malicious intent resulting from the exercise of his right to speak on matters before a governing body. **FAILED.**

HB 3196 Comprehensive plan to include urban development areas. Provides that every county that has adopted zoning may, and that any city or town may, amend its comprehensive plan to incorporate one or more proposed urban development areas, if such locality meets the criteria for high growth. An urban development area is an area designated by a locality that is most suited for development due to proximity to transportation facilities, the availability of a public or community water and sewer system, or proximity to a city, town, or other developed area. The comprehensive plan shall designate one or more urban development areas sufficient to meet projected residential growth in the locality for the ensuing 20-year period. Any comprehensive plan amended pursuant to this section shall also be amended to incorporate the opportunity for development that includes features that promote new urbanism and traditional neighborhood development. No county, city, or town that has amended its comprehensive plan in accordance with these provisions shall limit or prohibit development pursuant to existing zoning or any application for rezoning based solely on the fact that the property is located outside the urban development area. Any locality that has not revised its comprehensive plan to establish an urban development area on or before July 1, 2008 shall not receive 50 percent of its annual secondary road allocation from the Virginia Department of Transportation. **FAILED.**

House Joint Committee

HJ 681 Study; climate change; report. Establishes a joint subcommittee to study the risks and opportunities created in the Commonwealth as a result of the changing climate. Specifically, the joint subcommittee will report on steps the public sector can take to minimize harmful impacts on the environment, such as green building practices and forest preservation; identify business opportunities for Virginia industry arising in various economic sectors that benefit from the efforts to mitigate the harm from climate change, such as alternative fuel technology and feedstocks; review the costs and benefits of possible regulatory schemes, such as market-based and command control initiatives; and suggest ways that the Commonwealth can act now to reduce the future cost of such

regulation and explore the value of participating in a nonnational regulatory scheme. **FAILED.**

HJ 575 Energy Conservation Awareness Week. Designates the first week in October, in 2007 and each succeeding year, as "Energy Conservation Awareness Week" in Virginia in support of the national initiative. **PASSED.**

HJ 692 Study; continues the Joint Subcommittee Studying Long-Term Funding for the Purchase of Development Rights to Preserve Open-Space and Farmlands; report. Continues for an additional year the Joint Subcommittee Studying Long-Term Funding Sources for the Purchase of Development Rights to Preserve Open-Space Land and Farmlands. In conducting its study, the joint subcommittee shall review recent funding for the preservation of open-space and other conservation land; the future needs of the Commonwealth for open-space and other conservation land, including but not limited to: working farms and forests, wildlife habitat and gamelands, natural areas, parks, and historic resources; the mix of programs best suited to meet such needs, including but not limited to Purchase of Development Rights programs; the cost of such needs; and long-term funding to pay the costs. In addition, the joint subcommittee shall develop a plan for the sharing of the costs of land preservation among the Commonwealth and its local governments. Further, the joint subcommittee shall identify strategies for increasing land preservation, water supply protection and the availability of large parks to serve Northern Virginia. This resolution incorporates HJR 576 (Lewis) and is identical to SJR 401 (Hanger). **PASSED.**

APPENDIX B

EQAC RESOLUTIONS AND POSITIONS DECEMBER 2006 THROUGH OCTOBER 2007

CONTENTS

County of Fairfax, Virginia

MEMORANDUM

DATE: January 10, 2007

TO: Board of Supervisors

FROM: Stella Koch, Chairman Stella M. Koch
Environmental Quality Advisory Council

SUBJECT: Support for a Fairfax County "Cool County" Effort

EQAC would like to commend members of the board of supervisors for their comments in the discussion on global climate change on December 11, 2006 at the board's Environmental Committee meeting. We understand that the county supports the concepts in the Sierra Club's Cool Cities program. We support and applaud Fairfax County's existing efforts to address some of the factors involved in creating the greenhouse gases that contribute to global climate change.

We support the board's intention to take action on this issue. We urge the county to take a leadership position and move forward in creating and implementing a "Cool Counties" program that mirrors the intention and performance-based orientation promoted by the Sierra Club's Cool Cities Program. We note that measures to reduce greenhouse gas emissions have local environmental benefits as well as cost savings. We look forward to working with the board and staff on this issue.

SMK:nhk

cc: Anthony H. Griffin, County Executive
Robert A. Stalzer, Deputy County Executive
Kambiz Agazi, Fairfax County Environmental Coordinator
Environmental Quality Advisory Council file: January, 2007

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Resolution of the Fairfax County Environmental Quality Advisory Council Regarding the Metrorail extension through Tysons Corner, Virginia

January 10, 2007

WHEREAS, the Environmental Quality Advisory Council (EQAC) is an advisory group that has been appointed by the Fairfax County Board of Supervisors to advise the board on environmental matters; and

WHEREAS, EQAC has consistently advocated for better land use and transportation integration, which includes a complete multimodal transportation system with complimentary rail, bus, car, and pedestrian facilities which is greatly facilitated by a street grid and safe connecting pedestrian walkways; and

WHEREAS, it is EQAC's view that the proposed extension of rail transit into and through Tysons Corner will be an essential component of such a multimodal transportation system and will be important to the continued economic vitality of Fairfax County; and

WHEREAS, the approved design of this rail extension would result in an alignment that is largely above ground through Tysons Corner; and

WHEREAS, it is EQAC's view that the construction of an aerial Metrorail project cutting through one of the nation's largest retail and business centers would negatively impact the Tysons Corner area; and

WHEREAS, it is EQAC's view that the proposed aerial route would not allow for an effective street grid due to large concrete pillars required to support the aerial track along route 7 and 123, and would impose significant physical barriers that must be addressed by the land use plan for the future mixed-use urban vision for Tysons Corner; and

WHEREAS, it is EQAC's view that the aerial Metrorail option, independent of land use planning decisions that may be made pursuant to the Tysons Corner Transportation and Urban Design Study, would ultimately result, when compared with a tunnel option, in more congestion, less walkability, more car miles/person, extra car trips and associated environmental impacts to include: increased noise pollution, visual pollution and light pollution; and

WHEREAS, while the aerial option has been approved by the Federal Transit Administration, EQAC believes that it is still timely and appropriate to revisit this decision; and

WHEREAS, on January 8, 2007, the board of supervisors endorsed consideration of the tunnel option;

THEREFORE, BE IT RESOLVED BY THE FAIRFAX COUNTY ENVIRONMENTAL QUALITY ADVISORY COUNCIL that EQAC commends the board of supervisors for its endorsement of the tunnel option.

BE IT FURTHER RESOLVED BY THE FAIRFAX COUNTY ENVIRONMENTAL QUALITY ADVISORY COUNCIL that:

County leaders are urged to continue to explore and advocate for the construction of a Metrorail tunnel through Tysons Corner; and

The council expresses its support to achieve:

1) An assessment of the environmental advantages of constructing a tunnel option instead of an aerial Metrorail option through Tysons Corner;
2) Simultaneous consideration of both a 3.5 mile tunnel beneath the entire length of Tysons Corner and an aerial design;
3) Side-by-side, open, competitive bidding of the tunnel option and the aerial option;
4) Assurance that total life cycle costs are included in any side-by-side competitive bidding; and
5) Consideration of the average car miles/person as a factor in the decision for the aerial or tunnel option.

/

County of Fairfax, Virginia

MEMORANDUM

DATE: January 17, 2007

TO: Board of Supervisors

FROM: Environmental Quality Advisory Council

SUBJECT: Pathway lighting and technical aspects of "glare"

At the December 4, 2006 meeting of the board of supervisors, at which the Environmental Quality Advisory Council's Annual Report on the Environment was presented, Supervisor Hudgins raised some technical questions concerning lighting glare in certain applications. The EQAC chair indicated that those questions could be best answered by the two EQAC members most conversant with these issues. In a subsequent discussion with Supervisor Hudgins to be certain that her questions would be properly addressed, it was determined that her particular concerns were for lighting of sidewalks and walkways that would provide safety but without glare that would degrade night vision of pedestrians and that would not adversely affect adjacent residences.

Through this memorandum, EQAC is responding to the specific questions that were raised on December 4, 2006, as clarified through subsequent coordination. This memorandum does not address the board's January 8, 2007 request for EQAC's review of the Fairfax County Park Authority's Field Lighting Study. We will review this document and provide comments through future correspondence.

In order to familiarize the board with the various provisions of the county's Outdoor Lighting Ordinance that apply to sidewalks and walkways, a copy of the ordinance and the explanatory 16 page guidance booklet are attached. The relevant paragraphs are highlighted. The Public Facilities Manual (PFM) does not contain any information dealing specifically with pathway lighting.

In general, there are two types of lighting fixtures that work well for paths and walkways: 1) post-mounted fixtures that are above head height and 2) bollard or short fixtures that are generally below waist height. In order to avoid glare, pole-mounted fixtures should be of the full cutoff type as illustrated in the guidance booklet and also in the EQAC Annual Report on the Environment. The higher the poles the greater can be the spacing between them. Bollard-type fixtures are available in a number of different styles and are generally in the range of 24-

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36 inches tall with louvers or other shielding devices at the top end so that the bulb surface is not directly visible. These are in use at many of our newer Fairfax County government and Park Authority facilities. Lower fixtures are usually about 10-15 inches above the ground and are widely used along the edges of planting beds and in similar situations so that the edges of a paved path are adequately lighted for safety but with a gentle indirect light. Because of the closer spacing normally required with bollard and lower level fixtures, installation costs may become an important consideration. The third attachment illustrates a variety of these latter fixture types.

Glare is a complex and frequently not well understood issue. However, it is very important in the type of lighting involved in this inquiry. The objective is sufficient lighting on a pathway surface for safe walking and enough to the sides to provide safety against intruders but, at the same time without luminous surface of high intensity being directly visible and thereby degrading sensitive night vision. To exemplify some of the confusion surrounding the glare issue, the recent memo to the Board of Supervisors from Harold Strickland, Chairman of the Fairfax County Park Authority, dated November 15, 2006, relating to the FCPA Athletic Field Lighting Study and a Performance Specifications Outline (ver. 3.0) dated November 1, 2006, which claimed the FCPA had adopted "glare" standards is instructive.

The FCPA letter states that "direct glare" is "the visual discomfort resulting from insufficiently shielded light sources in the field of view and is measured in candelas." This statement is largely correct as to visual discomfort but incorrect as to units of measurement.

The U.S. National Institute of Standards and Technology (NIST) defines the candela as the SI (International System of Units) unit of luminous intensity, which is essentially equivalent to the older term candle power. It refers to the luminous intensity of the source itself and is technically more completely stated as, "The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} hertz and that has a radiant intensity in that direction of 1/683 watt per steradian." There is no national or international standard for 'glare' and neither the Illumination Engineering Society of North America (IESNA) nor the International Dark-Sky Association (IDA) have promulgated one, though both bodies have extensively discussed the importance of the issue.

Glare is a complex concept. In addition to intensity of the source, its spectral distribution and whether it is a point source or distributed over a larger surface is important. Even more important is the background against which the source is viewed. An intense source, say a 1,500 watt metal halide bulb such as is common in sports lighting fixtures, viewed against the background of the mid-day or early evening sky appears only a little brighter than the background and is not particularly bothersome (see the left hand figure in the fourth attachment). However, the same source viewed against the dark night sky (the right hand figure) appears so intense as to be almost physically painful and destroys the dark adaptation (i.e. bleaches rhodopsin and the three photopsins) of the human eye. Thus, the complex characteristics of the human eye and the time of day are as important or more important than the mere physics of the light source. This is precisely the reason that there are no established standards for glare.

It is rather like one of our supreme court justices said of pornography, "I can't define it, but I know it when I see it."

A good encyclopedia definition of glare is as follows:

"Glare is the result of excessive contrast between light and dark areas in the field of view. For example, glare can be associated with directly viewing the filament of an unshielded or badly shielded light. Light shining into the eyes of pedestrians and drivers can obscure night vision for up to an hour after exposure. Caused by high contrast between light and dark areas, glare can also make it difficult for the human eye to adjust to the differences in brightness. Glare is particularly an issue in road safety, as bright and/or badly shielded lights around roads may partially blind drivers or pedestrians unexpectedly and contribute to accidents. Glare can be categorized into different types. One such classification has been developed by Bob Mizon, coordinator for the British Astronomical Associations Campaign for Dark Skies. According to Mizon's classification:

- **Blinding Glare** describes the effects such as that caused by staring into the sun. It is completely blinding and leaves temporary vision deficiencies.
- **Disability Glare** describes effects such as being blinded by an oncoming car's lights, with significant reduction in sight capabilities.
- **Discomfort Glare** does not typically cause a dangerous situation in itself and is annoying and irritating at best. It can potentially cause fatigue if experienced over extended periods."

Notice that in all three cases the glare is due to a directly visible luminous source. The adverse impacts of sports field and road/pathway lighting are primarily of the discomfort glare type, but often they occur over extended periods and therefore have a material impact on adjacent residential neighborhoods.

From the above it is clear that statements that 'glare' is limited to a certain number of candelas are meaningless since the candela measurement refers only to the luminous intensity of the source and has nothing to do with the background against which the source is viewed or the perceptual mechanisms of the human eye. Further, the IESNA has no glare standards and the International Dark Sky Association (IDA) specifically recommends full cutoff type fixtures where the luminous source is fully shielded and therefore not directly visible.

It is useful to note the ordinances of adjacent jurisdictions. Melinda Artman, Zoning Administrator of Loudoun County (and formerly in Zoning Administration in Fairfax County), supplied the relevant section of the Loudoun County zoning ordinance entitled Light and Glare Standards (see fifth attachment). It is stricter than either the Fairfax County ordinance or the recent FCPA version 3.0 draft standard. Similarly, the Montgomery County ordinance appears to have stricter provisions (see sixth attachment).

Should additional information be desired please contact Frank Crandall, the EQAC member who authors the Light Pollution section of the Annual Report on the Environment. He may be reached by phone at 202-633-1771 or by e-mail at crandalf@si.edu.

cc: Anthony H. Griffin, County Executive
Robert A. Stalzer, Deputy County Executive
James P. Zook, Director, Department of Planning and Zoning
Lorrie E. Kirst, Deputy Zoning Administrator, Zoning Administration Division, DPZ
John E. Reale, Jr., Zoning Administration Division, DPZ
EQAC file, January 2007

Attachments: *[Not provided in the 2007 Annual Report. For copies, contact the Department of Planning and Zoning at 703-324-1380.]*

1. Fairfax County Outdoor Lighting Ordinance.
2. Fairfax County Outdoor Lighting guidance booklet.
3. Illustrations of low level path lighting fixtures.
4. Views of pole-mounted lights against different backgrounds
5. Loudon County ordinance.
6. Montgomery County ordinance.

County of Fairfax, Virginia

MEMORANDUM

DATE: February 16, 2007

TO: Board of Supervisors

FROM: Environmental Quality Advisory Council

SUBJECT: Support for a Proposed Public Facilities Manual Amendment to Incorporate Low Impact Development Practices

EQAC would like to commend the Board of Supervisors for initiating the process of amending the Public Facilities Manual (PFM) to incorporate Low Impact Development (LID) practices. This action supports the Board of Supervisors' Environmental Agenda, which includes the following statement: "Encourage the use of low impact development concepts and techniques, especially in new residential and commercial areas, and seek opportunities for retrofitting established areas."

EQAC recommends that the Board move forward with this initiative and approve the proposed PFM amendment consisting of six LID practices (pervious pavement, bioretention filters and basins, vegetated swales, tree box filters, vegetated roofs, and reforestation). Incorporating these six proposed practices into the PFM is an important first step and will provide additional tools and options for meeting stormwater management requirements. LID practices provide better pollution mitigation from small, more frequent storm events than existing conventional stormwater management. Having established design and construction standards will help facilitate implementation of LID throughout the county.

EQAC shares with others considerable concern over the recommended restrictions on the application and location of selected practices. These restrictions are based on consideration of long term sustainability of these LIDs given maintenance and inspection responsibilities. However, as the county more closely approaches build-out, an increasing fraction of our stormwater problems will originate with infill redevelopment sites, resulting in the bulk of locations not considered for LIDs because of these restrictions. It is our firm opinion that as more of these practices are implemented throughout the county, and experience and data are obtained, these issues and restrictions should be reviewed and minimized to optimize implementation of these six practices and other LID technology in the county.

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It is critical to take the first step and incorporate the proposed LID amendment into the PFM to continue the forward momentum of the Board's Environmental Agenda.

EQAC further commends the county for partnering with other local jurisdictions, the Northern Virginia Regional Commission, and Engineers and Surveyors Institute on developing a supplement to the Northern Virginia BMP Handbook that will include LID practices (including the six proposed to go into the PFM).

EQAC looks forward to continuing to work with the Board and county staff on this issue.

cc: Fairfax County Planning Commission
Anthony H. Griffin, County Executive
Robert A. Stalzer, Deputy County Executive
Jimmie D. Jenkins, Director, Department of Public Works and Environmental Services
EQAC file, February 2007

County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

April 10, 2007

Chairman Connolly and Board Members:

Good evening, my name is Stella Koch and I am speaking on behalf of the Environmental Quality Advisory Council this evening. We thank you for this opportunity to speak.

EQAC commends the board for its continued strong support of environmental programs that have been developed and expanded through the last decade. Each year we see advancement and improvement in the county's stewardship efforts. As support is largely manifested through staff and budget resources, we would like to make the following comments about the proposed FY2008 budget:

We support the continued dedication of the one penny of the Real Estate Tax for additional stormwater management efforts, including the protection and restoration of our local streams.

We also support the following inclusions in this proposed budget:
1) Funding of the first of four installments to purchase planimetric data, which will allow the county to keep current with land use and development changes through aerial imagery and digital orthophotography.
2) Funding to hire an additional Wildlife Biologist and support for Deer and Geese Management programs.
3) Funding for a dedicated Soil Scientist to maintain the newly created soil survey data base, to be available for questions from county staff and developers on soil issues and to integrate the new survey materials into the county's GIS programs.

We are very pleased that over the past three years the county has funded parts of the Environmental Improvement Program (EIP), the non-stormwater environmental initiatives in the county. In light of the Cool Counties program and other energy use / carbon dioxide reduction efforts the county is making, we would recommend that there be additional funding for the EIP program, most specifically funding for an environment and energy staff position.

We thank you again for this opportunity to speak and look forward to working with you on these issues.

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Resolution of the Fairfax County Environmental Quality Advisory Council Regarding the Draft Environmental Impact Statement addressing Base Realignment and Closure and related actions at Fort Belvoir

April 11, 2007

WHEREAS, the U.S. Army Corps of Engineers, Mobile District, released the *Draft Environmental Impact Statement for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia* in March 2007, and

WHEREAS, this EIS shows significant environmental impacts to Fairfax County; and

WHEREAS, EQAC reviewed this EIS and has concerns about the adequacy of the EIS and about the proposed mitigation measures (attached);

BE IT THEREFORE RESOLVED that EQAC recommends that the Board of Supervisors include EQAC's comments and recommendations in the Fairfax County response to the EIS, and

BE IT FURTHER RESOLVED that EQAC recommends that the Board of Supervisors work with our Congressmen and Senators, plus our Delegates and State Senators, to ensure that all traffic mitigation measures are funded and in place before any personnel moves associated with BRAC take place, and

BE IT FURTHER RESOLVED that EQAC recommends that the Board of Supervisors work with our Congressmen and Senators to delay the movement of personnel to Fort Belvoir and the Engineer Proving Ground if traffic mitigation measures are not in place by 2011.

EQAC COMMENTS ON THE DRAFT EIS FOR BRAC AND RELATED ACTIONS AT FORT BELVOIR

April 11, 2007

A. The traffic summaries contain significant flaws.

(1) Table 4.3-15 shows the distribution of NGA employees. However, this is based on payroll data and therefore only includes federal employees, not embedded contractors. Embedded contractors are approximately 50% of the personnel coming to Fort Belvoir. All calculations done on the effect of the move of NGA are based on the federal employees. The implicit assumption is that the embedded contractors have the same distribution as federal employees, but this is not supported in any fashion.

(2) Support contractors, not embedded, are not considered. It can be expected that some support contractors will relocate to be nearer to the agencies they are supporting, but others will elect to stay in place. The impact of these contractors is not addressed.

(3) Table 4.3-15 shows that 45% of the employees at NGA will have to cross the Potomac to get to Fort Belvoir. While this figure is subject to debate (see A1 above) and may be much higher, this puts a significant number of new crossings over bridges across the Potomac. This will have a significant impact on already overloaded bridges and make the existing situation worse. Yet none of these bridges are addressed in the study.

(4) There is an error in one table on road intersections in Table 4.3-5 and this leads to a question about the accuracy of the others in this table. The Telegraph Road/South Van Dorn Street intersection is given as having traffic condition C in the AM and as D in the PM. The nearby intersection of Telegraph Road/South Kings Highway is not addressed, yet it will contain significant traffic going to Fort Belvoir. At 8:00 AM, the intersection of Telegraph Road/South Kings Highway is F and the intersection of Telegraph Road/South Van Dorn Street is often D or worse. At 5:00 PM, the intersections of both Telegraph Road/South Van Dorn Street and Telegraph Road/South Kings Highway are both F.

(5) The EIS does not take into consideration or include an analysis of the increased production of ground-level ozone (smog) or particulate matter ($PM_{2.5}$) that will likely result from the significant increase in traffic that will be coming to Fort Belvoir. An ozone and $PM_{2.5}$ hot spot analysis should be included as part of the EIS to determine what impacts, if any, each alternative would have on local ground-level ozone and $PM_{2.5}$ concentrations.

B. The measures for mitigating the admitted serious (Paragraph 4.3.4.4) traffic impacts are inadequate.

(1) Only potential measures are shown and a comprehensive list of measures that will be done, if any, is left to the future. Since there are many uncertainties in these measures, including cost, an informed guess cannot be made as to what measures will be selected.

(2) At this time, it is highly unlikely that a complete set of mitigation measures will be in place by 2011, the date the BRAC changes will occur. Therefore, severe traffic impacts will happen and be experienced by not only those newly assigned personnel to Fort Belvoir, but also all users of the roads in eastern Fairfax County.

(3) Rail is not considered as a mitigation measure. This is a serious mistake. As mentioned in A3, there will be a significant number of people coming across the Potomac. If NGA at the Washington Navy Yard is a good example, a significant number of NGA personnel use Metrorail today, and these personnel would have to find alternative ways of getting to Fort Belvoir. This will be via an already overloaded road network. While busses can help, they are still tied down to the road network and will suffer delays due to traffic. Rail extensions, either extending today's Metrorail or by light rail, on both the Blue and Yellow lines to Fort Belvoir on Richmond Highway and to the EPG, need to be put in place before 2011. Furthermore, there needs to be internal shuttles that will carry people from the new rail stations to their places of work.

C. The change in land use categories (paragraph 2.2.1.2) may reduce protection to environmentally sensitive areas.

(1) The existing 1993 Master Land Use Plan includes a category for environmentally sensitive land (currently at 3,063 acres, which does not include EPG). The proposed new plan eliminates this category and places some of the environmentally sensitive land into a community category. However, large areas of environmentally sensitive land are placed into other categories – airfield, professional/industrial, and training. These three categories will encompass significant environmentally sensitive areas such as portions of the wildlife corridor, streams and wetlands in the southwest area, and all the streams and wetlands on the EPG.

(2) While some protections remain in place for these environmentally sensitive areas, the overall designation as such is gone. As a result, future development can be expected to encroach into these areas. This expectation of future development is illustrated by a statement in paragraph 4.6.2.1.1 "The Professional/Industrial, Community, and Residential land uses would allow development in areas that were considered Environmentally Sensitive in the 1993 land use plan, although environmental constraints (e.g., endangered species habitat) would retain their protected status and continue to limit potential development in some of these areas."

(3) The Environmentally Sensitive category should remain in the land use plan.

D. Construction because of BRAC will have significant impact on streams.

(1) A number of subwatersheds will experience over a 10% increase in 1- and 10-year storm event peak discharge (Table 4.7-7). These increases range up to 100%. Furthermore, these increases can be even greater since experience in storm event has shown that models can, and do, under predict peak discharges.

(2) The EIS does not address any impact on streams other than peak discharges. Due to the increase in impervious surface, many subwatersheds will experience an increase in total volume of water, thereby increasing erosion.

(3) A good list of mitigation measures is proposed (paragraph 4.7.2.4); however, there is no commitment to some of these. The language that some of the measures "could be included" needs to be changed to "will be included." These include LID management practices, man-made wetlands, restored riparian buffers, stream restoration projects, and participating in Fairfax County's Watershed Planning Process.

E. Additional mitigation measures can be done both within and outside of the areas affected by BRAC.

(1) Stream restoration and riparian buffer restoration should be done at Davison Army Airfield. This can mitigate some of the impacts of BRAC on Accotink Creek.

(2) Reforestation should be done on selected areas within Fort Belvoir. This would help replace some of the trees that BRAC construction removes. One such area would be those portions of the EPG that are being grubbed to remove unexploded ordnance (UXO). Where possible, oak and mixed oak hardwoods should be considered for upland areas. Such replantings that would help regenerate a mixed oak forest would have long-term benefits to both water quality and animal life that depends upon oaks as a food source.

Environmental Quality Advisory Council

Resolution Supporting Implementation of Compact Fluorescent Light Bulbs
June 2007

Whereas Compact Fluorescent Lights (CFLs) conserve approximately two-thirds of the energy used by incandescent bulbs; and

Whereas electricity generated from fossil fuels also produces air pollution, greenhouse gases and acid rain; and

Whereas CFL use results in lower emissions of SO_2, CO_2, NO_x and mercury specifically, which is in the spirit of the Clean Air Interstate Rule; and

Whereas the introduction of just one CFL in each of Fairfax County's 238 schools prevents about 107,100 pounds of power plant emissions; and

Whereas the replacement of 238 60-watt incandescent bulbs with 238 13-watt CFLs can save at least $7,140 in energy costs; and

Whereas CFLs contain 5 milligrams of mercury sealed within the glass tubing that is harmless during appropriate use, but necessitates proper disposal of all bulbs; and

Whereas FCPS has retrofitted lighting fixtures in 106 schools and offices, thereby replacing standard incandescent light bulbs by approximately 99%; and

Whereas all FCPS buildings now use high efficiency T-8 or T-5 lighting with electronic ballasts; and

Whereas FCPS has conducted other such energy-efficiency lighting programs.

Therefore be it resolved that EQAC recommends that the Board of Supervisors commend Fairfax County Public Schools (FCPS) for discontinuing purchase of incandescent bulbs and for its commitment to energy efficiency; and

Be it further resolved that EQAC recommends that the Board encourage FCPS to continue and maintain the transition from incandescent to fluorescent light bulbs in all county public schools; and

Be it further resolved that EQAC recommends that the Board direct the County Executive to train custodial staff or require contract custodial service firms to train their staffs regarding safe operation and disposal of fluorescent lights; and

Be it finally resolved that EQAC recommends that the Board of Supervisors provide information on CFLs to the public so that similar actions will be taken by private schools and large businesses in the county.

Tree Preservation Ordinance

Testimony before the Fairfax County Board of Supervisors

October 15, 2007

My name is Chet McLaren. I am the Braddock District representative on the Environmental Quality Advisory Council and the EQAC representative on the Tree Commission. I am here today to speak on behalf of EQAC.

The members of EQAC are pleased that the Board is continuing to take actions in regard to the quality and quantity of tree cover in Fairfax County. This proposed Tree Conservation Ordinance is another necessary step in carrying out provisions of the Tree Action Plan and also attaining your goal of 45% tree cover for the County.

We encourage you to approve the Tree Conservation Ordinance which is under consideration today.

However, we are concerned that the Ordinance does not take full advantage of all provisions of the State tree conservation ordinance concerning the taking of property and compensation therefor. Accordingly, we strongly recommend approval and implementation of the Ordinance as presented. Then, staff should perform a study directed at modifying the Ordinance to provide the Board the option of taking full advantage of State authorized action if the Board should see the need to employ such actions in the future.

Thank You.

Lyle C. McLaren
[redacted]

APPENDIX C

FAIRFAX COUNTY
ENVIRONMENTAL EXCELLENCE AWARDS

The Fairfax County Environmental Excellence Awards have been established to recognize county residents, organizations, businesses and county employees who unselfishly dedicate time, energy and expertise for the betterment of the environment in support of countywide environmental goals and initiatives. Award recipients are selected by the Environmental Quality Advisory Council, and the awards are presented each fall during a meeting of the Fairfax County Board of Supervisors.

The recipients of the 2007 Environmental Excellence Awards were:

County Resident Awards:	Scott Birdwell
	Eleanor Quigley and Penelope Firth
Organization Awards:	Great Falls Citizens Association
	Invasive Management Area Volunteers
County Employee Award:	Judy Fincham

Scott Birdwell has been recognized for his efforts in support of the Hidden Oaks Nature Center and for his efforts, as president of the 145-member Friends of Hidden Oaks Nature Center, to establish the greater Mason District area as an official community Backyard Habitat as sanctioned by the National Wildlife Federation. This effort promotes the use of native plants and organic, environmentally-friendly gardening practices. Through his efforts to enlist support from political, organizational and business leaders and through a variety of public outreach efforts, over 250 homes or businesses have been certified as official sanctuaries for wildlife, providing food, water, shelter and places to raise young. He has worked with managers of three Home Depot stores in the Annandale area for backyard habitat displays within each store to promote the program; this effort has resulted in the production of a CD that has been sent to each Home Depot store throughout the country to promote creation of backyard habitats at each store and to promote wildlife-friendly practices to the public. Home Depot plans to challenge other "big box" retailers to undertake similar efforts.

Eleanor Quigley and Penelope Firth were co-chairs of the county's Tree Action Plan Work Group that was asked by the Board of Supervisors to produce a Tree Action Plan. As noted in the Tree Action Plan, the task of the group was quite ambitious: *". . . The vision put trees at the center of comprehensive planning; set clear and measurable milestones to track progress; institute simple but effective communication capabilities to inform and educate the public, the private sector and government officials about the value of trees and efforts to preserve and restore them."* The work group was convened in April 2006 and included a mix of county

staff, members of the county's Tree Commission, and representatives from the Virginia Department of Forestry, Virginia Department of Transportation, Northern Virginia Soil and Water Conservation District, EQAC, Fairfax ReLeaf and the development community. Through their leadership skills, technical knowledge and passion for trees, Ms. Firth and Ms. Quigley deftly led this group through a complex and sometimes difficult consensus-building process that resulted in a comprehensive, long-range plan to protect and restore tree cover in Fairfax County. As noted in the Ecological Resources chapter of this report, the Tree Action Plan was endorsed by the Board of Supervisors in January 2007.

The Great Falls Citizens Association has been recognized for varied and continuing environmental stewardship efforts. The award nomination characterizes this association as "a model organization for environmental stewardship," and the activities outlined in the nomination attest to this characterization. Through the association's efforts, Great Falls has been designated as the 23rd Community Wildlife Habitat in the United States as certified by the National Wildlife Federation. Between April 2006 and April 2007, 175 individual homeowners, seven common areas/work places and four schools improved the habitat values of their properties by providing for food, water, shelter and safe places to raise young. The association has also undertaken a *Heritage Tree Census* to identify the largest trees in the Great Falls area, including those on park land. A primary goal of this effort was to engage and educate area residents and youth groups about the value of forest preservation, thereby inspiring environmental activism and understanding. The effort has been received enthusiastically and is inspiring additional tree projects. The association's Trail Blazers Committee works tirelessly to secure trail easements from developers and residents and is an advocate of environmentally-sensitive trail design.

The Invasive Management Area Volunteers are 21 individuals who served as team leaders in 2006 at 21 Fairfax County Park Authority properties throughout the county to remove invasive species. In all, these individuals coordinated the efforts of 875 people through over 1,300 hours of volunteer time, resulting in the removal of plants that damage wildlife habitat, in turn resulting in improved habitats, improved water quality by allowing native plants to perform their natural water quality improvement functions and improved accessibility to parks for all to enjoy. The effort, funded through a $100,000 appropriation by the Board of Supervisors as part of a broader set of efforts to support the board's Environmental Agenda, has generated both short-term benefits in the removal of invasive species and longer-term benefits through increased education, awareness and interest in stewardship among county residents. These volunteers sometimes worked in adverse weather conditions and also dealt with realities such as poison ivy and ticks. Through their dedication and energy, they have inspired growth in the program, as the number of volunteer leaders more than doubled between 2006 and 2007.

Judy Fincham, a fourteen-year employee with the Environmental Monitoring Branch of the Department of Public Works and Environmental Services, is being recognized for her implementation of the Water Environment Federation's "Sewer Science" program in all 25 Fairfax County public high schools. The Sewer Science program is a multi-day water education program that introduces students to wastewater treatment processes and technologies via course books, a mobile mini wastewater treatment plant and several hands-on treatment and water quality exercises that challenge students to treat water to the same standards expected of

municipalities; it fosters understanding and appreciation of relationships in the water cycle and the environment and engages tomorrow's leaders about the importance of water in the environment and their roles in pollution prevention and minimization. Ms. Fincham has been responsible for the implementation and success of this program in all county public high schools. She has coordinated teacher training, recruited a team of county mentors for assistance in the classroom as needed and provided additional training and logistical support to ensure the success of the program. She also developed, coordinated and conducted a field workshop to provide additional education to teachers. She did all this in addition to her duties as an Environmental Technologist I, and her outreach efforts to schools has opened the door for introduction of related environmental topics, such as stormwater and solid waste management, to the schools.

EQAC congratulates all award recipients.

In past years, Environmental Excellence Awards have been awarded to the following people and organizations:

2006

County Resident Award:	Ken Andrews
Organization Award:	Northern Virginia Soil and Water Conservation District
Business Award:	Wetland Studies and Solutions, Inc.

2005

County Employee Award:	Janet Rahman

2004

County Resident Award:	Ned Foster
Organization Award:	Reston Association

2003

County Resident Award:	Joseph Chudzik
Organization Award:	Students Against Global Abuse
County Employee Award:	Noel Kaplan

2002

County Resident Award:	Charlie Creighton
Organization Award:	Hickory Farms Community Association

2001

County Resident Award:	Chris Koerner
Organization Award:	Bailey's Beautification Alliance

2000

County Resident Award:	Norma Hoffman
Organization Award:	Friends of Sugarland Run
County Government Employee Award:	Gary Roisum

The nomination period for the Environmental Excellence Awards occurs during the spring of each year. EQAC encourages interested individuals, organizations, county employees and businesses to submit nominations.

APPENDIX D

ACRONYMS AND ABBREVIATIONS USED WITHIN THE 2007 ANNUAL REPORT

A&F	**Agricultural and Forestal**
ANS	**Audubon Naturalist Society**
APHIS	**Animal Plant Health Inspection Service (federal)**
APC	**Aviation Policy Committee (regional)**
APR	**Area Plans Review**
BMP	**Best Management Practice**
BOS	**Board of Supervisors (county)**
BRAC	**Base Realignment and Closure**
CAAN	**Citizens for the Abatement of Airoprt Noise**
CADD	**Computer-Aided Design and Drafting**
CAIR	**Clean Air Interstate Rule (federal)**
$CBOD_5$	**Chemical and Biological Oxygen Demand (5-day text)**
CDC	**Centers for Disease Control and Prevention (federal)**
CDF	**Citizens' Disposal Facility**
CESQG	**Conditionally Exempt Small Quantity Generator**
CFI	**Covanta Fairfax, Inc.**
CFL	**Compact fluorescent light**
CFR	**Code of Federal Regulations**
CLF	**Community Labor Force (county)**
CLRP	**Constrained Long Range Plan (regional)**
CO_2	**Carbon Dioxide**
COG	**Metropolitan Washington Council of Governments (regional-Also cited as MWCOG)**
CTB	**Commonwealth Transportation Board (state)**
CTC	**Commonwealth Transportation Commissioner (state)**
CTO	**Certificate to Operate**
CY	**Calendar Year**
dB	**Decibel**
dBA	**Decibel (A-weighted level scale)**
DCR	**Department of Conservation and Recreation (state)**
DEET	**N,N-diethyl-meta-toluamide**
DEIS	**Draft Environmental Impact Statement**

DEQ	**Department of Environmental Quality (state—also VDEQ and VA DEQ)**
DNA	**Deoxyribonucleic Acid**
DNL	**Day-Night Average Sound Level**
DO	**Dissolved Oxygen**
DPWES	**Department of Public Works and Environmental Services (county)**
DPZ	**Department of Planning and Zoning (county)**
Dscm	**Dry standard cubic meter**
DU/AC	**Dwelling Units per Acre**
E&S	**Erosion and Sediment**
E/RRF	**Energy/Resource Recovery Facility**
ECC	**Environmental Coordinating Committee (county)**
ECHO	**Enforcement and Compliance History Online (federal)**
EHD	**Epizootic hemorrhagic disease**
EIP	**Environmental Improvement Program (county)**
EIS	**Environmental Impact Statement**
EPA	**Environmental Protection Agency (federal—also USEPA)**
EPG	**Engineer Proving Ground**
EQAC	**Environmental Quality Advisory Council (county)**
ERC	**Employee Recycling Committee (county)**
ERICA	**Employee Recycling Committee Recycler of the Year Award**
FAA	**Federal Aviation Administration**
FAR	**Floor Area Ratio**
FCDOT	**Fairfax County Department of Transportation**
FCPA	**Fairfax County Park Authority**
FCPD	**Fairfax County Police Department**
FCPS	**Fairfax County Public Schools**
FJLEPC	**Fairfax Joint Local Emergency Planning Committee (regional)**
FPP	**Forest Pest Program (county)**
FY	**Fiscal Year**
GIS	**Geographic Information System**
Hazmat	**Hazardous Materials**
HB	**House Bill (state)**
HHW	**Household Hazardous Waste**
HJ	**House Joint Resolution (state)**
HOT	**High Occupancy Toll**
HOV	**High Occupancy Vehicle**
IAQC	**Interstate Air Quality Council (regional)**
ICPRB	**Interstate Commission on the Potomac River Basin (regional)**
IDA	**International Dark Sky Association**

IESNA	**Illuminating Engineering Society of North America**
IIHS	**Insurance Institute for Highway Safety**
IPLS	**Integrated Parcel Lifecycle System**
IT	**Information Technology**
kBTU/SF	**Thousands of British Thermal Units per square foot**
kWh	**Kilowatt hours**
LDS	**Land Development Services function of the Department of Public Works and Environmental Services (county)**
LEED®	**Leadership in Energy and Environmental Design**
LEPC	**Local Emergency Planning Committee**
LID	**Low Impact Development**
LIS	**Legislative Information System (state)**
LOS	**Level of Service**
MCL	**Maximum Contaminant Level**
MDA	**Maryland Department of Agriculture**
mgd	**Million gallons per day**
MLC	**McLean Land Conservancy**
MOU	**Memorandum of Understanding**
MPO	**Metropolitan Planning Organization**
MS4	**Municipal Separate Storm Sewer System**
MW	**Megawatts**
MWAA	**Metropolitan Washington Airports Authority (regional)**
MWAQC	**Metropolitan Washington Air Quality Committee (regional)**
MWCOG	**Metropolitan Washington Council of Governments (regional – also cited as COG)**
NGA	**National Geospatial-Intelligence Agency**
NiCad	**Nickel-Cadmium**
NIST	**U.S. National Institute of Standards and Technology**
NLC	**Natural Landscaping Committee (county)**
NMCPCP	**Noman M. Cole, Jr. Pollution Control Plant (county)**
NOAA	**National Oceanographic and Atmospheric Administration**
NOx	**Oxides of Nitrogen**
NPDES	**National Pollutant Discharge Elimination System**
NRMP	**Natural Resource Management Plan**
NTU	**Nephelometric Turbidity Unit**
NVCC	**Northern Virginia Community College**
NVCS	**National Vegetation Classification System**
NVCT	**Northern Virginia Conservation Trust**
NVRC	**Northern Virginia Regional Commission (regional)**

NVRPA	**Northern Virginia Regional Park Authority**
NVSWCD	**Northern Virginia Soil and Water Conservation District**
NVUFR	**Northern Virginia Urban Forestry Roundtable**
NWR	**National Wildlife Refuge**
OSLPTF	**Open-Space Land Preservation Trust Fund (state)**
OWML	**Occoquan Watershed Monitoring Laboratory**
PCB	**Polychlorinated Biphenyl**
PFM	**Public Facilities Manual (county)**
PLUS	**Planning Land Use System (county)**
PM 2.5	**Particulate Matter less than 2.5 microns in diameter**
PPM	**Parts per million**
QA/QC	**Quality Assurance/Quality Control**
RBRC	**Rechargeable Battery Recycling Corporation**
RIF	**Reduction in force**
RDOC	**Recycling Drop Off Center**
RPA	**Resource Protection Area**
SARA	**Superfund Amendments and Reauthorization Act of 1986 (federal)**
SB	**Senate Bill (state)**
SCRAP	**Schools/County Recycling Action Partnership**
SDWA	**Safe Drinking Water Act (federal)**
SIP	**State Implementation Plan**
SO_2	**Sulfur Dioxide**
SOCs	**Synthetic Organic Compounds**
SWMP	**Solid Waste Management Program (county)**
TAC	**Technical Advisory Committee**
TCC	**Transportation Coordinating Council (regional)**
TDM	**Transportation Demand Management**
TMDL	**Total Daily Maximum Load**
TOD	**Transit Oriented Development**
TPB	**Transportation Planning Board (regional)**
TTHM	**Total Trihalomethanes**
UDIS	**Urban Development Information System**
UFMD	**Urban Forest Management Division (county)**
UOSA	**Upper Occoquan Sewage Authority**
USDA	**United States Department of Agriculture**
USEPA	**United States Environmental Protection Agency (also EPA)**
USGS	**United States Geological Survey**
UXO	**Unexploded ordnance**
V/C	**Volume to Capacity Ratio**
VA DEQ	**Virginia Department of Environmental Quality (also DEQ and VDEQ)**
VDACS	**Virginia Department of Agriculture and Consumer**

	Services
VDEQ	**Virginia Department of Environmental Quality (also VA DEQ and DEQ)**
VDGIF	**Virginia Department of Game and Inland Fisheries**
VDOF	**Virginia Department of Forestry**
VDOT	**Virginia Department of Transportation**
VOC	**Volatile Organic Compound**
VOF	**Virginia Outdoors Foundation**
VPDES	**Virginia Pollutant Discharge Elimination System**
VRE	**Virginia Railway Express**
WID	**Watershed Improvement District**
WQIF	**Water Quality Improvement Fund (state)**
WTP	**Water treatment plant**
ZOAWP	**Zoning Ordinance amendment work program (county)**