Annual Report on the

ENVIRONMENT

2009

DETAILED REPORT

Fairfax County, Virginia

Environmental Quality Advisory Council

A Fairfax County, Va. Publication

November 2009

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The cover shows a portion of the Great Falls of the Potomac River; the river forms Fairfax County's border with Maryland. Photo by Ben Swanson, Student Member, Environmental Quality Advisory Council.

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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.

EQAC is presenting this year's Annual Report in two formats: (1) A detailed report similar to the reports that have been produced each year; and (2) A summary report providing highlights of recent activities, key issues, and comments and recommendations associated with each of the major topical areas covered in the larger report. In addition, most of the chapters of each report format include discussions of stewardship opportunities. Both report formats are provided electronically, but only the summary document is being made available in hard copy this year. It is EQAC's hope that the new approach to report formatting will provide interested readers with the level of detail or generality that they desire while saving resources associated with hard copy production.

The report continues to include chapters on major environmental topics including: global climate change as it relates to Fairfax County; land use and transportation; air quality; water resources; solid waste; hazardous materials; ecological resources; wildlife management; and noise, light, and visual pollution. An appendix addressing state legislation relating to the environment is also provided within the detailed report format, as is an appendix providing EQAC's resolutions and positions taken over the past year. Within each chapter of the detailed report format are: a discussion of environmental issues; a summary of relevant data; and a discussion of applicable government programs. Most of the chapters include information regarding stewardship opportunities and conclude with recommendations that identify additional actions that EQAC feels are necessary to address environmental issues. References are presented only in the detailed report format. As was the case in last 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 2008; however, in some cases, key activities from 2009 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:

Alice Ferguson Foundation
Audubon Naturalist Society
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 Office of Community Revitalization and Reinvestment
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
Potomac Conservancy
Reston Association
United States Environmental Protection Agency
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 Environmental Quality
Virginia Department of Forestry
Virginia Department of Game and Inland Fisheries
Virginia Department of Transportation
Virginia Outdoor Lighting Taskforce
Virginia Outdoors Foundation

Finally, 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 2008 *Annual Report on the Environment* and welcomes the efforts of the newly formed interagency Energy Efficiency and Conservation Coordinating Committee.

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 16, 2009

Chairman Bulova and Members of the Board:

The Environmental Quality Advisory Council is pleased to present the 2009 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. This report covers 2008, but also includes significant actions from 2009 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. The report consists of nine chapters – each chapter addressing a different aspect of the environment. The first and newest chapter reflects the county's leadership and efforts to address global climate change. The rest of the chapters are arranged to reflect the order of topics listed in the Board of Supervisors' Environmental Agenda. This year we have created two versions of the report; one a published summary version, and secondly, an on-line complete version with all data included. This year we have also highlighted environmental stewardship opportunities within the report chapters.

EQAC thanks the board for its continued strong support of environmental programs. We understand that budget constraints this year continue to impact all programs within the county and have resulted in some very challenging choices, including those affecting environmental services.

EQAC asks that you continue to support the environment programs you have established. The programs are important if we are to maintain the high quality of life we have in Fairfax County and the high standards we have set for ourselves. We note that for Fairfax County residents, quality of life is not just about good schools and jobs but also about having a clean and healthy environment in which to live and recreate. This support for environmental programs includes funding 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.

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We therefore have two key requests this year among the many recommendations we have made in our report. EQAC members have also asked that two other recommendations be highlighted. The key recommendations are:

1. EQAC recommends that Fairfax County adequately fund and implement its ongoing stormwater program, which includes dam maintenance, infrastructure replacement, water resource monitoring and management, watershed restoration and educational stewardship programs. EQAC realizes the current budget constraints have removed monies available from the General Fund and that the funding for the stormwater program will come from funds generated through the Stormwater Service District rates.

   EQAC recommends that the stormwater program continue to be funded by the Service District, and that the rate be increased to a penny and a half. This would result in the restoration of some funding for modest watershed improvement programs and some funds for infrastructure replacement. In terms of infrastructure replacement, the present level of funding is simply not acceptable. We also realize that there will likely be a need for additional increases for water quality projects to meet future permit conditions, and for infrastructure reinvestment, as the system is continually growing and aging.

2. **EQAC recommends that the Remote Hazardous Waste Events be reinstated.** In FY 2009, five of these events were conducted in Mount Vernon, Mason (there were two events in Mason), Dranesville and Springfield 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 $16,870 per event. They are provided at no cost to county residents and are, therefore, dependent upon the special funding from the Board of Supervisors. 1,450 households participated in the five events. These events removed over 90,000 pounds of materials from the waste stream and disposed of approximately 1,300 compact fluorescent lights. EQAC is concerned that if these events are not held, the materials that would have been collected there may not be properly disposed of and have the potential to create problems at a greater cost to clean up later.

The other recommendations that EQAC wishes to highlight are:

1. EQAC commends the Fairfax County Board of Supervisors for supporting Cool Counties, Energy Star and other programs to promote energy efficiency. While the county has set an example for reducing carbon dioxide emissions through energy efficiency and is encouraging LEED certification or equivalent for projects that come through the zoning process (particularly those in the county's growth centers), **EQAC encourages the county to explore whether commitments should be sought from developers to reduce their**

greenhouse gas emissions by reducing their energy consumption or by obtaining energy from sources that do not emit greenhouse gases (e.g., energy from wind, solar, hydroelectric and/or geothermal sources).

2. **EQAC understands that additional information could be incorporated into the Integrated Parcel Lifecycle System to make the system more useful, and EQAC recommends that this information be incorporated.** Specifically, the following are noted:

   - The incorporation of new nonresidential pipeline data into IPLS would be very useful for forecasting and analyzing with existing data.
   - IPLS should incorporate data regarding planned nonresidential land use intensities.

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.

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. Fairfax ReLeaf continues to promote tree preservation and tree replacement programs. The Park Authority Natural Resources 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.

As we do each year, 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. We also commend the establishment of the county's Energy Efficiency and Conservation Coordinating Committee, which is chaired by Deputy County Executive David Molchany. We look forward to continued coordination with this new interagency committee.

As always, it gives me great pleasure as the representative of EQAC 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, as I did last year, 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 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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SCORECARD
Progress Report on 2008 Recommendations

I. CLIMATE CHANGE

Climate Change Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC continues to support the hiring of an Energy Coordinator for Fairfax County.	At the direction of the Board of Supervisors' Environmental Committee in October 2007, the county executive included within the fiscal year 2009 advertised budget an energy coordinator position. The Board of Supervisors adopted the FY 2009 budget with the energy coordinator position authorized in the budget. The position was to be established through the abolishment of a vacant assistant to the county executive position. In a memorandum from the county executive to the Chairman of the board, dated November 17, 2008, the county executive indicated that while he had every intention of filling the position, due to the worsening fiscal crisis in the county, the county executive concluded that filling the vacant energy coordinator position would not be fiscally prudent at this time. The county executive, after consulting with appropriate staff, believed that a viable alternative was to formally establish an Energy Efficiency and Conservation Coordinating Committee, which serves as an interagency forum for cross-organizational collaboration and coordination of energy efficiency and conservation efforts.	While EQAC continues to support the hiring of an energy coordinator, EQAC recognizes the budget problems. Given these problems, the EECCC appears to be a viable alternative. When future budgets permit, consideration should be given to hiring an energy coordinator.	No, but overtaken by events for now.

II. LAND USE AND TRANSPORTATION

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the county produce an updated version of the "State of the Plan, An Evaluation of Comprehensive Plan Activities." EQAC would like to discuss with staff what would be entailed in pursuing a complete review of the Comprehensive Plan. The evaluation and assessment would 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. The comprehensive preparations would be timely with the significant changes happening in the county.	The main component of the recommendation, to comprehensively monitor Plan recommendations, is being addressed through a different method than suggested by EQAC. Although an evaluation following the *State of the Plan* approach would be possible if staff resources are available, DPZ believes that a full scale rewrite of the Comprehensive Plan would only be productive if fundamental changes in the Plan are required. At the present time, staff resources are limited due to the ongoing planning efforts. Historically, staff has initiated discussions with the Planning Commission and the community towards the end of the current APR cycles. These discussions address broader issues such as how to: update the "character" sections of the Area Plans; incorporate factual edits such as tax map changes/corrections and geographic description corrections; provide new guidance for how specific neighborhoods should be preserved or how they should develop in the future; and provide an assessment of the cumulative impacts of land use changes that have been adopted through amendments to the Comprehensive Plan. Staff still believes the current method of Plan monitoring is a more effective tool for evaluating development and growth in the county. Furthermore, the new GIS-based approach monitors Plan changes at a more detailed level than analyzed in the *State of the Plan* document.	EQAC continues to recommend that the county evaluate 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" to cover plan activities between 1995-2008 and assess impacts through 2025. EQAC also continues to recommend that the county consider the process for a complete review of the Comprehensive Plan.	No.

Land Use & Transportation Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2a. EQAC recommends that Geographic Information System tools and capabilities continue to be pushed out for use by the general public.	Staff concurs with making more data and tools available via the Web. The process of doing that will be gradual: for instance some of the key models used in transportation are not GIS-based and do not provide GIS output. The My Neighborhood application now includes links to LDSNet, to property assessment data and to watershed information. Planning for the next version of My Neighborhood is underway.	EQAC recommends that the county continue to expand the ability of the general public to access these tools, as appropriate and feasible. This includes the next iteration of My Neighborhood.	In progress.
2b. EQAC recommends that the county begin leveraging three-dimensional models into the planning process.	This recommendation is being addressed. Staff utilizes aerial imagery, oblique imagery, and three-dimensional modeling, as part of the current review process for Plan amendments and special studies. The county's three-dimensional modeling usage has been done through several different products, as the county's use is still in its pilot phase and new applications are rapidly becoming available. As a result, the most effective tool for county use has not been determined yet.	EQAC is impressed with the ways the county has incorporated three-dimensional models. We recommend that the county continue to enhance its investment in GIS technology and updates to the source data.	In progress.

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.	This recommendation is being addressed. The environmental analyses relating to land cover and impervious surface require accurate planimetric data, for which the effort is ongoing with and continuously updated. Runoff modeling at the macro scale currently is being standardized countywide. With respect to transportation, the development of models that allow analysis of macro effects of land use and transportation decisions is being addressed and implemented as indicated above. Transportation demand management measures are being used in significant new development projects to reduce trips and increase transit use, and the implementation of these strategies will continue. In regards to air quality analysis, staff will continue to work with the Metropolitan Washington Council of Governments in its efforts to model emissions on a regional and sub-regional planning level.	EQAC supports the current efforts and recommends that these efforts continue. Ultimately, this can result in a Digital Comprehensive Plan that includes the Integrated Parcel Lifecycle System as a base data capability, three-dimensional representations of the county, future projections for planned changes and growth and environmental and transportation models with both local and macro impacts.	In Progress.

III. AIR QUALITY

Air Quality Recommendation	Action taken by Agency or Department	EQAC Comments	Completed
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.	At the time of preparation of responses to the recommendations (prior to adoption of the FY 2010 budget), the Health Department concurred with the recommendation. The response noted that a key issue in the Air Quality Monitoring Program was the need for a dedicated supervisory staff to oversee the complex daily monitoring activities, provide guidance to the program staff, expand efforts in air quality planning, conduct environmental impact reviews, develop strategy, expand outreach activities and ensure the data from the monitoring network is of the highest quality so accurate ozone forecasting and daily pollution indexes are disseminated to the public. However, the County Executive concluded that due to the worsening fiscal crisis and budget shortfall, it was necessary for the Air Monitoring Program to be placed as a budget reduction option for the Board of Supervisors to consider. As detailed in the Air Quality chapter, county monitoring efforts are being phased out; the state will need to assume monitoring responsibilities in FY 2011.	EQAC supports the board for retaining, in the FY 2010 budget, the county's air quality management position. EQAC recognizes, however, that the overall budget constraints in the county that led the Board of Supervisors to make significant reductions in the budget for the Health Department could potentially affect air quality in the county.	No.

IV. WATER RESOURCES

Water Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. Continue to adequately fund and implement the county's ongoing water resource monitoring, management, restoration and educational stewardship programs.	In order to restore the full value of the original dedicated penny while continuing to absorb operating costs, Stormwater Management supported the implementation of a "service district," as authorized by Va. Code Ann. §§ 15.2-2400 to -2403.1 (2008). The district would encompass the entire county with the exception of Fort Belvoir, and it would levy its own tax rate as approved by the Board of Supervisors. The DPWES recommended tax rate was $0.015 per $100. The BOS did establish the service district, and set the tax rate of $0.010 per $100.	EQAC is pleased to note that the Service District has been established. However, EQAC feels that the district should be funded at a minimum rate of $0.015 rather than the current rate of $0.010 per $100. EQAC recognizes that stormwater funding remains a critical problem and is inadequate. The tax rate need to increase to a penny and a half at minimum so that funding is available for needed efforts.	In progress.

V. SOLID WASTE

There were no recommendations in the 2008 Annual Report

VI. HAZARDOUS MATERIALS

There were no recommendations in the 2008 Annual Report

VII. ECOLOGICAL RESOURCES

Ecological Resources Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. 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.	The Fairfax County Park Authority has sought funding for the Natural Resource Management Plan through the regular budget process for the last few years. In its request for the FY 2008 budget, funding was requested for Phase 1 of the NRMP (six positions and $650,000). Additionally, FCPA did thoroughly investigate positions throughout the agency to re-align and did identify one position that could be abolished and re-established for the natural resource management program should the county provide funding and one position. However, funding and staff was not provided in the FY 2008 budget and the position is no longer available. At this time, FCPA is unable to reallocate staff to the natural resource management program without sacrificing other important existing programs and services for the public. However, the Park Authority will continue to work with the Department of Management and Budget to seek funding in future years. If funding is provided, FCPA will look at its positions again to see if any can be re-aligned to the natural resources program.	EQAC feels that the allocation of resources by FCPA is not in balance between the two primary missions of FCPA – providing resources for recreation of the citizens and protecting sensitive environmental areas. EQAC continues to stress that more resources need to be devoted to protection of sensitive environmental areas and that a better balance exists in how resources are allocated. EQAC reiterates its recommendation.	No.

VIII-1. IMPACTS OF DEER IN FAIRFAX COUNTY

Deer Management Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. The authorized Assistant County Wildlife Biologist position should be filled forthwith. This position is critical to implementation of deer herd reduction goals, to attainment of public education program goals and to an appropriate level of networking with other local, state and federal agencies.	While staff concurs with EQAC's recommendation, due to various factors, efforts to fill this position were unsuccessful. Three interview processes were conducted without successfully filling the position. Before a fourth attempt could be initiated, it became clear that the position would be frozen due to budgetary constraints. Since that time, funding for the entire program has been cut. Due to the continued decline of the county's budgetary outlook, it is expected that this position will remain vacant for the foreseeable future.	It is hoped that recovery from the recession will permit reactivation of this position.	Not applicable.

VIII-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 at the earliest budgetarily feasible time for this program in the form of one full-time equivalent Assistant Wildlife Biologist, to undertake several initiatives relating to geese management.	Funding for the Goose Management Program within the Police Department was cut in early November 2008. Existing position vacancies within the Wildlife Section were frozen. This includes the full time Assistant Wildlife Biologist position. The Fairfax County Wildlife Biologist position became vacant after February 20, 2009 [EQAC notes that the position was filled after the staff response was provided]. Given the budgetary constraints and the other uncertainties associated with the future of the Wildlife Section, it is unlikely that any additional positions will be established in the near term.	It is hoped that recovery from the recession will permit authorization of this position.	Not applicable.

VIII-3. COYOTES IN FAIRFAX COUNTY

There were no recommendations in the 2008 Annual Report

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

There were no recommendations in the 2008 Annual Report

IX-1. NOISE

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. Formally request the Metropolitan Washington Airports Authority and the Federal Aviation Administration to evaluate options for the operation of the existing and new runways at Washington Dulles International Airport to identify approaches that will optimize flight operations in a manner that minimizes community noise exposure. Include an evaluation of noise impacts beginning at the time the first of the new runways is opened for use and to continue in perpetuity. The results of all such noise evaluations should be reported quarterly and should be provided to a number of stakeholders.	Staff has communicated with Metropolitan Washington Airports Authority and Federal Aviation Administration noise abatement staff about evaluating operational approaches that will minimize community noise exposure; concerns have been raised to staff regarding the implications of competing use of airspace, and, based on a recent FAA action in response to proposed noise abatement measures at Ronald Reagan Washington National Airport, FAA is likely to be reluctant to approve, pursuant to Part 150 of the Federal Aviation Regulations (Code of Federal Regulations, Title 14, Chapter I), any noise abatement measure that is pursued outside of the DNL 65 dBA noise impact area that does not also reduce the number of noise sensitive land uses within that contour. Staff has recommended that EQAC hold discussions with FAA, MWAA and county staff before pursuing the formal request identified in the recommendation. Staff further encourages EQAC to coordinate on this matter with the county's Airports Advisory Committee.	EQAC agrees with staff comments and will follow up. (See Recommendation 2 in the Noise Chapter.)	Ongoing.

Noise Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. EQAC is pleased that a series of Web pages have been established on the county's Web site addressing noise issues. The county should ensure that this page is kept current through regular updates.	The Web pages have been established, and staff plans to update them as needed.	EQAC encourages the county to update the Web pages. (See Comment 5 in the Noise Chapter.)	Ongoing.

IX-2. LIGHT POLLUTION

Light Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
1. EQAC recommends that the Board of Supervisors direct the Department of Planning and Zoning to move ahead as rapidly as possible on revisions to the Outdoor Lighting Ordinance. The revisions need to address glare and several minor issues.	Each year the Board of Supervisors adopts a Zoning Ordinance Amendment Work Program which contains a Priority 1 list of amendment items that staff will be working on during the year and a Priority 2 list of items that will be maintained for future prioritization. The 2008 Priority 1 ZOAWP list adopted by the Board on March 31, 2008 contained an item to consider revisions to the outdoor lighting standards pertaining to security lighting, outdoor sports facility lighting, automatic teller machine lighting and single family residential lighting exemptions. A major component of this effort is contingent upon ongoing coordination and input from the Fairfax County Park Authority. Staff is recommending that the outdoor lighting item remain on the Priority 1 list of the 2009 ZOAWP.	Needed revisions and additions have been identified. Final writing up and review needs to be completed.	Partially completed.
2. EQAC recommends that the Board of Supervisors designate EQAC to work with the Fairfax County Park Authority to review and fine tune its specifications for athletic field lighting to correct the current deficiencies.	This recommendation is in the process of being addressed through coordination and collaboration with key members of EQAC, the Fairfax County Park Authority and the Department of Planning and Zoning. It is the opinion of DPZ that additional discussion should occur regarding the differences between glare and light intensity, and that the white paper should be revised to more fully consider those distinctions. The white paper is currently being revised to better address the comments provided to FCPA by EQAC and DPZ.	The progress has been very satisfactory. The scientific study on glare is in final write-up, while the extensive engineering specifications are substantially complete. Final review needs to be completed prior to publication.	In progress.

IX-3. VISUAL POLLUTION AND URBAN BLIGHT

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
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.	Staff concurs that sign proliferation within rights-of-way detracts from community appearance and can pose a hazard to the traveling public. However, due to a significant increase in the workload related to zoning and property maintenance complaint investigations and due to the uncertain staffing levels which may occur in FY 2010, staff at this time is not in a position to undertake the implementation of a program dealing with this issue. Given the lack of resources available to address this issue, action on this will need to be deferred again.	EQAC believes that the county should more forward on this issue. We recommend that the county work with VDOT and empower all Fairfax County residents to remove unauthorized signs from the VDOT Right-of-Way. We also recommend that the county petition the state legislature to restore the original penalty set forth in the 1993 version of §33.1-373 and that revenue be shared equally between the state and the locality. Finally, we recommend that §33.1-375.1 be stricken from Virginia state code unless it is modified to be a “zero tolerance” law and makes no exceptions for anything other than official government business.	No.

Visual Pollution Recommendations	Action taken by Agency or Department	EQAC Comments	Completed
2. EQAC recommends that the lack of an explicit provision within 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 similar to 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.	Provisions of the Zoning Ordinance, adopted by the Board of Supervisors in 1985, delineated those sign violations which are regulated as a civil penalty and those regulated as a misdemeanor. Prior to this change, all violations of the sign regulations were classified as misdemeanors. With the adoption of this change 1985, it was the intent of the amendment to classify the most common types of sign violations a civil penalty, which also reduces the burden of proof in such enforcement actions. However, it had been the experience of staff that requesting injunctive relief in the Circuit Court to enforce the Sign Ordinance had proven to be more effective than either the civil penalty process or the misdemeanor process because it provided for permanent relief with the ability to seek contempt sanctions if the court's order is violated in the future. In November 2008, the board adopted an amendment to the Zoning Ordinance which provides for a 10 day appeal period to the Board of Zoning Appeals for Notices of Violation related to the illegal placement of signs on private property as well as other types of violations. Staff notes that issuing a "Letter to Industry" as suggested by EQAC will result in further delays in enforcement. Regarding the recommendation to revise the Zoning Ordinance in Article 12 to provide for a separate penalty provision for signs, it is staff's position that the existing format with the penalty provisions established in a single section provides for a consistent approach for all violations of the Zoning Ordinance.	EQAC notes that the proliferation of illegal signs continues and that present strategies don't appear to be working. EQAC agrees that the "Letter to Industry" would result in delays in enforcement. Therefore, EQAC recommends that no warnings be given but that people be forewarned via announcements in the media.	No.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

I. FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

A. OVERVIEW

The impact of environmental contamination on climate change/global warming is the result of world-wide emissions of greenhouse gases (GHG), including carbon dioxide (CO_2). While it is world-wide emissions that contribute to climate change, reductions in GHG emissions will be addressed at the local/community level. Fairfax County is fortunate that we are actively pursuing opportunities to reduce GHG emissions.

1. 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 seven percent below their 1990 levels by 2012. Chairman Gerald E. Connolly and other members of the Fairfax County Board of Supervisors decided 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/).

Solving climate change is admittedly a daunting task by any measure, but we as county governments have a unique role to play in this effort. Through our regional cooperation and influence on major environmental policy and operations like air quality, land use planning and zoning, transportation, forest preservation, solid waste management and recycling and water conservation, we can lead by example by looking at our own operations to assess what policy or program changes we have the authority and resources to enact in order to lower the emissions produced by our operations.

Fairfax County has already taken a number of these actions, such as purchasing hybrid vehicles, promoting green buildings, purchasing wind power and teleworking to name just a few. Fairfax County now has hybrids as part of its vehicle fleet.

In addition, Fairfax County is purchasing energy from renewable energy sources, which both reduces GHG emissions and encourages the further development of renewable energy sources. In April 2007, the county signed a new three-year wind energy purchase contract with 3-Phases Climate Solutions, Inc. Fairfax County will continue the commitment of purchasing five percent of the general county's electricity from wind energy in 2007 and 2008 and has expanded to 10 percent of the general county usage in 2009.

Telework is another effective tool for reducing our GHG emissions by taking cars off our roadways and commuters out of already-crowded trains and buses. Removing just five percent of cars from the road reduces traffic congestion by up to 20 percent. In 2000, the Metropolitan Washington Council of Governments set the goal of having at least 20 percent of all eligible workers in our region telecommuting one day a week by 2005. All 17 jurisdictions in the region endorsed that goal, and Fairfax County was the first to achieve it.

A few additional examples of current county efforts that support greenhouse gas reductions follow.

2. 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 GHG 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.

b. Ride Sharing, Telework and Other Transportation Policies

Transportation policies that serve to reduce vehicle trips and vehicle miles traveled (e.g., provision of transit support facilities, transportation demand management efforts such as ride sharing programs and incentives, telework opportunities, bicycle parking and shower facilities in offices, shuttle bus service, transit incentives, etc.) are implemented routinely through the zoning process.

c. Transportation Programs

Numerous transportation programs are also in place that serve to reduce vehicle trips and vehicle miles traveled, therefore reducing overall GHG emissions. These include:

- **Employer Services Program** – This program promotes transportation demand management strategies and associated outreach efforts to employers in Fairfax County, thereby reducing single occupancy vehicle trips.

- **South County Bus Plan** – This program has increased bus ridership significantly on Richmond Highway.

- **Fairfax County Transit Program** – This multi-modal transportation program supports Metro and Virginia Railway Express services. Metrorail trains will soon expand to eight car trains, VRE is replacing existing cars with double deck passenger cars, and CUE bus service will 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 Purple Days, transit systems throughout the entire region offer free rides to all passengers. GHG emissions reductions attributed to the Fairfax Connector totals 5,766 tons of GHG for fiscal year 2009. If the Fairfax Connector Bus services were not available, county staff estimates that there would be an additional 7,543 tons of GHG emissions.

- **Metrocheck** – This is a fare card voucher program that benefits employees using public transportation. Fairfax County's Employees Transportation Benefits Program provides up to $105.00 per employee per month for transportation by bus, rail or vanpool.

- **Ridesources** – This program provides ridematching services to county employees and residents along with a marketing program to encourage its use.

- **County telework program – Approximately 1,500** county employees telework. Fairfax County is the first jurisdiction to reach —and then exceed — the regional goal set by the Metropolitan Washington Council of Governments to have 20 percent of the eligible workforce teleworking by the end of 2005. The county's outreach efforts on telework and other transportation demand management efforts have broader benefits countywide.

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 nonmotorized transportation.

d. Tree Preservation and Planting

Planting efforts reduce GHG concentrations, as trees sequester carbon by absorbing GHG 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 40 percent (104,000 acres) of the county; therefore, this equates to between roughly two and three million tons of carbon storage. It should be noted that the acreage of tree canopy has dropped slightly since last year because of development. 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 CO_2) 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.

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, actions to improve urban forestry and preserve tree canopy are part of the FY 2010 Environmental Improvement Program.

Chapter 122 of the Fairfax County Code requires the preservation of existing trees during land development (including by-right development) and strengthens expectations to conserve trees during the zoning process. Tree preservation efforts, landscaping efforts and the preservation and restoration of Environmental Quality Corridors and Resource Protection Areas all serve to enhance overall carbon sequestration, thereby supporting

reduced atmospheric GHG concentrations. The establishment and enforcement of limits of clearing and grading on site plans, subdivision plans and grading plans also support reductions in GHG concentrations, as do tree planting initiatives and public outreach focusing on land stewardship issues such as tree preservation and planting.

3. Energy Efficiency Solutions

a. Green Buildings

GHG emissions will be reduced as energy demands are reduced (or as renewable energy sources that to not emit greenhouse gases, such as wind, solar, and geothermal energy are employed). In support of reduced energy use, Fairfax County has adopted green building policies addressing its own capital projects as well as private sector development. Under the Sustainable Development Policy for Capital Projects (adopted by the Board of Supervisors on February 11, 2008), county projects greater than 10,000 square feet in size have a goal of achieving Silver certification through the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) program; smaller facilities are recommended for LEED certification.

The Department of Public Works and Environmental Services 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. This is important because methane is approximately 20 times more potent as a greenhouse gas as is CO_2. 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 projects, 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.

On December 3, 2007, the Board of Supervisors adopted an amendment to the Policy Plan volume of the Comprehensive Plan that incorporated within the Plan support for green building practices and that served to promote the application of these practices. Included in the amendment were new policies establishing linkages between the incorporation of green building/energy conservation practices and the attainment of certain Comprehensive Plan Options, planned uses or densities/intensities of development. In the county's growth centers, commitments for green building practices sufficient to attain certification through the LEED program or its equivalent are expected for certain nonresidential and

multistory multifamily residential proposals (e.g., proposals seeking development at the high end of the planned density/intensity range; development seeking a Comprehensive Plan Option; development involving a change in use from what would be allowed as a permitted use under existing zoning; development at a planned Overlay Level). ENERGY STAR® Qualified Homes designations are expected for any other residential development proposed at the high end of the Plan density range.

b. Energy Efficiency

The county's Facilities Management Department has started an energy efficiency program for the buildings in its inventory. Total energy measured in 1,000 British Thermal Units (kbtu) in 2008 was 513,779,217 and in 2009 it was 622,511,335. This is clearly an increase in total use. There is also an increase in use per square foot. The addition of the county's McConnell Public Safety and Transportation Operations Center (MPSTOC) and the Courthouse expansion with high energy intensity are the main reason for these increases. However, despite these recent increases, total avoided energy use measured in kbtu and the associated cost avoidance between fiscal year 2001 and fiscal year 2009 exceeds 417,000,000 kbtu and $6.7 million.

Natural gas consumption was also reduced by 14,802,596 therms between FY 2001 and FY 2008. However, natural gas consumption increased by 59,658,438 therms in FY 2009, primarily due to the addition of MPSTOC and Courthouse Expansion.

The Facilities Management Department has set an internal goal of a one percent annual reduction in kBTU/SF; between FY 2001 and FY 2008, the annual reduction averaged 1.8 percent per square foot, and the total consumption reduction during this time was 12.6% per square foot. During FY 2009, there was a 9% increase in total energy consumption, thereby reducing the net savings per square foot since FY 2001 to 4.5%.

The Fairfax County Park Authority initiated the lighting retrofit, energy efficient motor upgrades, and automated controls portion of the Park Authority's energy management effort at eight recreation facilities and the Frying Pan Activity Center. The Park Authority is committed to programmatically addressing energy management and has established an internal position to coordinate energy management initiatives and conservation throughout the agency. Now that the budgeted lighting projects are complete, the Park Authority will monitor the energy usage at these sites and will be able to report those savings in future years. These energy saving retrofits will reap long term, system-wide environmental and cost benefits.

Lighting Retrofits ($107,120) consist of installation of T8 Lamps and electronic ballasts, light-emitting diode exit signs, LED light fixtures, replacement of 400-watt high intensity discharge lamps with 300-watt high-intensity discharge lamps, compact florescent lamps vs. incandescent lamps and occupancy sensors at targeted locations. Annual savings are estimated at $60,358 per year.

The initial funding for this project is now expended and the agency is looking for additional funding for continuation of light system retrofits. Staff is requesting bond funds and stimulus monies as additional sources of funding.

Control Installations ($234,840) consist of Web based wireless control of key mechanical systems to allow automatic run time scheduling, phased start up to avoid peak demand utility penalty charges, remote access and run time history reporting. Annual savings are estimated at $70,493 per year. The team assigned this project is continuing research for these controls and hopes to select a system soon as a test in one of the FCPA locations.

Motor Replacements ($43,260) consist of replacing 20 horsepower or larger motors, with 95% (or even higher efficiency) efficiency optimizing units for pool pumps and air handling units. Annual savings are estimated at $16,068 per year. This project was completed with the allotted funding and with the software tracking site usage staff should be able to report on the savings in future updates.

4. 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 has continued its commitment of purchasing wind energy and expanded this commitment in 2009 from five to 10 percent of the general county government usage.

b. Waste-to-Energy and Landfill Gas Recovery and Utilization

County recycling, landfill gas to energy, waste to energy and transfer station operations are the most effective means by which to reduce GHG emissions. These efforts have resulted in an annual reduction of CO_2 equivalents of 913,583 tons.

The county 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 over 80MW of electricity, offsetting an estimated 1,000,000 tons (approximately) of GHG emissions that would have been generated by a conventional power plant of this size.

The county uses landfill gas generated by 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 Maintenance Garage has radiant heaters that can be easily converted to burn landfill gas, as was done for the truck wash at the I-66 Transfer Station and for the maintenance shop 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 buildings mentioned above is being accomplished in Phase 2, was completed in fall 2008. The total project cost is approximately $300,000, and the project will provide estimated annual savings of $70,000 per year in reduced natural gas consumption. The LFG pipeline is approximately 2,500 feet from the existing flare station to the garage, requiring 4" high density polyethylene pipe to transmit the gas. Approximately 150-200 standard cubic feet per minute of LFG are required to heat the garage. In addition, LFG is used at I-95 to generate six MW of electricity which is solid to Dominion Energy, and also as the fuel for sludge processing at Noman M. Cole, Jr. Wastewater Treatment Plant.

5. Green Vehicle Solutions

a. Hybrid Vehicle Replacement Program

As of July 2009, the county's vehicle fleet had the following hybrid vehicles: 55 Toyota Priuses and 55 Ford Escape hybrids. The county plans to continue its hybrid vehicle replacement program in 2010 at a reduced pace due to budget constraints. In 2009, the county purchased a Freights hybrid box delivery truck. The use of these vehicles has resulted in a decrease in GHG emissions equivalent to at least 120 tons per year of CO_2. In 2006, the county converted one of its Priuses to a "plug-in-hybrid-electric" vehicle. This car travels up to 30 miles on electric power from the grid before engine-generated electrical power is used. It achieves fuel efficiency on some trips of over 100 miles per gallon of gas, plus grid electricity. Using Recovery Act funding from the Federal government, the county expects to receive a hybrid school bus and a hydraulic trash truck. The county has also obtained grant funds to acquire a plug in hybrid electric school bus. We expect that the school bus would achieve a 40 percent

decrease in diesel fuel consumption and the truck a 25 percent decrease with corresponding decreases in greenhouse gas emissions.

b. Diesel Exhaust Retrofits

The county has retrofitted 1,012 school buses, 167 Connector buses, and 113 heavy duty trucks with exhaust after-treatments that reduce particulate emissions. The bus retrofits include 436 school buses and 57 Connector buses with treatments that also reduce nitrogen oxides (a precursor to the formation of smog). These retrofits also indirectly benefit greenhouse gas reduction. In addition, Fairfax County Public Schools purchased 147 school buses with the reduced emissions engine control.

c. Idle shutoff and horsepower reduction

All county solid waste trucks and all Fairfax Connector buses have automatic idle shutdown programmed into their engine controls. In addition, the engines on 25 Connector buses have been de-rated by 25 horsepower to reduce fuel consumption and corresponding emissions of regulated pollutants and greenhouse gases by five percent for affected buses.

B. FAIRFAX COUNTY'S PARTICIPATION IN REGIONAL EFFORTS

While progress to reduce GHG emissions takes place at the local level, the greatest benefits of GHG emissions reductions will be realized as Fairfax County, neighboring counties, the Commonwealth of Virginia, other states and foreign countries undertake efforts to reduce GHG emissions. At a regional level, Fairfax County is a leader. Moreover, the county's elected leadership plays an active leadership role in the formulation of county and regional strategies to effectively reduce GHG emissions.

Regional efforts to address climate change over the past year are expected to be key in the development of state, regional and county plans for reducing GHG emissions. The following actions should be noted:

- On December 21, 2007, Governor Tim Kaine issued Executive Order 59, creating the Governor's Commission on Climate Change and setting a target of reducing statewide greenhouse gas emissions to 30% below business as usual by 2025.

- The Governor's Commission on Climate Change (December 2008) recommended the following:

- Virginia will reduce GHG emissions by increasing energy efficiency and Conservation.
- Virginia will advocate for federal actions that will reduce net GHG emissions.
- Virginia will reduce GHG emissions related to vehicle miles traveled through expanded commuter choice, improved transportation system efficiency, and improved community designs.
- Virginia will reduce GHG emissions from automobiles and trucks by increasing efficiency of the transportation fleet and use of alternative fuels.
- Virginia will reduce GHG emissions through accelerated research and development.
- Virginia will reduce GHG emissions by increasing the proportion of energy demands that are met by renewable sources.
- Virginia will reduce GHG emissions by increasing the proportion of electricity generation provided by emissions-free sources of energy.
- Virginia will reduce net GHG emissions by protecting/enhancing natural carbon sequestration capacity and researching/promoting carbon capture and storage technology.
- The Commonwealth and local governments will lead by example by implementing practices that will reduce GHG emissions.

Most planning for regional issues in the metropolitan Washington DC area takes place with the Metropolitan Washington Council of Governments. In November 2008, the Climate Change Report was issued, which provided a number of recommendations that call for reducing GHG emissions. The Climate, Energy and Environment Policy Committee is currently working to develop implementation plans. Fairfax County is an active participant in these efforts and residents should watch these efforts to see both what steps are being taken and how they might contribute to further reducing GHG emissions.

C. NATIONAL RECOGNITION FOR COUNTY EFFORTS

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

- In 2009, the Tree Conservation Ordinance received a “Best in Category” Achievement Award from the National Association of Counties.

- Member U.S. Environmental Protection Agency Green Power Partnership.

- Certified as a Green Government through Virginia Municipal League/Virginia Association of Counties Go Green Virginia Initiative.

- Recognition by 3Degrees Energy for Extraordinary Environmental Leadership through the Support of Renewable Energy.

- Initiated the State Wide Local Government Energy Efficiency and Conservation Committee through the Virginia Energy Purchasing Governmental Association.

- In 2008, the county received the 2007-2008 PTI Technology Solutions Award for Sustainability from the Public Technology Institute for its Plug-In Hybrid Vehicle Fleet Trial.

- In 2007, the county was recognized as a Green Power Partner by the U.S. Environmental Protection Agency for efforts to reduce the risk of climate change through green power purchasing.

- In 2007, the county joined the U.S. Environmental Protection Agency's ENERGY STAR® Challenge program.

- In 2006, the county received a National Association of Counties Achievement Award for Environmental Excellence for the Board of Supervisors' Environmental Agenda ("A 20-Year Vision") and for the Environmental Improvement Program.

- In 2006, Fairfax County was first among large counties in the National Association of Counties Change a Light Campaign, a two-month nationwide campaign challenging county employees to change incandescent bulbs with compact florescent bulbs.

- In 2005, the county received recognition as the U.S. Environmental Protection Agency Landfill Methane Outreach Program Community Partner of the Year Award for use of landfill gas as a renewable energy source, saving the county $5,000 a year in fuel.

- In 2005, the county received a National Association of Counties Achievement Award for "Improving Air Quality in the Washington Metropolitan Region, a Commitment to Air Quality Excellence - Air Quality Protection Strategy".

D. STEWARDSHIP

The regional greenhouse gas emissions reduction implementation plans that Fairfax County will be contributing to for the region will serve as a guide for both things that must be done and steps that can be taken on a voluntary basis. Some efforts, such as saving energy, reducing vehicle miles, carpooling or maybe riding a bike to work will involve changes in lifestyle that can be better for the planet and good exercise. Opportunities for reducing one's personal GHG footprint can be organized in many ways but the following suggestions may be helpful.

- Reduce home energy demands. Insulation, energy efficient windows, solar panels, geothermal energy and wind power can all help to reduce GHG emissions. As the use of renewable energy sources increases, the availability and cost of these sources will hopefully decrease.
- Reduce the use of single occupancy vehicles by carpooling, using mass transit, bicycle, walk or other alternatives (including work at home opportunities).
- Participate in local efforts to plan for efforts to improve land use planning and encouraging energy efficient construction practices. Participating in these local efforts will also help to ensure that energy efficient construction practices will have a better chance of acceptance and success.

E. COMMENTS

1. The Facilities Management Department cost avoidance from FY 2001-FY 2009 for electricity and natural gas is $6.7 million without dedicated staffing. For example, one energy project performed by part-time efforts of one staff member resulted in a cost avoidance of approximately $83,000 annually at the Government Center Complex (variable frequency drives, lighting retrofits and lighting software upgrades). More could be accomplished with dedicated staffing. EQAC commends the county for its past efforts and looks forward to working with the county in the future on its climate change program.

2. When the opportunity for reporting of GHG emissions is available, the county should pursue reporting of GHG emissions so that the reporting can be readily combined with reporting of other jurisdictions. Reporting requirements are currently under consideration by the Environmental Protection Agency and we expect those requirements to be similar to those recommended by the Climate Registry. The reporting format of the Climate Registry would standardize electronic reporting, minimizing the need for data handling. If common definitions and electronic reporting are not part of the planning for reporting, the quality of reporting is likely to be impacted and the cost of preparing the GHG emissions inventories will increase.

F. RECOMMENDATION

1. For new building construction, Fairfax County should explore whether commitments should be sought from developers to: (1) encourage reporting of greenhouse gas emissions estimates, which could be based on energy consumption of fuels that release greenhouse gases; and (2) reduce their greenhouse gas emissions by reducing their energy consumption or by obtaining energy from sources that do not emit greenhouse gases (e.g., energy from wind, solar, hydroelectric and/or geothermal sources). The use of electronic reporting standards employed by the Climate Registry or other sources should reduce the need for human intervention in the handling of data. The pursuit of commitments to LEED certification at the Silver level or higher should be considered as well.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER II

LAND USE AND TRANSPORTATION

II. 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, our region is the second most congested in the country. In 1982 the average metropolitan resident spent 16 hours in congestion; by 2007 that ballooned to 62 hours wasted in congestion. That can be translated into $2.8 billion, 133 million hours and 90 million gallons of gas in 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, 2007 Edition, Land Use Chapter
[2] "Where We are Growing", Southern Environmental Law Center, 2002
[3] Texas Transportation Initiative, 2009 Urban Mobility Report

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 affect 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. Furthermore, this situation skews the affordable housing debate, because it undercounts the number of households needing affordable housing and/or makes it appear as though "non-residents" (i.e., non-tax-payers) simply want to take advantage of Fairfax County affordable housing opportunities.

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.

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

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

Due to a variety of 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, that is, how it should look rather than function (for example, how a building looks rather than its use for commercial or residential purposes). Such codes also 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.

The county has been adopting the use of charrettes (facilitated planning) for many of the new initiatives underway in Urban, Suburban, and Community Business Centers. The Tysons Corner Task Force utilized PB Placemaking to facilitate community sessions. The Urban Land Institute has been assisting with the smaller regions.

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 and heating 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

[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

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 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

[7] Low Impact Development Center at: http://www.lid-stormwater.net/intro/background.htm
[8] http://www.fairfaxcounty.gov/nvswcd/newsletter/greenroof.htm

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:

- 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, which provides shade, air cleansing and light dampening, 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, included in the Comprehensive Plan, 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

[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

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 rezoning approval 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 Metrorail 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 the Tysons Land Use Task Force in 2005 with a very ambitious charge to consider the redevelopment of the “downtown” for Fairfax County. The Task Force has been working for over five years and published “Transforming Tysons: Vision and Area Wide Recommendations” (referred to as “the vision”) in 2008. This is the basis for an amendment to the Comprehensive Plan that should be considered in 2010.

The scope of Tysons Corner required new and creative approaches. The Task Force consisted of appointees that represented a wide swath of stakeholders. It included developers, landholders and residents, as well as

advocates for neighboring communities, distant communities, affordable housing, the arts, the environment, transportation, biking, accessibility and others. The Task Force worked together with professional assistance from county staff, a world recognized urban design firm, experts in transportation and modeling and advisors on communications.

Technology was incorporated throughout the process with models and digital mockups that showed massing and expected growth projections. These were shared with the community to help them visualize the proposed Vision. As the Tysons vision evolves into the Comprehensive Plan, new creative mechanisms will need to be adopted that encourage and monitor the vision and provide the ability to monitor the macro effects and provide mitigation options to make sure the reality aligns with the vision.

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 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 staff 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 prepare for future scenarios and visualization tools to help with decision making—these are becoming increasingly important.

Over the past several years, EQAC has advocated for an enhanced IT capability for tracking land use. Our original recommendations evolved into a comprehensive system to track land use changes at a parcel level. This new system is called the Integrated Parcel Lifecycle System and has had a transformative effect across the county. Many agencies work on parcels for a particular period, but IPLS allows that full lifecycle to be captured across agencies. Layering these data on the GIS system allows for a visualization of how land in the county is used and how it changes over time.

1. Integrated Parcel Lifecycle System

The IPLS System is in production and staff has been doing outreach to train users across agencies on how to leverage the capability. The main transformation is that IPLS provides users with relevant data that can be used for analysis. Prior systems would produce a report that summarized the data. This opens new possibilities for understanding and innovating with information.

The current parcel data include:

- Housing Units.
- Households.
- Population.
- Gross Floor Area.
- Housing Value.
- Residential Development.
- Existing Land Use.

All data are spatially enabled and can be analyzed with the GIS tools.

This information managed by IPLS is 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. One example of the increased resolution the system provides is enhanced demographic forecasts that take advantage of parcel characteristics such as age of structure, location, steepness and other features. County staff can 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.

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 Department of Systems Management for Human Services for its leadership and advocacy on the IPLS. EQAC also congratulates the department on receiving a GIS Excellence Award for the Best GIS Integration or Application Development.

The IPLS system replaced the older Urban Development Information System that captured land use data relevant as the county was urbanizing from 1970 to the present. Every parcel in UDIS would be clearly delineated into Residential, Industrial, Commercial or Public use. The IPLS system can track data at a more

granular level and quickly generate reports. However this granularity highlights the fact that the UDIS categories are no longer appropriate, especially as the county adopts more transit-oriented designs that incorporate mixed use development. Parcels in a mixed use development cross categories and parcels with multiple stories of mixed use further complicate simple analyses.

With IPLS in place, the county needs to develop an updated reporting methodology to accurately reflect the land use across the county. IPLS provides a base to analyze parcel information, but there is a considerable task remaining to synthesize that information and turn it into useful land use reports.

2. Data

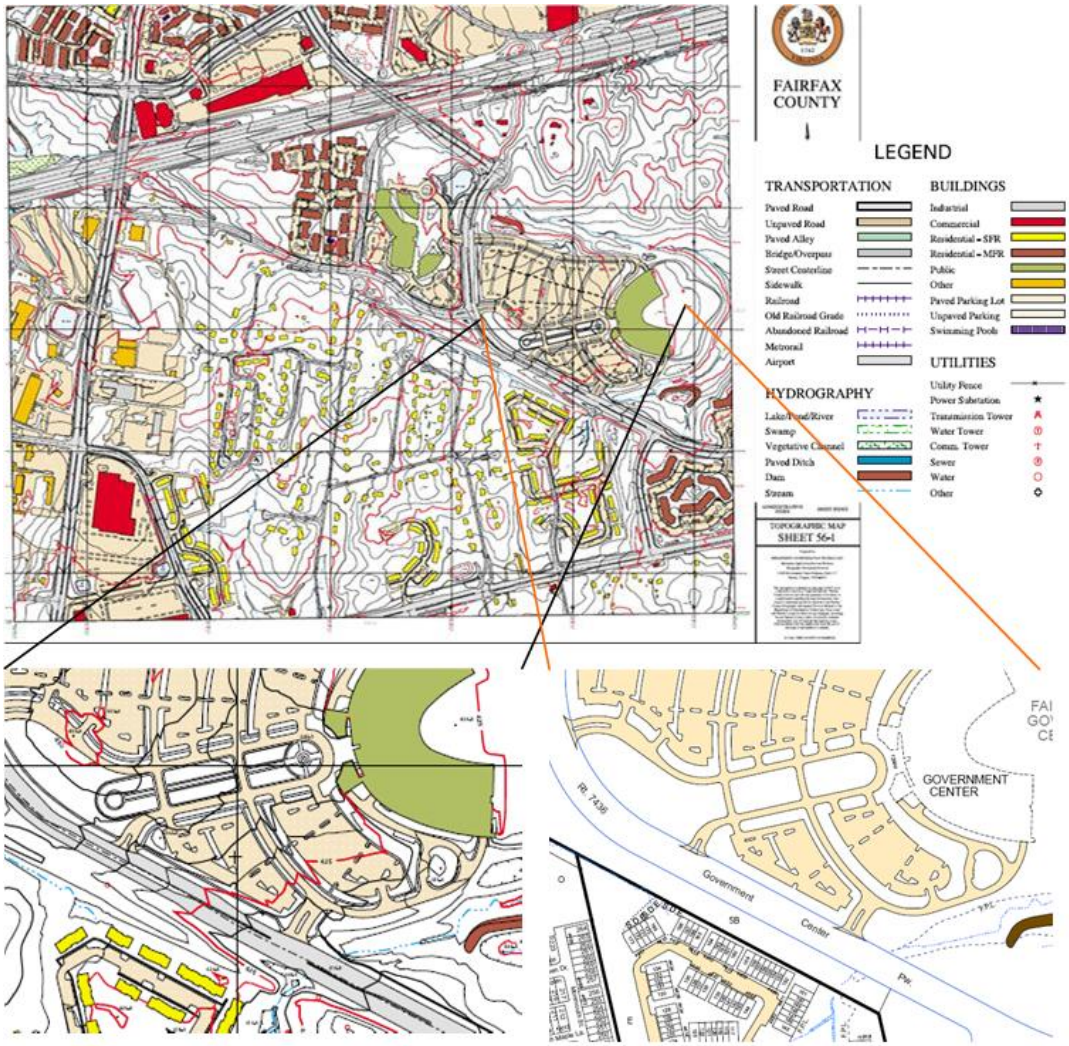
The GIS systems are only as reliable as the data they process. The county has acquired significant data and maintains these data on a regular basis. Prior EQAC recommendations focused on enhancing different types of data in particular:

- 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.
- Natural Resource data – identification of resources that should be considered during environmental and conservation planning efforts.

a. 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.

b. 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.

c. Natural 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 its limitations.

3. Models and Visualization

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.

In addition, EQAC recommends that the county leverage its data holdings with new visualization tools. This could be especially relevant for task forces, such as the Area Plan Reviews in each district. It if very difficult for the public to visualize amendments, and the county has data that can greatly assist the public.

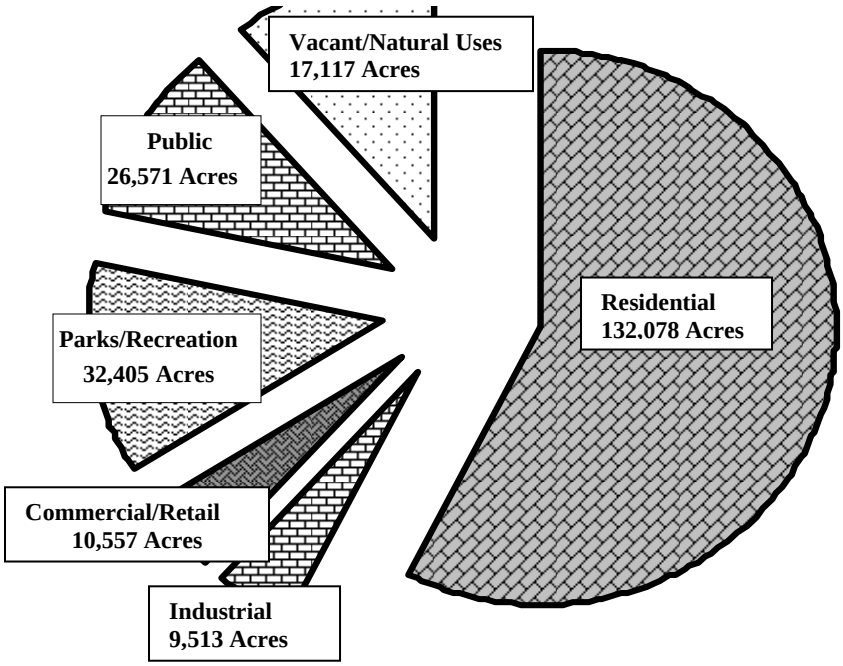
C. LAND USE

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?

Fairfax County has 228,240 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 broad categories identified in Figure II-3.

Figure II-3: Existing Land Uses in Fairfax County



Source: Fairfax County Department of Systems Management for Human Services, 2007.
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 2007 edition, was developed around 18 Goals for Fairfax County (a 19th goal was added later). The 2007 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.

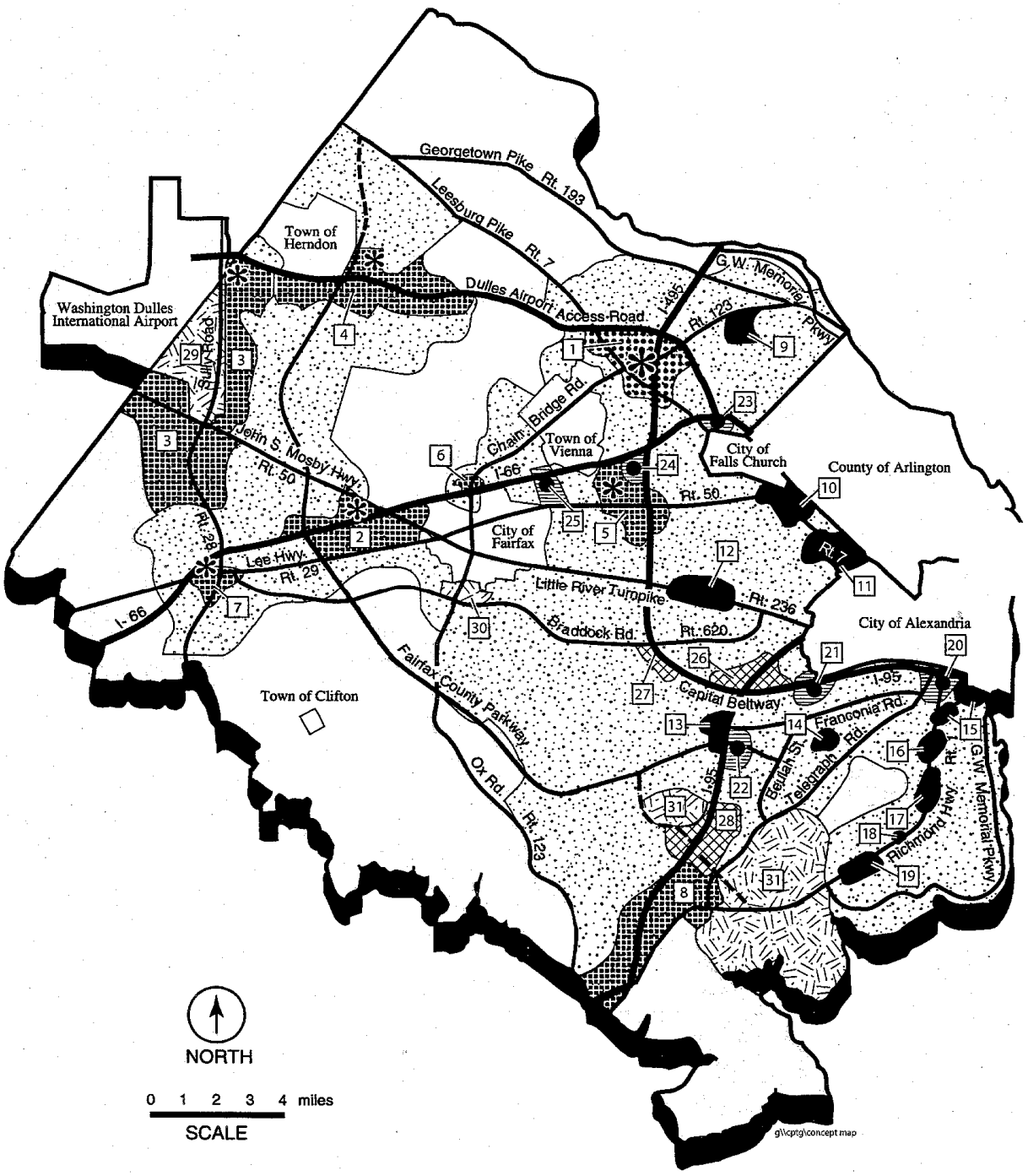
a. Concept Map for Future Development

In 1990, the county's Concept Map for Future Development was developed. This map identified 23 mixed-use centers; the Concept Map has been revised slightly since then and includes Lorton-South Route 1 and the South County Center, for 25 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 2009. The *2008-2009 North County Area Plans Review Summary of Adopted Amendments to the Fairfax County Comprehensive Plan Resulting from the 2008-2009 North County Area Plans Review*, September 2009 is available at http://www.fairfaxcounty.gov/dpz/apr/. The southern portion, which includes Braddock, Lee, Mason, Mount Vernon and Springfield districts, was reviewed in 2005-2006, and will be reviewed in 2009-2010. The South County APR schedule and guide for 2009-2010 are also available at http://www.fairfaxcounty.gov/dpz/apr/.

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.

APR 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 Master 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.

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 2007, with only approximately 7.5 percent 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.

The current land use categories are shown in Table II-2 below. Currently, 57.9 percent of the county land is developed for residential use, with 4.6 percent for commercial. These numbers show the land devoted to each use type, but they do not show the corresponding density/intensity. Commercial/retail acreage in the county has a higher intensity 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/intensity and whether it is a function of dwelling units per acre, floor area ratio or both.

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
2007	17,117	228,240	7.5 percent
Planned land does not generally include public roads and water Note: Some of the decrease in vacant land between 2000 and 2007 is due to a change in the definition of vacant land. Areas previously classified as vacant but owned by tax exempt entities such as houses of worship and private schools are no longer included as vacant land.			
Source: Fairfax County Department of Systems Management for Human Services (IPLS), 2007			

Table II-2 Existing Land Uses		
Land by existing use	**Acreage**	**Percent of Total**
Residential	132,078	57.9 percent
Industrial	9,513	4.2 percent
Commercial	10,557	4.6 percent
Parks and Recreation	32,405	14.2 percent
Public	26,571	11.6 percent
Vacant & Natural	17,117	7.5 percent
Total	228,240*	100.0 percent
*Does not generally include public roads and water		
Source: Fairfax County Department of Systems Management for Human Services (IPLS), 2007		

As the current Plan is exercised and the county reaches build-out, the planned land use acreage will certainly increase. All vacant and natural land will be developed or become parkland. The ratios between the types will also change.

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.

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-3, 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-3 have increased since 1991.

Table II-3
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

5. Plan Density Trends

Informal observations show that the overall 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.

The recent Tysons Corner Land Use Task Force recommendations also highlight the density increases. The proposed vision calls for increasing from 17,000 to 100,000 residents and from 120,000 to 200,000 jobs. This growth, which will all occur as redevelopment within an existing developed area, will be more complex then any other development in the county's history.

With that increasing density, the Tysons Corner plan provides a comprehensive urban vision that provides:

- 95% of all development within an easy walk of transit.
- A new transit oriented focus with public circulators and Metrorail stops.
- A jobs/housing balance of approximately 4.0 jobs per household.
- A sustainable Tysons with restored streams, new parks and green buildings.

This vision highlights the need for new analysis techniques and models to better understand and prepare for future land-use decisions.

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.

V/C ratios on county highways as of 2002 are shown in Figure II-5. 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-6. 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:

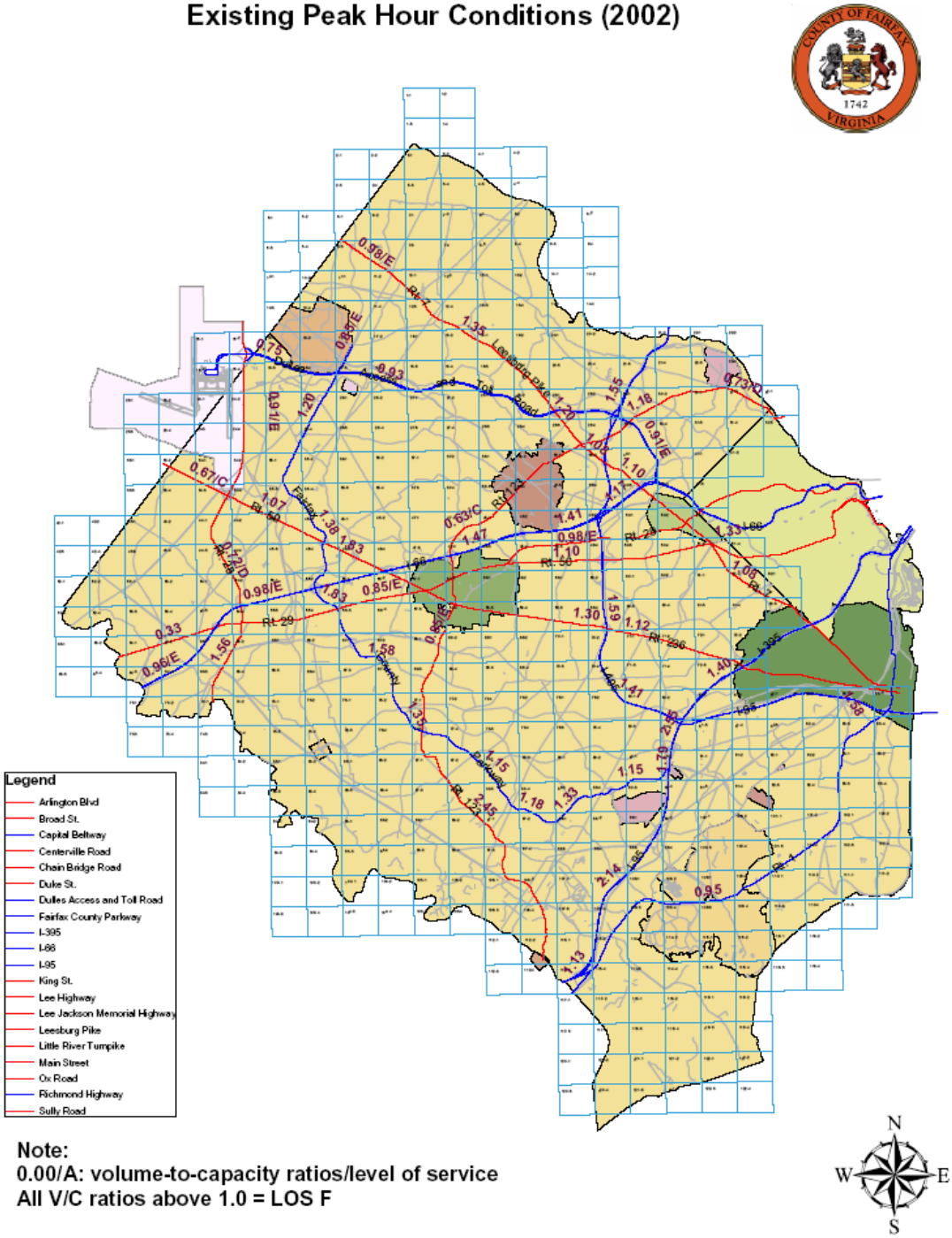
- The failing highways are still failing, some much worse and others actually better:
    - I-66 West of the City of Fairfax will get increasingly more congested, while I-66 east of Fairfax will get less congested.
    - The Beltway will become considerably more congested, with V/C ratios ranging from 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.

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.

Figure II-5.

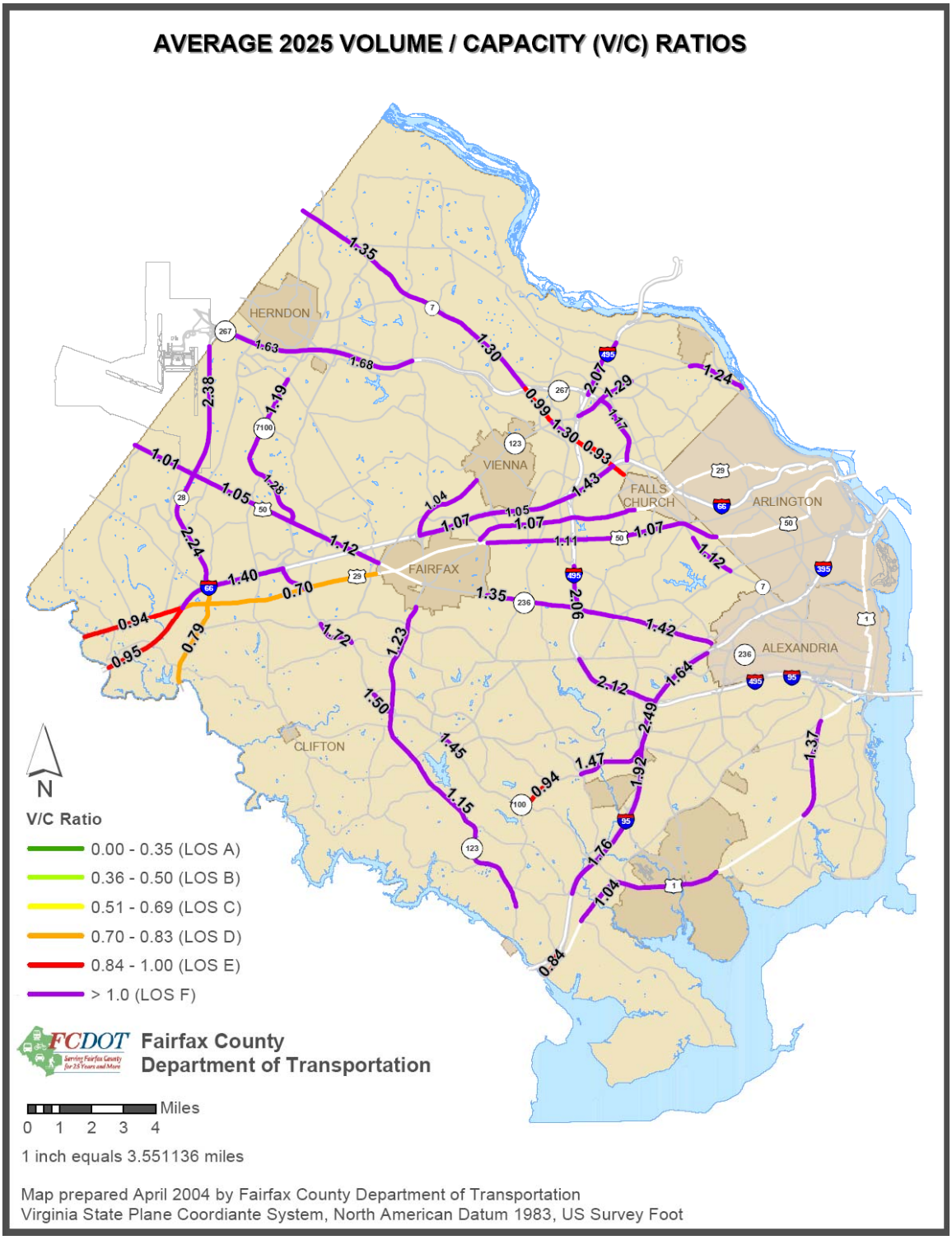
Average Volume/Capacity V/C Ratios - Existing Peak Hour Conditions (2002)



Note:
0.00/A: volume-to-capacity ratios/level of service
All V/C ratios above 1.0 = LOS F

Source: Fairfax County Department of Transportation

Figure II-6.


AVERAGE 2025 VOLUME / CAPACITY (V/C) RATIOS
HERNDON
VIENNA
FALLS CHURCH
ARLINGTON
FAIRFAX
ALEXANDRIA
CLIFTON
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

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.[10] 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-4), 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-5); 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.

The following has been noted by the Metropolitan Washington Council of Governments in its January 2006 publication "Fairfax County and the Washington Region: A Look at Economic and Demographic Characteristics" (see page five):

> *"Nearly three-quarters of Fairfax County resident workers commute to work by driving alone, compared to 68 percent of the Washington region's workers. Seven percent of Fairfax County's resident workers use public transportation, compared to 11 percent of the Washington region's workers. Thirteen percent of resident workers of both Fairfax County and the Washington region use car pooling as a means of transportation to their jobs.*
>
> *Of the 350,714 occupied housing units in Fairfax County, four percent (14,207 housing units) do not have vehicles. For renter-occupied housing units, approximately nine percent do not have vehicles."*

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. Metrorail is a good example of denser transportation in a smaller footprint.

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

Table II-4 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[11]		

Table II-5 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:

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

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 Metrorail right of way is a much thinner with a higher peak capacity. As the

[11] http://www.fairfaxcounty.gov/demogrph/census_summaries/2000census_commuting.pdf

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. 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.

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 Virginia Department of Transportation's 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, D.C. 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) was conducted by the Washington Metropolitan Area Transit Authority and its engineering consultants with the cooperation of Arlington and Fairfax Counties from spring 2004 to spring 2006. WMATA undertook the Pike Transit Initiative to consider the development of an advanced transit system connecting the Pentagon/Pentagon Crystal City area with Bailey's Crossroads. In May 2006, the Fairfax County Board of Supervisors endorsed the "Modified Streetcar Alternative" recommended in the Columbia Pike Transit Alternatives Analysis as the preferred transit alternative for the Columbia Pike corridor. The endorsement allowed the project to advance to the next phase of project development in which the project team developed a financial strategy. Currently, the Columbia Pike Streetcar Project is poised to enter the environmental documentation and preliminary engineering phase of project development.

Although the project is not considered a good candidate for Section 5309 New Starts or Small Starts funding, federal transportation funding programs will continue to evolve and federal grants outside of the Section 5309 program may be available to the project. These include Congestion Mitigation and Air Quality Improvement Program and Regional Surface Transportation Program funds. A favorable National Environmental Policy Act finding would give the project potential to make use of other federal funds that may become available, and it would avoid possible back-tracking to make appropriate revisions and secure needed approvals.

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.

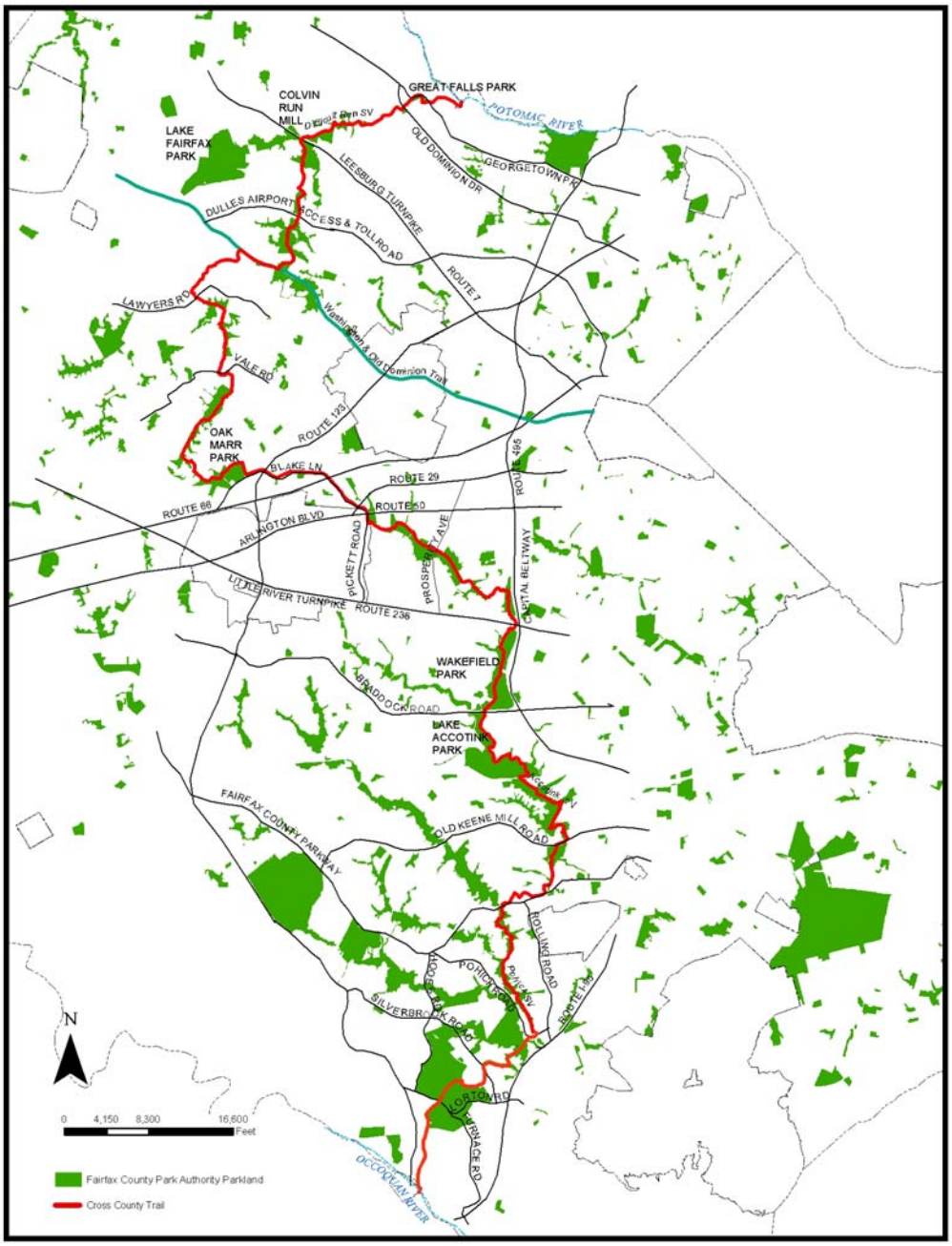
Improved non-motorized transit access by connecting hike/bike paths to the Metrorail stations and bus stops was one of the major considerations for the 2002 update of Fairfax County's Countywide Trails Plan. The Trails and Sidewalks Committee continues to improve the trail connections to transit facilities by working with the Washington Metropolitan Area Transit Administration, the Virginia Department of Transportation and the county's Department of Transportation.

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-7) was completed in December 2005. As the Cross County Trail continues to attract new users, staff and volunteers evaluate and improve routes and trail surfaces to keep the trail in a usable condition.

Figure II-7: 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 Metrorail 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.

(i.) Pedestrian Program

In 2006 the Pedestrian Task Force recommended and the Board of Supervisors endorsed a ten-year funding goal of $60 million for new pedestrian projects. The board's 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 2007 Transportation Bond funded $15 million for additional pedestrian projects and nearly $8 million for additional bus stop projects. The board-prioritized VDOT Secondary Program funded $2.8 million for pedestrian intersection projects. The approved FY 2009-2011 commercial and industrial tax will fund over $7 million for additional pedestrian projects and nearly $2 million for additional bus stop projects. As of the end of FY 2008, this and other programmed funding totals over $48 million towards the Pedestrian Task Force's 2006 recommended ten-year funding goal of $60 million.

(ii.) Transportation Demand Management

The county has integrated Transportation Demand Management strategies into the land development process and is working to formalize this program. TDM commitments, or "proffers," promote alternatives to single occupant vehicle trips. TDM proffers can contain commitments to provide TDM services, goals for percentage trip reduction and remedies or penalties for non-attainment of proffered goals. The TDM proffer coordinator is negotiating proffers and monitoring implementation and performance of existing proffers. In FY 2008, TDM plans were proffered for new developments in Tysons Corner, Merrifield and Fair Lakes; TDM commitments were also considered for proposals in Annandale, Springfield and Alexandria. Proffer monitoring began for properties in Tysons Corner, Vienna, Herndon and the Fairfax area.

In November 2007, the Fairfax County Department of Transportation began a consultant study on integrating TDM into the land use and approval process. The study will include a best practices report, local data collection to quantify possible TDM reductions, a TDM proffer manual and parking strategies for transit-oriented development. Staff expects the December 2008 completion of this study to lead to more effective TDM strategies and to formalize arrangements for TDM proffers.

(iii.) Fairfax County Comprehensive Bicycle Initiative

As we approach the third anniversary of the county's Comprehensive Bicycle Initiative, FCDOT continues to address the growing needs of area bicyclists and is making Fairfax County bicycle safe and friendly.

As directed by the Board of Supervisors, a major goal was the development and printing of the first "Fairfax County Bicycle Route Map," issued on May 16, 2008, "Bike to Work Day." The map defines a network of preferred as well as less preferred on-road bike routes that enable bicyclists to traverse the county. The county printed about 6,000 copies in the initial print job and will follow up with another run of approximately 41,000 more as a result of demand for the maps. Electronic copies of the map are available for download in PDF format at http://www.fairfaxcounty.gov/fcdot/bike/bikemap.htm.

FCDOT continues to coordinate with VDOT to re-stripe priority roadway segments for bike lanes as part of several overlay/paving projects. Shoulders were added to a segment of Stringfellow Road; Westmoreland Street in the McLean area of the county will be retrofitted with on-road bike lanes in 2008. Work continues with the Gallows Road On-Road Bike Lane Initiative. In an unusual and foresighted project, Lawyers Road, which had four lanes of traffic, has been reduced to two, with a new turning lane down the middle, as well as bike lanes at the edges.

Work has been initiated to define potential areas for an Interconnected Network Pilot Bicycle Program. Potential sites include Vienna-Dunn Loring-Merrifield Town Center and the Fairfax County Government Center.

Utilizing county transportation bond funds and federal Congestion Mitigation and Air Quality Grant funds, project scopes are being prepared for bicycle spot projects countywide. Projects include the installation of bicycle racks and lockers, construction of missing segments of trails and bridges in order to provide connectivity and retrofitting roadways with on-road bicycle facilities.

FCDOT continues to manage a bicycle locker rental program at the Reston East and Herndon Monroe Park-and-Ride lots. Additional lockers and racks are planned at various locations countywide.

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 over 1,000 by 2005 (thereby meeting a goal that was set based on the Metropolitan Washington Council of Governments' goal of having 20 percent of the regions' eligible workforce teleworking by 2005), and the number of teleworkers continues to increase, as there are, as of October 2009, 1,500 county teleworkers. Based on information provided to EQAC previously regarding the 2005 telework goal, it is estimated that county teleworkers potentially saved roughly 80,000 commuting hours and 2.5 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, emphasizing H1N1 virus preparedness, in order to ensure that county workers have the tools to work from remote sites.

c. Major Transportation Projects[12]

I-495 High Occupancy Toll Lanes - Fourteen miles of new HOT lanes (two in each direction) are being built on I-495 between the Springfield Interchange and just north of the Dulles Toll Road.

[12] Virginia Megaprojects http://www.vamegaprojects.com

I-95/395 HOT Lanes - This 56-mile project would add a third lane to the existing 28 miles of high occupancy vehicle lanes between Arlington and Dumfries and would build two new HOV lanes for an additional 28 miles south from Dumfries to Spotsylvania.

Dulles Corridor Metrorail Project - A new 23-mile rail line, described above, will extend service from the existing Orange Line at the East Falls Church station in Fairfax County to Route 722/Ryan Road in Loudon County. Utility relocation is under way on Route 7 in Tysons Corner in preparation for the extension.

I-95 Telegraph Road Interchange - Rebuilding the Telegraph Road interchange at I-95 is the final component of the Woodrow Wilson Bridge project. When completed, motorists will have smoother traffic flow on Telegraph Road and Huntington Avenue, as well as easier and safer access to the new bridge.

Fairfax County Parkway Extension for Base Realignment and Closure - The project will build the final two miles of the four-lane Fairfax County Parkway, will build an interchange at the Engineer Proving Ground access road and will extend Boudinot Drive to provide an on-ramp to the southbound parkway. Estimated completion: Late 2010.

d. Transportation Alternatives

The combined outreach efforts of FCDOT demand management programs, known as the Transportation Services Group, along with programs sponsored by the Metropolitan Washington Council of Governments Commuter Connections programs, have been successful. In 2008, these programs reached over one hundred thousand people who live or work in Fairfax County with messages about environmentally friendly transportation options.

- Over 300 Fairfax County employers have implemented Transportation Demand Management programs.
- There are 17,592 parking spots in the county's Park & Ride lots that allow commuters to park near public transportation hubs; the lots average about 70 percent capacity.
- The RideSources program received over 500 applications from commuters looking for car or van pool matches last year.
- Within Fairfax County government, 180 employees participate in the Transportation Benefits Program, taking public transportation to work, and, as noted earlier, over 20 percent of eligible employees telework at least one day a week. The county also provides reserved parking spaces for car and van pools at some facilities.

- Information about transportation options such as the high-occupancy vehicle lanes, RideSharing, Guaranteed Ride Home, car sharing, using bus and rail and teleworking is disseminated at outreach events throughout Fairfax County.
- The Fairfax County Community Residential Services Program partnered with multi-family complexes, area developers, and civic organizations to promote telecommuting and the use of mass transit, carpools, vanpools, biking and walking instead of drive-alone commuting.
- The Fairfax County Transportation Services Group also supports Transportation Management Associations and other organizations that assist commuters and community, including the Dulles Area Transportation Association, LINK of Reston Town Center, TyTran in Tysons Corner, and the Transportation Association of Greater Springfield.

The county participated in Try Transit Week, September 21-25, 2009 (a statewide event sponsored by the Virginia Department of Rail and Public Transportation) to encourage everyone to avoid driving solo and give transit options such as bus, rail, carpools, vanpools and telework a try.

The county is developing a Transit Development Plan, a comprehensive 10-year plan for bus service countywide that includes both Fairfax Connector and Metrobus. To ensure that the plan meets the needs of residents, the county has completed the following actions: examined current and projected demographic, economic, and land use data; conducted customer and resident surveys; counted ridership; conducted public meetings for additional input; and developed service recommendations. The county is seeking additional public input through public meetings and online. http://www.fairfaxcounty.gov/fcdot/tdp.htm.

New "Green Diesel" buses were also introduced in 2007. They run on ultra-low sulfur diesel and include a particulate trap, which can reduce emissions up to 90 percent. The new buses conform to Environmental Protection Agency 2007 clean air mandates. Bike racks have been installed on all buses and SmarTrip fare boxes have also been added. The Fairfax Connector's new buses are low-floor vehicles which are more passenger friendly; they do not require a lift for passengers needing assistance.

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 Metrorail 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 reviews projects that have combined elements of land use and transportation via special studies or revitalization districts that incorporate mixed use and transit oriented development. They are in various stages, from conceptual to planning to implementation, and provide valuable lessons for future projects. A consistent thread that runs through them is the holistic integration of Land Use and Transportation that has contributed to public acceptance and enhanced utility.

a. Tysons Corner Urban Center

Tysons Corner is the only Urban Center designated in The Fairfax County Comprehensive Plan. It consists of 1,700 acres of land that currently house 16,000 residents and provide employment for roughly 105,000 people. The current plan Comprehensive Plan for Tysons Corner has evolved over the past 48 years. In 1960 Tysons Corner was first viewed as having potential to become the Fairfax County "downtown." In 1975 the Board of Supervisors commissioned a special study that guided development through 1993. In 1994 a second major study was commissioned that produced a significant amendment to the comprehensive plan. The result of this long term planning is mixed. On the positive side, Tysons Corner has become a successful economic engine for the county as the 12th largest employment center in the United States. On the negative side however, the area faces significant challenges with traffic congestion, pedestrian accessibility, stormwater management and environmental impact. It has effectively become a destination, not a place to stay and it lacks the essential 24 hour vibrancy of a traditional downtown.

In March 2005, the Fairfax County Board of Supervisors created the Tysons Coordinating Committee with the following mission to update the 1994 Plan to:

1. Promote more mixed use.
2. Better facilitate transit-oriented development.
3. Enhance pedestrian connections throughout Tysons.
4. Increase the residential component of the density mix.
5. Improve the functionality of Tysons.
6. Provide for amenities and aesthetics in Tysons, such as public spaces, public art, parks, etc.

In September 2008 the task force delivered a report containing a revised Vision and Area Wide Recommendations. Throughout the three year process, the task force worked closely with over a dozen public and private agencies, engaged with world-renowned consultants that specialize in transit oriented design, and conducted 45 public meetings attended by over 2,000 participants.

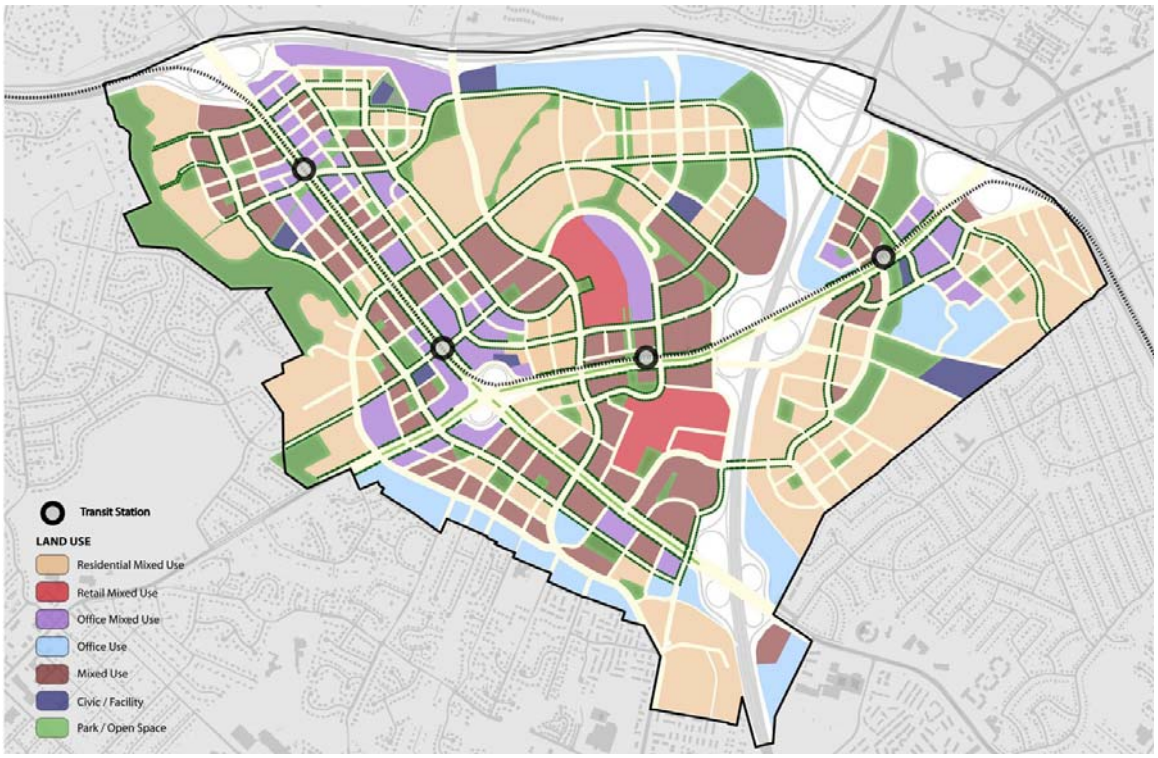
The recommendations for a transformed Tysons Corner are organized around six key points:

1. Create a people-focused urban setting;
2. Redesign the transportation network to balance walking, biking, transit and the automobile;
3. Place a strong focus on the environment;
4. Develop a vital civic infrastructure of the arts, culture, recreation and the exchange of ideas;

5. Sustain and enhance the contributions of Tysons as the county's employment center and economic engine; and
6. Establish an authority for implementation that provides the flexibility, accountability, and resources necessary to achieve the vision.

The conceptual plan for the vision is shown in Figure II-8. The majority of the development is mixed use with different concentrations highlighted by their primary orientation towards residential, office, or evenly split.

Figure II-8: Tysons Land Use Task Force's Recommended Conceptual Plan for Tysons Corner (Land Use, Parks and Open Space Network)



The vision will increase the residential population six-fold from 16,000 to 100,000 and almost double the number of jobs from 116,000 to 200,000. This is more balanced and will increase the vibrancy of the community.

Transportation will be centered on the four metro stops, with significant density within 1/8 mile of each station tapering outward. A new circulator transit is proposed to weave between the metro stops and the community. To encourage development along the circulator routes, additional development density is planned within 400-600 feet of the circulator route.

The plan is subdivided into eight separate districts or places, each with a particular character. These districts are effectively neighborhoods that allow

further detailed planning. The connectedness and uniqueness of each place will be mutually supportive and add vibrancy.

Environmental stewardship is an important aspect of the plan. Specific objectives and incentives are presented for green buildings. Open space is an integral part of the conceptual plan, with 160 acres identified as open space or parkland. Rigorous storm-water management practices are mandated to restore stormwater retention to the equivalent of forested condition. Redevelopment will include stream valley restoration. With this green focused redevelopment the plan should help the county achieve an 80 percent reduction in carbon emissions by 2050 with the goal for Tysons Corner to achieve carbon neutrality by 2030.

The Vision and Area Wide recommendations are the first milestone for an updated comprehensive plan. The next steps that must be taken are to create Area-wide plan text, District and Sub-district Plan text, and a Draft Plan Amendment. The Board of Supervisors has accepted the Vision and Area Wide Recommendations. The next steps are being coordinated by Staff with guidance from the Task Force Advisory Committee working with the Planning Commission.

As the county continues to refine the Comprehensive Plan for Tysons Corner there are two significant transportation projects underway that are being coordinated by other authorities:

1. The Dulles Corridor Metrorail Project is proceeding with plans to extend the Metro from East Falls Church to Wiehle Avenue with four stations in Tyson Corner. The Comprehensive Plan for Tysons Corner is aligned with the Metrorail construction, with specific bonus density increases designed to be phased in with the Metrorail construction. This project is under the authority of the Metropolitan Washington Airport Authority.

2. The I-495 Virginia HOT Lanes Project will deliver the most significant enhancements to the Beltway since its opening in 1964. It includes two new lanes in each direction from the Springfield Interchange to just north of the Dulles Toll Road. This project falls under the authority of a public/private partnership between VDOT and two private corporations.

These three projects are executing concurrently with agreements to coordinate as they move forward. Having three separate authorities responsible for implementing different aspects of Land Use and Transportation is not an ideal situation. The agreements in place are a first step towards an integrated approach. With multiple levels of decision making authority distributed between the county, state, and federal government, such coordination may be the only practical arrangement. It

however highlights the complexity involved in integrating Land Use and Transportation.

b. High Occupancy Toll Lanes on the Beltway

This project will build fourteen miles of new HOT lanes (two in each direction) on I-495 between the Springfield Interchange and just north of the Dulles Toll Road. These HOT lanes will allow the Beltway to offer HOV-3 connections with I-95/395, I-66 and the Dulles Toll Road. When completed, buses, carpools and vanpools with three or more people, and motorcycles can ride in the new lanes for free. Vehicles carrying two people can either travel for free in the regular lanes, or pay a toll to ride in the HOT lanes. Tolls for the HOT lanes will change according to traffic conditions, which will regulate demand for the lanes.

This project will also make a significant contribution to the Beltway's 45-year-old infrastructure, replacing more than 50 bridges and overpasses, upgrading 10 interchanges and improving new bike and pedestrian access. This project is made possible through a public-private partnership between the Virginia Department of Transportation and Fluor-Transurban.

Project construction started in June of 2008. Because of the public input received, VDOT has re-considered the locations of the sound walls and will be providing additional sound walls and sound wall height adjustments throughout the project. VDOT has also hired a landscape architect to develop a landscaping plan for the project.

c. 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. That vision is now becoming a reality. The first phase will connect East Falls Church to Wiehle Ave, passing through Tysons Corner and providing the transit component for the new Tysons Corner Urban Center. The second phase will link Wiehle Ave through Reston to Dulles Airport. The Metropolitan Washington Airports Authority is responsible for the construction with funding being provided by the county, the Commonwealth of Virginia and the U.S. Department of Transportation..

On March 10, 2009, the Secretary of the U.S. Department of Transportation executed the Full Funding Grant Agreement with the Metropolitan Washington Airports Authority to provide $900,000,000 of federal funds to Phase 1 of the Dulles Corridor Metrorail Project. This action finalized the funding plan for the $2.7 billion project.

Phase I construction is under way, including four stations in Tysons Corner leading to Wiehle Avenue in Reston. Route 7 roadway enhancements and rail construction along Route 267 was to have begun in late summer 2009. Preparatory work at the Route 7/123 interchange is under way for the Tysons Central 123 Station and tunnel rail construction under the interchange will begin late 2009, with aerial rail construction along the Dulles Connector Road and Route 123 to begin in early 2010.

Phase II of the Dulles Metrorail project will complete the extension of the new Silver Line to Dulles Airport and into Loudon County. Phase II will be funded primarily through bonds issued in relation to revenue collected from Dulles Toll Road tolls. The ongoing effort to create a Special Tax District, taxing property owners in the corridor, is critical to fund the building of the stations that will serve the phase II extension.

An additional critical funding source will be the Metropolitan Washington Airports Authority Dulles Toll Road rate increases at specific on-ramps, to take effect in 2010, with an additional increase at the Main Plaza in 2012.

d. Dulles Corridor Special Study

On May 18, 2009, the board authorized a special study of the Reston segment of the Dulles Corridor, in conjunction with the review of the Reston Master Plan, to look at the 20 North County Area Plans Review nominations submitted. This special study is being conducted in the following four segments: 1) a land use college and existing conditions analysis; 2) a review of the planning for the Town Center and the Reston areas along the Dulles Corridor; 3) a review of planning principles for Reston and the planning for the Reston residential neighborhoods; and 4) a review of the Reston Village Centers.

The Reston Land Use College and the existing conditions analysis has already started as the first segment of the master plan review. The Reston Land Use College and the preparation of existing conditions data, both of which were started in June and should be completed by October 2009[13].

e. Ft. Belvoir—Base Realignment and Closure

On January 26, 2009, Fairfax County's Board of Supervisors adopted Comprehensive Plan Amendments for seven BRAC Area Plan Review nominations. The adopted changes modify Plan guidance for parts of the Woodlawn Community Business Center along Richmond Highway, the

[13] Memorandum from James P. Zook, Director, to Board of Supervisors, June 30, 2009, Subject, Proposed Scope and Schedule for Reston – Dulles Corridor Special Study

Springfield Community Business Center and a block near the Huntington Metro Station.

The purpose of the BRAC APR cycle is to determine whether amendment of the Comprehensive Plan is warranted given the relocation of approximately 20,000 jobs to Fort Belvoir. The impacts of the planned movements will significantly affect transportation systems, the natural environment and the quality of life both on- and off-post. The new jobs and residents moving to the area also may have a beneficial impact on the local economy.

f. Revitalization Projects in Targeted Commercial Areas

The Fairfax County Office of Community Revitalization and Reinvestment is facilitating strategic redevelopment and investment opportunities in seven targeted commercial areas. Six of these are summarized below, and the seventh, Merrifield is summarized within the next section of this chapter (Suburban Centers). Quotes are taken from the OCRR Web site.

Annandale - "Annandale business core is a culturally diverse hub that contains more than two million square feet of commercial space, including shops, restaurants, and service businesses that draw customers from throughout the Washington, D.C., Metropolitan Area. Excellent development opportunities exist within Annandale, which is in process of being studied to develop and refine an urban concept, with the goal of creating a town center consisting of a diverse mix of uses."[14] The Annandale Design Guidelines for developing property or making site or building improvements, in Annandale, was completed in September 2009.

Bailey's Crossroads/Seven Corners - " The core of the district includes Skyline Center, national chains and a diverse array of locally owned stores and restaurants. Neighborhoods of single-family homes and apartments house the diverse population. . . it is envisioned to become more urban in character. The area is in the midst of a series of studies to develop and refine an urban concept with the goal of increasing density, mixing uses and improving the transportation network."[15] The Baileys Crossroads Planning Study focuses on evaluating and refining the concepts and strategies developed by the Urban Land Institute Advisory Services Panel.

Lake Anne – "The Lake Anne Commercial Revitalization Area, which includes the Historic Overlay District, is bounded by Baron Cameron Avenue (Rte 606) to the north, Lake Anne to the south, North Shore Drive to the west and Moorings Drive to the east." "The Lake Anne Village Center Washington Plaza was the first area developed in the planned

[14] http://www.fcrevit.org/annandale/index.htm.
[15] http://www.fcrevit.org/baileys/index.htm.

community of Reston, and its unique design and sense of place are recognized worldwide by planners, architects and developers." "An integrated planning effort consisting of a stakeholder charrette, focus groups and planning, parking and transportation studies resulted in an amendment to the Fairfax County Comprehensive Plan on March 30, 2009 These changes reflect community values and perspectives, and position Lake Anne to again become an example of how innovative reinvestment and development can result in a renewed economic future."[16]

McLean -"The McLean area is renowned for its affluent, stable residential neighborhoods and a wide variety of community serving retail uses and businesses. Seeking to preserve and enhance the McLean Commercial Revitalization District's small town environment while stimulating change, the revitalization concept for McLean centers on the creation of North and South Villages. This balanced reinvestment strategy primes the area for expansion of community serving retail and businesses, additional residential development, public amenities and entertainment venues that will draw current and future generations to live, work, and play in the McLean CRD."[17] The McLean Revitalization Corporation secured funding to test the viability of these concepts, estimate their costs and recommend an approach to implementation. The MRC has also been working with the Supervisor's office and the county to begin the first phase of a long-term process to move utility infrastructure underground.

Richmond Highway Corridor - "In general, the Richmond Highway corridor has an uncoordinated, strip-commercial appearance. The corridor itself serves a dual purpose of being a Main Street for surrounding residential development as well as a major north-south oriented transportation route, carrying heavy volumes of commuter traffic. The width of the highway varies from four to six lanes and service drives exist sporadically along its length."[18]

Springfield - "In May, 2006 an Urban Land Institute Advisory Panel completed a report and recommendations for future development of Central Springfield...Springfield will more firmly establish itself as a regional center of commerce with added commercial and office space. Springfield will continue to be a regional transportation hub, given its prime location at the intersection of two key regional interstates (I-95 and I-395) and a station on the Metro Blue Line. Springfield Mall will be revitalized and redesigned along with the northeast quadrant of central Springfield to become a lifestyle shopping and entertainment district. The Southeast Quadrant of Central Springfield will be transformed into a high technology office campus. The

[16] http://www.fcrevit.org/lakeanne/index.htm.
[17] http://www.fcrevit.org/mclean/index.htm.
[18] http://www.fcrevit.org/richmondhwy/index.htm.

Northwest Quadrant will be developed as a focal point for arts and culture with a center for the performing arts, housing for artists and a county library, all as part of a walk-able people place town center convenient to well located and well maintained neighborhoods. Older apartment buildings will be renovated and new luxury and workforce housing will be built. A trolley system is proposed as another method of interconnecting the quadrants and helping to create a sense of place for Central Springfield."[19] The Springfield Town Center rezoning, approved on July 13, 2009, will permit the redevelopment of the Springfield Mall into a mixed-use Town Center.

g. 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 Metrorail 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:

- 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.

[19] http://www.fcrevit.org/springfield/index.htm.

- 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.

- 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.

- 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.

- 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.

- 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.

"With the Dunn Loring-Merrifield Metro station and proximity to Interstate 495 and 66, Merrifield is one of the most centrally located and easily accessible areas in Fairfax County. Taking advantage of its location, Merrifield is planned to accommodate a new town center envisioned to be a thriving mixed-use area attracting new residents to Merrifield while also supporting the surrounding existing neighborhoods. This evolution is underway as recent mixed-use developments have brought additional residential, retail and office space while also providing amenities such as improved pedestrian connections and open space with Merrifield Park."[20] On April 27, 2009, the Board of Supervisors created the county's first Community Development Authority for the proposed Mosaic - Merrifield Town Center development.

h. Transit Station Areas

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

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

[20] http://www.fcrevit.org/merrifield/index.htm.

- 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 Metrorail 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.

i. Cool Counties

Fairfax County's implementation of the Cool Counties program includes a number of exemplary efforts to reduce congestion and enhance transportation opportunities. Fairfax County's Cool Counties strategy reflects the relationship between land use and transportation. 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.

2. 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. STEWARDSHIP

The array of forces that influence, drive and guide transportation and land use, including individual and corporate interests and behaviors, government regulations and processes, urbanization, climate change and cultural behaviors are highly interactive and complex, but manageable. This report focuses predominantly on the government role in managing these forces, but individual and corporate activities and behaviors are the predominant factors in the success or failure of environmental stewardship.

Fairfax County residents have a huge selection of opportunities to engage in environmental stewardship ranging from personal activities in their daily lives and work, to active participatory citizenship, to serving as a volunteer with government or non-profit organizations. A well-informed, active citizenry is fundamental to good government and livable communities – everyone should know how his or her government operates, what we as a community are up against, where our taxes go in “one of the best-managed jurisdictions in the region” and exactly what government functions are diminished or lost with revenue losses. The county provides extensive opportunities for residents, employers and employees to learn about issues and the functions of government and extensive opportunities to participate. The Fairfax County Web site is a wealth of well-organized information that can serve as a starting point for stewardship resources and to get involved. The county also performs extensive public outreach for a wide array of programs

and development projects, bolstered by project specific efforts like the Reston Land Use College and the Tysons Task Force.

1. Stewardship Responsibilities and Opportunities for Individuals

a. Transportation

Current transportation challenges in the county require critical stewardship activities from every household. According to the FY 2011 financial forecast presented at the Board of Supervisors' retreat in June 2009, there are approximately 945,000 registered vehicles in the county. According to the Metropolitan Washington Council of Governments, there are 350,714 occupied housing units in the county and "nearly three-quarters of Fairfax County resident workers commute to work by driving alone, compared to 68 percent of the Washington region's workers. Seven percent of Fairfax County's resident workers use public transportation, compared to 11 percent of the Washington region's workers. Thirteen percent of resident workers of both Fairfax County and the Washington region use car pooling as a means of transportation to their jobs." (Metropolitan Washington Council of Governments, "Fairfax County and the Washington Region: A Look at Economic and Demographic Characteristics," January 2006, p.5).

Everyone who uses transportation systems in the county can protect and nurture a healthy environment by assessing their needs and habits and looking into the growing number of alternatives to our current traffic volumes. Some examples of these alternatives, from the county Web site, include the following:

Bike Program In 2006 the Fairfax County Board of Supervisors approved the comprehensive bicycle initiative--a program committed to making Fairfax County bicycle friendly.

Community Residential Program The Fairfax County Community Residential Program partners with residential developments, multi-family complexes and associations to promote use of alternative modes of transportation including public transit. CRP is dedicated to encouraging people who live, work or commute through Fairfax County to use mass transit, carpools, vanpools, walking, biking or teleworking instead of driving alone.

Employer Services The **Fairfax County Employer Services Program** helps businesses and employees find transportation solutions that will not only make companies more successful, but will improve the economic vitality and quality of life for the entire region. The Employer Services Specialists work on-site with businesses to help them realize the bottom-line benefits of commute alternatives.

Guaranteed Ride Home The **Guaranteed Ride Home Program** is for commuters who regularly take the bus, rail, vanpool, carpool, bike or walk to work. The program is designed to serve commuters who are worried about how they'll get home when an emergency arises.

Pedestrian Program The Pedestrian Program for Fairfax County addresses pedestrian safety and community generated pedestrian systems improvements. The Pedestrian Task Force, consisting of residents, appointed commission members and multi-disciplined staff, reviews existing Fairfax County pedestrian programs and activities, makes recommendations on improving these programs, develops coordinated education and outreach efforts and prioritizes funding for pedestrian projects.

Ride Sources The RideSources Program is operated by the Fairfax County Department of Transportation and is a member of Commuter Connections. The RideSources program provides commuters with free ridesharing information, including ridematching assistance to form or join carpools or vanpools.

Travel Training - MATT Bus is a unique Fairfax Connector bus that has been renovated and designed for training senior citizens to travel safely and independently on regional transit systems.

The county also offers periodic events or opportunities for commuters to test alternatives. For example, Fairfax County participated in Try Transit Week, September 2009, a statewide event sponsored by the Virginia Department of Rail and Public Transportation to encourage everyone to avoid driving solo and give transit options such as bus, rail, carpools, vanpools and telework a try.

b. Land Use

Residents may practice stewardship with regard to land use in three significant arenas: first is on their own properties, condo/homeowners association properties, or apartment complexes; the second is in regard to development and revitalization activities in the county; and the third is through volunteering with organizations that have a stewardship mission. Residents can all do their parts at home by becoming aware of the impacts of their activities and the buildings in which they live. Residential stewardship may be as simple as planting a tree or small garden or choosing more efficient appliances and as complex as retrofitting with green features, reducing impermeable surfaces or creating a certified wildlife habitat.

Land use issues, in terms of development and revitalization, are generally focused through the county's planning and zoning, community revitalization and public works programs, and the county Web site provides an excellent starting point. LDSnet, which provides access to information in the Fairfax County Land Development System is comprised of the Zoning and Planning System (ZAPS) and the Plan and Waiver System (PAWS). Through LDSnet, it is possible to search for individual zoning applications and/or plans and studies submitted to the county to perform land-disturbing activities. In addition, the LDS database can be searched for zoning applications or construction plan submissions meeting any combination of the thirty-one search criteria. The Northern Virginia Soil and Water Conservation District is an excellent starting point for residents wishing to learn more about stewardship practices and is also an entre to other stewardship organizations.

The Office of Community Revitalization and Reinvestment provides a number of online tools for residents to use to learn more about their own properties and revitalization efforts throughout the county. These include county land use applications such as iCare—Real Estate Assessments, the Land Development System , and My Neighborhood.

Volunteers are increasingly crucial to environmental stewardship, and residents and other volunteers can broaden their knowledge while serving. There are a wide variety and number of environmental organizations from which to choose and the Fairfax County Web site, at http://www.fairfaxcounty.gov/volunteering/ and Volunteer Fairfax, at http://www.volunteerfairfax.org are good places to start.

2. Stewardship Responsibilities and Opportunities for Corporations

The Fairfax County Economic Development Authority held a conference called "The New Urban Economic Model: The Transformation of Fairfax County" in June 2009 to "highlight what suburban communities can and should do to be well-positioned as the strong business communities of the future." According to a national survey commissioned by EDA in preparation for the conference, of the respondents who work in the suburbs, nearly half (47 percent) wish that their working environment offered more, such as: more parks and other open spaces nearby; a broader array of employers and work environments; access to convenient public transportation; greater cultural diversity; a more walkable environment; and proximity to housing options. Fairfax County already has many of these characteristics; however, as this EQAC report indicates, these characteristics may be in jeopardy without informed and concerted environmental stewardship.

As environmental stewardship has become more mainstream, the awareness and practice of corporate social responsibility have developed to address employee sensibilities, community relations and the "double bottom line." There are tremendous opportunities in Fairfax County for partnerships across the sectors to join resources, interests and expertise to protect and enhance our quality of life. In every major development, and many minor ones, opportunities exist for the environmental and social services agencies to work with EDA, developers, the real estate industry and future corporate tenants in new or revitalized developments. Tysons, the Dulles Corridor and other transportation oriented development projects are good examples of success and foundations for extending strategic stewardship partnerships. Issues such as affordable housing and an aging population in the county have land use and transportation components; these can be folded into broader land use and transportation issues to create broader solutions.

> *The involvement of business leaders in crafting a set of locally supported solutions would seem to be a very important element in the future. At the strategic end, business leader actions take the form of information development and communication with the public and decision-makers to emphasize the role of transportation in the state and regional economy. On the tactical end, business and community leaders can make the case for small-scale improvements that may not be evident to the operating agencies. And they can support individual workers who wish to choose carpooling, public transportation, flexible work hours, telecommuting or other route or mode options.* (2009 Urban Mobility Report, Texas Transportation Institute, July 2009

G. 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.

H. COMMENTS AND ONGOING CONCERNS

1. Share the County's Knowledge and Increase Partnerships

EQAC commends the Board of Supervisors for actively supporting and implementing policies that address land use and transportation issues. EQAC encourages the county to publicize these successful projects, share the best practices and lessons learned, and encourage others to follow. Further, the county should partner with businesses, non profits and other organizations and groups to assist the general public in achieving common goals. Some examples of existing or potential programs are:

a. Telework: The county achieved the goal of 20 percent participation by county staff. The county should continue to work with the federal government and other jurisdictions to encourage them to set similar goals and work with the Virginia Congressional Delegation to secure resources to establish teleworking sites around the region.

b. The Environmental Improvement Program: The EIP creates an exemplary foundation that can be used to both educate and engage residents, businesses and organizations to support collaborative goals to enhance environmental quality, quality of life and progress on specific actions. Recognizing that many of the EIP actions are strictly internal, others offer opportunities to leverage outside resources to meet county goals as well.

c. Smart Growth: There are opportunities for partnering throughout the development/redevelopment process with the Economic Development

Authority, the Redevelopment and Housing Authority, developers, new commercial tenants and real estate companies, among others, on mutually beneficial goals for commuter reduction strategies, car-free enclaves, local commutes, affordable housing and telecommuting.

d. County Stewardship Goals: Establish or compile existing stewardship goals or guiding principles that all residents can embrace and achieve. For example: implementing the tree action plan; reducing the average miles commuted per person; collaborating in Cool Counties, Cool Neighborhoods and Cool Houses to conserve energy.

e. Friends of RPAs: Establish partnerships with county departments, property owners, non-profits and the landscaping/lawn supply industry to educate and notify property owners of their locations and responsibilities associated with Resource Protection Areas. Through education, with expertise and marketing by local industry as an augmentation to governmental community outreach, encourage appropriate landscaping modifications.

f. Native Transportation: Partner among the Department of Transportation and relevant non-profits and businesses, among others, to pilot highway median maintenance projects based on non-grass, native plantings to help to address the median mowing funding issue, along with adding more diverse plantings.

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. Transportation Funding and Authority

EQAC supports efforts to pursue alternatives that will give the county more funding and regulatory authority to address transportation enhancements and maintenance. Recognizing that this is an expensive and complex undertaking, EQAC supports the board's decision to review and hold a public discussion, and recommends: (1) that all options and innovations be reviewed; (2) that the trade-off costs and consequences of not taking action be made clear to the public; and (3) that implementation of the resolution(s) be phased so that steps will be taken where possible.

At the Board of Supervisors' recent retreat, approaches that were discussed included taking over responsibility for the road system in the county, perhaps by

having the county assume city status, with the additional responsibilities and authorities that this would entail, or by retaining county status but following the model used in Arlington and Henrico counties. These ideas were evaluated by the board in the 1990s but were dismissed due to the recession, cost and concerns about assuming additional financial burdens from the state. As noted in this chapter, there are a number of forces and evolving practices, such as increasing pressures and demands from urbanization and sprawl in surrounding counties, that indicate this may be an idea whose time is coming.

In the 2008 report, EQAC noted 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 Virginia HOT Lane project also directly impacts the county but is being managed by VDOT with two private companies.

The county needs to have a greater role in these mega projects to make sure they align with its Land Use and Transportation goals.

4. 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 Integrated Parcel Lifecycle System provides a base capability to capture and analyze the changes. EQAC's recommendations in the past to replace the Urban Development Information System 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 incorporated and will lead to cost savings in the long run.

5. Green Buildings

The county is becoming a leader in building green buildings and has adopted Comprehensive Plan policy that includes broad support for green building practices and establishes linkages between the incorporation of green building/energy conservation practices and the attainment of certain Comprehensive Plan options, planned uses and densities/intensities of development, particularly in the county's growth centers. EQAC commends the county for committing to LEED certification (generally at the silver level) for all new county buildings and for its efforts to encourage green building and energy conservation practices through the zoning process. EQAC encourages the county to further support green building design and energy efficient buildings.

I. 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 evaluate 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 1995-2008 and assess impacts through 2025.

EQAC also recommends that the county consider the process for a complete review of the Comprehensive Plan. 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. Further, there have been a number of substantial planning efforts and external factors that have occurred since 1995 that have not been evaluated comprehensively for their countywide implications. Among these efforts and factors are: the Base Realignment and Closure actions; the forthcoming extension of Metrorail through Tysons Corner to Dulles Airport; the Tysons Corner Transportation and Urban Design Study; substantial redevelopment projects, proposals and studies in revitalization areas;

and major transportation projects such as the construction of high occupancy toll lanes on a portion of the Capital Beltway.

The evaluation and 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. The comprehensive preparations are timely with the significant changes happening in the county.

2. Data and Modeling

a. EQAC is an advocate of the county GIS system and the Integrated Parcel Lifecycle System. We understand that there are financial and training costs associated with these advanced technologies, but we recommend that the county continue to invest in these capabilities. In particular:

- New nonresidential pipeline data needs to be incorporated into IPLS. This would be very useful for forecasting and analyzing with existing data.
- IPLS should incorporate the COG forecast for regional household and employment data.

b. These tools have become essential for county staff to get its jobs done. EQAC recommends that the county continue to expand the ability of the general public to access these tools, as appropriate and feasible. This includes the next iteration of My Neighborhood.

c. EQAC is impressed with the ways that the county has incorporated three-dimensional models across the various agencies. These have had a transformative effect on business operations. We recommend that the county continue to enhance its investment in GIS technology and updates to the source data.

d. EQAC further recommends that the county success in adopting this technology and transforming business practices to use the technology be expanded into a comprehensive vision for a Digital Comprehensive Plan. The Digital Comprehensive Plan would combine:

1. The Integrated Parcel Lifecycle System as a base data capability.
2. Three dimensional representations of the county.
3. Future projections for planned changes and growth, as well as various alternatives.
4. Environmental and Transportation models with both local and macro impacts.

Such information is necessary as the county becomes more complex and densely developed.

3. Economic Opportunities for Revitalization

The current recession presents a unique opportunity to view foreclosed homes, vacant commercial space and the expected employment rebound as targets of opportunity in achieving transportation and land use goals. EQAC recommends that the county prepare a strategy for the recovery that includes ideas such as:

- Continue to expand options for affordable housing by investing and partnering appropriately in areas that will need increased affordable options as the economy rebounds.

- Identify vacant offices and homes in locales with good transit options and coordinate with the real estate industry to aid in marketing those properties, thereby supporting new tenants with quality of life perquisites, improved commuting options, and better residential/commercial or mixed use utilization.

- Coordinate with agencies and businesses to inform prospective/new workers of opportunities for desirable commutes and local housing amenities.

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OTHERS

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www.walkable.org/

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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

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER III

AIR QUALITY

III. AIR QUALITY

A. OVERVIEW OF AIR QUALITY IN FAIRFAX COUNTY

1. Introduction

Through a federal-state-regional-local partnership, the quality of our air is monitored for specific contaminants and actions are taken against those who cause the contamination level to exceed allowed limits. 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 climate change. With regard to traditional air quality matters, Fairfax County has demonstrated a continuing commitment to being an active partner in improving the region's air quality.

a. Budget Impacts

Due to the overall budget constraints in the county, the Board of Supervisors made significant reductions in the budget for the Health Department that could potentially affect air quality in the county. The FY 2010 budget eliminated two of the four field positions in the Air Quality Monitoring Program, with full elimination of the monitoring program scheduled for FY 2011. The Program Manager position that deals with air quality will be retained and will continue to participate in local and regional air quality meetings. During FY 2010, the monitoring program will transition from county to state responsibility, with the Virginia Department of Environmental Quality assuming full responsibility for air monitoring in FY 2011. During FY 2010, two remaining air quality staff will provide monitoring and sampling activities along with routine maintenance for ozone and fine particulate matter at county-operated monitoring stations located at Lewinsville, Mason, Mount Vernon, and Cub Run. They will also perform data analysis, prepare written reports, represent the Health Department at local and regional air quality meetings and work with DEQ staff to facilitate the transition. All county air monitoring activities will cease on June 30, 2010.

Based on recent discussions with county staff, it is unclear as to what level of monitoring will be conducted by the state after the county ceases its air monitoring activities. There are ongoing discussions with the U.S. Environmental Protection Agency and the Virginia Department of Environmental Quality about this matter and it is unknown when further direction will be provided.

In addition, the FY 2010 budget reductions eliminated the Environmental Hazards Investigation Section. While this is sometimes viewed within the context of a Hazardous Materials program, it addresses several items relevant to air quality. In

the past, EHI staff responded to approximately 1,000 residents' concerns per year about potential chemical, biological, and nuclear hazards such as mold, radon, asbestos and indoor air quality. They also worked in collaboration with the Hazardous Materials program in the Department of Fire and Rescue to provide emergency response to hazardous material incidents. EHI staff investigated cases of elevated blood lead levels in children as mandated by state law. The Health Department will continue to investigate cases of elevated blood lead levels as mandated by law; however all other services previously provided by EHI to the public will now need be provided by private contractors. Services previously provided to the Hazardous Materials program in Fire and Rescue will be provided by the Virginia Department of Environmental Quality or private contractors.

b. Update on Air Quality Regulatory Changes

i. Clean Air Interstate Rule

In December 2008, the U.S. Court of Appeals for the D.C. Circuit issued an order that leaves the Clean Air Interstate Rule in effect while EPA develops a new clean air program for power plants. The court essentially reversed its previous ruling made in summer 2008 which vacated the rule and sent it back to EPA for retooling. The CAIR program was designed to reduce pollution from coal-fired power plants in 28 eastern states and the District of Columbia.

ii. Atmospheric Ozone

In March 2008, EPA tightened the ozone National Ambient Air Quality Standard from 0.08 ppm to 0.075 ppm but the standard was challenged by a coalition of environmental and health advocacy groups. The environmental and health advocacy groups have argued that EPA ignored the recommendation of its own scientific advisory panel, which advised that the standard be strengthened to 0.070 ppm.

EPA has requested the court that the briefing schedule in that case be suspended for six months, in order to review the existing ozone NAAQS and determine whether another revision is warranted. The fact that EPA has now asked for time to review the current standard indicates that EPA is considering the more stringent standards.

iii. Fine Particulate Matter--$PM_{2.5}$

On February 24, 2009, the United States Court of Appeals for the District of Columbia issued its ruling on EPA's Final Rule on NAAQS for fine particulates. The case involves EPA's October 2006 revisions of the particulate matter NAAQS and particularly the agency's decision to retain the limit for the annual concentration for $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter) at 15 $\mu g/m^3$. The court concluded that EPA failed to adequately

explain why the annual standard of 15 μg/m^3 for fine particulates would be sufficient to protect the public health within an adequate margin of safety. The court chose to keep the standard in place so that some protection for fine particulates would remain in place.

On January 15, 2009, EPA proposed to revise the agency's Air Quality Index to update the values states use to report daily concentrations for fine particle pollution, to reflect changes to the fine particle standard made in 2006. The proposed changes would set a $PM_{2.5}$ AQI value of 100 at 35 μg/m^3, which is the level of the 24-hour $PM_{2.5}$ NAAQS. This means that anything above an AQI of 100 is unhealthy for sensitive groups.

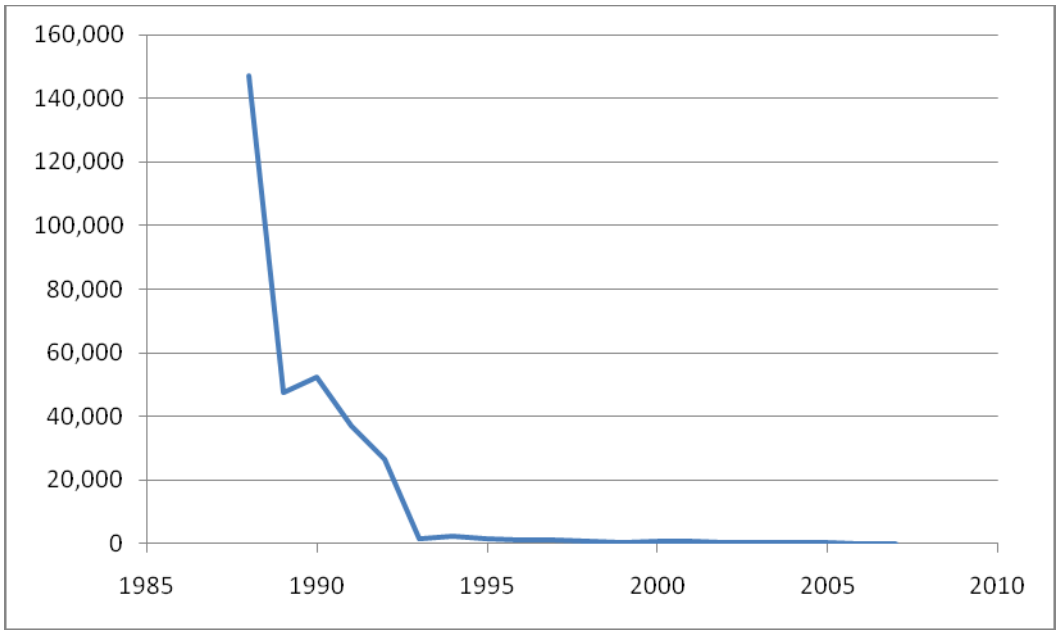
2. Air Quality Status in Northern Virginia

a. Hazardous Air Pollutants and Enforcement

EPA tracks the emissions of 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. All are regulated under law. Virginia DEQ's air compliance program (http://www.deq.state.va.us/air/compliance/homepage.html) conducts inspections of facilities within Fairfax County and records information on violations in the state's database (Comprehensive Environmental Data System). A preliminary review of the DEQ database shows a total of 12 facilities in Fairfax County that were noted for violations, consisting of six service stations, five dry cleaners and a concrete plant. The majority of these violations are for deficiencies in recordkeeping, with some violations also noted for hanging hardware (i.e., the gasoline dispensers, fuel hoses, and/or fuel nozzles [the above grade fuel dispensing equipment] at a gasoline station). In addition, there are several facilities where the subject of the violation has been addressed but where the state's database has not yet been updated.

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, as reported by EPA's Toxic Release Inventory. Note that this graph shows a very low level of emissions in Fairfax County over more than the past ten years.

Figure III-1. Hazardous Air Emissions in Fairfax County (pounds of fugitive plus stack air emissions per year)



SOURCE: U.S. EPA Toxic Release Inventory, Accessed October 16, 2009. TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), Trend Report for Total Air Emissions for Facilities in All Original Industries, for 1988 Core Chemicals, Fairfax County, Virginia, 1988 – 2007.

b. Update on county and regional air quality data

i. Ozone State Implementation Plan

In April 2004, EPA designated the metropolitan Washington region as a moderate nonattainment area for the 8-hour ozone standard. The Clean Air Act requires states to develop and implement ozone reduction strategies in the form of a state implementation plan. The SIP is the state's "master plan" for attaining and maintaining the NAAQS. The region has a deadline of June 15, 2010 to meet the 8-hour ozone standard. Virginia submitted its 8-hour ozone SIP in June 2007.

ii. Fine Particulate Matter State Implementation Plan

Virginia submitted its $PM_{2.5}$ SIP in April 2008, despite a three-year history of $PM_{2.5}$ data in the region that demonstrates compliance with the 1997 $PM_{2.5}$ standards. In October 2008, EPA proposed to determine that the Metropolitan Washington region has attained the 1997 $PM_{2.5}$ NAAQS. This is the first step in the region getting an EPA determination of NAAQS attainment for $PM_{2.5}$. The decision was based on 2005–2007 data. The Washington metropolitan area is

on course to meet federal requirements for reducing $PM_{2.5}$ in 2009 and will also meet the NAAQS.

EPA recently sent the PM SIPs submitted in April 2008 back to the states. States contacted EPA to alert them that the states did not want the SIPs returned. The PM SIPs are being resent to EPA.

iii. Data and Trends

Ground-level ozone is a precursor to smog and can cause breathing problems for those sensitive to smog, especially those with asthma. Figure III-2, Figure III-3 and Table III-1 present regional and county air quality trends as they relate to the eight-hour ozone standard. It is evident from these charts that the metropolitan area has had continuing difficulty meeting the eight-hour ozone standard. Monitors in Fairfax County recorded violations of the eight-hour ozone standard on thirteen days during the 2008 ozone season. The Washington region registered 19 days with violations of the eight-hour standard during the 2008 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.

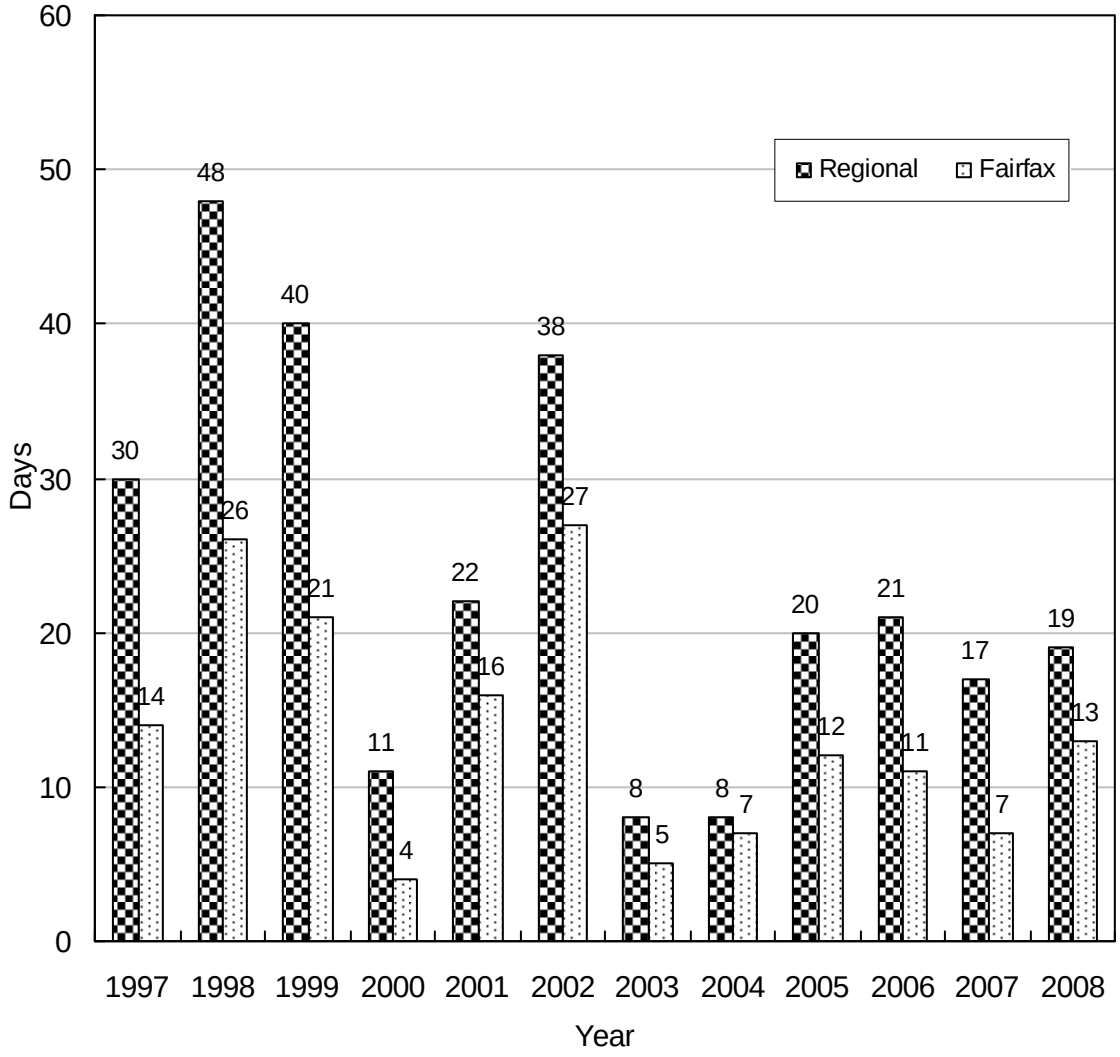
iv. Emissions from Motor Vehicles

One of the key issues related to ozone nonattainment is the extensive use of motorized vehicles and their emissions. The number of vehicle miles traveled per day has increased steadily over the past 20+ years, and, based on the most recent data, totaled more than 25 million miles in 2007. In addition, there are a significant portion of vehicles in Virginia that do not pass the emissions testing, with initial failure rates of approximately 8% and waivers of more than 1%. Should Virginia decide the exempt newer cars from inspections, these types of emissions may serve to worsen the extent of ozone nonattainment in the county.

The following overview has been provided by VDOT:

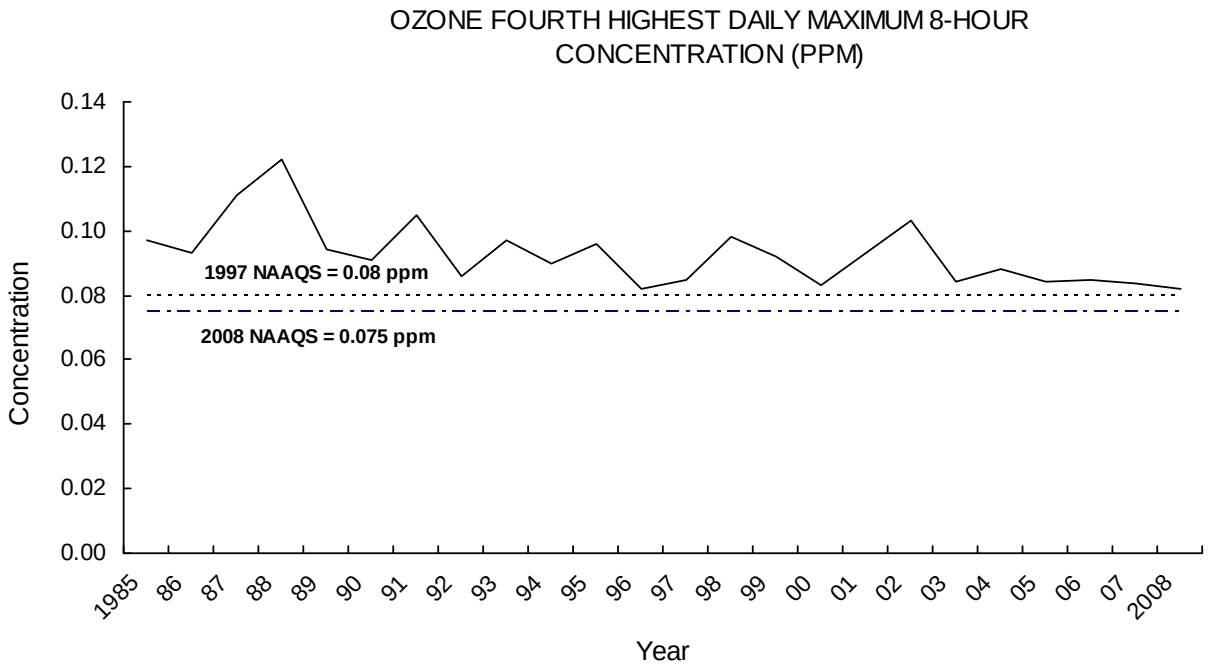
> VDOT is actively seeking to address transportation modes that can be used as alternatives to motorized vehicles, such as addressing increased safety for bicycling and pedestrians. These types of initiatives can serve to reduce the county's status as being in nonattainment for ozone, and should be commended.
>
> VDOT is attempting to make bicycling safer and more appealing as a transportation alternative. Experimental zigzag pavement markings were recently painted where the Washington and Old Dominion trail crosses a roadway in a neighboring county. The zigzag is an idea borrowed from Australia and the United Kingdom, where it has been used successfully to warn motorists of an upcoming crosswalk. The

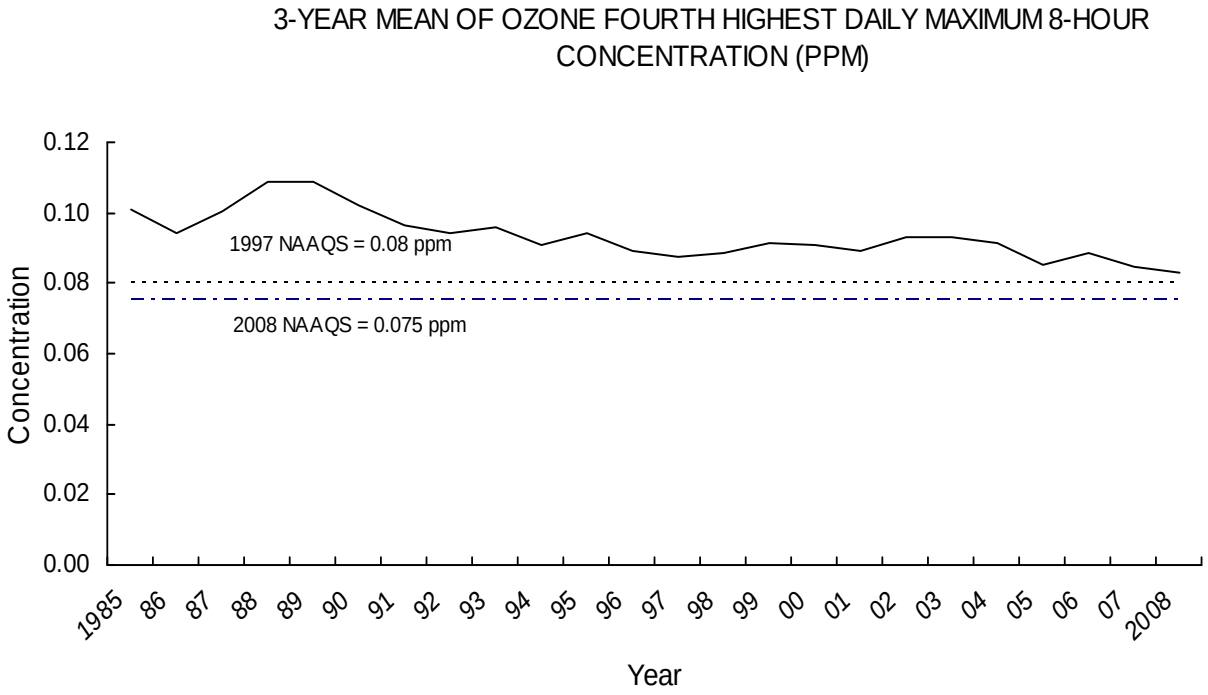
Figure III-2. Air Quality Trends in Relation to the Eight-Hour Ozone Standard (1997 Standard)
Ozone Exceedance Days

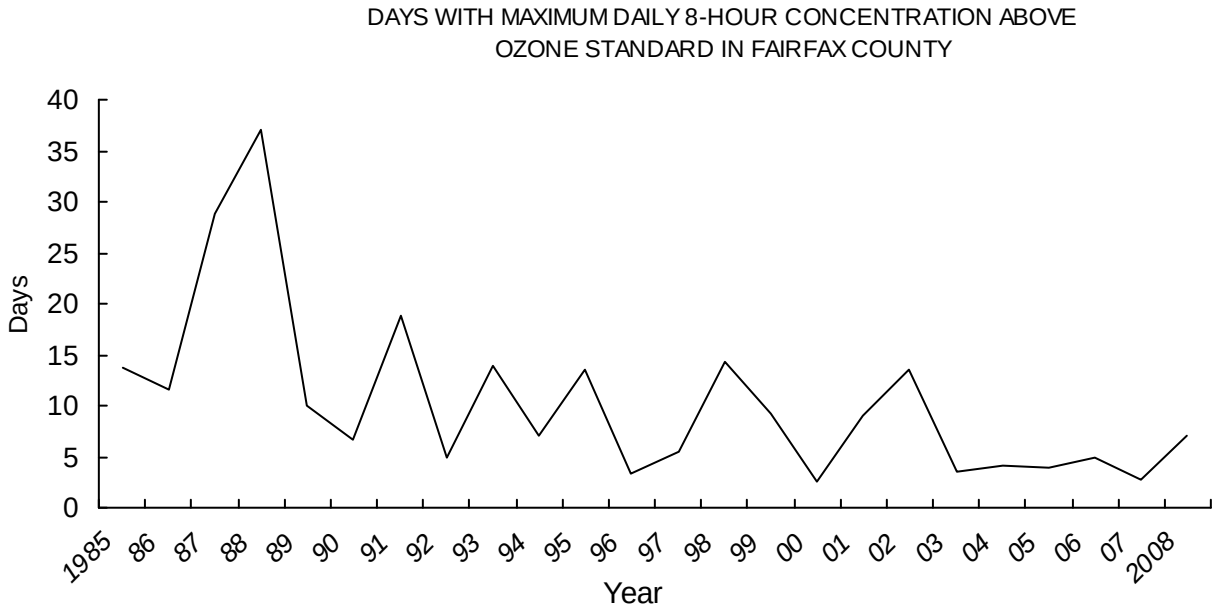


SOURCE: Fairfax County Health Department and the Metropolitan Washington Council of Governments. 2008 data are draft and are subject to change after Quality Assurance/Quality Control.

Figure III-3. Air Quality Trends in Relation to the Eight-Hour Ozone Standard (Fourth Highest Daily Maximum; 3-Year Mean of Fourth Highest Daily Maximum; No. of Days with Maximum Daily Above Standard; and Vehicle Miles Traveled).
(Source: Fairfax County Health Department and COG)




3-YEAR MEAN OF OZONE FOURTH HIGHEST DAILY MAXIMUM 8-HOUR CONCENTRATION (PPM)
Concentration
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1997 NAAQS = 0.08 ppm
2008 NAAQS = 0.075 ppm
1985 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 2008
Year


DAYS WITH MAXIMUM DAILY 8-HOUR CONCENTRATION ABOVE OZONE STANDARD IN FAIRFAX COUNTY
Days
40
35
30
25
20
15
10
5
0
1985 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 2008
Year

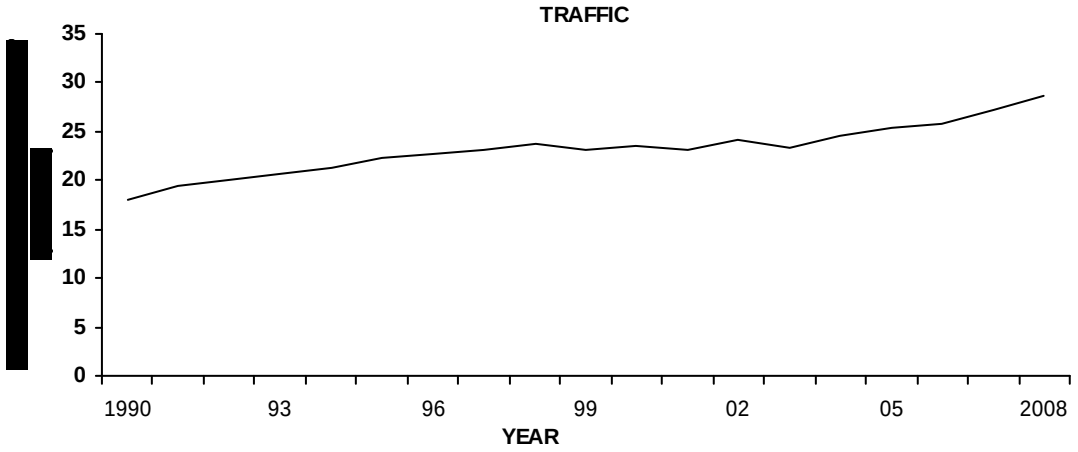


Table III-1: Regional Eight Hour Ozone Exceedances (2008 Standard)

Date	Number of Stations that Exceeded the Standard	Washington, DC-MD-VA Ozone Non-Attainment Area: Maximum 8-Hour Ozone (ppb)
4/18/2008	5	82
4/19/2008	3	77
6/5/2008	1	82
6/7/2008	1	81
6/10/2008	5	85
6/12/2008	13	102
6/13/2008	10	94
6/21/2008	5	80
7/12/2008	1	76
7/15/2008	4	85
7/16/2008	12	92
7/17/2008	15	112
7/18/2008	13	97
7/29/2008	5	89
8/19/2008	2	77
8/21/2008	1	80
8/25/2008	1	78
9/3/2008	7	87
9/4/2008	6	82

Source: Metropolitan Washington Council of Governments.
2008 data in Table III-1 is draft as of July 30, 2009 and is subject to change.

zigzag pattern extends for 500 feet in each direction from the W&OD crossing. Traffic habits on this stretch of road will be monitored for the next year to determine its safety effectiveness. If successful, bicyclists and pedestrians in Fairfax County may see this new traffic calming measure implemented in the future at some high risk crossings. In collaboration with local governments and partnering organizations around the state, VDOT continues to create an infrastructure that facilitates more routine use of bikes for commuting to work or by staffing various "pit stops" strategically located within the region to promote bicycling as one of the most efficient forms of transportation that offers a healthy option for traveling to work, school and home.

B. MAJOR PUBLIC AGENCY RESPONSIBILITIES

1. Introduction

Although compliance with National Ambient Air Quality 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. Metropolitan planning organizations 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. The Transportation Planning Board at the Metropolitan Washington Council of Governments serves as the designated MPO for the metropolitan Washington, D.C. area.

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. Air quality enforcement is handled by DEQ.

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 Metropolitan Washington Air Quality Committee, 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 Metropolitan Planning Organization 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 nonattainment 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 PM2.5 nonattainment, this group will add emission-reducing control measures for attainment of this standard to its duties.

C. STEWARDSHIP OPPORTUNITIES

Residents of Fairfax County have many opportunities to contribute to improvements in air quality. While some 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, there are many aspects of our daily lives that can affect the quality of our air. A significant contributor to air quality issues is vehicle miles traveled. As discussed above, Virginians drive many millions of miles. Reducing the amount of driving, as well as the use of other

combustion devices, especially during times where ground-level ozone is of concern (e.g., on hot days with lots of sun and little or no wind), can help to improve air quality. Examples of actions that can be taken include carpooling, taking mass transit, reducing or postponing mowing, paving and outdoor painting, limiting vehicle idling, bringing a lunch to work, avoiding drive-thru windows and refueling after dark. The following is a "Top 10 Tips List" that has been provided by Partners for Clean Air (www.cleantheair.org/overview.shtml):

1. Limit driving – rideshare, walk or bike
2. Take public transportation
3. Avoid excessive idling and abrupt starts
4. Use E85 [an ethanol fuel mixture] in your flexible fuel vehicle
5. Use a charcoal chimney or electric starter instead of lighter fluid when grilling
6. Limit use of household products that cause fumes
7. Conserve energy at home to reduce demands on power plants
8. Do not burn leaves and other yard waste
9. Avoid burning wood in fireplaces
10. Avoid using lawnmowers and other gasoline-powered equipment

D. COMMENTS

1. EQAC supports the retention of all of the air quality monitors that are currently being operated by the county's Health Department; these monitors should be incorporated within the Virginia Department of Environmental Quality's monitoring network. EQAC's understanding is that DEQ is working with the regional EPA office to determine the specific air quality monitors and suite of monitoring parameters that it will propose to operate in the county. EQAC will continue to track DEQ's decision-making process (proposals are anticipated to be made in Spring 2010) and may recommend further action at that time.

2. EQAC acknowledges that budget limitations required significant cuts in the FY 2010 budget and will likely require further cuts in the future. The FY 2010 budget reductions eliminated the Environmental Hazards Investigation Section of the Fairfax County Department of Health, which has provided valuable services by responding to complaints about mold, radon, asbestos and indoor air quality and in assisting the Fire and Rescue Department with responses to hazardous materials incidents. EQAC feels that, in the future, when budgetary conditions allow, these functions should be restored. Until these functions are restored, these services will need to be provided by private contractors.

E. RECOMMENDATION

1. EQAC acknowledges the budget limitations that can be expected to continue for a few years, yet also recognizes that without a continued commitment to traditional air pollution problems, the area will not attain national air quality standards. EQAC commends the Board

of Supervisors for retaining, in the FY 2010 budget, the county's air quality management position and recommends that this position be retained in future budgets as well. This staff position provides the following services: manages the county's air quality program; provides support to address board matters related to air quality and the environment; performs ongoing planning through attendance at Metropolitan Washington Council of Government's Air Quality Committee meetings and participation on the Air Quality Technical Review Committee and subcommittees; collaborates with other local, regional, and national air quality organizations, such as Clean Air Partners; coordinates with other county agencies on efforts to reduce air pollution and perform annual county survey to assess progress toward SIP commitments; serves on county groups and committees such as Environmental Coordinating Committee and Environmental Improvement Program Action Group; reviews proposed projects for environmental impact related to air quality; performs legislative reviews; assesses the results of ongoing monitoring; and participates in outreach events and encourages county residents and others to take voluntary action to improve air quality.

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ANNUAL REPORT ON THE ENVIRONMENT

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 decade, 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.

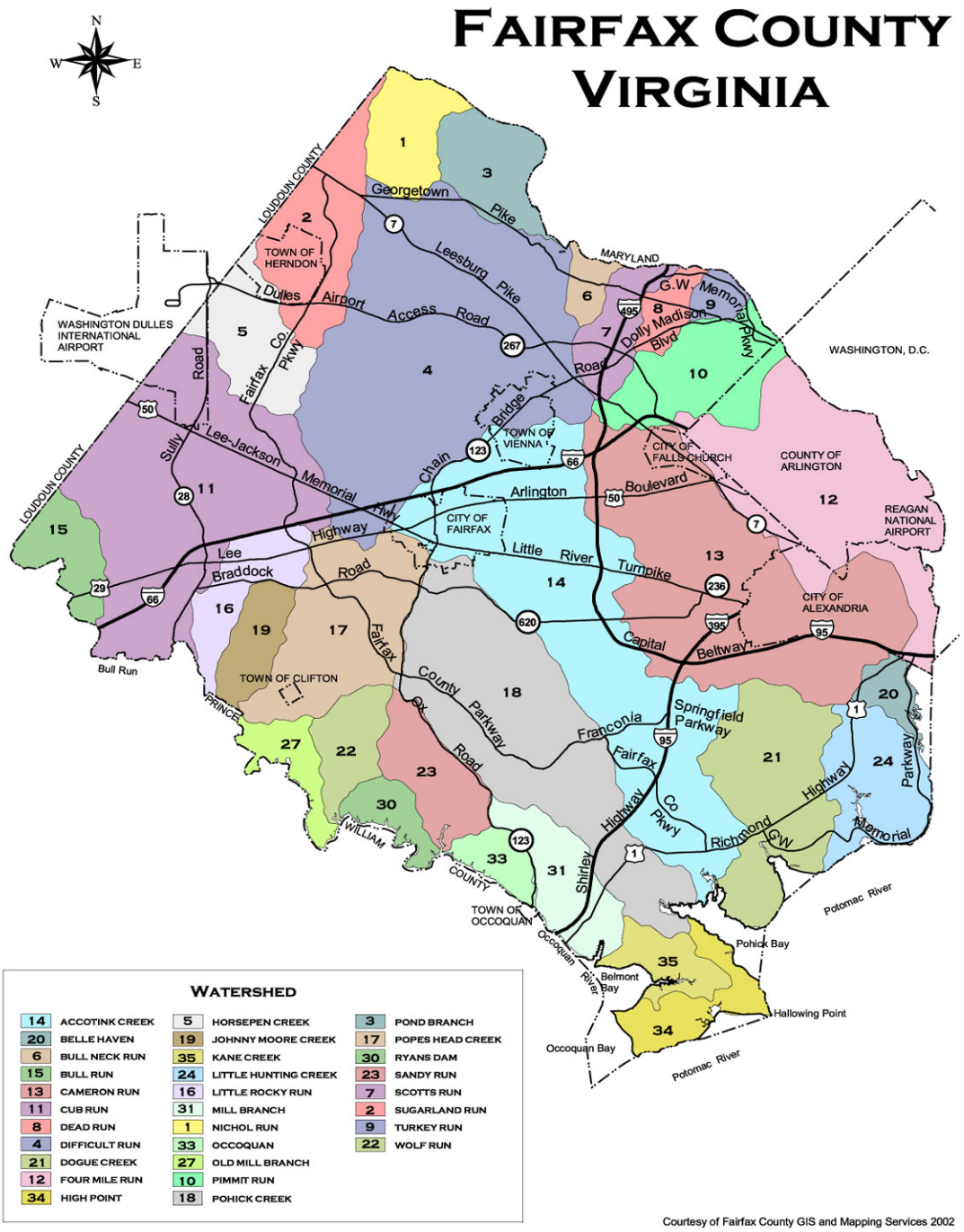
1. Watersheds

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 Northern Virginia Soil and Water Conservation District also collects monitoring information through its 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. 2008 Annual Report on Fairfax County's Streams

This report provides data from sampling efforts conducted in 2008 and documents overall stream conditions based on the health of fish and benthic macroinvertebrate communities. In addition, the potential human health risk associated with wading or swimming in streams is assessed based on analyses of E. coli bacteria.

A probability-based site selection sampling methodology was used to identify randomly-selected stream bioassessment locations throughout Fairfax County. These sites were stratified and proportionally distributed throughout the county based on Strahler stream order applied to all perennially flowing streams in Fairfax County. This methodology eliminates any site selection bias and is commonly used as a cost-effective way of obtaining a statistically defensible determination of stream conditions at a countywide scale. A total of 69 sites were sampled in 2008: 40 sites randomly selected within Fairfax County as part of the annual probabilistic monitoring program; 14 trend-monitoring sites in the County; 11 piedmont reference locations in Prince William National Forest Park; two coastal plain reference sites in the Kane Creek watershed of Fairfax County; and two sites monitoring the Kingstowne restoration project. Results from the 40 randomly selected sites suggest that approximately 77 percent of the county's waterways are in "Fair" to "Very Poor" condition based on a decrease in biological diversity. The monitoring program is part of the framework to establish a baseline to evaluate future changes in watershed conditions. Results may be viewed 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. Fairfax County's Chesapeake Bay Preservation Ordinance is available on-line at: http://www.fairfaxcounty.gov/dpwes/environmental/cbay/.

On November 17, 2003, based on the Perennial Streams Identification and Mapping program conducted by staff of the Department of Public Works and Environmental Services, 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 manages 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. Approximately 150 monitors collected data at 20 active monitoring sites in 2008. Information about the NVSWCD volunteer monitoring program can be found at http://www.fairfaxcounty.gov/nvswcd/monitoring.htm.

The Audubon Naturalist Society 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 were five monitoring stations in Fairfax County. In 2008, ANS monitoring stations were incorporated into the NVSWCD volunteer monitoring program.

Volunteers and Reston Association staff monitor Reston's streams four times a year using the Virginia Save Our Streams protocol. 24 volunteers collect data at eleven monitoring sites in Reston. The Reston Association works closely with the Northern Virginia Soil and Water Conservation District program and plans to conduct three Stream Monitoring Workshops in July, August and October, 2008.

Data are forwarded to Fairfax County, the Virginia Department of Environmental Quality, Virginia Save Our Streams and other interested organizations or individuals. 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.

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

a. 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 coliform bacteria, 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.

b. Potomac River Water Quality Monitoring

COG continues to serve as the water quality monitoring coordinator and regional repository for water quality and wastewater data in the Washington metropolitan region, as it has for more than two decades. Presently, COG serves as a repository for physical/chemical water quality data, hydro-meteorological data and wastewater loadings for the COG region, as produced by federal, state, and local government agencies. This includes data from 99 stations on the main stem of the Potomac River and the mouths of its tributaries (Point of Rocks to Point Lookout) and 46 stations in the Anacostia watershed. In addition, more than 33 wastewater treatment plants send their monthly discharge monitoring reports and monthly operating reports to COG. COG supplements these data with flow gage data from the USGS and meteorological data from the National Weather Service

6. Update on Potomac River Water Quality

The tidal section of the Potomac River is affected by many sources of pollution. With rapid population growth in the region over the past century, the Potomac River has faced water quality problems such as bacterial contamination, low dissolved oxygen and nuisance algal blooms. The implementation of secondary and advanced wastewater treatment in the National Capital Region has resulted in significant improvements in water quality and ecological conditions in the Potomac Estuary, including healthy dissolved oxygen levels, reduced nuisance algal blooms and the return of important living resources such as large mouth bass and submerged aquatic vegetation.

The United States Geological Survey monitors water-quality on the Potomac River at Chain Bridge as part of the Chesapeake Bay River Input Monitoring Program. The results of this work can be obtained on the Web site http://md.water.usgs.gov/gis/trends/.

7. 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 dissolved oxygen, 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 maximum contaminant level.

8. Kingstowne Monitoring and Stream Restoration

In 1999, the Department of Public Works and Environmental Services, the 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.

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.

9. 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.

10. 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 polychlorinated biphenyls 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. There are now 14 county waterways in or draining to the tidal Potomac River that have a TMDL for PCBs. 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: http://www.novaregion.org/index.asp?nid=394.

11. 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. Most 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 and in-stream bank erosion, 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 2007 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.

In 2007, Lake Anne was randomly chosen to be surveyed as part of EPA's National Lake Survey. In June 2008, USGS sampled the bottom sediments at Lake Anne as part of a national study of water quality trends. The scientists learn about trends by studying bottom sediment cores from lakes, in a similar way to using tree rings to look at historical climate. The scientists took sediment cores from Lake Anne in 1996 and analyzed them for metals and organic compounds and will update the trends they saw a decade ago by comparing them to the 2008 samples. Some of the most common compounds used to date the sediment cores include DDT and lead. In addition, the amounts of Polycyclic Aromatic Hydrocarbons, which most commonly are found in coal tar asphalt sealers, are analyzed. For more information on the national study of water quality trends visit: http://tx.usgs.gov/coring/index.html.

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. The WID is responsible for the management of Lake Barcroft and regularly monitors water quality. Due to sediment loading the lake is in need of dredging. Given the significant amount of sediment that needs to be removed, there are continuous 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. The lake was originally created by construction of a dam across Accotink Creek in 1918. The existing dam was constructed in 1943. 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.

In September 2005, the Park Authority Board approved a contract award to Mobile Dredging and Pumping to hydraulically dredge 161,000 cubic yards of silt from Lake Accotink and pump the material to a property owned by Virginia Concrete for dewatering and disposal. The Department of Public Works and Environmental Services is overseeing the construction contract because of its past experience on other similar type projects.

Mobilization began in October 2005 and the 2.8 mile long slurry pipe line installation was completed in June 2006. Dredging began in July 2006. The project also includes expanding and enhancing existing wetlands. At the Park Authority's request, DPWES performed a preliminary evaluation to determine if the Virginia Concrete disposal site could accommodate additional dredge material above the 161,000 cubic yards currently specified in the contract. Based on this review, up to 204,000 cubic yards of material can be disposed of at the Virginia Concrete site, and DPWES agreed to provide $1,545,000 in additional funding to dredge and dispose of 43,000 additional cubic yards. In June 2006, a major storm caused a significant amount of silt to flow into the marina area, reducing water depth. In combination with the drought conditions, boat access from the marina to the main lake channel has been limited. DPWES has agreed that a portion of the additional 43,000 cubic yards of dredge material could be reprogrammed for dredging in the vicinity of the marina, reducing the dredge amount at the top end of the lake by an estimated 10,000 cubic yards.

Approximately, 195,000 cubic yards of material was removed by project completion in September 2008.

12. 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 2007, there were 40 new release cases investigated by the Virginia Department of Environmental Quality. As of July 2008, there were a total number of 2,456 cases, of which 84 remain open.

13. Stream Restoration and Ecosystem Function

The Hydroecology of Flowing Waters group in the National Research Program of the United States Geological Survey is currently conducting a study on two

streams in Fairfax County to evaluate the effects of stream restoration on stream ecosystem functioning at low levels of the food chain. By changing the morphology of the stream, restoration activities change the distribution of habitats for primary producers and consumers and the amount of time it takes water to move through those habitats. Restoration activities also change the quantity of light reaching the stream, altering the amount of primary production by algae. Both factors influence the balance between the production and respiration of organic matter, which in turn strongly influences food web structure and water chemistry. The USGS study focuses on obtaining a fundamental understanding of the linkage between flow, the transport of sediment and organic matter, the physical structure of the stream and the resulting production and respiration of organic matter in a restored section of Accotink Creek, compared to an unrestored section of Upper Difficult Run. Initial efforts are under way to understand how spatial differences in the physical characteristics of these streams control spatial differences in primary production and respiration. Future efforts will involve laboratory and numerical modeling studies to determine how storm flows influence these processes.

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.

Six watershed management plans (Little Hunting Creek, Popes Head Creek, Cub Run/Bull Run, Difficult Run, Cameron Run, and Middle Potomac) have been completed and approved by the Board of Supervisors. 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) are anticipated to be completed by 2010.

2. Restoration Efforts

a. Department of Public Works and Environmental Services Stream Restoration and Stabilization Projects

The Department of Public Works and Environmental Services reports that, between July 2007 and July 2008, 12 stream restoration and/or stabilization projects were in progress or had been completed. Nine of the 12 projects addressed stream bank erosion; for two of these projects, erosion was considered to be severe, with exposed and threatened sewer lines in one case (see the discussion of the Little Pimmit Run project below) and with erosion around culvert pipes in the other. Of the other three projects, two addressed stream channel blockages and one addressed severe sedimentation.

Between July 2008 and July 2009, DPWES reports that there were eight projects in progress or that had been completed. These are identified in Table VII-1 in the Ecological Resources chapter of this report. All eight projects addressed stream bank erosion.

b. Riparian Buffer Restoration

In 2008, 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.

c. Huntley Meadows Park

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. In 2007, additional live stakes, tublings, and biologs were installed to further stabilize banks. Maintenance of construction access points continued in 2007.

In 2007, the county began working on the plan for Huntley Meadows Wetland Restoration project. The goal of the project is to restore the wetland to its previous, more water-filled condition with the aid of an earthen berm, water control structure, and several wetland pools. The project is ongoing. Information about the project can be found on-line at: http://www.fairfaxcounty.gov/parks/huntley/restorationproject.htm.

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.

In 2007, Reston Association continued to work with Northern Virginia Stream Restoration, L.C., managed by Wetland Studies and Solutions, Inc., to help coordinate the Reston stream mitigation bank. The project is implementing the recommended stream restoration projects outlined in the Reston Watershed Management Plan.

The groundbreaking for Phase I, which covers 14 miles of stream, occurred on February 12, 2008. As of July 2008, approximately one mile of stream in the Snakeden Branch watershed has been restored, fully funded by the Northern Virginia Stream Restoration, L.C. Designs for the entire Snakeden Branch watershed are finished and are being processed. Construction should be finished on Snakeden Branch by late Spring 2009. Survey and data collection is nearly finished in the Glade Stream Valley, which is slated to be restored beginning late Spring/Summer 2009. For more information on the stream restoration project in Reston visit: http://reston.wetlandstudies.com or www.reston.org/water.

e. Little Pimmit Run

In June 2007, the Northern Virginia Soil and Water Conservation District completed the Little Pimmit Run Stream Restoration project. The project involved a public-private partnership that used natural stream channel design and innovative techniques to restore 675 feet of a severely degraded stream segment. It also protected three threatened sanitary sewer lines that are parallel to and crossing the stream. Nearby homeowners assumed two-thirds of the cost for design and construction of the project, which is located primarily within parkland. NVSWCD partnered with an engineering firm to design and oversee the project. Other partners, in addition to the homeowners, included the Park Authority, DPWES-Wastewater Collection Division, the Dranesville District Supervisor and Angler Environmental Construction. The design included two stacked stone walls to bankfull height, five j-hooks to control and direct flow, bankfull benches, riffles and

pools throughout the segment, an integrated trail crossing, floodplain and upland grading and planting with native grasses, shrubs and trees.

Since completion, the restored channel functions as designed and successfully conveys stormwater flows. The neighbors are exploring how they can help with stewardship of the project, including the riparian buffer. Both the stream and riparian habitats are improving, and the trail users enjoy the new stream crossing.

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 2008, VDOF partnered with a number of organizations and volunteers including the Potomac Conservancy, the Fairfax County Park Authority, Earth Sangha, Fairfax ReLeaf, Eagle Scouts and the Chesapeake Bay Foundation to plant approximately 5,000 seedlings throughout Fairfax County.

Included in the above statistic is that in fall 2008**,** about 260 volunteers working with Earth Sangha planted over 1,200 trees and shrubs on six sites totaling just over 2.6 acres and buffering about 2,000 feet of stream channel. Four of these plantings were enrichments of sites already enrolled in the buffer program; two were new.

VDOF, the Fairfax County Park Authority and the Department of Public Works and Environmental Services 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.

4. Reston Storm Water Trail

The Reston Association received a grant for $8,500 from the Chesapeake Bay License Plant fund, $4,000 from Fairfax Water and a donation from Deloitte LP to implement a self-guided Storm Water Trail in Reston that will serve as a guide to help community associations, residents and youth to better understand stormwater management. It will also encourage individuals to implement at least one of the demonstrated techniques to protect water quality from nonpoint source pollution and to buffer storm runoff.

The Storm Water Trail includes best management practices or low impact development techniques, including an infiltration sidewalk that uses porous paver bricks. Also included is a rain garden that collects water from the gutter and downspouts at Brown's Chapel; it filters the water through a mixture of sand, topsoil and leaf mulch before conveying the drainage into a gravel layer, a drainage swale, a garden planted with native species that grow well in the Northern Virginia area which require little maintenance and a rain barrel that will be used to collect and conserve rainwater to be used to water the gardens in between rainstorms.

At Brown's Chapel Park on Friday, June 6, 2008, during the ninth annual Deloitte IMPACT Day, over 60 volunteers from Deloitte LP worked alongside Reston Association staff and the association's Environmental Advisory Committee to install the Storm Water Trail's rain garden and native plant garden, to assemble 36 rain barrels, to plant a groundcover demonstration on a shaded slope and to improve the natural areas by removing a vast amount of invasive exotic plants.

At Lake Newport, Deloitte volunteers and Reston Association staff kicked-off a massive removal of purple loosestrife from the shoreline. Purple loosestrife, a noxious weed in Virginia, was well established at Lake Newport. A remarkable 47 bags of purple loosestrife were removed during Deloitte Impact Day and another 50 or so bags were removed the following week.

The Storm Water Trail helps satisfy the goal outlined in Reston's watershed plan of expanding environmental education opportunities in the watersheds of Reston by implementing on-site controls that include low impact development technologies to reduce storm water runoff volume and peak flows and to

implement best management practices and retrofits to take advantage of natural storm water infiltration that is provided in natural stream valleys.

Reston's watershed management plan is available online at: www.reston.org/Nature/n_natural_resources.html#watershedmasterplan.

5. Alice Ferguson Foundation

On April 4, 2009, the Alice Ferguson Foundation held its 21st annual Potomac River Watershed Cleanup. This was truly a comprehensive, watershed-wide effort, in that there were over 500 cleanup sites in four states and the District of Columbia. A total of over 291 tons of trash were removed by over 13,500 volunteers. Items removed included over 41,000 plastic bags and over 2,000 tires. Among the more interesting items removed were a bowling ball, a safe filled with concrete, a soccer goalpost, a machete and three tiki torches. In Fairfax County and the City of Fairfax, nearly 1,900 volunteers working at over 100 sites collected over 77,000 pounds of trash, including 248 tires, over 30,000 bottles and over 4,600 cigarette butts.

More information about the foundation can be found in the Solid Waste chapter of this report.

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 illicit 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 continuance of the existing permit 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. In April 2008, the county responded to DCR's second preliminary draft. A permit for Fairfax County Public Schools is being coordinated with the county permit, Fairfax County MS4 annual reports can be viewed on-line at: www.fairfaxcounty.gov/dpwes/stormwater/ms4permit.htm.

2. Regional Stormwater Management Pond 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.

Although innovative stormwater management practices are being explored and applied throughout the county, construction of regional ponds continues to be an option used by the county to retrofit areas needing stormwater controls. In 2008, one new regional stormwater management facility was substantially completed, which provides water quality control for 344 acres.

3. Stormwater Management Facilities and Infrastructure

Fairfax County maintains more than 1,237 stormwater management facilities (as of 2008), 1,400 miles of pipe and 45,000 drainage structures designed to protect the county's streams. In 2008, the county retrofitted 14 stormwater management facilities to provide enhanced water quality benefits. There are approximately 3,164 private stormwater facilities in the county. The county inspected 1,193 county facilities and 585 of the 3,164 privately maintained facilities in 2008. In 2008, the county cleaned and mowed 1,027 dam embankments and completed 314 maintenance work orders to correct deficiencies in publicly maintained SWM/ BMP facilities. Additionally, the county inspected 338 miles of county maintained storm drainage conveyances. 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 2008 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 design 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 that LID practices be used to the full extent allowed by the county's Public Facilities Manual.

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 Facilities 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 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 tracked, inspected, and maintained. Enforcing maintenance requirements will also be a challenge given limited staff.

In 2007, with the help of a grant from the Virginia Department of Conservation and Recreation, the Northern Virginia Soil and Water Conservation District conducted a study of 20 existing rain gardens in the county, three to five years old, both publicly and privately maintained. The evaluation focused on their physical characteristics, in relation to how well they were functioning. The analysis included infiltration tests and lab analyses of soil texture, organic matter content and bulk density. The filter media were examined to determine the type and level of pollutants retained and their relationship to the area drained. The actual installation of each rain garden was compared to the approved design. In general, publicly maintained rain gardens fared better than private ones, as did those built according to their approved designs. The study suggests several design recommendations. Perhaps the most important recommendations for overcoming the problems that were observed are for training and education that would ensure rain gardens are properly installed and well-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 March 2008, the Virginia Department of Conservation and Recreation approved the county's program, finding it to be "fully consistent with the requirements of the Virginia Erosion and Sediment Control Law and Regulations."

During FY 09, there were nine complaints received by DCR from residents in Fairfax County; all but two were addressed by county and DCR staff and closed. The remaining two complaints are being addressed but the cases have not been closed.

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 2008, a total of 670 erosion and sediment control plans were submitted and approved for projects that would disturb a land area of 2,500 square feet or more. Fairfax County's Alternative Inspection Program, established in cooperation with DCR, resulted in 32,168 Erosion and Sediment control

inspections. In 2008, the county issued 188 notices of violation. Criminal proceedings were started in 16 cases.

6. Illicit Discharges

In 2008, the Hazardous Materials and Investigative Services Section of the Fairfax County Fire and Rescue Department received 418 complaints. Approximately 330 of the complaints involved the actual release of various petroleum or chemical substances. Of the 340 releases, 267 involved the release of either diesel fuel (45), home heating fuel oil (63), gasoline (48) or hydraulic oil (45). Other releases investigated involved antifreeze, paint, sewage, mineral oil, and mercury. Storm drains or surface waters were involved in 43 of the 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 per day.

UOSA operates under a Virginia Pollutant Discharge Elimination System Permit, which is issued by the Virginia Department of Environmental Quality. The permit limits and 2007 plant performance are listed in Table IV-1.

Table IV-1. UOSA Permit Requirements and 2008 Performance		
Parameter	**Limit**	**Performance**
Flow	54 mgd	28.5 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	0.034 mg/l
Total Kjeldahl Nitrogen	1.0 mg/l	0.3 mg/l
Dissolved Oxygen	>5.0 mg/l	8.2 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 March 22, 2007 at 43.3 mgd. The UOSA Plant continues to produce high quality reclaimed water.

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 2008 Performance Averages		
Parameter	**Limit**	**Performance**
Flow	67 mgd	41.1 mgd
$CBOD_5$	5 mg/l	< 2 mg/l
Suspended Solids	6 mg/l	2.4 mg/l
Total Phosphorus	0.18 mg/l	< 0.10 mg/l
Chlorine Residual	0.008 mg/l	< 0.008 mg/l
Dissolved Oxygen	6.0 mg/l (minimum)	8.8 mg/l
pH	6.0-9.0 (range)	7.0
E. coli Bacteria	126/100mls*	< 1/100mls*
Ammonia Nitrogen	1.0 – 2.2 mg/l (seasonal)	< 0.14 mg/l
Total Nitrogen	No Limit	<5.53 mg/l
Total Nitrogen (Annual)	7 mg/l	N/A

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

In 2008, 57,031 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.

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 of the new modifications have begun. The NMCPCP has volunteered to comply with the phosphorus requirement five years early.

2. Septic System Permitting and Repairs

An estimated 23,905 homes and business are served by on-site sewage disposal systems in Fairfax County. The county's Health Department reported that, in fiscal year 2009, 88 new sewage disposal permits were issued for single family residences. There were 138 new sewage disposal systems installed, 57.9 percent were alternative type systems and 42.1 percent were conventional systems. Approximately 668 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 3,860 septic tank pumps outs.

In fiscal year 2008, notices were sent to 13,421 homeowners to remind them to turn their system's flow diversion valve and pump out the septic tank every three to five years.

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. To address concerns about the management of onsite sewage disposal systems, Health Department staff and representatives from American Water/Applied Water Management are currently working together to complete a study to examine the feasibility of establishing an onsite sewage disposal management entity. If deemed feasible, the entity would be responsible for ensuring that proper and timely system maintenance is performed. This project will be completed in a phased approach of which three phases are completed. The fourth phase and release of the technical report and recommendations concerning the creation of management for these facilities is expected by 2010.

3. Sanitary Sewer Maintenance, Repairs and Rehabilitation

The Wastewater Collection Division within the Department of Public Works and Environmental Services manages the county's operation and maintenance program for the 3,300 mile sanitary sewer system. Closed circuit television inspection is used to inspect trunk sewer mains to identify defective lines in need of repair and/or rehabilitation. In 2008, 251 miles of old sewer lines and 11 miles of new sewer lines were inspected using CCTV. Approximately 69,800 feet of sanitary sewer lines were rehabilitated and 30 dig-up and 142 trenchless point repairs were completed (46 robotic repairs and 96 tophats). Over the past 11 years, 252 miles of sewer lines have been rehabilitated.

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 withdraws water from the Potomac River at the James Corbalis Water Treatment Plant and from the Occoquan Reservoir at the Frederick Griffith Water Treatment Plant. Fairfax Water provides drinking water to most Fairfax County residents. Fairfax Water also provides drinking water to the Prince William County Service Authority, LoudounWater, Virginia America Water Company (City of Alexandria and Dale City), Town of Herndon, Fort Belvoir and Dulles Airport. 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 53,056 billion gallons of drinking water in 2008.

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 2008 Water Quality Report is available for review on the Fairfax Water Web site at www.fairfaxwater.org.

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 2008 there were 116 new well approvals, 50 well repairs, and 130 Water Well Abandonments issued.

Table IV-3
Fairfax Water -Water Supply Sources, 2008

Sources	Gallons (in billions)
Occoquan Reservoir (Lorton/Occoquan)	22.357
Potomac (Corbalis)	30.503
Wells	0.000
Purchased	0.102
Untreated	0.094
TOTAL	53.056

Source: Fairfax Water

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.

Fairfax Water no longer operates public wells.

There are approximately 12,500 single family residences and businesses that are served by individual well water supplies in Fairfax County.

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 Reservoir Facilities

The Frederick P. Griffith, Jr., Water Treatment Plant, sourced by the Occoquan Reservoir, came on line in 2006 and has a current capacity of 120 million gallons per day. The plant is designed for an ultimate capacity of 160 mgd. In addition to flocculation and sedimentation, the Griffith Plant includes advanced treatment processes of ozone disinfection and biologically active, deep bed, granular activated carbon filtration. Chloramines are used for final disinfection.

b. Potomac River Facilities

The James J. Corbalis, Jr., Water Treatment Plant, sourced by the Potomac River, has a current capacity of 225 mgd. 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.

4. Drinking Water Quality Monitoring

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 2009 Water Quality Report is available for review on the Fairfax Water Web site at www.fairfaxwater.org, and includes much of the following information.

a. Disinfection by-Products

Trihalomethanes are by-products of chlorination water treatment and are suspected carcinogens at elevated levels. The 2008 distribution system averages continue to be below the federally mandated Maximum Contaminant Levels for total trihalomethanes. In addition to the trihalomethanes, haloacetic acid levels, another by-product of chlorination, continue to be below the required maximum contaminant level. The presence of chlorine in drinking water supplies remained below the required Maximum Residual Disinfectant Level.

b. Metals

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 2008 continued to be below their MCLs. The concentration levels for unregulated metals were within the expected range. Test results for these and other constituents are available on-line at: http://www.fairfaxwater.org.

c. *Cryptosporidium*

Cryptosporidium is a microbial pathogen sometimes found in surface water throughout the United States. Although filtration removes *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal. Fairfax Water consistently maintains its filtration process in accordance with regulatory guidelines to maximize removal efficiency. Fairfax Water's monitoring indicates the occasional presence of these organisms in the source water. Current test methods do not help determine whether the organisms are dead or if they are capable of causing disease.

Ingestion of Cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children and the elderly are at greater risk of developing life-threatening illness. Fairfax Water encourages immuno-compromised individuals to consult their doctors regarding appropriate precautions to take to avoid infection.

Cryptosporidium must be ingested in order to cause disease. It may be spread through means other than drinking water, such as other people, animals, water, swimming pools, fresh food, soils, and any surface that has not been sanitized after exposure to feces.

Fairfax Water has completed monitoring of the Potomac River and Occoquan Reservoir for compliance with the EPA Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). EPA created this rule to provide for increased protection against microbial pathogens, such as *Cryptosporidium*, in public water systems that use surface water sources. Fairfax Water's monitoring program began in 2004 and involved the collection of two samples from water treatment plant sources each month for a period of two years. Once monitoring for compliance with the LT2ESWTR was complete, Fairfax Water continued to monitor for *Cryptosporidium* at water treatment plant sources.

Under the LT2ESWTR, the average *Cryptosporidium* concentration determines whether additional treatment measures are needed. A *Cryptosporidium* concentration of 0.075 oocysts/Liter will trigger additional water treatment measures. Fairfax Water's raw water *Cryptosporidium* concentrations consistently remain below this threshold.

d. Emerging Water Quality Issues

An emerging water quality issue of particular media interest this year is a group of compounds including: (1) pharmaceuticals and personal care products; and (2) endocrine disrupting compounds. While the presence of these substances in source and drinking water has been a recent issue of national interest, to date research has not demonstrated an impact on human health from these compounds at the trace levels discovered in drinking water.

There are tens of thousands of compounds that are considered potential endocrine disrupting compounds or pharmaceuticals and personal care products. In establishing a protocol for monitoring these compounds, Fairfax Water carefully considered the most prudent use of its resources when developing the list of compounds to test for in raw and treated water. Fairfax Water looked at influences in the Potomac and Occoquan River Watersheds (industrial, agricultural uses, etc.) to determine which compounds are most likely to be present in the raw water. Fairfax Water then looked at the treatment process to determine which compounds would not be readily removed through treatment. Finally, Fairfax Water looked at which compounds could be measured in water and chose 19 compounds to test for in the source and treated waters. Samples were sent to an independent laboratory proficient in this type of analysis.

To date, none of these compounds have been detected in Fairfax Water's finished drinking water during this study. As expected, very, very small amounts of a few compounds were found in the source waters - the Potomac River and Occoquan Reservoir. Research shows that there is no indication of human health concern at the levels found in the source waters. In addition to research and testing, Fairfax Water continually employs advanced water treatment technologies, ozonation and granular activated carbon to treat all of the water in its system. Ozone breaks down organic matter in the water that is then captured in the granular activated carbon filtration process. Research has shown that the combination of ozone and filtration is highly effective in removing broad categories of the compounds of concern. To view the results from Fairfax Water's monitoring of these compounds and to learn more about emerging water quality issues, visit the Fairfax Water Web site at www.fairfaxwater.org/current/special_statement_120408.htm or call 703-698-5600, TTY 711.

e. Special Perchlorate Monitoring Study

Perchlorate is a naturally occurring as well as a man-made compound. Its presence in drinking water is currently unregulated and utilities are not required to monitor for it. In mid-2007, Fairfax Water began voluntarily participating in a 12-month non-regulatory perchlorate sampling project for the Potomac River funded by the EPA. The EPA initially established a reference dose of 24.5 parts per billion for perchlorate and beginning in 2009 has proposed an interim health advisory of 15 ppb. A reference dose is a scientific estimate of a daily exposure level that is not expected to cause adverse health effects in humans. The reference dose concentration was used in EPA's efforts to address perchlorate in drinking water and to establish the interim health advisory.

The source and treated water samples collected in 2007 and 2008 from Fairfax Water's Potomac River treatment plant showed only trace amounts of perchlorate at levels less than 1.1 parts per billion, far below the EPA reference dose level of 24.5 ppb or the interim health advisory of 15 ppb. Based on EPA's research, the levels of perchlorate observed in the Potomac plant waters are not considered to be a health concern. If you have special health concerns, you may want to get additional information from the EPA at www.epa.gov/safewater/contaminants/unregulated/perchlorate.html or contact the EPA's Safe Drinking Water Hotline at 800-426-4791, TTY 711.

f. Tap Water Monitoring

In 2008, Fairfax Water monitored 3,302 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 40 synthetic organic compounds. Low levels of atrazine, simazine, and metolachlor were detected in the source waters, and a very low level of atrazine was detected in finished waters sourced by the Occoquan Reservoir. Total trihalomethanes, a subset of volatile organic compounds, as discussed above, were also detected at low levels in the finished water as expected in a chlorinated system.

Fairfax Water has been testing for lead and copper in customer tap samples in accordance with EPA's lead and copper rule since 1992 and has consistently tested below the action level established in the rule. In 2008, the 90th percentile value for lead was 0.77 parts per billion, compared to the EPA action level of 15 ppb. For copper, the 90th percentile value in 2008 was 0.064 part per million, compared to the EPA action level of 1.3 ppm. Additional information on these programs and more 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 per 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 that adjustment, the flow was actually 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 flow regimes, 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.

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 U.S. Army Corps of Engineers, The Nature Conservancy and the Interstate Commission on the Potomac River Basin are collaborating on a multi-year watershed assessment of the Potomac River basin. The assessment will consider water supply, environmentally sustainable flows, ecosystem protection and restoration, drought preparedness and watershed resource management in the Middle Potomac River watershed in the District of Columbia, Maryland, Pennsylvania, Virginia and West Virginia. The project will describe current and future conditions that are likely to have significant impacts on human and ecological needs within the basin. The assessment will include modeling activities, data gathering and ecological investigations. The goal is to identify key ecological needs, current and future human activities (especially withdrawals, dam operations and land use change), potential effects of climate change on the basin's hydrology and how these might be balanced and mitigated to prevent water use conflicts and ecological degradation of the Potomac River's native species and natural communities in a 50 to 100-year timeframe.

The watershed assessment will investigate the following:

- Surface and groundwater withdrawals.
- Dams and other impoundments.
- Effects of land use change and increase in impervious surfaces on flow.
- Cumulative hydrologic impacts of withdrawals and impoundments.
- Projected changes to water demand in the basin (including consumptive use).
- Condition and flow requirements for the basin's aquatic species and ecosystems.

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 2008. No releases from upstream reservoirs to augment water supplies were needed in that time, and it is unlikely that releases will be needed for the remainder of 2009. In October 2007, ICPRB worked with the region's utilities and the U.S. Army Corps of Engineers to conduct several test releases from upstream reservoirs. These test releases provided useful data on how the river behaves during droughts and will help to make drought management activities more efficient in the future.

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 in the publications section of the ICPRB Web site, www.potomacriver.org.

Every five years since 1990, the section for Cooperative Water Supply Operations on the Potomac of ICPRB also conducts a 20 year forecast of demand and resource availability on behalf of the three major water utilities in the Washington D.C. Metropolitan Area (including Fairfax Water). The ongoing study has two parts to it. The first part evaluates demand forecast, analysis of current resources and evaluation of alternative resources. The second part factors in the effects and impacts of climate change to this equation. Different possible climate change scenarios for the region will be evaluated using climate change models and the results will be incorporated into the water utility planning model to better help forecast future demands and the constraints that need to be overcome to meet the demands.

The 2005 study is available on ICPRB's Web site: http://www.potomacriver.org/cms/.

b. Metropolitan Washington Council of Governments

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 organized workshops over the past year that addressed subjects such as endocrine disruptors in the Chesapeake Bay watershed and contaminants of emerging concern in the Potomac and Anacostia Rivers.

COG put forward a report on the effects of climate change in the National Capital Region in November 2008. The issues addressed in the report have a direct impact on the direction of future growth and development in the region. The report also identified potential impacts of climate change on the water resources of the region. It sets forth relevant time lined goals for reduction of greenhouse gas emissions in the region. The report also

contains recommendations to help reduce the emissions, which will ultimately help conserve the natural and water resources in the region, in face of the adverse effects of climate change.

In coordination with the water utilities in the Washington area, including Fairfax Water, a Water Emergency Response Plan was develop and completed in 2005, and recently updated in 2009. The Plan provides communication and coordination guidance to area water utilities, local governments, and agencies in the event of a drinking water related emergency. The Plan replaced the 1994 Water Supply Emergency Plan.

c. NVRC Water Supply Plan

Work is underway by more than 20 local governments and the Northern Virginia Regional Commission on the first Northern Virginia Regional Water Supply Plan project. This is the first time that so many local jurisdictions and water supply utilities are working together on a region-wide project and this is the first Water Supply Plan that encompasses all municipalities in Northern Virginia.

The Northern Virginia Regional Water Supply Plan will include information on water sources, water use, water resource conditions, projected water demand, water management actions and an analysis of alternatives, drought and contingency plans in the event of water deficits. The plan, expected to be completed in 2011, will include water supply projections for the next 30 years.

H. REGULATIONS, LAWS AND POLICIES

1. Buffer Protection for Headwater and Intermittent Streams

On February 25, 2008, the Board of Supervisors adopted an amendment to the Policy Plan to strengthen Comprehensive Plan guidance regarding the protection and restoration of streams and associated buffer areas along stream channels upstream of Resource Protection Areas and Environmental Quality Corridors. This new guidance augments the EQC policy by explicitly encouraging stream and buffer area protection and restoration in these headwaters areas.

2. 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 residents 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.

3. 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.

4. Virginia Stormwater Management Program

New provisions of the VSMP permit program will transfer from the state to the county new responsibilities for the administration, monitoring and enforcement

of stormwater impacts in the Chesapeake Bay Watershed. Work was in progress in 2008 to create new Stormwater Regulations.

Information on legislation and proposed changes is available on-line at: http://www.dcr.virginia.gov/lawregs.shtml.

I. STEWARDSHIP OPPORTUNITIES

There are numerous actions that county residents can and should take to support water quality protection.

1. Disposal of Household Hazardous Wastes

Medicines, paints and other toxics should NOT be flushed down toilets and should NOT be dumped down storm drains. Instead, they should be taken to one of the county's household hazardous materials collection sites. For a list of common household hazardous materials and how to dispose of them, go to http://www.fairfaxcounty.gov/dpwes/trash/disphhw.htm.

2. Septic System Pumpouts

Septic systems must be pumped out every five years—it's the law! Residents with questions or with problems with their septic systems should call the Fairfax County Health Department at **703-246-2201, TTY 711**.

3. Yard Management

Residents are encouraged to get soil tests for their yards before fertilizing and then to apply fertilizers and pesticides responsibly. Grass should not be cut to the edge of a stream or pond; instead, a buffer should be left to filter pollutants and provide wildlife habitat.

The Northern Virginia Soil and Water Conservation District can advise homeowners on problems with ponds, eroding streams, drainage, problem soils and other natural resource concerns. More information about managing land for a healthier watershed Is available from the NVSWCD publications "You and Your Land, a Homeowner's Guide for the Potomac River Watershed" (http://www.fairfaxcounty.gov/nvswcd/youyourland/intro.htm) and the "Water Quality Stewardship Guide" (http://www.fairfaxcounty.gov/nvswcd/waterqualitybk.htm).

Advice regarding drainage and erosion problems in yards can be provided by the technical staff of the Northern Virginia Soil and Water Conservation District. They can assess the problems and advise on possible solutions. Interested parties can send an e-mail to NVSWCD at

https://www.fairfaxcounty.gov/contact/mailform.aspx?ref=9990 or call 703-324-1460.

4. Volunteer Opportunities

There are numerous opportunities throughout the year to participate in stream cleanups, storm drain labeling, volunteer water quality monitoring and tree planting projects. Interested parties can send an e-mail to NVSWCD at https://www.fairfaxcounty.gov/contact/mailform.aspx?ref=9990 or call 703-324-1460. EQAC also commends the efforts of the Alice Ferguson Foundation and encourages residents, employers and employees in Fairfax County to participate in these initiatives. Visit the foundation's Web site at www.Fergusonfoundation.org for further information.

5. Reporting Violations

Vigilance in reporting activities that threaten water quality is important to the protection of water resources.

Sediment runoff from construction sites can be reported to Fairfax County's Code Enforcement Division at 703-324-1937, TTY 711; e-mail reports can also be filed at https://www.fairfaxcounty.gov/contact/mailform.aspx?ref=70003.

Improper disposal of motor oil, paint or other materials into streams or down storm drains should be reported through a phone call to 911. This is particularly important if the substance being dumped can be identified as motor oil or another toxic substance but also applies to any other substance; assumptions regarding the contents of the materials should not be made. Callers to 911 should be prepared to provide specific information regarding the location and nature of the incident. If the person dumping materials into the stream or storm drain has a vehicle, the tag number should be recorded.

Storm drains are for stormwater only, NOT motor oil, paint, or even grass clippings.

If dumping is not witnessed but is instead suspected, and if no lives or property are in immediate danger, the suspected incident can be reported to the Hazardous Materials and Investigative Services Section of the Fire and Rescue Department at 703-246-4386, TTY 711. If it is unclear as to whether or not there may be a danger to life or property, 911 should be called.

A more comprehensive table addressing how to report environmental crimes is provided in the Hazardous Materials chapter of this report.

J. 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 require post development runoff not exceed pre-development runoff rates. Most Fairfax County streams have increased runoff flows that exceed the capacities of their original 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 in the past. 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.

K. ACCOMPLISHMENTS

Over the past several years, Fairfax County has demonstrated a clear commitment to improve, restore and protect the county's water resources.

- In February 2008, the Board of Supervisors adopted an amendment to the county's Policy Plan to strengthen comprehensive plan guidance regarding the protection and restoration of streams and buffer areas along stream channels upstream of Resource Protection Areas and Environmental Quality Corridors. This new guidance augments the EQC policy by explicitly encouraging stream and buffer area protection and restoration in headwater areas.

- 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 initiated its annual preparation of an 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. Information on the EIP FY 2010 projects and plans may be found on-line at: http://www.fairfaxcounty.gov/living/environment/eip/.

- 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.

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

- The county continued developing and completing watershed management plans for each of the county's 30 watersheds. Six watershed management plans have been approved by the Board of Supervisors. It is anticipated that plans for the remaining watersheds 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 continues to expand its public outreach efforts to increase awareness about high fecal coliform bacteria counts in the county's waterways and potential health hazards from coming in contact with impaired surface waters.

- 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.

L. COMMENTS AND ONGOING CONCERNS

1. EQAC commends the Board of Supervisors for its actions of the past few years authorizing one penny of the real estate tax to be dedicated to the stormwater management program. The amount increased from the original amount of $17.9 million for FY 2006 to $22.8 million for FY 2009. In FY 2010 however, this amount decreased to about $10.3 million due to the creation and structuring of the Service District as a funding mechanism halfway through the Fiscal Year. There were also reallocations of financial responsibilities from the General Fund to the Stormwater Fund, which means that funding in FY 2010 does not support basic operations, including regulatory compliance, and that carry over funds originally intended for watershed projects or infrastructure replacements will be used for annual operations this year. Even in FY 2011, with full year's revenue, the current rate of one penny is expected to generate just over $18 million. After all annual operating expenses and dam safety needs are met, there will be very little available for watershed projects or infrastructure reinvestment.

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 thanks the Board of Supervisors for its recent efforts to protect intermittent and headwater streams by 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.

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 track, inspect and ensure adequate maintenance of these LID facilities.

9. More than 12,000 single-family residences and businesses are served by individual well water supplies in Fairfax County, and 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 that will establish a framework for ensuring that proper and timely septic system maintenance is preformed. EQAC continues to support this effort and recommends that this report include support for requirements that owners with alternative septic systems be required to file a maintenance plan for their systems and provide evidence of compliance.

M. RECOMMENDATION

1. EQAC recommends that Fairfax County adequately fund and implement its ongoing Stormwater Program, which includes dam maintenance, infrastructure replacement, water resource monitoring and management, watershed restoration and educational stewardship programs. EQAC realizes the current budget constraints have removed monies available from the general fund and that the funding for the Stormwater Division will come from funds generated through the Service District rates.

   EQAC recommends that the Stormwater Program continue to be funded by the Service District, and that the rate be increased to a penny and a half. This would result in the restoration of some funding for modest watershed improvement programs and a somewhat more realistic infrastructure replacement timeline. We realize that there will likely be a need for additional increases for water quality projects to meet future permit conditions, and for infrastructure reinvestment, as the system is continually growing and aging.

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CHAPTER V

SOLID WASTE

V. SOLID WASTE

A. ISSUES AND OVERVIEW

In a year of great challenge for our nation as a whole, and for local government in particular, Fairfax County's Solid Waste Management Program was able to maintain the general level of success and productivity it has demonstrated in previous years. Once again, the program increased the published recycling rate for the county – it has increased from 38 percent last year to a new record high of 40 percent. As it has for many years now, Fairfax County's recycling rate far exceeds the Virginia minimum requirement of 25 percent. As always, during this same period of increased recycling, the county has also met the minimum 930,750-ton annual waste delivery obligation to the Energy/Resource Recovery Facility, which is located at the county's I-95 landfill complex, and owned and operated by Covanta Fairfax, Inc.

During this same year past, the program continued to provide waste collection and recycling services to over 45,000 homes in designated County Sanitary Districts. The program also moved a daily average of 185 tractor-trailer loads of municipal solid waste from the I-66 Transfer Station to the Energy/Resource Recovery Facility and other appropriate disposal locations.

1. Energy/Resource Recovery Facility and Landfill Capacity

The E/RRF continued to serve as the primary disposal location for the county's municipal solid waste, processing approximately 1,059,000 tons of waste in FY 2009 (up about three percent from the FY 2008 level). Due to the economic downturn (which greatly affects waste generation) and increased availability, the county had to bypass less than 8,000 tons of waste to a municipal solid waste landfill.

This reflects the Solid Waste Management Program's efforts to deliver all of the county's municipal solid waste to the E/RRF if possible. In addition to avoiding the increased cost of hauling that waste to a disposal site far away, the policy of maximizing the use of the E/RRF also provides substantial environmental and public safety benefits due to having fewer trash trucks driving shorter distances on the region's local roads and highways.

Another ancillary benefit of this E/RRF-centered strategy is that the county can, at its discretion, offer a closer and better waste disposal option to its neighboring jurisdictions. Approximately 12 percent of waste processed by the E/RRF was from neighboring jurisdictions, including Prince William and Loudoun Counties, and the District of Columbia.

2. Solid Waste Management Plan Implementation

The 20-year Solid Waste Management Plan was approved by the Board of Supervisors in 2004. Highlights of the implementation actions as the Plan enters its five-year milestone include the following:

a. **Environmental Excellence.** The Solid Waste Management Program continued to maintain its Environmental Enterprise certification with the Virginia Environmental Excellence Program, administered by the Virginia Department of Environmental Quality.

Other Solid Waste Management Environmental Excellence goals and objectives for 2009 include the following:

- Continue to support a progressive policy through which currently 14 employees telecommute (28 percent of eligible employees).
- Maintain involvement with the Businesses for the Bay Certification Program.
- Continue to celebrate Earth Day as well as support Virginia Recyclers Association's designation of April as Electronic Recycling month.
- Continue to provide technical and logistical support to the project which is developing an alternative water supply for the E/RRF, using effluent from the Noman M. Cole Pollution Control Plant.
- Continue to sponsor community recycling events and, where possible, include computers and peripheral equipment, cellular telephones, rechargeable batteries, bicycles and eye glasses are reused and recycled. These recycling events are conducted in partnership with a variety of non-governmental organizations and private businesses.

Accomplishments of E2 Program in FY 2009

Continued to operate six hybrid vehicles and two electric vehicles, reducing air emissions from the operating fleet.

Completed the new landfill gas-to-energy project at the closed I-66 Landfill and Vehicle Repair Facility.

Continued to operate two landfill gas-to-energy projects at the I-95 Landfill complex and the newest space heating project.

Held 11 E-waste and specialty recycling events in 2008. Collected approximately 100 tons of obsolete electronic equipment and other usable items that were donated to charity. Of particular note is Covanta's generous contribution of $35,000 towards the cost of properly recycling old televisions and computer monitors collected at these events.

Held three Conditionally Exempt Small Quantity Generator events, collecting a total of 8,610 pounds of Hazardous Waste.

Held five remote household hazardous waste collection events, in addition to two permanent drop-off centers.

Worked with property managers to educate them about new recycling requirements.

Expanded recycling in county buildings by providing new containers to collect cans and bottles.

Introduced a new program at the Government Center where the public can properly dispose of used compact fluorescent light bulbs.

b. Non-Residential and Construction Demolition Debris Recycling

The Solid Waste Management Program continues to target education and outreach activities towards these newcomers to the county's requirement to recycle. The focus of these efforts has been not only to educate business owners and contractors, but also to help these important community groups educate their customers about the need to recycle.

c. 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 collection events during FY 2009. The collection events were held at locations in the Mount Vernon, Mason, Dranesville, Hunter Mill and Springfield Districts. These remote events are part of the county's Environmental Improvement Program and are dependent upon separate funding by the Board of Supervisors on an annual basis.

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

Fairfax County's Solid Waste Management Program received a national excellence award from the Solid Waste Association of North America for its "No Collection Before 6 AM" campaign, which places multi-lingual notices on dumpsters close to residential communities, reminding the driver not to collect before 6 AM. The program, which was deployed at no cost to the county, has resulted in the complete elimination of early collection complaints in 2008.

3. Solid Waste Disposal Fee

The contract waste disposal fee, offered to companies that sign agreements with the county, remained at $55.00 per ton in FY 2010, due in part to the loss of General Fund support for programs such as recycling education and household hazardous waste. Further restructuring of the program's finances and a general increase in operational costs has forced the program to increase its base solid waste disposal fee from $57.00 per ton to $60.00 for FY 2010. A complete list of fees for various materials is posted on the county's Web site and at the facilities.

B. PROGRAMS, PROJECTS AND ANALYSIS

1. Waste Disposal Program

a. Overview

The Solid Waste Management Program's Division of Solid Waste Disposal and Resource Recovery is responsible for providing the municipal solid waste disposal

capacity demanded by both private- and public-sector waste collectors countywide. This is accomplished through a network of facilities and programs including:

- The I-95 Landfill Complex and Recycling and Disposal Facility.
- The I-95 Energy/Resource Recovery Facility.
- The I-66 Transfer Station Complex & Recycling and Disposal Center.
- The Household Hazardous Waste Program.
- Other Relevant Activities.

Each element of this network is described under separate heading below.

b. I-95 Landfill Complex and Recycling and Disposal Center

i. Groundwater Monitoring

Groundwater Protection Standards were established for the I-95 Sanitary 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 the Virginia Department of Environmental Quality in August 2002. VDEQ commented on the ACM and the county addressed VDEQ's comments by submitting a revised ACM and Corrective Action Plan on April 30, 2004. VDEQ commented on the revised ACM and CAP on April 30, 2007 and the county's response to the comments was submitted on May 23, 2007. We are awaiting VDEQ's 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 complex. Proposed components of the program consist of:

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

The county will implement institutional controls in accordance with the closure and post-closure care plan. A number of engineering controls (leachate collection, landfill gas system and placement of cover) have been installed. Placement of the cap on the municipal solid waste portion of the landfill was completed during 2008. 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. The

county will implement the Corrective Action Plan after final approval from VDEQ.

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 VDEQ's requirements of assessment monitoring. Further, staff will monitor the additional parameters at supplemental locations as specified in the CAP.

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. The county continues sampling and monitoring the groundwater and is in compliance with VDEQ's regulations.

ii. Landfill Closure

Capping of the municipal solid waste section of the landfill (an area of 260 acres) was completed during 2008. Phases I and II of the closure of this section were completed by placing a synthetic cap over an area of 125 acres, and Phases III and IV of the closure consisted of capping 135 acres of landfill with a thick, low permeability soil layer to minimize surface water infiltration. Additional landfill gas control systems were installed as part of the closure design. The project was awarded Project-of-the-Year by the Virginia-District of Columbia-Maryland Chapter of the American Public Works Association in 2007.

The capping work on some of the side slopes of the Area Three Lined Landfill was conducted during 2008 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 330 installed wells extracting landfill gas for energy recovery. Approximately 2,500 cubic feet per minute of this gas is distributed to a variety of energy recovery systems, including the six-megawatt Michigan Cogeneration Systems electric generating facility, and the three-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 2009, county staff continued 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 saving approximately $9,000 per year in heating costs, and

received a National Award from the U.S. Environmental Protection Agency in 2006.

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 are conducted as per regulations, and annual air emission reports were submitted to the VDEQ. 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, from a similar Covanta facility serving the City of Alexandria and Arlington County and from the NMCPCP are all disposed at the I-95 (Area Three Lined Landfill) Ash Landfill. Ash is placed in a double-composite lined landfill, controlled by state-of-the-art leachate collection and detection systems.

The ash landfill has four phases. Phases I and II have reached the capacity and an intermediate cover has been placed. Approximately 1,000 tons of ash is placed daily in the ash landfill. Approximately 6,000 tons of shredded tires were used as a protective layer during the construction of Phase II of the ash landfill. 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 was completed during March 2008. A certificate to operate from VDEQ was obtained on August 21, 2008 and the county has been placing ash in the new cell since October 2008. Phase IIIA has a disposal capacity for ash for five years.

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 2009, 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. Recycling and Disposal Center

The Recycling and Disposal Center allows county residents and small businesses to bring their municipal solid waste and recyclables directly to the I-95 Complex for disposal. The center offers a full range of recycling opportunities, as well as household hazardous waste disposal service. Recycling is free to residents. During FY 2009, users visited the I-95 Recycling and Disposal Center over 88,000 times.

c. Energy/Resource Recovery Facility

i. Overview

Operations at the Energy/Resource Recovery Facility continue to meet or exceed accepted industry standards, as evidenced by the annual independent engineering report prepared by Dvirka and Bartilucci Consulting Engineers in November 2008. This report states, "CFI [Covanta Fairfax, Inc.] has complied with the requirements of the Service Agreement, as amended, and has complied with the Facility's various environmental permit and regulatory obligations."

Since 2008, when CFI was released from the E/RRF's federal output limit of 80 megawatts, the plant now generates an additional 1-2 MW of electricity during peak periods, which is sold at premium prices on the PJM regional energy market (extra revenues being shared with Dominion Virginia Power, which facilitates the sale). Revenue from the sale of the "extra" electricity is used to keep the disposal fees lower.

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 2009, the E/RRF processed approximately 1,059,000 tons of waste (almost 88,250 tons per month). Approximately 825,000 tons of this waste (78 percent) originated in Fairfax County, with the remainder coming primarily from Prince William County and the District of Columbia. The quantity of Fairfax County waste generated has been reduced, partly due to increased recycling initiatives and the economic slowdown.

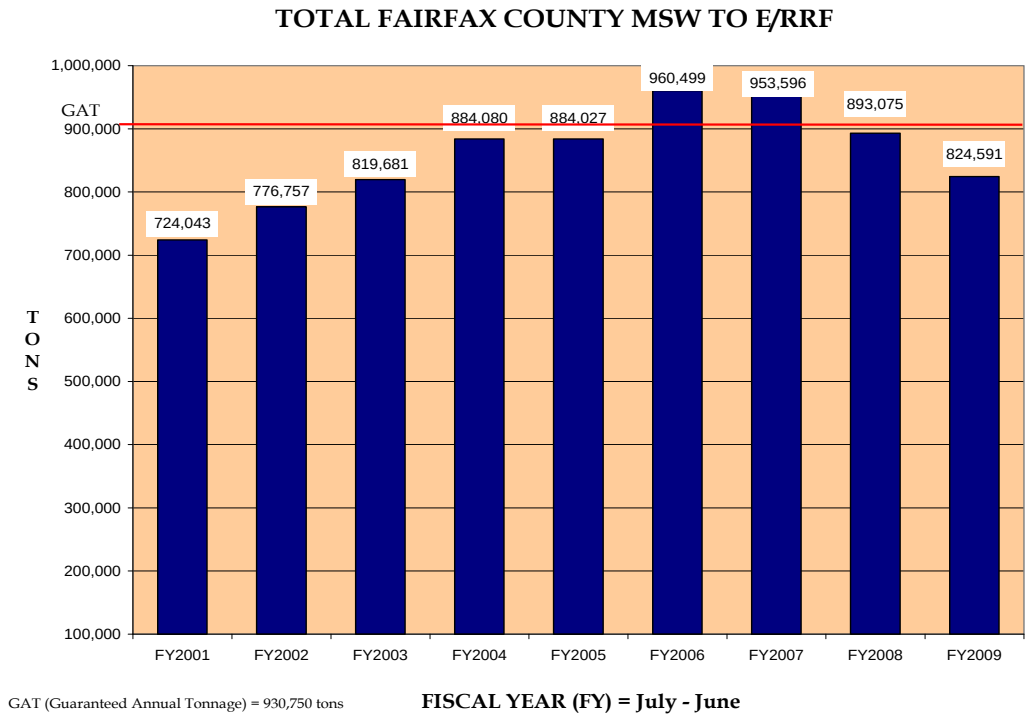


Figure V-1. Total Fairfax County Municipal Solid Waste to E/RRF FY2001-2009

iii. Air Quality

The E/RRF's continuous emissions monitoring systems sample flue gas from the combustion process and alerts CFI operating personnel when monitored emissions are approaching the concentration limits specified in the facility's air pollution control permits. Permit exceedances must be reported to VDEQ, with an explanation as to the circumstances of the event and proposed solutions, as warranted. The E/RRF continues to meet its air permit limits, with most parameters well below their regulatory limits. The following stack emissions were documented by an independent lab test in June 2008 and reported to VDEQ.

Table V–1 Energy/Resource Recovery Facility Emissions Results June 2008		
Parameter	**Permit Limit**	**Average E/RRF Result**
Sulfur Dioxide (SO_2)	29 ppm	7.5 ppm
Carbon Monoxide (CO)	100 ppm	6.25 ppm
Nitrogen Oxides (NO_x)	205 ppm	193 ppm
Hydrochloric Acid (HCl)	29 ppm	4.86 ppm
Particulate Matter (PM)	27 mg/dscm	2.65 mg/dscm
Mercury (Hg)	0.080 mg/dscm	0.00222475 mg/dscm
Dioxin/Furans*	30 ng/Nm3	1.47 ng/Nm3

ppm = parts per million
Dscm = dry standard cubic meter
mg = milligram
ng = nanogram
* only one unit tested annually

Covanta Fairfax, Inc, Annual Compliance Stack & RATA Test Reports, (COV Report No. 326808), 08/05/08

iv. Material Recovery

In addition to recovering energy from municipal solid waste, metals are recovered from the ash residue and recycled. In FY 2009, 27,680 tons of ferrous metal and 1,294 tons of non-ferrous metal were recycled from the ash.

d. I-66 Transfer Station & Recycling and Disposal Center

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 residents and businesses, and also private sector and county collection vehicles, into large transfer trailers. These trailers are hauled over the road to a final disposal site, primarily to the E/RRF. Primary benefits from this type of transfer system are a reduction in the number of vehicles traversing the county to reach the final disposal point, 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.

VDEQ regularly inspects the Transfer Station; the facility was found to be in full compliance during all inspections in FY 2009.

i. Transfer Operations

The main role of the Transfer Station is to move waste collected in the northern and western parts of the county to the E/RRF in the south. With increased development and population growth, waste collection companies are bringing more and more waste to the facility. Moreover, technology has given us collection vehicles that can now hold (and deliver) more waste per trip. As a result, the daily tonnage being managed by the transfer operations has grown. In order to meet the growing demand for waste transfer, the county has supplemented its fleet of tractor trailers with private trucking contractors.

The county vehicle fleet, including the transfer trucks at the Transfer Station, now uses ultra-low-sulfur diesel fuel and exhaust after treatment systems. These changes reduce air pollutant 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.

In FY 2009, the project to convert space heaters to use landfill gas at the Department of Vehicle Services shop near the closed I-66 landfill was completed. This project is expected to save $50,000 annually on fuel costs.

In a pilot program to reduce fuel consumption and air emissions in the transfer fleet, by decreasing the amount of time idling, six of the program's tractors have been equipped with battery-powered heat and air conditioning systems that provide up to two hours of air conditioning comfort without running the truck's engine. At this early stage, the units seem to be performing well, but computer analysis of the engine idling times will be the true test. Given continued success with this pilot program, it is anticipated that additional trucks will be converted if funding is made available.

ii. Recycling and Disposal Center

Photo of the Recycling and Disposal Center under construction in April 2008

The Transfer Station Complex also has one of the county's two Recycling and Disposal Centers where residents and small businesses self-haul their waste and recyclables. In FY 2009, users visited the I-66 site more than 191,000 times. The facility has undergone

significant modernization to accommodate growing local demands for recycling and disposal services. New scales and booths, improved entrance and egress, and newer technology have been installed to improve customer service and increase capacity.

e. Household Hazardous Waste Program

The Household Hazardous Waste and the Conditionally Exempt Small Quantity Generator collection programs are operated by the Solid Waste Management Program; however, the statistics about the program results are provided in the Hazardous Materials chapter of this report.

f. 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. An integral requirement of these permitting programs is that permitted collectors must demonstrate that they comply with all applicable provisions of Chapter 109.1, the county's solid waste management ordinance.

The Solid Waste Management Program has responsibility for enforcing Chapter 109.1 and for resolving any potential violations observed by program staff. In addition to this responsibility, the program also coordinates with other county agencies as necessary to lead enforcement of relevant provisions of 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 Virginia Department of Environmental Quality is responsible for establishing the regulations that require all municipalities in the Commonwealth to recycle a certain minimum 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, 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 VDEQ each year in the spring. Fairfax County's recycling rate for calendar year 2008 was 40 percent, which represents a full fifteen percentage points above the required rate of 25 percent.

Chapter 109.1 requires annual reports on the tonnages of recyclables collected by a broad spectrum of businesses and commercial establishments, material recovery facilities, and other entities that operate in the county. These reports are compiled to calculate the countywide recycling rate. Figure V-2 depicts the historical quantities of recyclables collected in the county since 1988. Since the recycling program's inception in 1988, the county has recycled over 7.1 million tons and continues to exceed the state-mandated requirement.

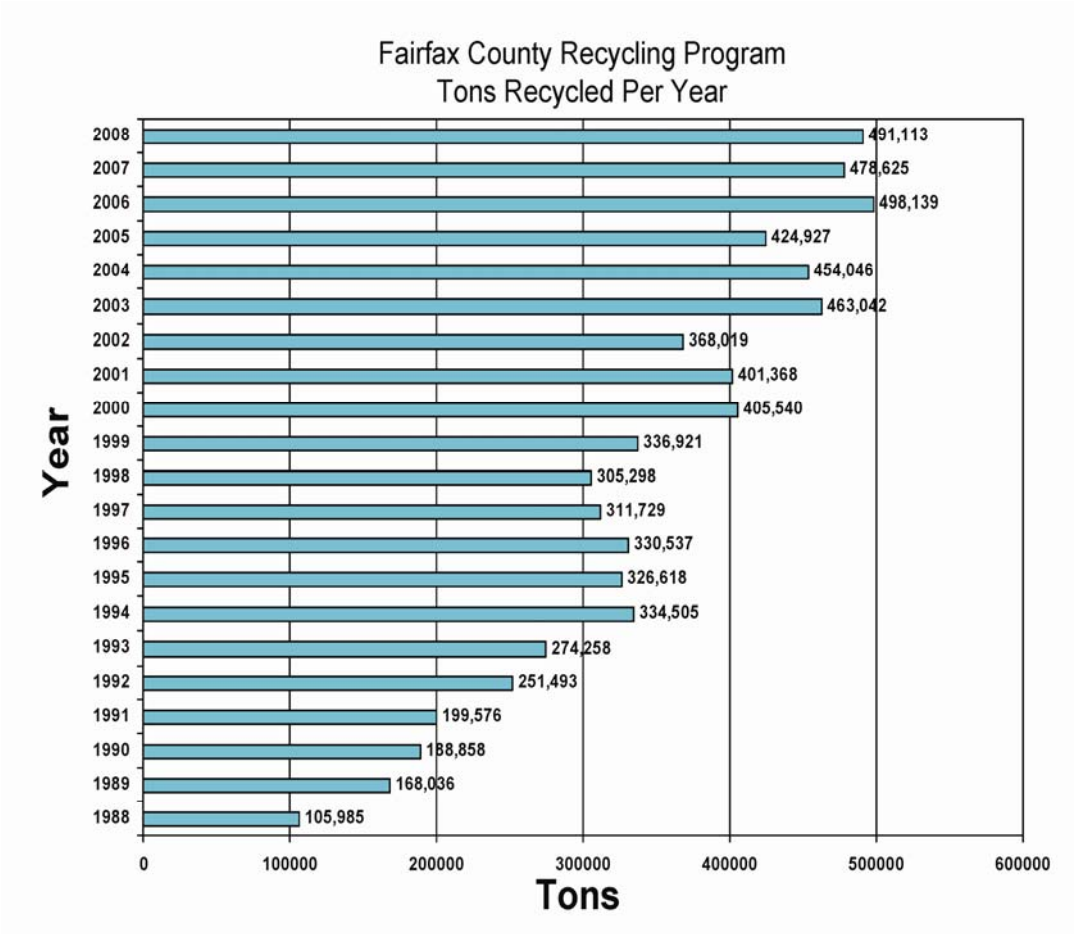


Figure V-2 - Historical Quantities of Materials Recycled in Fairfax County

Currently, all residential properties in Fairfax County receiving curbside trash collection must also be provided with recycling collection. Recyclables that must be collected at the curb, in conformance with Chapter 109.1, include: metal food and beverage containers; glass bottles and jars; plastic bottles and jugs; mixed paper; cardboard; and yard waste.

Recycling of mixed paper and cardboard is required for all nonresidential properties in the county. All nonresidential entities that generate a principal recyclable material other than mixed paper and cardboard are required to recycle that material in addition to the mixed paper and cardboard.

Recycling of mixed paper and cardboard is required for all multifamily buildings in existence prior to July 2007.

Recycling of mixed paper, cardboard, metal food and beverage containers, glass bottles and jars and plastic bottles and jugs is required for all multifamily buildings constructed *after* July 2007. Appliances from these properties are also required to be recycled.

Recycling of mixed paper and cardboard is required for all schools and institutions.

All construction and demolition contractors are required to recycle cardboard.

b. Major Program Additions in FY 2009

Fairfax County constantly reviews its solid waste management practices to accommodate changes in the waste generated within the county. Based on changing community needs, the Solid Waste Management Program attempts to provide solutions for managing new (and thus sometimes) problematic wastes. Two emerging waste streams were identified by the program and new programs were initiated so that these wastes could be better managed. The wastes were compact fluorescent lamps (and other fluorescent lamps) and E-wastes, including old computers and televisions with cathode ray tubes.

Compact Fluorescent Lamps

The management of compact and other fluorescent lamps from residences in the county was addressed in several ways. CFLs and other fluorescent lamps can be taken to either of the county's Household Hazardous Waste facilities at the I-66 Transfer Station complex in Fairfax or the I-95 Landfill complex in Lorton. Both of the facilities take these lamps at no charge to county residents. In FY 2009, the Solid Waste Management Program hosted five household hazardous waste collection events around the county to give residents another convenient way to properly dispose of these light bulbs.

The program also started to collect CFLs at the document shredding events held around the county each year. CFL collection for Fairfax County residents and employees is also available in the program's office location at 12000 Government Center Parkway, Suite 458. Information detailing these recycling opportunities is on the county Web site at: http://www.fairfaxcounty.gov/dpwes/recycling/mat-light.htm. This portion of the Web site also provides information about other organizations in the county that are accepting CFLs for recycling.

E-Wastes

In FY 2009, the Solid Waste Management Program initiated its "Electric Sunday" program whereby, on one Sunday each month, residents can bring their e-wastes for recycling to the I-66 transfer station.

With the end of analog television broadcasting in CY 2009, the Solid waste Management Program is in the process of addressing the disposal of televisions from residents who purchase new digital equipment. The program is now accepting televisions at electronic collection events around the county. In calendar year 2008, 2,305 monitors with cathode ray tubes and 956 televisions were collected for recycling at county sponsored events. As reported to the county from all sources, 560 tons of e-wastes were recycled from residents and businesses in the county.

c. Review of Collection and Recycling Programs

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

- Collection of refuse and recyclables from about 44,000 residences, primarily on the east side of the county in designated Sanitary Districts.
- Collection of refuse and recyclables from county-owned buildings.
- Seasonal curbside vacuum leaf collection for about 23,000 residences.
- The management of eight Recycling Drop-Off Centers.
- Removal of oversized piles of trash through the *Clean Streets Initiatives* and *MegaBulk* programs.
- 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, household hazardous waste and solid waste management.

The Megabulk program was originally established for county refuse and recycling customers in Sanitary Districts to collect 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 is now available to residents 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, and if he or she fails to do so or otherwise cooperate, the Solid Waste Management Program removes the refuse and bills the owner for removal of the material. If the property owner refuses to pay that bill, a lien is placed on the property.

i. Yard Waste

Recycling of yard waste (brush, leaves and grass) is required for all residential properties in Fairfax County, and collection of that yard waste is required to be provided as part of the base level of service by all permitted collection companies operating in the county from March 1st through December 24th of each year. Yard waste recycling is suspended in the months of January and February is because very few leaves and virtually no grass are generated during that part of the year.

Townhouse communities may apply to the county for approval of an alternative yard waste recycling system. The reason for this flexibility is because lawns are typically small and these communities contract with landscaping firms that groom common areas. For almost three years now, Fairfax County has required all townhouse communities to apply for approval of an alternative yard waste recycling system. Approximately 200 townhouse communities have approved alternative recycling systems for yard waste.

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 2008, over 200,000 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. These are unmanned facilities, open 24 hours, and there is no fee to use them. No new centers have been added to the county system in approximately 10 years, but the existing facilities are used frequently by residents and about 5,000 tons of recyclables are collected annually in the drop-off centers. Recycling Drop-Off Centers continue to play an important role in supporting recycling in the community, serving patrons in multifamily units and small businesses. However, the centers appear to be experiencing a gradual downward trend in usage, and the county bears significant costs to clean up illegal dumping of garbage, appliances, demolition debris and other inappropriate materials at these sites.

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 FY 2009, county agency locations recycled approximately 911 tons of material. The program provides containers for the collection of bottles and cans (plastic bottles, aluminum beverage cans and glass bottles) from buildings owned and occupied by Fairfax County and its employees. These plastic containers have been placed in all of the county's larger office buildings and most of the smaller agency buildings in areas where beverages are sold and consumed like cafeterias and conference rooms. Existing can and bottle collection containers already placed in county buildings were all relabeled in the hope of refocusing county employee efforts on recycling. Additionally, cardboard containers used to collect paper from county buildings were replaced due to damage or age.

iv. 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. In FY 2009, 10 document shredding events were held. As of June 2009, approximately 100 tons of personal documents had been shredded.

v. 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; support and publicity for several events specifically dedicated to recycling; public speaking opportunities; and technical support in the research of recycling technologies and issues.

The Solid Waste Management Program continues to partner with the Fairfax County Wastewater Treatment Program in its 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 science teachers with assistance and support from county employees.

Both the county's stormwater program and the solid waste management program have been invited to assist 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. Staff members 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 over 100 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 Corporation 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 offices of all members of the Fairfax County Board of Supervisors and at 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

The Fairfax County Solid Waste Management Program partnered with the Metropolitan Washington Council of Governments to produce the Builder's Guide to Refuse and Recycling.

In years past, the program has participated in Celebrate Fairfax and Fall for Fairfax. Both of these events have been a major portion of the county's overall public outreach campaign, providing the program with opportunities to disseminate technical guidance and practical information on using the county's solid waste management system. However, due to budget constraints, there was no exhibit at Celebrate Fairfax this year. Efforts were instead focused on the Fall for Fairfax event, which was hosted in October 2009.

The Solid Waste Management Program is a proud financial sponsor of the annual Earth Day/Arbor Day celebrations promoted by Clean Fairfax Council. The program also supports the Johnie Forte Jr. Environmental Scholarship, which awarded fourteen $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 the Schools/County Recycling Action Partnership. This 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 program developed the scrapbook, a resource tool distributed to all science teachers in the school system, that details all of the opportunities provided by the 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 committee 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.

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 2008 was celebrated on November 10, 2008, with the Community Recycling Roadshow at Herndon High School. At the end of the day, the Solid Waste Management Program collected 193 pairs of eyeglasses for the Lion's Club of Fairfax and 211 cellular telephones for OAR of Fairfax County. Safeguard Shredding reported six tons of paper shredded at the event. Bikes for the World received over 75 bicycles. ServiceSource and CDM E-Cycling received over 30 tons of computer and peripheral equipment (including televisions, CD and DVD players and telephones). Art for Humanity collected sewing machines, window air conditioning units, baby strollers and microwaves and filled a 16-ft. trailer completely with clothing, towels and linens.

The Rechargeable Battery Recycling Corporation Program received more than 275 pounds of rechargeable batteries.

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 and the annual Residents Solid Waste Forum. The Residents Solid Waste Forum meeting was held on May 12, 2009.

The program also uses 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 continues to update the Solid Waste Management Program's Web site to improve its ease of use for residents and businesses. More information was

added to help county residents, solid waste industry companies and schools access forms, data and publications about the program.

The program also published an electronic "listserv" to county collection customers to automatically send updates to customers on the program and to provide 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 dates that the leaf collections would be conducted on their streets in order to ensure that residents would have time to rake their leaves to the curb.

The Solid Waste Management Program published for distribution to county residents (and others, upon request) a brochure that consolidates and summarizes information about the program. Printed on recycled paper, the color brochure briefly provides an overview of the program.

vi. Awards and Recognition

The Solid Waste Association of North America recognizes outstanding solid waste programs and facilities through its Excellence Awards Program. These annual awards are presented to governmental organizations that advance the practice of environmentally and economically sound solid waste management through their commitments to: 1) using effective technologies and processes in system design and operations; 2) advancing worker and community health and safety; and 3) implementing successful public education and outreach programs. Programs also must demonstrate that they are fiscally and environmentally responsible through their compliance with all applicable federal, state and local regulations. In 2008, Fairfax County's Solid Waste Management Program was awarded the annual Excellence Award in the category of "Communication" at the silver level by SWANA.

3. Clean Fairfax Council

Clean Fairfax Council is a private, nonprofit (501(c)(3)) corporation dedicated to the education of the residents, students and businesses of Fairfax County on issues relating to litter prevention and recycling. Environmental education and lessons on sustainability are provided to students and adults throughout the county. The council is currently working toward a less paper-intensive outreach program including e-newsletters, an environmental blog and updated website, educational videos, interactive programs for students, community service opportunities for students (i.e., support at the council's office), classroom presentations and presentations to homeowner associations and other groups. 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.

A key effort of the council is 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. In its FY 2009 annual report to the Virginia Department of Environmental Quality, the council notes that there were 8,649 participants at 185 cleanup events; over 532 cubic yards of litter were collected at these events. The value of the volunteer hours (estimating three hours per volunteer) is approximately $466,260.00

The report also notes the distribution of over 200,000 pieces of informational materials (e.g., brochures, newsletters), 30 youth presentations/workshops (with a total attendance of 2,500), six additional group presentations/workshops (again with a total attendance of 2,500) and four staffed displays/events (e.g., fairs, community events) with an estimated attendance of 36,000.

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 annual 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.cleanfairfax.org.

4. Alice Ferguson Foundation

The nonprofit Alice Ferguson Foundation was established in 1954. While chartered in Maryland, it has implemented programs throughout the Potomac River watershed, with benefits to the main stem of the river as well as tributaries in Washington, DC, Maryland, Pennsylvania, West Virginia and Virginia. As stated on its Web site, the foundation's mission is "to provide experiences that encourage connections between people, the natural environment, farming and the cultural heritage of the Potomac River Watershed, which lead to personal environmental responsibility."

On April 4, 2009, the foundation held its 21st annual **Potomac River Watershed Cleanup**. This was truly a comprehensive, watershed-wide effort, in that there were over 500 cleanup sites in four states and the District of Columbia. A total of over 291 tons of trash were removed by over 13,500 volunteers. Items removed included over 41,000 plastic bags and over 2,000 tires. Among the more interesting items removed were a bowling ball, a safe filled with concrete, a soccer goalpost, a machete and three tiki torches. In Fairfax County and the City of Fairfax, nearly 1,900 volunteers working at over 100 sites collected over 77,000 pounds of trash, including 248 tires, over 30,000 bottles and over 4,600 cigarette butts.

Other programs implemented by the foundation include:

Trash Free Potomac Watershed Initiative—This is a program to reduce trash and increase recycling, education and awareness of trash issues in the watershed

Potomac Watershed Trash Treaty—As of fall 2008, this treaty commits 100 signers to achieving a "Trash Free Potomac by 2013" and to: support and implement regional strategies aimed at reducing trash and increasing recycling; increase education and awareness of the trash issue throughout the Potomac watershed; and reconvene annually to discuss and evaluate measures and actions addressing trash reduction. Fairfax County was one of the founding signers of the treaty in 2005.

Potomac Watershed Trash Summit—The foundation convenes this meeting annually to provide a venue for key stakeholders to collaborate on strategies to eliminate trash from waterways, communities, streets and public lands, including regional public policy, model best management practices, business actions and public education. **Enforcement**—The foundation worked in partnership with the Metropolitan Washington Council of Governments' Police Chief Committee on "Litter Enforcement Week," which provided a focus on litter-related crimes and raised awareness of the harmful effects trash has on communities and the environment.

There are numerous other programs and initiatives that are implemented by the foundation; the reader is encouraged to visit the foundation's Web site at www.fergusonfoundation.org.

C. RECOMMENDATIONS

No new recommendations are proposed this year.

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.

EQAC also acknowledges Clean Fairfax Council and the Alice Ferguson Foundation for information provided through e-mails.

ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VI

HAZARDOUS MATERIALS

V. 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.

The discarding of older model televisions, as well as computer monitors and peripherals requires continued effort to help keep lead from entering the landfill. Compact florescent light bulbs contain small amounts of mercury; they therefore must be disposed of properly when the bulbs are used as well as if they are broken. With the 2012 mandatory change to compact florescent light bulbs, proper disposal will become a bigger issue.

Finally, there were two FY 2010 budget impacts that had direct impact on environmental programs: reorganization of the Hazardous Materials and Investigative Services Section and the loss of the Local Emergency Planning Committee Coordinator. The HMIS reorganization did not involve any reduction in service or mission objectives for the section. Resources were reallocated to better distribute workload and address concerns for officer safety and staffing. The duties of the LEPC Coordinator were reassigned to the alternative placement Lieutenant assigned to the Hazardous Materials Technical Support Branch. The long-term impact for the loss of the LEPC Coordinator will come in 2012 when the alternative placement Lieutenant retires. The Fire and Rescue Department purchased Tier II Manager Software in an effort to compensate for the loss of the LEPC Coordinator position. This allows for Web-based entry of Tier II information by submitting facilities. The most significant advantage of this software is that it automatically generates the Hazardous Material Emergency Response Plan for the critical hazard facilities. (13)

2. Hazardous Materials Incidents

a. Overview of 2008 Hazardous Materials Incidents

In 2008, the Fire and Rescue Department's Hazardous Materials and Investigative Services section received 418 complaints involving hazardous materials (103 more than the previous year), 330 of which were reported spills, leaks or releases of hazardous materials into the environment. Of the 330 releases, 267 involved petroleum based products. There were 45 hydraulic oil spills/releases (mostly from trash trucks), 63 fuel oil or home heating oil releases, 48 gasoline releases and 45 diesel fuel releases. The remainder consisted of a variety of materials including paint, antifreeze, cleaners, various gases, various chemicals and mercury. There were 43 incidences where the release of hazardous materials did impact storm drains or surface waters. Currently, 43 sites are being tracked for long term remediation. The most significant of these is the Pickett Road Terminal Site (Fairfax Tank Farm) release which started in 1991. Also being assessed is the underground methane production situation in a residential neighborhood. This problem originated in early 2005. The Hazardous Materials and Fire Investigation Mobil Lab was requested to address 11 incidents or events. Personnel in this section maintain relationships with the major pipeline companies and blasting companies that operate in the county. (1)

b. Hazmat Response Team Information

The Fire and Rescue Department maintains a well equipped hazardous materials response team for emergency response. The primary unit operates out of Fairfax Center Fire Station 40. There are four satellite stations located throughout the county in support. These stations are located at Fire Station 1 in McLean, Fire Station 11 in Penn Daw, Fire Station 19 in Lorton 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. (1)

The Hazardous Materials Response Team responded to 994 calls in CY 2008. The team responded to a myriad of incidents including methane/propane gas emergencies, transformer fires, overturned gasoline/ethanol tank trucks, weapons of mass destructions investigation for suspicious packages or white powder, mercury events, chemical odors or spills, petroleum releases, the dumping of hazardous materials and various other Department of Transportation HazMat Class events. (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. (1)

c. Fairfax County Department of Health, Environmental Hazardous Investigation Section

The Air Quality chapter of this report discusses the elimination, due to FY 2010 budget reductions, of the Environmental Hazardous Investigation Section of the Fairfax County Department of Health. In that this section responded to residents' concerns about potential chemical, biological, and nuclear hazards such as mold, radon, asbestos, and indoor air quality, there are both air quality and hazardous materials implications associated with this budget decision. The Air Quality chapter should be consulted for further information.

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

Millions of do-it-yourselfer motorists change their own oil. Some of the oil is disposed of properly at a used-oil recycling center. But much used motor oil is being disposed of in garbage cans, sewers, storm drains and backyards – practices that can contaminate soil, local streams, rivers, bays and beaches. One gallon of used motor oil, if not disposed of properly, can contaminate one million gallons of water. (4)

As a part of its ongoing effort to educate all Americans on environmental responsibility, the U.S. Environmental Protection Agency launched "You Dump it, You Drink It" **(**"Si lo tira, se lo toma"**)**, a new Spanish-language campaign. 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)

Recycling of petroleum products is less well known than for other products. The recycled used motor oil is used for many purposes. The primary use is to refine it into a base stock for lubrication oil. The secondary use of used oil is to burn it for energy. If you recycle just two gallons of used oil, it can generate enough electricity to run an average household for almost 24 hours. (4)

Many service stations, repair facilities and quick lubes will accept used oil and used oil filters.
(The American Petroleum Institute-The Oil Recycling Process 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. While having chemicals and hazardous materials transported by rail keeps them off the highways, 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, new ethanol transfer stations and the future shipments of nuclear radioactive waste throughout the country.

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. (3)

The July 2001 Baltimore tunnel fire immediately got woven into debate of whether nuclear waste could be transported safely to Nevada. Studies in 2003 were performed to determine what would have happened had the train been carrying nuclear waste. Conclusions differed. A state analysis concluded that a

cask carrying radioactive spent fuel would have been breached by temperatures inside the Howard Street Tunnel. Escaping radioactive particles would have contaminated 32 squares miles, increased the chances of cancer deaths for up to 28,000 people and cost $13.7 billion to clean up. The Nuclear Regulatory Commission said the nuclear waste canister would have endured the fire "and the health and safety of the public would have been maintained." (3)

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 is exercised regularly.

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 has a hazardous material emergency response plan, "Community Awareness Emergency Planning Guide" dated October 2008. A written copy of that plan is on file with the Fairfax County Fire & Rescue Hazmat Station 40. (12)

At www.csx.com CSX reports that each year it moves over 350,000 tons of hazardous materials and has a low number of incidents. For every billion ton-miles of hazardous materials transported, trucks (which operate over inherently more dangerous highways) are involved in 16 times as many accidents as the rails. CSX has achieved a 99.9 percent success rate for safe transportation of hazardous materials. CSX has been involved with years of hearings and legal proceedings concerning the safety with urban rail transportation of certain hazardous materials. Among these is the re-routing trains around Washington D.C. (9).

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. As a member of the Clean Water Partners, Fairfax County participates in the annual storm water education campaign. Calendar year 2008 marked the fourth year of the campaign with "The Call" public service announcement that aired on nine radio stations. Complementing print, video and Web-based products (www.onlyrain.org) have been developed to aid in raising awareness of Northern Virginia residents about behaviors leading to non-point source pollution and the actions residents can take to protect local and regional water quality. "The Call from the Sewer Guy" can be heard at www.potomacroundtable.org. (6)

The goal of the expanded program continues to be educating the community about the water quality impacts of storm drain dumping. Pollution that enters

our water resources through storm drains is called nonpoint source pollution because it comes from all our homes and communities. Nonpoint source pollution is the leading cause of water quality deterioration in the Chesapeake Bay. During 2008, 465 volunteers worked in their communities to carry out 30 projects. These volunteers included scout groups, middle and high school students and homeowner associations. As a result, more than 28,331 households in Fairfax County received nonpoint source pollution prevention education. This included information about how to properly dispose of pet waste, used motor oil, fertilizer, antifreeze and other hazardous materials. Following the education campaign, volunteers labeled 2,644 storm drains, thereby providing an on-going reminder to not dump anything in storm drains. Check NVSWCD's Web site to learn more about the Storm Stenciling Program and how civic and community groups can have their local drains marked (http://www.fairfaxcounty.gov/nvswcd/stormdrained.htm). (6)

NVSWCD also publishes a bi-monthly newsletter, *Conservation Currents*, for Fairfax County residents. 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))

A relatively new group of local governments and utilities called the Northern Virginia Clean Water Partners has launched an effort to educate the public about how to prevent water pollution. The group includes the counties of Fairfax, Arlington, Loudoun, Prince William and Stafford; the cities of Alexandria, Fairfax and Falls Church; and the towns of Dumfries, Herndon, Leesburg and Vienna. Other members of the partnership are Fairfax Water, Loudoun Water, the Northern Virginia Regional Commission and the Virginia Department of Environmental Quality Coastal Zone Management Program. (2)

The logo, and theme, for the Northern Virginia Clean Water Partners (2)

Each spring, NVCWP launches a campaign to remind residents that they can reduce the amount of polluted storm water reaching waterways. The group plans surveys to help quantify the effectiveness of the campaign. It also wants to determine how aware Virginians are of storm water pollution and the behaviors that cause it. Last year's survey found that after hearing the radio spot, 12 percent of respondents would be more careful with fertilizer, nine percent would pick up after their pet more often and nine percent said they would recycle their motor oil. (2)

To learn more about NVCWP, check its Web site at: www.onlyrain.org.

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 tip fees and from the General Fund. Beginning in FY 2009, the General Fund support was removed and the program has since been supported entirely from tip fees. In FY 2008, 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 2009, 19,951 users participated in the HHW program, disposing of 404,896 pounds of HHW. Compared to FY 2008, this represents an 11 percent decrease in the number of users and a 12 percent decrease in the weight of HHW disposed. Program details are provided in Table VI-1 below (11).

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.

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 2009	19,951 households	404,896	$32.66
FY 2008	22,112 households	452,552	$30.59
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.

5. Commercial Hazardous Wastes

In FY 2009, the Solid Waste Management Program 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. In FY 2009, 70 companies participated in the three events. Information about the CESQG program and a list of commercial hazardous waste disposal companies are

available on the county's Web site at www.fairfaxcounty.gov/dpwes/trash/disphazcomm.htm.

The Solid Waste Management Program also spearheaded development of the Know Toxics program, managed regionally by the Northern Virginia Regional Commission staff and Waste Management Board, www.KnowToxics.com (11).

6. Rechargeable Battery Recycling

In addition to the Solid Waste Management Program's battery collection activities described in the Solid Waste chapter of this report, the Program collects mercury and lithium batteries for recycling at its household hazardous waste facilities. Non-rechargeable household batteries are not accepted by the program and can be safely thrown away. Nickel-Cadmium and other rechargeable batteries (commonly found in cordless tools and appliances, computers, camcorders, cameras and toys) are also accepted by the household hazardous waste program. The program has put rechargeable battery containers at the Fairfax County Government Center and each of the Board of Supervisors' offices, and program staff collects these batteries on a routine basis. A complete listing of collection locations is on the county Web site at: http://www.fairfaxcounty.gov/dpwes/recycling/mat-bat.htm.

As described in the Solid Waste section of this report, the Solid Waste Management Program also participates and actively supports the recycling service provided by the Rechargeable Battery Recycling Corporation (11).

7. Remote Household Hazardous Waste Events

As an adjunct to the permanent household hazardous waste facilities, and as described in the Solid Waste chapter of this report, the Solid Waste Management Program has received special funding through the county's Environmental Improvement Program to conduct a series of remote household hazardous waste collection events at locations throughout the county. In FY 2009, five of these events were conducted in Mount Vernon, Mason (there were two events in Mason), Dranesville and Springfield 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 $16,870 per event. They are provided at no cost to county residents and are, therefore, dependent upon the special funding from the Board of Supervisors. 1,450 households participated in the five events. These events removed over 90,000 pounds of materials from the waste stream and disposed of approximately 1,300 compact fluorescent lights. In addition, 560 tons of electronics/computers were collected in the county in CY 2008. (11)

Funding for remote household hazardous waste collection events is no longer available, and the last such event was held in September 2009.

In 2009, the seven Electric Sundays held monthly from January to July collected 3,718 televisions and 4,547 computer monitors. These items along with all of the CPUs and peripherals that go along with computers, weighted over one-half million pounds. About 5,000 customers were served during the seven events. (17)

8. Fluorescent Lights

Americans bought 290 million compact fluorescent light bulbs in 2007. That's 20 percent of all light bulbs sold in the United States and almost double the sales from a year earlier. (13) Compact fluorescent light bulbs have become popular for residential use due their energy savings potential. The incandescent light bulbs are being phased out and will no longer be sold in 2012. (10) However, the compact fluorescent light bulbs contain minute quantities of mercury which classify them as household hazardous wastes when they are disposed. These types of lights are accepted from residents for proper disposal at both of the county's HHW facilities.

Small businesses that generate less than the regulated quantity of fluorescent lights 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 lights (11).

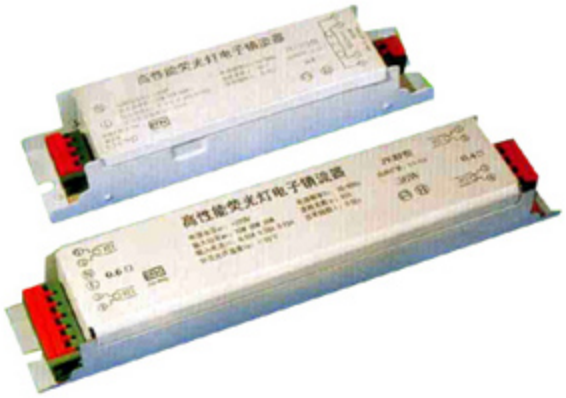
The following Fluorescent Bulb Reference Guide has been taken from a Web site from the Northern Virginia Regional Commission's and Northern Virginia Waste Management Board's "KnowToxics" campaign. (16)

Fluorescent Bulb Reference Guide

- Any bulb with the (Hg) symbol **cannot** be disposed of in the trash
- These bulbs contain mercury and must be reclaimed or recycled through an appropriate facility
- The following table shows a sample of typical fluorescent and High Intensity Discharge bulbs that contain mercury and the names often used for them:

Type of Bulb	What it might look like...
Fluorescent tubes: This includes 4-footers, 8-footers, T-12s, and T-8s	
Low mercury "green tips"	
High intensity discharge (HID)	
Compact fluorescents	
Neon	

U-tubes	
Circulars	
Mercury vapor	
High pressure sodium	
Low pressure sodium	
Ultraviolet	

Electronic Ballasts	

A new brochure about the value of using fluorescent lights and how to recycle them is available on Fairfax County's Web site. The brochure's instructions on how to handle a broken compact fluorescent light bulb are consistent with the guidelines given by the Environmental Protection Agency including sealing the broken material in two plastic bags and placing outside with the regular trash collection. However, Maine's Department of Environmental Protection did a study in 2008 comparing clean-up methods, and warned that the Environmental Protection Agency's recommendation of plastic bags was the worst choice, as vapors well above safe levels continued to leach from the bags. Maine's Department of Environmental Protection now recommends a sealed glass jar as the best repository for a broken bulb. Whether disposing in plastic bags or glass jars, if vapors above safe limits are still present when disposed of with regular trash, can this lead to potential problems in the future? Disposing of these light bulbs is also being looked at by other areas of the country, including crushing the light bulbs in a machine that uses negative pressure ventilation and a mercury-absorbing filter, and in the northwest part of the United States households have the option of disposing these light bulbs in the same way they dispose of other solid waste. (15)

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 this 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

1. The Fairfax County Board of Supervisors adopted amendments to Chapter 62 of the Fire Prevention Code effective July 1, 2009. The amendments that directly impact environmental stewardship primarily involve changes to Chapter 27 of the Statewide Fire Prevention Code. The amendment to Section 2703.3.1 requires that "Any person who witnesses, discovers, or otherwise has knowledge of a spill, leak or other release of a hazardous material or other material that may negatively impact the environment, regardless of quantity, shall immediately report such spill, leak or release to the Department of Public Safety Communications and to the Fire Marshall." This requires that the release of any material that may cause an

environmental impact, not just hazardous materials, be reported to investigation and follow up. (13)

2. On December 19, 2007, the Energy Independence and Security Act of 2007 was signed. Among other things, this will begin the phase out of the incandescent light bulb from the U.S. market in 2012. (10)

E. STEWARDSHIP

What is considered hazardous materials has changed in recent decades. It use to be primarily industrial releases or transportation of chemicals used with industrial work. Hazardous material then came to include terrorist attacks, some household chemicals used for cleaning and chemicals used for yard work. Now hazardous material includes items that individuals use in everyday life such as rechargeable batteries for cell phones and power tools as well as the compact fluorescent light bulb. This year, many older televisions, some containing large amounts of lead, were disposed of with the transition from analog to digital. Stewardship for the storage, use of, and disposal of hazardous materials is no longer solely an industry issue; it now belongs to individuals and with more than a million individuals in Fairfax County, household hazardous waste will continue to increase.

F. COMMENT

1. A comment within the Air Quality chapter of this report noted that the FY 2010 budget reductions eliminated the Environmental Hazards Investigation Section of the Fairfax County Department of Health, which has provided valuable services by responding to complaints about mold, radon, asbestos, and indoor air quality and in assisting the Fire and Rescue Department with responses to hazardous materials incidents. EQAC feels that, in the future, when budgetary conditions allow, these functions should be restored. Until these functions are restored, these services will need to be provided by private contractors.

G. RECOMMENDATION

1. EQAC recommends that the county continue to find ways to help people more easily recycle household hazardous waste. As examples of the need for such efforts, with the increased use of rechargeable batteries and compact fluorescent light bulbs, more households in the county will have these hazardous waste items to dispose of on regular basis. Consideration should be given to continuing remote household hazardous waste collection events.

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ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER VII

ECOLOGICAL RESOURCES

VII. ECOLOGICAL RESOURCES

This chapter summarizes the status of ecological resources and the actions of public agencies and stakeholder 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.

EQAC also commends those residents of Fairfax County who give donations and time to a number of county organizations involved in environmental activities. EQAC encourages such volunteer activity. The following paragraphs describing organizations' activities mention opportunities for such stewardship.

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 had 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 document can be viewed at:
http://www.fairfaxcounty.gov/living/environment/eip/bos_environmental_agenda.pdf.

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

TABLE VII-1. DPWES Stream Restoration Projects in 2008			
PROJECT NAME	**PROBLEM**	**SOLUTION**	**PARTNERS**
Clarke's Landing	Eroded Streambank	Constructed a retaining wall to provide structural protection to two adjacent dwellings and used bio-engineering techniques to establish a buffer area and stabilized 285 linear feet of streambank	DPWES
Beach Mill Road	Eroded Streambank	Installed 200 linear feet of streambank stabilization	DPWES
Chesterbrook Road Drainage Improvement Project	Eroded Streambank	Stabilized 70 linear feet of streambank with revegetation techniques	DPWES
1362 Kirby Road	Eroded streambank	Constructed a retaining wall to provide structural protection to an adjacent dwelling and used bio-engineering techniques to establish a buffer area and stabilized 200 linear feet of streambank	DPWES
Mount Vernon Estates	Eroded streambank	Rehabilitated 600 linear feet of severe streambank erosion. Used bio-engineering techniques to reestablish the stream buffer	DPWES
Hollington Place	Eroded streambank	Rehabilitated 730 linear feet of severe streambank erosion. Used bio-engineering techniques to reestablish the stream buffer	DPWES
Turkeycock Run at Green Spring Gardens	Eroded streambank	Constructed 1,000 linear feet of streambank stabilization	FCPA/DPWES
Poplar Springs Court (near Hatch Lake)	Eroded streambank	Restored 1,100 linear feet of streambank using bio-engineering techniques	DPWES

Source: *EQAC Information*, Stormwater Management, Department of Public Works and Environmental Services, Fairfax County, Virginia, July 2, 2009

DPWES was involved in a number of stream restoration projects. Bioengineering techniques are being used where possible. Table VII-1, above, shows projects that were in progress or completed in 2008.

b. Green Roof Technology

In 2008, the county completed installation of a green roof on the top deck of the county Government Center's Herrity Building parking garage, and interpretive signs were installed. A ribbon cutting ceremony was held on August 4, 2008. The project is easily accessible for observation by industry professionals, county staff, residents and students. In addition to being an educational tool, the green roof provides an important research opportunity. Monitoring equipment was installed at the site, and the county began to measure performance differences between the vegetated area and an identical, un-vegetated area of the garage roof during storm events. The amount of rain, soil moisture level and volume of water leaving the green roof continues to be monitored and will provide data to analyze rainfall-runoff characteristics of the green roof and its performance as a best management practice.

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

FCPA added 114.2 acres between July 2008 and June 2009. This brings the parkland inventory to a total of 24,262 acres as of June 2009.

FCPA purchased the following properties:

- On September 30, 2008, the Park Authority added 41.60 acres to park land in the Sully District following the acquisition of the Ingersoll property. The acquisition was an important link in the creation of a continuous land mass between the Horne, Cunigan and BOS 13 properties, all of which are now part of Poplar Ford Park.
- The Park Authority purchased 1.93 acres from Kenneth Thompson on October 8, 2008. This acquisition in Dranesville District provided a critical link in the Pimmit Run Stream Valley trail.
- On December 22, 2008, the Park Authority acquired three adjoining parcels in the Sully District from Dennis and Karen Hogge. The parcels total 2.49 acres and will become part of Historic Centreville Park.

- On January 15, 2009, the Park Authority acquired the Braddock Pickwick property, also known as the Royal Oaks property. The parcel totals 4.4 acres which, along with Mount Gilead and the Hogge properties, are all included as part of Historic Centreville Park
- On February 5, 2009, the Park Authority acquired 1.5 acres from Judith Holt along the northern perimeter of Green Spring Gardens; this area will help preserve the watershed for an ecologically sensitive magnolia bog within the park.
- On May 13, 2009, the Park Authority acquired 5.8 acres of land as an addition to the Sully Historic site.

FCPA acquired the following property through donations:

- On January 7, 2009, Dolores G. Reinsch donated 27.6 acres in Lee District to the Park Authority. The property contains the remains of Union earthworks built for the defense of Edsall Station along the Orange and Alexandria Railroad during the Civil War. The parcels will be an addition to Backlick Run Stream Valley Park.

FCPA acquired the following property through dedications:

- On November 3, 2008, Uniwest dedicated 0.39 acres within Merrifield Town Center as a public park. This property is an addition to the new urban park in Providence District, and contains outdoor seating, a dancing water fountain feature, small grassy, treed areas and a raised, open "stage" area for small gatherings. The local condominium association will maintain the fountain feature and the grassy areas.
- In Sully District, Neighborhoods II LLC dedicated 0.9 acres to the Park Authority on January 14, 2009. The parcel contains a portion of the Civil War Confederate earthworks built by General Johnston in 1861, as well as a gazebo, tot lot, interpretive signage and perimeter sidewalk.
- On February 3, 2009 Magnolia Manor LLC dedicated a half-acre of land to the Park Authority, next to an ecologically sensitive magnolia bog within Green Spring Gardens.

FCPA acquired the following properties through transfers:

- On July 29, 2008, the Park Authority received from the Board of Supervisors a total of three parcels in Lee District totaling 26.77 acres. This acreage was added to Huntley Meadows Park.
- On January 21, 2009, the Board of Supervisors conveyed ownership of a cemetery in Mason District to the Park Authority. The cemetery contains the remains of Francis Summers, a Revolutionary War soldier.

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.

Some of the highlights of year five (FY 2009) included:

- Policy and Best Practices
    - Policy 201, Natural Resources, was revised.
    - FCPA continued to develop best practices. Topics this year included native and non-native plant guidance, site Natural Resource Management Plan standard operating procedures, land acquisition criteria and native plant rescues.
    - FCPA began the Natural Capital project, which will result in a report with recommendations for the use of natural capital valuation for Fairfax County parklands as well as an analysis of the appropriateness of using bond funds for natural resource projects.
    - FCPA drafted guidance and procedures for the use of native and non-native plants on parkland.

- Partnerships
    - The Invasive Management Area volunteers were recognized with the state Master Naturalists Armed and Dangerous Award.

- FCPA worked with Urban Forest Management on a number of initiatives including a trial release of a biocontrol at Scott's Run to control Hemlock Wooly Adelgid.
- FCPA worked with the Virginia Department of Agriculture and Consumer Services and Virginia Department of Forestry to collaborate on a test release of a biocontrol for the non-native, invasive plant, mile-a-minute.
- FCPA continued its partnership with The Earth Sangha, a local non-profit organization; this partnership continues to be a highlight of invasive plant control efforts at both the Marie Butler Leven Preserve and Wilburdale Park.

- Invasive Non-native Species
  - The Invasive Management Area program completed its third year in 2008. The program now has 40 sites with 45 trained volunteer leaders.
  - A group of five graduate and undergraduate interns worked to control non-native invasive plants at 19 sites throughout the county in the summer of 2008.
  - Over 260 acres of parkland were managed by a contractor for invasive plant removal.
  - FPCA presented on the Invasive Management Area program at several local and regional events including the Virginia Native Plant Society Potowmack Chapter meeting and the Northern Virginia Urban Forest Roundtable.
  - The first ever statewide Invasive Plant Removal Day was held on May 2, 2009. This was due in part to the success of the Fairfax County Invasive Plant Removal Day in 2008 and staff efforts to work with the state and Master Naturalists to create this statewide effort.

- Stewardship and Education
  - FCPA continued working with volunteers and local media to educate residents about non-native invasive plant issues on and off park property.
  - The Non-native ID and Control book was published in 2008 and over 400 copies have been distributed. This book has been recognized by MarCom and the Communicator Awards, both with their highest awards.
  - FCPA worked with the Northern Virginia Soil and Water Conservation District to create a guidebook "Rain Garden: Design and Construction."
  - The Stewardship Education Team continued its outreach efforts and worked on projects related to recycling, cultural resource awareness and a proposed Stewardship Ambassador program. The team discovered that recycling was occurring in all different

manners at park sites and that recycling services by the county are available to all county offices. As a result, recycling is now mandatory for all Park Authority facilities with office space.

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. At present, the resources allocated by the FCPA between protection of sensitive environmental land and active recreation are out of balance. Resources devoted to the protection of the environment need to be increased.

c. Natural Area Geospatial Analysis Model Feasibility Study

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. The end product will be a detailed protocol including all analytical steps as well as data needed, sources and costs. Development of the model for the entire county will be considered based upon the results of this study and the availability of funding. The Park Authority is leading this project and collaborating with the Department of Information Technology, the Department of Planning and Zoning, the Department of Public Works and Environmental Services and others.

The project was awarded to PlanGraphics, Inc in the fall of 2007, which has teamed up with George Mason University as a sub-consultant. The project is well underway and all but the demonstration of the model (which is unfunded) was to have been completed late in summer 2009. The end product will include an assessment of other green infrastructure and natural area models, evaluation of existing data and recommendations for model options including costs of development and data. Development of the model for the entire county will be considered based upon results of this study and availability of funding. EQAC notes that the anticipated completion date as reported in last year's Annual Report on the Environment was late 2008. This is another example of the lack of resources being devoted to FCPA's environmental stewardship.

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.

Invasive plant control projects occur at over 50 park sites throughout the county. The Fairfax County Park Authority's Resource Management Division's nature centers such as Ellanor C. Lawrence Park, Huntley Meadows Park and Riverbend Park work collaboratively with the Invasive Management Area program to remove the most highly invasive plant species from selected areas of parkland.

The partnership with Earth Sangha continues to be a highlight of invasive plant control efforts at both the Marie Butler Leven Preserve and Wilburdale Park. In 2008, Earth Sangha expanded its work area to include several acres of English ivy infested forest, a paperbark mulberry grove and fine-scale invasive removal around desirable species at the preserve. Earth Sangha's sites are supported with staff and contractor herbicide applicators when possible.

The Invasive Management Area program completed its third year in 2008. FCPA successfully captured some of the enthusiasm of volunteers for unstaffed parks, establishing 40 sites with 45 trained volunteer leaders. From June 2008 to July 2009, nearly 1,220 volunteers donated 4,300 hours of work towards habitat restoration. The IMA program works on plots of land, typically ½ acre, to remove priority invasive species.

The Invasive Conservation Corps is an internship opportunity designed to support FCPA staff and volunteers at invasive plant control sites. In 2008, a

group of five graduate and undergraduate interns worked to control non-native invasive plants at 19 sites throughout the county.

FCPA contracted with Invasive Plant Control, Inc. to apply selected and careful herbicide treatments for the removal of invasive plans. 260 acres of parkland were treated by IPC in 2008. Many of these acres overlapped areas where volunteer and interns provided the manual removal of priority species.

The Non-native Invasive Plant Assessment and Prioritization project began in 2008 and will be completed by mid-2009. This project took a hands-on approach to the non-native invasive species issues as they occur in Fairfax County. The result of this project will get a defensible scheme which will allow FCPA to prioritize where and what will be treated, as well as a handbook for how and when to treat non-native invasive species most efficiently. The report will also include recommendations for staffing and funding for establishing an invasive removal program.

EQAC continues to commend the volunteers and the Park Authority staff who are cooperating in removing invasives; however, 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 Section B.2 of this chapter and the Water Resources chapter of this report for descriptions of these projects. Three stream restoration projects underway or completed on park land during FY 2009 were the Turkeycock Run Stream Stabilization at Green Spring Gardens, the stabilization of a regional pond outfall on a tributary of Rabbit Branch in Royal Lake park by Stanley Martin (a developer), and the stabilization of a tributary of Pohick Creek by DPWES at the old Hatch's Lake property in Springfield.

f. Environmental Stewardship

FCPA offers 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 residents 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 donations 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 21 regional parks and owns 10,300 acres of land throughout the region.

It also holds conservation easements on 114 parcels covering more than 650 acres. Recently, an in-holding parcel at Pohick Bay Regional Park was donated to NVRPA, providing opportunities for better non-motorized trail access to the park. An option has been secured to purchase 275 acres on the Potomac River in Loudoun County. Completion of the acquisition is expected later in 2009. This property has half a mile of river frontage and will greatly expand the Potomac Heritage National Scenic Trail. NVRPA owns about 13 miles of land along the Potomac River and over 20 miles along the Bull Run/Occoquan Rivers.

In 2009 NVRPA dedicated an eight mile segment of the Potomac Heritage National Scenic Trail from Algonkian Regional Park to Riverbend Park as the Ira Gabrielson Trail in memory of NVRPA's first chairman, who was an inductee in the Conservation Hall of Fame. NVRPA also received National Recreational Trail designation from the Department of Interior for the Occoquan Water Trail.

NVRPA was the first park agency in the country to adopt the Cool Counties/Cool Cities pledge to reduce greenhouse gases and now has an energy conservation plan in place at each of its parks, tracking energy consumption and converting it to both BTU and carbon emissions. When the energy conservation policy was adopted by the NVRPA Board in 2006, an annual goal was set to

reduce energy consumption by 5% agency wide. By signing on to the Cool Counties Initiative, NVRPA agreed to stop increasing carbon emissions by 2010 and then reduce the output of carbon by 2% per year for every year after that until 2050 (resulting in an 80% reduction). In the first full year of the effort, total carbon emissions were reduced well ahead of the Cool Counties goal. Between 2006 and 2007, NVRPA reduced its carbon emissions agency-wide by 2% in its operations. Efforts at Brambleton Regional Golf Course, for example, saved enough energy last year to heat and cool 103 average homes for a year, a 27 percent reduction in the course's energy consumption. In 2007, Cameron Run Regional Park reduced its energy consumption by almost 21%. Between 2007 and 2008, energy use was up slightly due primarily to irrigation needs during drought conditions.

NVRPA also has implemented the following "green" tactics at various park facilities: high efficiency lighting including motion sensing switches, programmable thermostats, retrofitting buildings with more efficient windows and insulation, use of high efficiency pumps, geothermal heat pumps, active solar power generation, waterless urinals and low-flow water fixtures and introduction of more electric utility, hybrid and natural gas vehicles in the parks.

NVRPA completed certification by Audubon International of all three of its golf courses as Wildlife Sanctuaries. This extensive process took NVRPA over a year to complete, and NVRPA was the first public agency in the Mid-Atlantic region to achieve this designation for any of their golf courses. NVRPA replanted its Algonkian golf course fairways with Bermuda grass, which virtually eliminates the need for fungicide.

In addition to increasing no-mow areas to reduce energy consumption and pollution and increase habitat, NVRPA worked with U.S. Environmental Protection Agency and the Virginia Department of Agriculture and Consumer Affairs to develop an aggressive pesticide and fertilizer use policy. This policy goes far beyond the law and has been implemented at all of its parks. This is particularly important since NVRPA parks are overwhelmingly riparian areas adjacent to local drinking water supplies. This policy establishes riparian areas as zones that will not have any pesticides or fertilizers used, requires state certification for anyone applying pesticides, and other controls to protect the environment.
Environmental Stewardship opportunities for volunteers are available at Meadowlark Botanical Gardens, Potomac Overlook Regional Park, Upton Hill Regional Park, and various other parks on occasion. More information can be found at http://www.nvrpa.org/html/index.php?pg=volunteer.html.

For current information about the Northern Virginia Regional Park Authority and to obtain a copy of its 2008 Annual Report, visit 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 in Northern Virginia, preserve native habitat and educate the public about the benefits of trees. These volunteers appreciate and support the county's goals to increase the tree cover in Fairfax County. Fairfax ReLeaf contributed to this goal by nearly doubling the number of tree seedlings it planted in 2007.

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:

- Improved appearance of roadways, parks, schools and private land in Fairfax County.
- Improved air quality.
- Reduced heat island effects.
- Reduced noise.
- Preservation of human and wildlife habitats.
- Reduced energy use.
- Reduced surface runoff and improved water quality.

Fairfax ReLeaf remains very active in its efforts. The organization planted or distributed 7,283 trees in calendar year 2008. Over 700 volunteers spent over 3,397 hours planting tree seedlings, removing invasive species and maintaining sites. Some specific activities were:

- Fairfax ReLeaf led a corporate workday to plant nearly 1,000 trees at Rachel Carson Middle School. This took several unusable acres out of mowing and will screen the school from a busy street in the front and from a housing development in the back.
- Over 1,800 trees were planted in parks, including private, county and national parks.
- Over 1,600 trees were planted at school sites (including Rachel Carson Middle School).
- Over 800 trees were planted in riparian areas, including storm ponds and around lakes.

Fairfax ReLeaf provided the opportunity for community groups to serve Fairfax County, including seven Eagle Scout plantings, several school clubs and a home school co-op. ReLeaf led three corporate workdays, where employees from the National Rural Utilities Cooperative Finance Corporation, Bearing Point and

Level Three gave their time to improve Fairfax County. Fairfax ReLeaf conducted four workshops to prepare individuals to lead plantings.

ReLeaf's educational and outreach activities in 2008 included exhibiting at the Fairfax County Earth/Arbor Day celebration, the 4H Fair and the Garden Festival. The organization participated in all four Teen Volunteer Fairs at library sites around Fairfax County. ReLeaf was also involved in the Roundtable and Tree Action Plan program.

Fairfax ReLeaf offers a number of opportunities for stewardship. 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 eighth year.

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 2009, NVCT has preserved about 656 acres of open space in Fairfax County through easements, fee simple ownership, and partnerships. Between July 2008 and June 2009, NVCT permanently protected a waterfront property on Little

Hunting Creek in the Mount Vernon District and executed and recorded a trail easement to the Fairfax County Park Authority to complete the last segment of the Pimmit Run Trail from Old Dominion Drive to Pimmit Bend Park. NVCT continued work on numerous other projects, some of which are close to completion, including conservation easements, fee acquisitions and trail easements.

Tables VII-2, VII-3 and VII-4 provide details on all these properties.

NVCT also has a public outreach program – *Explore and Restore* (formerly known as 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 also sponsored (with the McLean Trees Foundation) the "Saving Nature Club" at Copper Middle School, an after-school conservation program for students.

NVCT was listed in this year's Catalogue of Philanthropy as one of the best small charities in Northern Virginia.

During this fiscal year, NVCT participated in the new accreditation program of the Land Trust Accreditation Commission and was awarded full accreditation on September 1, 2008. NVCT is one of the very first and very few nationally accredited land trusts out of approximately 1,700 land trusts. NVCT was the only accredited land trust in the Commonwealth of Virginia at that time and the only accredited land trust servicing Fairfax County.

Table VII-2. 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	Great Falls	14.07	7/3/2003
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	Great Falls	5	8/14/2001
Dranesville	Clifton	5.3	5/27/2003
Dranesville	McLean	62.7783	11/20/2006
Dranesville	McLean	7.7717	11/20/2006
Dranesville	McLean	1.9	12/14/2005
Dranesville	McLean	41	12/27/2005
Dranesville	McLean	6	8/1/2002
Dranesville	McLean	5.03	12/18/2006
Hunter Mill	Vienna	0.39	3/28/2003
Lee	Alexandria	3.98	1/8/2008
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
Mt. Vernon	Alexandria	0.83	11/19/2008
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	**470**	

NVCT EQAC Update for ARE, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, June 25, 2009.

Table VII-3. 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**	

NVCT EQAC Update for ARE, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, June 25, 2009.

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Table VII-4. Land Turned Over to Local Government and Associated Acreage			
Property/District	**Location**	**Acreage**	**Recordation**
Bannister Outlots/Springfield	Springfield	0.6	12/2001
Pimmit Run Trail off Brookhaven		1.0	6/2008
	Total	**1.6**	
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**	

NVCT EQAC Update for ARE, Email from Whit Field, Vice President and General Counsel, Northern Virginia Conservation Trust, Fairfax County, Virginia, to Robert McLaren, June 25, 2009.

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.

As can be seen by the paragraphs above, NVCT offers many opportunities in stewardship for Fairfax County residents. 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. The conservancy'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.

MLC holds a 16-acre conservation easement on Scotts Run in McLean. This important property is vital for the health of Scotts Run, which provides stormwater drainage for Tysons Corner.

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 and is both a state agency and an independent instrumentality. VOF is also a public foundation and can "…accept, hold, and administer gifts and bequests of money, securities, or other property, absolutely or in trust, for the purposes for which the Foundation is created." A good summation of the VOF legislative charge may be that it is steward of the natural and cultural heritage land resources of Virginia on behalf of present and future residents.

The primary mechanism for accomplishing VOF's mission is the perpetual open space easement. As of May 2009, VOF held easements on over 530,000 acres in over 100 local jurisdictions across the Commonwealth. These easements protect a wide variety of natural resources, including farm and forest land, natural areas, watershed areas, rural historic districts and the settings for historic homes, scenic views, lands adjacent to public parks and game preserves.

The Virginia Outdoors Foundation currently holds six easements in Fairfax County as shown in Table VII-5.

Additional information about VOF can be seen at its Web site: http://www.vofonline.org/.

Table VII-5. Easements Held by the Virginia Outdoors Foundation in Fairfax County		
Original Donor*	**Acreage**	**Date Recorded**
Thayer	59.33	10/30/1969
American Horticultural Society	8.15	10/03/1978
McCormick-Goodhart	26.665	06/13/1988
McCormick-Goodhart	5.25	06/13/1988
McKee-Bennett	20.47	12/28/1990
Ridder and Andrews, Jr., trustees	7.858	12/23/1998
Total Acreage under Easement	**127.723**	

Source: *2009 Annual Report*, Attachment to email, VOF Info for 2009 Annual Report, from Erika Richardson, Stewardship Specialist, Virginia Outdoors Foundation, Warrenton, Virginia, to Noel Kaplan, Department of Planning and Zoning, Fairfax County, Virginia, June 9, 2009.

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***** 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.

The Fairfax County Chesapeake Bay Preservation Ordinance and Agricultural and Forestal District Ordinance require land in agricultural use to have a soil and water quality conservation plan. In 2008, seventeen soil and water quality conservation plans were prepared for 830 acres, which included 46,712 linear feet of Resource Protection Area, primarily stream buffers. During 2008, three conservation plans were prepared and technical assistance provided to help the landowners successfully resolve pollution problems, which were identified in complaints filed under the Virginia Agricultural Stewardship Act. NVSWCD secured a grant from the Virginia Water Quality Improvement Fund to construct a manure composting facility at Gunnell's Run Farm in Great Falls. This demonstration project will help to educate the horse-keeping community about

a better way to manage manure and recycle nutrients. It was the site of one of a series of educational workshops that were held in the spring of 2009.

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 residents a package of native tree and shrub seedlings for a small cost. In the spring of 2009, a variety of 6,500 native tree and shrub seedlings were bundled into 413 packages and sold at a small cost to individuals and groups to promote urban reforestation, habitat enhancement and water quality protection. The package, "For the Birds," contained a variety of six species that provide food and shelter for birds.

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. Local and regional competitions are held in April, and the state competition is in May. In 2009, the Hidden Pond Ecology Club, comprised of students from several county high schools, came in second in the regional competition, and fifth overall in the state competition.

At the bi-monthly Saturday morning **Green Breakfasts**, interested residents, county officials and agency staff, state legislators, students, members of the business community, and representatives of local non-profits and environmental groups discuss environmental topics, share information and network. Each breakfast begins with a presentation. In 2008, topics included: Recycling and Solid Waste Management; Adopt-A-Stream and Stream Cleanups; Wetlands; Trees; Update on the Stormwater and Erosion & Sediment Control Recommendations in the Infill Study; and Protecting Headwater Streams. Also announcements about programs and events, including county initiatives, and other topics of interest are sent to 500 recipients on the *Green Breakfast* email distribution list. Notices also are sent to approximately 1,200 recipients on the *Watershed Calendar* email list.

Conservation Currents, the NVSWCD quarterly newsletter, includes many articles related to ecological resources. In 2008, topics included: the Neighborhood Ecological Stewardship Training program; the county's tree canopy goal; home improvement tax credits; energy audits; an LID project to demonstrate faith and sustainability; Fairfax Master Naturalists; the green roof on the Herrity Building garage; Monarch butterfly waystations; the state of the Potomac River; no-till agriculture; drinking water protection; and the Emerald Ash Borer infestation.

Fairfax County Soil Survey and Soil Scientist. The county provided funding to NVSWCD to continue the expertise of a soil scientist. During the past year, the soil scientist has continued to facilitate the transition from the old to the new Fairfax County Soil Survey. Descriptions of all 119 soils have been published in the *Description and Interpretive Guide to NRCS Mapped Soils in Fairfax County*. The new soil survey has been integrated into the county's GIS. Maps showing soil types layered over county property maps have been created for each tax grid in the county. These maps are available to the public through the Digital Map Viewer on the county Web site. The soil survey information is also available online at two USDA-NRCS Web sites; the soil map and tabular data are available at the Web Soil Survey Web site, and tabular data alone is available at the Soil Data Mart Web site. The tabular and map data available at the USDA-NRCS Web sites are much broader and more extensive than that found on the county Web site, but the data on the county Web site is more specific to the needs of Fairfax County residents and the maps include county property information.

A reformulation of the soil problem classes has been completed and applied to all soil types in the new survey. The new problem classes more closely resemble those used in Loudoun and Prince William Counties so as to cause less confusion for private industry. One major difference will be that disturbed soils, which are mapped only in Fairfax County, have their own separate problem class.

The soil scientist and staff from the Department of Public Works and Environmental Services are collaborating on updating codes and procedures, notifying industry and ensuring a smooth transition to using the new survey. The soil scientist has made presentations to several groups, including teaching a class at the Engineers and Surveyors Institute.

The soil scientist continues to assist with providing technical assistance to homeowners, homeowner associations, the development and construction community and county staff on soils-related matters and on infiltration practices. During 2008, soils information was provided to 173 consultants, engineers, Realtors and homeowners. Special infiltration studies were conducted for eight county and NVSWCD projects. Technical assistance was provided to solve problems on both private and public lands. For example, a drainage problem at Ft. Willard Park was solved in a way that also saved the Park Authority a significant amount of money. Following soil tests, 10 holes were dug to reach a more permeable layer and pipes were inserted and filled with pea gravel. The work was done by NVSWCD staff and the cost of supplies was approximately $300.

Watershed Friendly Garden Tour. A Watershed Friendly Garden Tour was held in June 2009. It included fifteen sites in Fairfax County that demonstrated

ecologically-friendly sustainable management techniques, such as reducing lawn areas, creating bird-friendly habitats, implementing low impact development measures to retain and control stormwater, composting techniques, vegetating with native species that require less care and provide habitat for wildlife, green roofs and many other features that are both attractive and innovative. There were tour guides and handouts at each site.

Potomac Watershed Roundtable. Fairfax County and NVSWCD are members of the Potomac Watershed Roundtable, a regional government-resident forum founded in 2000 whose purpose is to enhance communication, collaboration and cooperation on environmental concerns, especially water quality issues and ecological resources, among the various local governments and stakeholder interest groups residing on the Virginia side of the middle and lower Potomac River watershed. Members include nine counties, five cities and towns, six soil and water conservation districts, two members of the General Assembly, Planning District Commissions, Water and Wastewater Utilities and representatives of several stakeholder interests – Environmental, Agriculture and Forestry, Fishing and Boating, Development, Construction and Real Estate, Waste Management and Recycling and Citizens of the Watershed. Fairfax County Supervisor Penny Gross serves as the current chair, and NVSWCD provides administrative support and financial administration. The Roundtable meets quarterly throughout the lower Potomac watershed to share technical information, strategies, programs and policies. Topics have included water quality and quantity, nonpoint source pollution, nutrients, stormwater regulations, land-use planning, best management practices, innovative techniques and land conservation. Recently the Roundtable focused on source water supply planning, drinking water, rainwater, graywater, water re-use, Potomac River flow, the new stormwater regulations, stream restorations and urban nutrient management. The Roundtable has sponsored five Potomac Forums, several tours and special programs on topics such as Low Impact Development and Rainwater Harvesting. Annually the Roundtable chooses several legislative positions, which it conveys to the 40 General Assembly members who represent the Roundtable's area. Information about the Roundtable is available at www.potomacroundtable.org.

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 and staff have developed Submission Guidelines to accompany the Joint Permit Application in order to elicit relevant information from wetlands permit applicants to accompany the application for the Wetlands Board use. The new guidelines are targeted to providing more information regarding the two primary Wetlands Board Policies – the Tidal Wetland Mitigation and Compensation Policy which was adopted in 2005 and the Living Shoreline Policy which was adopted in 2007.

During the 2008 session, the General Assembly extended the Coastal Primary Sand Dune Protection Act (the Act) to all Tidewater Virginia localities including Fairfax County. The General Assembly originally adopted the Act in 1980 and extended authority to eight coastal Virginia localities including the Counties of Accomack, Lancaster, Mathews, Northampton, Northumberland, and the cities of Hampton, Norfolk, Virginia Beach.

With the re-adoption of the Act in 2008, all localities within Virginia's Coastal Zone were enabled to adopt the Act which is codified as *Coastal Primary Sand Dunes and Beaches, Code of Virginia, Ch. 14 of Title 28.2*. The rationale for the expanding the Act in 2008 was based on the findings from a multi-year study performed by the Virginia Institute of Marine Science in the late 1990s. The VIMS study determined that:

- Beaches and dunes perform a broader spectrum of ecosystem services than was originally understood.
- Beaches and dunes provide critical habitat and act as a natural buffer to erosion from wind and wave energy.
- Beaches and dunes are more prevalent within the Virginia coastal zone than was known when the Act was originally adopted.
- Impacts to beaches and dunes in localities outside of the eight jurisdictions were not subject to public review and protection.

By expanding the Act to all Tidewater Virginia localities, the Commonwealth of Virginia can take a more comprehensive approach to shoreline management. In conjunction with the Virginia Marine Resources Commission and the Virginia Institute of Marine Science localities situated within the Virginia's coastal zone are now enabled (not mandated at this time) to protect beaches and dunes as part of integrated and comprehensive approach to shoreline management. Enabling all coastal localities to adopt the Act advances one of the key recommendations of the Governor's Climate Change Commission – to develop an integrated and comprehensive approach to shoreline management.

On June 22, 2009, the Board of Supervisors directed staff to draft a Coastal Primary Sand Dune and Beach Protection Ordinance for Fairfax County. This ordinance would be administered by the Fairfax County Wetlands Board. The purpose of the ordinance would be to protect non-vegetated tidal beach areas that may not be protected by the Wetlands Zoning Ordinance. This future ordinance is pending Board of Supervisors action.

The Wetlands Board has two incomplete wetland permit applications that will be evaluated by the Board when the applications are deemed complete. No new known tidal wetlands violations exist at this time.

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 55 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, the Fairfax County Park Authority, Fairfax ReLeaf and Earth Sangha.

The Department of Forestry, like all state agencies, faced budget cuts in 2008. The State Forester determined that VDOF's most valuable asset was its personnel and was determined to not fire anyone in response to the cuts. He was successful in this and VDOF will continue to have a presence in Northern Virginia for the foreseeable future. VDOF will continue to be able to provide technical assistance to Fairfax County in its environmental initiatives, but little in the way of direct material or funding support. Reduced competitive funding will be available through Water Quality Improvement Fund grants to support riparian plantings and tree related storm water management projects. VDOF may also be able to support tree planting with donated seedlings.

The Virginia Department of Forestry is the lead state agency in meeting Virginia's riparian buffer commitments to the Chesapeake Bay Program. In 2006 Urban Tree Canopy goals were added to the Bay Program's buffer strategy, recognizing the diminished water quality value of riparian forests in urban areas where upland storm water is conveyed directly to streams and bypasses the riparian forest. One way to view it is that street gutters and storm

drains are manmade extensions of the natural stream network, so all trees are effectively riparian trees. In 2008, the Virginia Department of Forestry provided project leadership and technical support to tree planting efforts in partnership with Earth Sangha, Elementary School Children, private landowners, Fairfax ReLeaf and the Potomac Conservancy.

In 2008, the Virginia Department of Forestry partnered with volunteers from various organizations, such as the Potomac Conservancy, Fairfax County Park Authority, Eagle Scouts and the Chesapeake Bay Foundation to plant approximately 5,000 seedlings 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.

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 26th 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 residents attending the Arbor Day celebration. In 2008, 325 donated short leaf pine 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 2008, approximately 500 pounds of seeds, mostly walnuts, were collected. Each year, 500-700 seedlings are given to residents 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 593.6 acres were prepared in 2008. VDOF also provides forestry management advice to homeowners associations and civic groups. In 2008, four community forestry plans were prepared covering 65 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 41 applications and plans in 2008. In addition, VDOF annually inspects dry hydrants to make sure they are available to fight wildfire in the county.

The department maintains an active public education and outreach 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 2008, VDOF conducted 43 talks on the general benefits of urban forests and riparian buffers.

The Virginia Department of Forestry Web site (www.dof.virginia.gov) contains many pages on forest management and urban forestry. Topics range from tree identification to proper planting under power lines. The pages contain information developed by VDOF and links to many other sources of information on urban forestry and treecare.

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 is currently constructing or monitoring the establishment of the following wetland mitigation sites in Fairfax County:

- Approximately 0.8 acres of tidal wetlands, 0.7 acres of riparian buffer, and 0.3 acres of tidal wetland enhancement adjacent to Cameron Run at the I-95/Route 1 interchange improvement (Woodrow Wilson Bridge Project – Belle Haven sites).
- Approximately 0.5 acres of wetland creation, 1.17 acres of wetland restoration, and 1.08 acres of sub-aquatic vegetation remediation at I-95/Route 1 interchange improvement (Woodrow Wilson Bridge Project – Route 1 sites).
- Approximately 2 acres will be constructed at the confluence of Taylor Run and Cameron Run Currently underway at the I-95/Telegraph Road interchange improvement (Woodrow Wilson Bridge Project – Cameron Run site).

These sites were created to mitigate unavoidable wetland impacts from replacing the Woodrow Wilson Bridge. Water quality permits require created wetland mitigation sites to be monitored for a period of five years following completion of construction to assess their functionality. On-going maintenance activities during this monitoring period include hydrology monitoring, plant diversity sampling, replacement of dead or damaged plants and invasive species control to ensure performance criteria are met. The tidal wetlands and riparian

buffer establishment sites at Belle Haven are in the fifth year of permit monitoring and the tidal wetland enhancement site is in the third year of permit monitoring. The submerged aquatic vegeation remediation of wetland restoration sites at Route 1 is in the first year of permit monitoring. Creation of the wetland site at Cameron Run will begin in the later phase of construction for the Telegraph Road interchange and then permit monitoring will begin the year following its completion.

VDOT is including landscaping in projects currently underway or scheduled to start in the next 12 months:

- Route 1/Capital Beltway interchange improvements associated with the Woodrow Wilson Bridge Project (landscaping and reforestation completed in 2009).
- Telegraph Road/Capital Beltway interchange improvements associated with the Woodrow Wilson Bridge Project (project recently under way).
- Dulles Corridor Metrorail extension (currently under way).
- I-495 Capital Beltway HOT/Bus/HOV lanes (currently under way).
- Fairfax County Parkway extension through Fort Belvoir (currently under way).
- Centreville Road widening at Frying Pan Park and Friends meeting house (project to begin in fall 2009).
- Fair Lakes Parkway/Fairfax County Parkway interchange (project to begin spring 2010).

Approximately five acres of wildflower meadow plantings exist in Fairfax County. This is a decline from last year's reported acreage sue to road construction projects and funding reductions.

16. Urban Forestry

a. Urban Forest Management Division activities

In addition to carrying out its core services relating to land development and forest pest management, in 2008, the Urban Forest Management Division of the Department of Public Works and Environmental Services focused on other projects that included:

- New Tree Conservation Ordinance: On October 20, 2008, Fairfax County was the first jurisdiction in Virginia to adopt a local tree conservation ordinance with a focus on tree preservation during land development. With assistance from DPWES Land Development Services and the Office of the County Attorney staff, UFMD staff prepared the following amendments:

- Added Chapter 122, Tree Conservation Ordinance. Chapter 122 is a new section of the Code of Fairfax County Virginia and provides the legal and conceptual framework for new Tree Conservation requirements and standards.
- Amended Chapter 101, Subdivision Ordinance to reflect the adoption of new tree conservation provisions set forth in Chapter 122.
- Amended Chapter 104, Erosion and Sediment Control to reflect the adoption of Chapter 122 and to provide guidance regarding the submission of Tree Conservation Plans
- Amended the Landscaping and Screening, Article 13 of Chapter 112, Zoning Ordinance in support of recommendations of the Tree Action Plan to examine transitional screening and long-term maintenance requirements, and to relocate the 10—Year Tree Cover requirements from the Zoning Ordinance to the Chapter 122
- Amended to the Public Facilities Manual to incorporate new plan submission requirements, technical standards, specifications, and onsite practices that support the new tree conservation requirements of Chapter 122.

- Industry Training Classes for the Tree Conservation Ordinance: UFMD staff prepared and implemented four separate training classes for the new Tree Conservation Ordinance. These classes targeted in-house staff, the private engineering sector and the private tree care industry. Additional training will be provided as necessary

- Continued Implementation of the Tree Action Plan: In 2007, UFMD, in conjunction with the Fairfax County Tree Commission, developed, and the Board of Supervisors endorsed, the Tree Action Plan. The Tree Action Plan is a 20-year strategic plan for the conservation and management of the county's tree and forest resources. Over the past year, UFMD staff has made significant progress towards meeting goals and executing strategies of the Plan. UFMD is currently engaged in numerous strategies associated with 10 out of 12 Core Recommendations of the Tree Action Plan. Urban Forest Management will continue to hold division-wide summits for the purpose of review and assessment to define appropriate short-term and long-term actions to assure continued support and achievement toward the goals and objectives related to Tree Action Plan.
- Strengthened partnership with Fairfax ReLeaf: Staff from UFMD is now an active liaison to the Fairfax ReLeaf Board. As such, UFMD involvement with Fairfax ReLeaf has increased. Additional involvement includes:
  - Acquisition of seedling storage area during spring planting season.
  - Tree planting at Shrevewood Elementary School.
  - Tree planting at Pine Ridge Park.

- Invasive plant removal at Pine Ridge Park.
- Assistance in preparing display and staffing the Fairfax ReLeaf exhibit at Celebrate Fairfax.
- Support GIS analysis of homeowner association land for Fairfax ReLeaf planting activities.
- Attendance at Fairfax ReLeaf Board Meetings.

- Active Participation in the Northern Virginia Urban Forestry Roundtable: UFMD staff regularly participates in the quarterly meetings to discuss urban forest management issues of concern to all jurisdictions in Northern Virginia.

- County Receives Tree City USA Award**:** For the 26th year, Fairfax County received the Tree City USA Award at the Earth Day/Arbor Day celebration held at the Northern Virginia Community College. UFMD prepares the application each year for this award and Fairfax County has one of the five longest running records in Virginia.

- Tree Planting on Government-owned Sites Continues: UFMD staff prepared planting plans and planted over 138 native and desirable trees at 11 county-owned facilities, including schools, libraries, mental health centers, police and fire stations, Government Centers and more, to help meet the 30-Year Canopy Goal, adopted by the board in 2007. The trees were planted for the specific purposes of energy conservation and parking lot landscaping. UFMD staff continues to monitor and provide appropriate maintenance. UFMD has partnered with on-site facility personnel to assist with the care and maintenance of newly planted trees.

- Continued Upgrades and Improvements to the DPWES 'Trees' Web Page:
  - UFMD staff continues to improve and upgrade the 'Trees" Web page. Some of the upgrades and improvements include:
  - Installation of the New Tree Conservation Ordinance.
  - Installation of the updated PFM.
  - Provision of information regarding the Emerald Ash Borer.
  - Inclusion of applications for designation of Heritage, Specimen, Memorial and Street trees.
  - Addition of an enhance section on the county's the 30-Year Tree Canopy Goal
  - UFMD staff continues to respond to internal and external feedback regarding its Web site and to make upgrades and improvements in an effort to provide superior communication with its internal and external customers.

- Tree Preservation and Planting Awards: As part of the 2008 Land Conservation Award Program, UFMD staff prepared nominations to the

Tree Commission of potential candidates for the Tree Preservation and Planting Awards. Awards for tree preservation are presented to recognize those developers and builders who have done an outstanding job of preserving trees on a project they have constructed. Tree planting and landscaping awards are presented to recognize developers and builders who have done an outstanding job of replacing trees that were unavoidably destroyed due to development. The Tree Commission awarded the 2007 Tree Preservation and Planting Awards to:

- Thistle Hill/ Tree Preservation.
- Talent House School/ Tree Preservation.
- Cooke Inlet Sections 1&2/ Tree Preservation.
- Green Spring Garden Park/ Tree Planting.

- Continuing Staff Education and Training: All of the UFMD Forest Conservation staff has completed the Certified Arborists exam. Test results are pending for our final Urban Forester. The remaining staff members are Certified Arborists by the International Society of Arboriculture (industry certification). Staff from UFMD attended the Urban Forest Strike Team, Task Specialist training in Williamsburg, Virginia at the invitation of the Virginia Department of Forestry. This training is intended to provide disaster planning assistance to communities and initial estimates of debris volume following a disaster. Risk assessment helps communities identify trees that are an unacceptable risk, and trees suitable for retention and management during disaster recovery.

- Increased Public Awareness and Outreach**:** UFMD staff continues to provide education and outreach to the public regarding the Urban Forest at several venues including:
  - Provision of informational talks to homeowners associations, scout groups and garden clubs.
  - Participation in “A Day of Arboriculture” for horticulture students at Virginia Tech.
  - Participation in the annual Earth Day/Arbor Day event with staff and an educational exhibit.
  - Continuation of updating of the county’s Big Tree Registry.
  - Participation in the Earth Day/Arbor Day planting celebration at the Woodrow Wilson Library in Mason District.
  - Organization and presentation of a class regarding urban forestry issues to the Engineers and Surveyors Institute members and participants for a Designated Plans Examiner class work/credit program.
  - Recording of a program from Dr. Kerwin entitled “Remarkable Trees in Fairfax County” for viewing on Channel 16.

- Provision of GIS analysis for the Fairfax County Sheriff's Office to identify areas of turf mowing and other landscape maintenance activities.

- Natural Landscape Initiative: UFMD staff continues to work cooperatively with many county agencies using GIS analysis to identify areas where turf mowing activities may be reduced and to identify potential tree planting sites for enhanced natural energy conservation and heat-island effect mitigation with parking lot landscaping.

b. Forest Conservation Branch activities

In 2008, FCB continued to serve its traditional customers: residents, 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.

Table VII-6 summarizes the workload of FCB based on the requests for assistance that were completed for FY 2006, 2007 and 2008. These figures demonstrate the number of requests for assistance in 2008 appears to have a modest increase of 7% from the previous years.

c. Forest Pest Management Section activities

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.

Table VII-6
Forest Conservation Branch Workload,
2006 through 2008

Type of Assignment	Number of Completed Requests		
	2006	2007	2008
Waivers	45	49	29
Zoning Cases	216	282	352
LDS Requests: Plan Review	676	628	586

LDS Requests: Site Inspections	726	810	978
Other (Bd of Supervisors, Park Auth., Other county agencies, etc.)	261	452	399
Hazardous Tree Investigations	8	8[1]	34
Total Completed	**1,932**	**2,229**	**2,378**

Source: *Information Requested for the Environmental Quality Advisory Council's 2008 Annual Report on the Environment,* Memorandum from Michael Knapp, Director Urban Forest Management Division, Land Development Services Department of Public Works and Environmental Services, Fairfax County, Virginia to Noel Kaplan, Department of Planning and Zoning, Fairfax County, Virginia,, October 5, 2009.

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 programs aimed at volunteer involvement.
- Biological: the release and monitoring of gypsy moth parasites and pathogens.
- Chemical: the aerial and ground applications of Diflubenzuron and Bacillus thuringiensis on high infestations.
- Educational: the self-help program and lectures to civic associations and other groups.

In calendar year 2009, gypsy moth caterpillar populations decreased somewhat compared to previous years. There was no measurable defoliation reported in Fairfax County. Minor defoliation was reported in the State of Virginia and other states in the north eastern United States. According to the Virginia Department Forestry, there were 25,000 acres of defoliated forest in the state. No defoliation numbers are currently available for the United States; however, it is expected that they will be less than the previous few years. Heavy rainfall in spring 2009 likely caused high mortality of gypsy moth larvae by a pathogenic fungus called Entomophaga maimaiga. The exact extent of caterpillar mortality will not be known until staff completes egg mass surveys in fall 2009. The gypsy moth staff will continue to monitor populations in fall 2009 and treatment is possible in 2010.

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

[1] Completed requests for Hazardous Trees do not include nine requests referred to VDOT and other county agencies which were inspected by FCB staff, but for which no correspondence was generated.

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 spring 2003. Staff has monitored for adult female moths throughout the Mount Vernon and Lee Districts in since January 2001. The result of the winter 2008– 2009 monitoring effort indicated that no aerial treatment was required in spring 2009.

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.

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 States Animal Plant Health Inspection Service quarantined the area infested. Unfortunately, a tree nursery owner inside of the quarantine area illegally shipped infested ash trees to a nursery in Maryland. During summer 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, the U.S. Animal Plant Health Inspection Service and the Virginia Department of Agriculture and Consumer Services conducted an Emerald Ash Borer Eradication Program. It was ordered that all ash trees within a one-half mile radius of the school site must 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 2004. Subsequent monitoring has indicated that this eradication effort was successful.

In July 2008, two new infestations of emerald ash borer were discovered in Fairfax County in the Town of Herndon and in the Newington area. Staff believes that these infestations were not related to the one found at Colvin Run Elementary in 2004. The U.S. Department of Agriculture's Science Advisory Council has recommended that no eradication action be taken in Fairfax County. This decision was made due to the extent of the infestations and due to the fact that similar eradication attempts in other

U.S. states have failed. On July 11, 2008, a federal order quarantined Fairfax County for Emerald Ash Borer. This means that all interstate movement of ash wood and wood products from Fairfax County is regulated, including all hardwood firewood, nursery stock, green lumber, waste, compost and chips from ash trees. The Virginia Department of Agriculture and Consumer Services has initiated similar quarantines for the counties of Fairfax, Arlington, Loudoun, Fauquier, Prince William and the cities of Falls Church, Fairfax City, Alexandria, Manassas and Manassas Park.

The Forest Pest Program has appointed an Urban Forester as its Emerald Ash Borer Outreach Coordinator. This staff member is responsible for educating the public on how to deal with the impending death of many thousands of ash trees. Education is concentrated on how to hire a private contractor to remove dead and dying trees and how to properly apply pesticides that might keep trees alive.

During spring 2009, staff assisted the Virginia Department of Agriculture and Consumer Services in implementing a large trapping (2,500 trap sites) campaign. The purpose of this campaign was to determine Emerald Ash Borer population levels in Fairfax County as well as other areas of Northern Virginia. Data collected from this survey will be used in implementing future emerald ash borer control options, which are being studied by the Federal Government.

Hemlock woolly Adelgid: Hemlock woolly adelgid is a recent addition to the VDACS list of insects that can be controlled by the Forest Pest Program. This is an insect that infests and eventually kills hemlock trees. In fall 2008, staff, in cooperation with Virginia Tech, released a colony of parasitic beetles (Laricobius nigrinus) in a native stand of eastern hemlock trees in the Difficult Run stream valley. Surveys will be conducted in fall 2009 in order to determine the effectiveness off the parasite release. Staff will continue to explore other methods of control for this pest.

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 2008 EQAC Annual Report on the Environment, there has been some changes to the A&F Program as shown in Table VII-7.

Table VII-7: Change in Local and Statewide A&F Districts from January 1, 2008 to August 31, 2009

Magisterial District	No. of Local Districts		No. of Statewide Districts	
	2008	2009	2008	2009
Dranesville	17	14	1	1
Mt. Vernon	3	3	1	1
Springfield	19	21	0	0
Sully	4	4	0	0
Total	43	42	2	2

Source: *Fairfax County 2009 Agricultural & Forestal District Annual Statistical Report*, Zoning Evaluation Division, Department of Planning and Zoning, Fairfax County, Virginia, September 1, 2009

As can be seen in the above figure, while there were changes in Dranesville and Springfield, there was a net loss of one Local District during this reporting period.

- Dranesville: Loss of three districts through:
  - Withdrawal of Eagle II.
  - Withdrawal of McInturff-Stewart.
  - Expiration of Longacre Farm.
- Springfield: Loss of two districts through:
  - Withdrawal of Kincheloe.
  - Withdrawal of Kincheloe II.
- Springfield: Gain of four districts through:
  - Creation of a new, consolidated Kincheloe.
  - Creation of Hall.

- Creation of Keener.
- Creation Crawford.

Despite this loss of one Local District, there has been an increase in the acreage in Local Districts. The loss of three districts in Dranesville resulted in a decrease of 40.41 acres. However, the changes in Springfield resulted in the gain of 125.12 acres. The withdrawal of Kincheloe and Kincheloe was replaced by the creation of a consolidated Kincheloe district plus additional land for a gain of 60.5 acres. Other gains in Springfield came from the creation of Keener (22.73 acres), Hall (20.65 acres) and Crawford (21.24 acres). Therefore, there was a countywide gain of 84.21 acres. This increases the total acreage in all districts, local and statewide, to 2,988.78 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 2008. 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 2008 report by Jones and Kraus 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.

Data from 2008 generally reinforced the major trends reported in previous years. First, phytoplankton algae populations in Gunston Cove have shown a clear pattern of decline since 1989 (although chlorophyll values increased somewhat in 2008). Accompanying this decline have been more normal levels of pH and dissolved oxygen, increased water clarity and a virtual cessation of cyanobacteria blooms such as *Microcystis*. The increased water clarity has brought the rebound of submerged aquatic vegetation, which provides increased habitat value for fish and fish food organisms. The SAV also filters nutrients and sediments and itself will inhibit the overgrowth of phytoplankton algae. This trend is undoubtedly the result of phosphorus removal practices at the

Noman Cole wastewater treatment plant, which were initiated in the late 1970s. This lag period of 10-15 years between phosphorus control and phytoplankton decline has been observed in many freshwater systems, resulting at least partially from sediment loading to the water column which can continue for a number of years. Gunston Cove is now an internationally recognized case study for ecosystem recovery due to the actions that were taken and the subsequent monitoring to validate the response. The increase in chlorophyll observed in 2008 may have resulted from unique conditions in 2008 such as the high loading of sediments and associated phosphorus from May storms. This merits close scrutiny in 2009.

Another significant change in water quality documented by the study has been the removal of chlorine and ammonia from the Noman M. Cole, Jr. Pollution Control Plant effluent. A decline of over an order of magnitude in ammonia nitrogen has been observed in the cove as compared to earlier years. The declines in ammonia and chlorine have allowed fish to recolonize tidal Pohick Creek. Monitoring of creek fish allowed us to observe recovery of this habitat which is very important for spawning species such as shad. The decreased ammonia has also lowered nitrogen loading from the plant contributing to overall Bay cleanup.

Another trend of significance to managers is changes in the relative abundance of fish species. While it is still the dominant species in trawls, white perch has gradually been displaced in seines by banded killifish. Blue catfish have entered the area recently and brown bullhead has decreased greatly in the cove. The introduction of snakeheads of recent years (not sampled very well by trawl and seine but found in the cove using drop ring sampling) may have some pronounced effects on the other fish species. The causes and significance of these changes are still being studied as are similar patterns throughout the Chesapeake Bay. Clearly, recent increases in SAV provide refuge and additional spawning substrate for the adhesive eggs of banded killifish. Data from drop ring studies reported above show that SAV harbors high densities of banded killifish. While the seine does not sample these SAV areas directly, the enhanced growth of SAV provides a large bank of banded killifish that spread out into the adjacent unvegetated shoreline areas and are sampled in the seines. Combined with the short generation time and high intrinsic rate of population growth of banded killifish, SAV appears to be direct cause of the recent high catch rates. In addition, the invasive blue catfish may also have both direct (predation) and indirect (competition) effects on brown bullhead, but details on these interactions require additional study. Declines in white perch probably have little direct connection to increases in banded killifish, and instead may be due to a combination of reduction in gear efficiency due to SAV and population-wide changes that result from environmental factors and/or fishing mortality. Overall, the fish assemblage in Gunston Cove is dynamic and supports a diversity of commercial and recreational fishing activities.

In short, due to the strong management efforts of the county and the robust monitoring program, Gunston Cove has proven an extremely valuable case study in eutrophication recovery for the Bay region and even internationally. The onset of larger areas of SAV coverage in Gunston Cove will have further effects on the biological resources and water quality of this part of the tidal Potomac River. It is important to continue the data record that has been established to allow assessment how the continuing increases in volume and improved efforts at wastewater treatment interact with the ecosystem as SAV increases and plankton and fish communities change in response. Furthermore, changes in the fish communities from the standpoint of habitat alteration by SAV, introductions of exotics like snakeheads and possible contaminant effects such as those from hormone pollution need to be followed.

Global climate change is becoming a major concern worldwide. In the past five years a slight, but consistent increase in summer water temperature has been observed in the cove which may reflect the higher summer air temperatures documented globally. Other potential effects of directional climate change remain very subtle and not clearly differentiated given seasonal and cyclic variability.

The 25+-year record of data from Gunston Cove and the nearby Potomac River has revealed many important long-term trends that validate the effectiveness of county initiatives to improve treatment and will aid in the continued management of the watershed and point source inputs. The Gunston Cove study is a model for long term monitoring which is necessary to document the effectiveness of management actions. EQAC supports the continuation of these studies.

C. STEWARDSHIP OPPORTUNITIES

The Fairfax County Park Authority offers 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.

Fairfax County residents and other interested parties 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. Those interested in giving tax-deductible donations 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

The Northern Virginia Regional Park Authority offers stewardship opportunities for volunteers at Meadowlark Botanical Gardens, Potomac Overlook Regional Park, Upton Hill Regional Park, and various other parks on occasion. More information can be found at http://www.nvrpa.org/html/index.php?pg=volunteer.html.

Fairfax ReLeaf offers a number of opportunities for stewardship. 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

The Northern Virginia Conservation Trust offers many opportunities in stewardship for Fairfax County residents. Additional information on NVCT can be found on its Web site, http://www.nvct.org. Landowners whose property contains environmentally sensitive land such as wetlands, stream valleys and forests can also participate in environmental stewardship. If these landowners grant easements to NVCT, 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.

For stewardship information on the Potomac Conservancy, see http://www.potomac.org.

D. 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 believes 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.

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.

E. RECOMMENDATION

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. The FCPA staff estimates that implementation 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 sufficient funding to implement Phase 1. EQAC recommends that some of the six staff positions should be found from internal FCPA staff assets.

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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 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. More recent, but fragmentary, data for a number of parks show deer population densities several times larger than maximum carrying capacities. 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
2007	152	245

(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 254) 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.

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.

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*
2007	133	19	0	152*

* 41 and 43 percent of these crashes occurred in October and November
(Source: Report 1993-2001, Michael Uram, Fairfax County Police Department. Report 2002-2004, 2006 Earl Hodnett, former County Wildlife Biologist. Report 2005, Emily Yance-Houser, FCPD.)

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 several years 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. The most recent data indicate a cost of $29.58 per deer taken. In the 2007-2008 season, 76 does and 43 bucks were taken by sharpshooters, for a total of 119 deer. Once again, the number of deer removed from the population by this method is not sufficient to have more than a modest local effect. However, 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.

  However, given the continuing shift from print material to Web site availability of information, much of the above may be more efficiently made available by the latter means.

- 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 Commonwealth, 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. Additional material is provided on the county Web site http://fairfaxcounty.gov/comm/deer/deermgt.htm.

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 Division 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. The most recent data indicate a cost of $29.58 per deer taken. In the 2007-2008 season, 76 does and 43 bucks were taken by sharpshooters,

for a total of 119 deer. 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. Last year, 1,085 deer (up from 854 deer during the previous year) were harvested using archery equipment. Another 158 (up from 119) deer were taken under the county's Urban Archery Program. This reduction of the county's deer herd by 1,243 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). A comment and a recommendation addressing geese issues and comments addressing wildlife borne disease issues are found beginning on pages 277 and 288, respectively.

1. The County Wildlife Biologist position became vacant in 2008, and there was a considerable lapse in deer management activity until a suitable replacement could be identified and hired. Even so, there was one managed hunt conducted with 32 deer taken, and five sharpshooter events with 27 deer taken for a total reduction in the deer herd of 59 animals.

2. Due to the current recessionary environment in which the county has been operating, it was necessary to cancel the Assistant Wildlife Biologist position that had been authorized but not yet filled. It is hoped that eventually economic recovery will make it possible to reactivate this position.

J. RECOMMENDATIONS

There are two recommendations for continuance of activity in the deer management program:

1. Insofar as staff resources permit, managed hunts should be continued as they have become both cost-effective and efficient in reducing excesses in the deer herd.

2. The sharpshooter events should be continued since the Police Department Tactical Teams must engage in required practice in order to maintain proficiency, and using deer as targets is both cost effective and more closely replicates operational situations than does practice on the target range.

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Susan Alger, Virginia Department of Game and Inland Fisheries.

Matt Knox, Deer Biologist, Virginia Department of Game and Inland Fisheries.

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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.

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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.

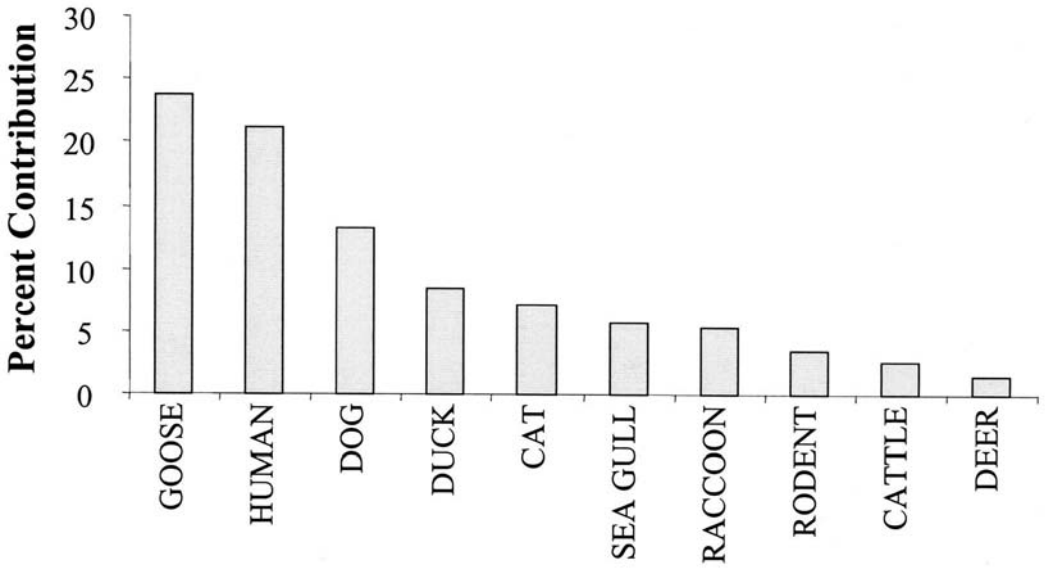
Several years ago, when the Evans Farm property in McLean was in the process of being rezoned for residential development, the farm pond, which was a prominent feature of the site, was extensively sampled to determine if it contained significant levels of pollution. It was known that a resident population 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

Sources of Fecal Coliform Pollution in Accotink Creek



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, eight years
   b. Pinecrest Community - population stabilization and nuisance abatement, seven years
   c. Pinecrest Golf Course - population stabilization and nuisance abatement, seven years

2. Centreville
   a. Franklin Farms - population stabilization, eight years
   b. Westfields - population stabilization, seven years

3. Fairfax County
   a. Lake Barcroft - population stabilization and nuisance abatement, nine years
   b. Fairfax County Parks - population stabilization, nine years

c. Copeland Pond - population stabilization and nuisance abatement, eight years
d. Brook Hills - population stabilization and nuisance abatement, eight years
e. Waters Edge - population stabilization and nuisance abatement, seven years

4. Oakton
   a. Fox Lake - population stabilization, seven years

5. Reston
   a. Reston Community - population stabilization, eight years

6. Vienna
   a. Trinity School - population stabilization, eight years
   b. Champion Lake - population stabilization, seven 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. In 2007, the FCPA program addled 451 eggs in 115 nests. In 2008, the FCPA program addled 522 eggs in 123 nests. The smaller numbers in the last two years are attributable to the dispersal of geese as the result of prior years' activities.

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. COMMENT

1. The Park Authority has recently held exploratory discussions to examine the feasibility of using managed shotgun hunts for reduction of resident goose populations. This approach has considerable promise for efficiently meeting program goals and a site has been identified for testing a pilot program. It is strongly suggested that a pilot program be implemented in the coming year.

J. RECOMMENDATION

The recommendation provided below address only the second section of this chapter (geese management issues). Comments and recommendations addressing deer management and comments addressing wildlife borne disease issues are found beginning on pages 266 and 288, respectively.

1. EQAC strongly recommends that, insofar as staff time is available, the goose management program be continued, particularly the public outreach and training activities so that a cadre of volunteers can be created to provide the labor to do the actual egg-oiling that is the principal control measure.

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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 holbrooki*, the most common species in the eastern United States, 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 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-December 2007	158	Not Available
January-December 2008	197 + 4 probable	Not Available
January-September 2009	43 + 11 probable	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 271). 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. HEALTH DEPARTMENT REFERENCE MATERIALS

The Fairfax County Health Department has prepared several excellent brochures to provide information to the public on various animal and insect borne diseases and means for their prevention.

- Ticks and tick-borne diseases in Fairfax County
- Understanding mosquitos and West Nile Virus
- The Asian Tiger Mosquito
- Choosing the right repellent
- Rabies and Animal Bites: What you should know and what you should do

The Health Department Web site, www.fairfaxcounty.gov/living/healthhuman/, has additional information in the section entitled Health.

- Lyme Disease
- Mosquitos
- Rabies
- Environmental health contains information sections on
    - Malaria
    - Mosquitos
    - Rabies
    - The Stream Protection Strategy Program contains information on fecal coliform pollution

F. 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.

G. 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 266 and 277, 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.

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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 two recommendations for continuance of activity in the deer management program:

1. Insofar as staff resources permit, managed hunts should be continued as they have become both cost-effective and efficient in reducing excesses in the deer herd.

2. The sharpshooter events should be continued since the Police Department Tactical Teams must engage in required practice in order to maintain proficiency, and using deer as targets is both cost effective and more closely replicates operational situations than does practice on the target range.

Impacts of Geese in Fairfax County

1. EQAC strongly recommends that, insofar as staff time is available, the goose management program be continued, particularly the public outreach and training activities so that a cadre of volunteers can be created to provide the labor to do the actual egg-oiling that is the principal control measure.

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 BLIGHT

IX-1. NOISE

A. OVERVIEW

Noise is a byproduct of our everyday lives, and noise that one group finds tolerable may be considered noise pollution to another. To some, 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.

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 event, 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.

Any regulation of noise pollution must be 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 allow for noise levels to be regulated when society calls for abatement. For an explanation of how sound is measured and perceived, see the county Web site at http://www.fairfaxcounty.gov/dpz/environment/noise/.

In response to an EQAC recommendation for the development and distribution of educational materials to the public regarding noise issues, county staff has established a Web site containing information and links addressing noise issues. The site is available at http://www.fairfaxcounty.gov/dpz/environment/noise/.

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 (Reagan National) and Washington Dulles International Airport (Dulles). Reagan National and Dulles are vital to the region's overall economy, connecting the Washington area with 140 domestic and international destinations. At Reagan National, most flights are short to mid-range jet aircraft flights operated by major airlines, but at Dulles, all types and sizes of aircraft are found. On a typical day, about 4,000 airplanes will fly in the skies over the Washington region. Most of these flights are to and from Reagan National, Dulles, 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.

According to the Metropolitan Washington Airport Authority's Web site, in 2008, 41.9 million passengers traveled through Reagan National and Dulles Airport on roughly 640,000 flights. This represented a drop in the number of passengers of 3.5% from the previous year at Reagan National, with only a 1% drop in the number of flights. At Dulles, the number of passengers also dropped 3.5% from the previous year, but the number of flights dropped almost 6%. This is the first significant decrease in traffic since the terrorist attacks in 2001 and is largely due to the combination of record high fuel prices and the overall downturn in the economy.

The number of daily operations at Dulles varies significantly, 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.

Reagan 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.

Because Reagan National is located near centers of political power and residential areas, aircraft at National are subject to several restrictions. There are four No Fly zones, which are the U.S. Capital, the National Mall, the White

House and the Vice President's house at the Naval Observatory. Under the Federal Aviation Administration's High Density Rule, carriers are limited, with some exceptions, to 37 scheduled operations per hour and the commuter carriers to 13 scheduled operations per hour. In addition, Reagan National 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. (with a half hour grace period) must satisfy the airport's nighttime noise limits or face monetary fines of $5,000 maximum per violation. There are approximately 5-10 noise violations each year.

The Metropolitan Washington Airports Authority, which operates both Reagan 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 by aircraft from the remaining events, which have been attributed to the community. The Metropolitan Washington Council of Governments' Aviation Policy Committee (formerly known as the 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 had become unreliable, and MWAA has discontinued publication of quarterly monitoring reports.

A new monitoring system has been acquired and became operational at the end of 2008. It monitors noise at 40 locations throughout the metropolitan Washington area, with 20 sites for Reagan National and 20 for Dulles, including 15 locations in Fairfax County. The Fairfax County locations are listed below:

Monitor locations serving primarily Reagan National:

- Great Falls Elementary School
- Langley Forest
- Marlan Forest
- Sandburg Middle School
- Springfield

Monitor locations serving primarily Dulles:

- Armstrong Elementary School
- Chantilly Post Office
- Crossfield Elementary School
- Cub Run Elementary School
- Floris Elementary School
- London Towne Elementary School
- Pleasant Valley Golf Course
- Union Mill Elementary School
- Virginia Run Elementary
- Westfield High School

MWAA is working with COG to determine the reporting format. EQAC looks forward to reviewing the 2009 monitoring data when they are available.

The new system will, for the first time, allow on-line reporting of noise complaints with real time noise complaint response feedback. This feature should be available by the end of the year. Until the new system is operational, complaints can be made to the Airport Authority's noise complaint centers at Reagan National and Dulles. In 2008, the center at Reagan National received 83 complaints, which is down from 102 in 2007. At the Dulles center there were 166 complaints, a significant increase from 112 in 2007. This is largely due to the changes in flight patterns caused by the renovation of the middle runway.

Resources: Metropolitan Washington Airports Authority

Community Relations and Noise Abatement	703-417-8745
Reagan National Noise Complaints	703-417-8020
Dulles Noise Complaints	703-572-8215

Federal Aviation Administration

Reagan National	703-413-1530
Dulles	703-471-1270
FAA Noise Ombudsman	202-493-5047

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.

The new north-south runway, 9,400 feet long, 150 feet wide and made of concrete, was opened for use in November 2008. The entire project includes the new runway, a parallel taxiway, connector taxiways and cross-field taxiways that connect to the terminal and existing airfield areas. With this new runway available to handle traffic, the middle north-south runway was taken out of operation for maintenance purposes beginning in July 2009 and should be available for use by late fall.

Noise from the new runway has been monitored since September 2008 from a station at Pleasant Valley Golf Course in Fairfax County and four additional

stations in Chantilly. EQAC strongly believes that evaluation of noise impact (to include both 24-hour noise monitoring and analysis to identify operational approaches that can be pursued to reduce noise) should be reported quarterly and provided to a number of stakeholders including the Fairfax County Board of Supervisors, EQAC and relevant county staff. MWAA staff has suggested that at least one year of data from the new runway configuration is needed to be able to evaluate operations on the new runways as they relate to community noise impacts and whether or not such impacts would suggest the need for consideration of operational changes.

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 "Aero Train" system to replace the existing Mobile Lounges with an underground rail system (scheduled to open in the second half of 2009).
- Improvements to the airport roadway system and connections to Route 28 and the Dulles Access Road.
- Expansion of the International Arrivals Building.
- Rail to Dulles.

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 Reagan National. 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, COG's Committee on Noise Abatement and Aviation at National and Dulles Airports (now known as the Aviation Policy Committee) 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. In all, the Part 150 Study recommended eight noise abatement measures (measures designed to reduce noise impacts) and six noise mitigation measures (measures taken to promote compatibility with and awareness of noise impacts). The recommended noise abatement measures were:

- Efforts supporting the use of advanced navigation technology.
- Two measures addressing the dispersal of flight paths in the area between five and ten miles south of the airport.
- Revision to the Airport Facility Directory reflecting current noise abatement procedures.
- Phasing out of "hushkitted" Stage 3 aircraft.
- Updating the airports noise monitoring and flight tracking system.
- Establishing a system to report airline compliance with noise abatement measures.
- Enhancement of the noise complaint system.

Five of the six mitigation measures were directed toward neighboring localities (e.g., disclosure of noise impacts; building code modifications; noise overlay zoning) and the sixth recommended an expanded MWAA airport noise information program.

MWAA submitted the Part 150 study to FAA, and FAA completed its review of, and issued a Record of Approval for, the Noise Compatibility Program in early 2008. Four of the eight proposed noise abatement measures were approved, and all six of the mitigation measures were approved with the acknowledgment that these measures were beyond the authority of FAA. Four noise abatement measures were disapproved for the purposes of Part 150—in disapproving these measures, FAA noted that the noise exposure model and noise compatibility program for the airport showed "no present or forecasted incompatible land uses within the DNL 65 dB" contour. Effectively, FAA is supporting the use of agency funds only for noise abatement projects that support actions that would be applied in areas inside the DNL 65 dBA contour, with the recognition that MWAA or Air Traffic Control could pursue similar or supportive actions at their discretion (and in the case of noise monitoring and flight tracking, at MWAA's expense). As noted in FAA's Record of Approval, a working group has been formed to develop advanced navigation procedures for arrivals and departures and to encourage the use of this technology, and MWAA is updating the noise monitoring and flight tracking system.

Nevertheless, EQAC continues to share the concerns of communities both north and south of Reagan National regarding noise impacts associated with airport operations and holds that noise impacts do not stop at the DNL 65 dBA model contour shown in the Part 150 study. The DNL 65 dBA contour for Reagan National encompasses a relatively small area that is located largely on airport property and within the Potomac River; some commercial, industrial and governmental areas are also located within this area, as is park land. No residences are located in areas that are currently exposed to, or that are projected to be exposed to, noise impacts of DNL 65 dBA or above. However, there have been significant concerns about airport noise impacts well outside this area, and operational noise abatement procedures have been established to minimize such impacts both north and south of the airport. Deviations to noise abatement procedures north of the airport have been documented by the McLean Citizens Association in collaboration with Congressman Wolf's office. While these impacts have occurred well beyond the DNL 65 dBA contour, they have had a significant and adverse impact to residents of the area.

4. The Aviation Policy Committee

The APC is a committee of COG 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 APC, 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 Ronald Reagan Washington National Airport. The committee will also continue to focus on noise abatement strategies for implementation at Reagan National and Dulles, with emphasis on review of emerging national legislation and studies on their impact on local noise strategies. Toward this end, the committee drafted a resolution that was adopted by the COG Board in June 2008 opposing efforts to usurp regional and local authority over the region's airports and to weaken the slot and perimeter rules affecting operations at Reagan National. The committee will also focus on the growing role general aviation plays in economic development and quality of life in the region. To that end, the APC will continue work on developing implementation strategies for the recently completed Regional Helicopter System Plan.

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.

In 2009, the COG Board of Directors made another enhancement to the APC by approving the following actions:

1. Retain the APC as currently constituted as a standing policy advisory committee to the COG Board of Directors through the end of calendar year 2009.
2. At the outset of FY 2010 (July 1, 2009), the focus of the committee would be ensuring a vibrant exchange of information with the regional community through conducting regular forums on important aviation policy issues. In addition, in cooperation with MWAA, implement improvements to COG's aviation policy Web site and maintain this enhanced Web presence on an ongoing basis.
3. Beginning in January 2010, to the extent that aviation policy matters require action by COG, these would be advanced through COG staff or board members for consideration by the board acting as a "committee of the whole" on aviation policy matters.
4. Allocate COG local funds at half the level being provided during FY 2009 for FY 2010 to provide ongoing support for this initiative. Staff believes this funding level ($43,368) will be adequate to carry out the revised aviation policy program.
5. COG's Executive Director would evaluate the effectiveness of the new approach in approximately one year and report to the board on appropriate refinements or other modifications that may be necessary to ensure an effective aviation policy program at COG. This should include possible integration of aviation policy into the recently established Climate, Energy and Environment Policy Committee.

These actions will maintain the appropriate presence within COG for addressing aviation policy issues. This conclusion is based on discussions with and concurrence by the COG staff including COG's Executive Director, Environmental Director, and Principal Environmental Planner who is lead staff for COG's aviation policy program. It further reflects the results of a recent survey with members of the APC and conversations with senior staff of MWAA.

C. HIGHWAY NOISE

1. Background

As the Washington metropolitan area continues to grow, so does traffic and traffic-related noise, degrading quality of life especially in residential areas adjacent to these roadways.

Noise has become 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 has been addressed by numerous investigations, including distinguishing among different sources of noise at receptor locations, studying noise perception by the human ear, and calculating highway noise reference energy mean emission levels. In addition, the effects of site geometry, meteorology, ground surface conditions and barriers on noise propagation are estimated and considered. While the study of noise and its perception has become more sophisticated, there is still a need for precise, uniform noise measurement procedures for assessing impacts of traffic noise in the vicinity of roadways, as well as a need for effective cost-efficient noise barriers.

When measurements indicate that noise abatement is required, the following procedures are options:

- The construction of barriers/walls or raised berms.
- The provision of landscaping/vegetation.
- The provision of acoustical design techniques.

In densely populated areas such as Fairfax County, noise barrier walls remain one of the most reasonable and feasible measures to abate traffic noise upon adjacent residential properties.

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 on 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

The largest of several highway projects planned for FY 09-10 is the I-495 Capital Beltway High Occupancy Toll/Bus/High Occupancy Vehicle Lanes Project, which will add a total of four new lanes for a 14-mile stretch between the Springfield interchange and the American Legion Bridge.

The potential noise impact of the I-495 HOT Lanes Project was assessed in accordance with Federal Highway Administration and VDOT guidelines. To determine the degree of impact of highway traffic noise, traffic noise levels during the loudest hour of the day were determined for the existing (1998) conditions and the design-year (2020) no-build and build conditions. Noise levels for the design-year no-build scenario are expected to increase on average by approximately 1 dB because of an increase in projected traffic volumes and the mix of heavy trucks during the loudest hour. In comparison, noise levels for the build scenario were estimated to increase an average of approximately 4 dB, with noise impacts in some areas increasing up to 19 dB and in others actually decreasing. The majority of impacted residences would be exposed to design-year traffic noise levels that approach or exceed an average of 67 dBA during the loudest hour of the day, a level that qualifies them for noise barriers if the following conditions for feasibility and reasonableness are also met:

- Noise barriers must be physically feasible and capable of providing at least 5 decibels of noise reduction.
- The noise barriers must meet VDOT's cost-effectiveness criterion of a maximum of $30,000 per protected or benefited dwelling unit, unless additional funding is provided by a third party.

Recommendations from the study led to subsequent approval of nine new sound barrier systems, as well as the replacement/enhancement/extension of eight existing sound walls which will need to be removed in order to widen the highway. Sound walls, therefore, will protect almost all residential areas on both sides of the highway adjacent to the 14-mile stretch of the project, with gaps where walls could not be built because of terrain or access issues, or, in a few cases, where a proposed barrier was not approved because it did not meet the criterion of either sound reduction or cost-effectiveness.

The study also estimated the impact of highway traffic noise on non-residential areas such as parks, schools, places of worship and recreation areas. Reasonableness for these areas was determined during final design on a case-by-case basis with respect to the type and duration of activity, size of the affected area, severity of impact, total cost and the amount of noise reduction.

Barriers constructed by VDOT since the early 1990s in Fairfax County have consisted of a solid wall of absorptive concrete that breaks the line of sight between vehicles and homes. Although noise barriers typically have a

maximum decibel reduction of 20 dBA, most only provide a reduction of 10-12 dBA. Walls for the I-495 HOT Lanes Project will look similar to those sound walls built in the past in Fairfax County. Noise barriers to be built for this project will range in height from about seven to 39 feet.

The following noise barriers have been have been approved for the following highway construction projects in Fairfax County currently underway during FY09-10:

- Replacement/enhancement/extension of eight existing sound barrier systems plus construction of an additional nine new sound barrier systems associated with the I-495 HOT Lanes Project (as discussed above).

- One replacement and enhanced noise barrier system and two new sound barrier systems associated with the Interstate 95/Telegraph Road interchange improvements associated with the Woodrow Wilson Bridge Project.

- One replacement and five new noise barrier systems associated with the Interstate 95 4th Lane Widening Project.

- Two new noise barrier systems plus two new third party funding barrier systems associated with Phase I and Phase III construction of the Fairfax County Parkway Extension through Fort Belvoir Engineering Proving Grounds Project.

- Six new noise barrier systems associated with the construction of the new Fairfax County Parkway/Fair Lakes Parkway Interchange Project.

No construction of approved noise barriers was accomplished during FY 08-09.

4. Other Noise Barriers

Barrier heights for other noise walls constructed in the county (e.g., walls constructed in conjunction with development projects) had been restricted, but in 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. 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.

D. METRO YARD NOISE

The Metro Service and Inspection Yard, located near the West Falls Church Metro station, services trains using a short-radius loop track. As the trains move along the track, "wheel squeal" is generated, which is extremely irritating to residents in nearby neighborhoods. An expansion of this yard has been proposed by the Washington Metropolitan Area Transit Authority in order to provide support for the coming Silver Line, and as part of the expansion, the Federal Transit Authority is requiring a sound box to be built over the noisiest portion of the loop track. The sound box must meet a development condition of DNL 55 dBA as well as requirements of the county's noise ordinance (Chapter 108.1 of the Fairfax County Code)--a requirement of a maximum noise level of 55dBA and also maximum noise thresholds in specific frequency-based octave bands. The sound box is still in the design phase but is expected to meet all of the conditions. It will cover approximately 1,000 linear feet of track and should be completed by 2013.

E. STEWARDSHIP

The Fairfax County Restoration Project, a public-private partnership, is expected to launch in spring of 2010 with its initial focus on restoration of areas negatively impacted by the I-495 HOT Lanes Project. FCRP is working with VDOT to modify its landscaping plans to include restoration of cloverleaf areas and areas inside and outside the sound walls. Vegetation planted inside and outside the sound walls will provide many benefits, including reduction in stormwater runoff, habitat for pollinators, birds and small mammals and visual relief for both motorists and residents. Anyone interested in joining the efforts should contact the FCRP at info@fcrpp3.org .

F. 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.

5. EQAC is pleased that a series of Web pages have been established on the county's Web site addressing noise issues. The county should ensure that this page is kept current through regular updates.

6. EQAC looks forward to reviewing results from the new noise monitoring system for Washington Dulles International and Ronald Reagan Washington National Airports, which became effective in fall 2008. EQAC assumes that results will be reported to the Fairfax County Board of Supervisors, relevant county staff, EQAC and other stakeholders on a quarterly basis.

7. With the goal of minimizing community noise exposure from the new runway configuration at Dulles Airport, EQAC and county staff plan to meet with Metropolitan Washington Airports Authority and Federal Aviation Authority staff to explore options, and EQAC also intends to coordinate with the Fairfax County Airports Advisory Committee. In addition, EQAC would like to discuss with the Airports Advisory Committee and staff the Federal Aviation Administration's views on the scope of Part 150 studies to determine what, if anything, the county can and should do in response to limits on noise abatement measure that are accepted by FAA. EQAC may recommend further action subsequent to this coordination.

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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 a few 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. RESPONSE OF THE HUMAN EYE TO LIGHT

To put the following sections in proper context it is helpful to briefly review how the human eye perceives and reacts to light. The various cells of retina of the eye contain what are called visual pigments. These pigments, in the fully dark-adapted condition, are complex proteins consisting of two linked components. The pigments respond to light by "bleaching" (actually the dissociation of the two protein moieties). The brighter the light, the greater is the bleaching and the longer the regeneration time. The greater the bleaching, the lower is the sensitivity of the retinal cell. The retina contains three types of sensory cells:

The rods which are most numerous toward the periphery of the retina and contain the visual pigment rhodopsin. They are useful primarily in low light and provide monochromatic images.

Three types of cones, mostly concentrated in the central portion of the retina and which provide color vision. They contain respectively photopsin I (erythrolabe), photopsin II (chlorolabe), and photopsin III (cyanolabe). Their peak sensitivities are in the red, green, and blue portions of the spectrum just like the sensor chip in a digital camera. (George Wald received the 1967 Nobel Prize in Medicine for his work on the three kinds of cone photopsins.)

The spidery retinal ganglion cells, containing the visual pigment melanopsin. These cells perform two different functions: control of the size of the pupil of the eye in response to light and as the control that resets the body's day-night cycle clock. Prolonged exposure of melanopsin to bright lights during normally dark periods of the evening and night can result in significant disturbances of the sleep-wake cycle.

C. 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.

D. 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 (2007 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. EQAC is currently collaborating with the Park Authority in preparation of a white paper on athletic field lighting with a section on glare and the scientific limitations on its control. That will provide a basis for addressing glare from all sources.**

E. 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.

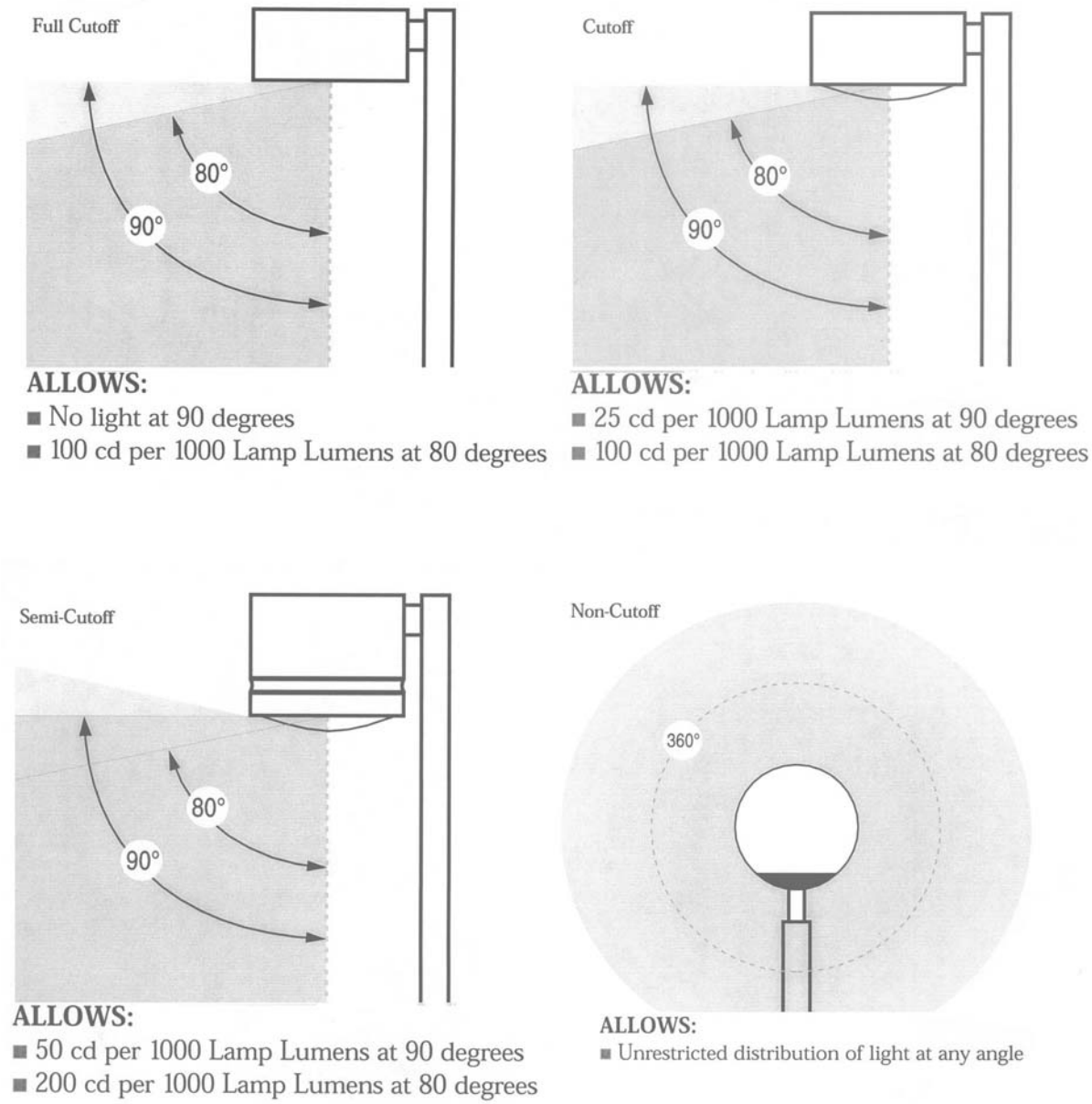
By redirecting this wasted energy, lower wattage lights provide the same amount of illumination in the areas where it is needed. These fixtures have reflective backing and full cut-off shielding to direct all light below the horizontal plane, with 90 percent of the light directed below an angle of 20 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. However, glare like that experienced from high-intensity sources, like those used to light athletic fields, is a result of the background contrast ratio. A light seen against a very dark sky seems very intense and intrusive, but if seen against a day time sky seems hardly noticeable. One can readily prove this by viewing a full moon at, say, 2 or 3 o’clock in the morning when it appears as an intense

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.)

disc so bright that it shows no features. However, the same moon viewed at, say, 9 or 10 o'clock the next morning is a very pale appearing disc with only slight contrast against the day light sky and shows an extensive array of features. This effect is due to the great difference in contrast with the background against which it is viewed. The mathematical difference between the source and the background is known as the background contrast ratio.

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.

F. 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.

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, although they could perhaps be better served by motion-detector activated lights. 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 the best designs and equipment in addressing these needs. To do less would unnecessarily and unfairly impact the surrounding neighborhoods and diminish 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.

G. 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.

H. 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 minimize adverse impacts on adjacent residential properties. The results with a test rectangular field that was outfitted with lights and artificial turf have been very informative. 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 fully address the light spill problem but are unable to address the glare problem since it is primarily governed by the fundamental laws of nature over which man has no real control. However, the International Dark-Sky Association in its outdoor lighting handbook has colored illustrations of a field lighted with full cutoff fixtures that minimize the glare problem. Specification of well-engineered fixtures should make it possible for the Park Authority to expand the use of lighting for fields while minimizing adverse impacts. 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.

I. 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 felt that this study had serious flaws in terms of the study objectives, the methodology and the evaluation criteria. The Park Authority 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, did 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 felt that this document contained serious scientific errors and thus created confusion rather than clarity. The Park Authority Director of Planning and Development informed us that they have done extensive rework of this material and requested EQAC to collaborate with his staff to revise the section on glare and to review the entire document. This effort is currently in progress.

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 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. In 2007 this item was moved to the DPZ Priority 1 list, but to date work on it has barely begun.**

3. EQAC recommends that the Board of Supervisors work with VDOT and Virginia elected officials to eliminate unnecessary roadway lighting and whenever possible to accelerate replacement of existing poorly designed fixtures under the control of VDOT with full cut-off fixtures.

J. RECOMMENDATIONS

1. The Zoning Administration Division of the Department of Planning and Zoning should attempt to have a draft of the proposed revisions to the Outdoor Lighting Ordinance by summer 2010. EQAC will collaborate with them to this end.

2. The Fairfax County Park Authority should attempt to have a finished draft of the "white paper", which discusses the scientific basis for the glare problem and the limitation for a solution to it, and improved technical design specifications for athletic field lighting design ready for publication by late spring 2010.

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, 2007 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 BLIGHT

A. OVERVIEW

Visual blight is considered by almost everyone who has studied it, to exist mainly in the subjective realm. In other words, one person's definition of visual blight may not be the same as someone else's. An example might be a building that is out of place in local architecture, but considered beautiful by at least a minority of observers. Meanwhile, people with a different perspective would define the same building as garishly ugly.

While people can disagree about what constitutes visual blight, there are some examples that the vast majority of people would classify as such. This short treatise deals with two of these – cigarette butts and illegal roadside signs.

B. CIGARETTE BUTTS

Cigarette butts are a ubiquitous problem in Fairfax County. While many cigarette smokers are often otherwise stellar citizens, it is a peculiarity of this habit that smokers often stamp them out on the ground or toss them out of car windows.

Cigarette butts tossed out of cars are excellent examples of visual blight. In April 2009, the author of this section of the report picked up 952 cigarette butts in a 100-foot stretch of a left turn lane on US 29. In addition, over the years, millions and millions of cigarette butts have been washed into local streams and rivers. This behavior constitutes an environmental problem with known consequences, not to mention the undeniable visual blight they create.

The Fairfax County Web site[1] points out that "Section 33.3-346 of the Code of Virginia makes littering or dumping trash a Class 1 misdemeanor, punishable by up to 12 months in jail and/or a fine up to $2,500."

C. ILLEGAL SIGNS

"Here in the United States we turn our rivers and streams into sewers and dumping grounds, we pollute the air, we destroy forests, exterminate fishes, birds, and mammals -- <u>not to speak of vulgarizing charming landscapes with hideous advertisements</u>." - Theodore Roosevelt (Theodore Roosevelt, "Our Vanishing Wildlife," Literary Essays (vol. 12 of The Works of Theodore Roosevelt, national ed.), chapter 46, p. 420 (1926). Originally appeared in The Outlook, January 25, 1913.)

[1] http://www.fairfaxcounty.gov/nvswcd/newsletter/buttlitter.htm

The struggle to regulate advertising on public highways and their rights-of-way has been underway for over a century. The first attempt by Virginia to regulate this practice was in 1938 via §2154 (247). Since then the law has been modified several times.

The result is that the Commonwealth of Virginia has one of the most progressive and no-nonsense laws in the United States. Under this law, no one can put a sign in the right-of-way of state-maintained highways without a permit. The cogent parts of this law say: "§ 33.1-373.… any advertisement within the limits of any highway shall be assessed a civil penalty of $100. Each occurrence shall be subject to a separate penalty…Advertisements placed within the limits of the highway are hereby declared a public and private nuisance and may be forthwith removed, obliterated, or abated by the Commonwealth Transportation Commissioner or his representatives without notice."

Subsequently, it also appears that a bill exempting Fairfax County from complying with that law has been passed. Specifically, § 33.1-375.1, sponsored by Delegate Orrock and approved in 1998, appears to allow signs in the right-of-way. It also appears that Fairfax County would be required to negotiate with VDOT to take over responsibility for the right-of-way and a subsequent public hearing would need to be held.

D. COMMENTS

1. In regard to cigarette butts, there are two key issues that EQAC would like to discuss with county staff prior to the development of recommendations: enforcement and public outreach. EQAC is interested in exploring whether there are any impediments to the issuance of citations for littering and in whether a public education program can be established to support responsible cigarette butt disposal.

2. With respect to illegal signs, EQAC plans to meet with appropriate county staff and with VDOT to clarify the rules governing signs in the VDOT rights-of-way; EQAC may develop recommendations on this matter based on the findings from these discussions.

ATTACHMENT IX-3.1 - § 33.1-373

§ 33.1-373. Advertising on rocks, poles, etc., within limits of highway; civil penalty.
Any person who in any manner (i) paints, prints, places, puts or affixes any advertisement upon or to any rock, stone, tree, fence, stump, pole, mile-board, milestone, danger-sign, guide-sign, guidepost, highway sign, historical marker, building or other object lawfully within the limits of any highway or (ii) erects, paints, prints, places, puts, or affixes any advertisement within the limits of any highway shall be assessed a civil penalty of $100. Each occurrence shall be subject to a separate penalty. All civil penalties collected under this section shall be paid into the Highway Maintenance and Operating Fund.
Advertisements placed within the limits of the highway are hereby declared a public and private nuisance and may be forthwith removed, obliterated, or abated by the Commonwealth Transportation Commissioner or his representatives without notice. The Commonwealth Transportation Commissioner may collect the cost of such removal, obliteration, or abatement from the person erecting, painting, printing, placing, putting, affixing or using such advertisement. When no one is observed erecting, painting, printing, placing, putting, or affixing such sign or advertisement, the person, firm or corporation being advertised shall be presumed to have placed the sign or advertisement and shall be punished accordingly. Such presumption, however, shall be rebuttable by competent evidence. In addition, the Commissioner or his representative may seek to enjoin any recurring violator of this section.
The provisions of this section shall not apply to signs or other outdoor advertising regulated under Chapter 7 (§ 33.1-351 et seq.) of this title or to a public transit bus shelter that is owned by a city, town, or county. The prohibition in subdivision (8) of § 33.1-369 against placing signs within 15 feet of the nearest edge of pavement of any highway shall not apply to such sign. However, the message shall not be visible to traffic in either direction on the main-traveled way of any highway. Signs on bus shelters visible from federal-aid highways shall conform with provisions of 24 VAC 30-120-80.

ATTACHMENT IX-3.2 - § 33.1-375.1

§ 33.1-375.1. Commissioner may enter into certain agreements; penalties.

A. The Commonwealth Transportation Commissioner may enter into agreements with the local governing body of Fairfax County authorizing local law-enforcement agencies or other local governmental entities to act as agents of the Commissioner for the purpose of (i) enforcing the provisions of § 33.1-373 and (ii) collecting the penalties and costs provided for in that section. However, no local governing body shall enter into any such agreement until it has held a public hearing thereon.

B. Notwithstanding the provisions of § 33.1-373, one-half of the penalties and costs collected under this section shall be paid to the affected locality, and the remainder shall be remitted to the Commissioner and paid into the Highway Maintenance and Operating Fund.

C. Notwithstanding the foregoing provisions of this section, the following signs and advertising shall not be subject to the agreements provided for in subsection A of this section:

1. Signs and advertising supporting an individual's candidacy for elected public office or other ballot issues, provided this exception shall not include signs and advertising in place more than three days after the election to which they apply.

2. Signs and advertising promoting and/or providing directions to a special event to be held at a specified date stated on the sign or advertising, provided this exception shall not include special event signs in place more than three days after the conclusion of the special event.

3. Other signs and advertising erected for no more than three days.

D. Notwithstanding the foregoing provisions of this section, the Commissioner may enter into agreements with the local governing bodies of localities to which the foregoing provisions of this section do not apply to authorize those governing bodies to act as agents of the Commissioner and the Department in enforcing the provisions of § 33.1-373. The limitations applicable to agreements entered into under subsections A through C of this section shall not apply to agreements entered into under this subsection.

(1998, c. 835; 1999, c. 195; 2003, c. 311.)

ATTACHMENT IX.3-3
Evolution of §33.1-373

Year	Statute
1938	**§2154 (247) Outdoor Advertising on Highways**
	Misdemeanor for placing an advertisement on "any sign rock stone…pole, highway sign, et. al.….within the limits of a highway." Originally passed in 1938 but not "codified" until 1942.
1950	**§33-319. Advertising on rocks, poles, etc., within limits of highway**
	Same as §2154 (247). No affixing of signs to a variety of objects.
1970	**§33.1-373. Advertising on rocks, poles, etc., within limits of highway**
	Same as §2154 (247) and §33-319. No affixing of signs to a variety of objects. Renumbered in a major overhaul of Virginia code.
1993	**§33.1-373. Advertising on rocks, poles, etc., within limits of highway**
	Drastic overhaul which includes language of previous renditions of this law but adds significant definition. Now it is illegal to place, put or affix "any advertisement within the limits of a highway". It is now a Class 1 misdemeanor to do so and a $2,500.00 fine. Declares such advertisements "a public and private nuisance which may be removed by the Commonwealth Transportation Commissioner or his representatives without notice. Likewise the Commissioner can recover the cost of this removal from whoever put the sign up.
1994	**§33.1-373. Advertising on rocks, poles, etc., within limits of highway**
	Reduces the Class 1 misdemeanor charge to a "civil penalty of $100. Each occurrence shall be subject to a separate penalty. All civil penalties collected under this section shall be paid in the Highway Maintenance and Operating Fund." Also adds that the provisions of §33.1-373 do not "apply to signs or other outdoor advertising regulated under Chapter 7 (§33.1-351 et seq) of this title.

ATTACHMENT IX.3-4
Modifications & Changes to §33.1-373 beginning in 1994
(Items in bold are of particular note)

Year	Bill ID	Patron	Summary	Final Status
1994	SB572	Saslaw, others	§33.1-373 - Sought to exempt political campaign signs and real estate directional signs plus other categories. Wanted to make these types of signs subject to local jurisdiction. (See 1 below)	
1994	SB572ER	Saslaw, others	§33.1-373 - Dropped Class 1 misdemeanor penalty for a $100 civil penalty for each occurrence, dropped exemption for political and real estate signs, etc.	
1994	SB572S1	Saslaw, others	§33.1-373 - Dropped Class 1 misdemeanor penalty for a $100 civil penalty, dropped exemption for political and real estate signs	
1994	CHAP0696	Saslaw, others	§33.1-373 - Dropped Class 1 misdemeanor penalty for a $100 civil penalty (See 2 below)	Approved 4/10/1994
1997	HB2065	Orrock	§33.1-373 - Sought to divide fine revenue equally between state and county, town, city	
1998	HB603	Orrock, others	§33.1-375.1 - Introduced §33.1-375 which would allow local governments to enforce §33.1-373 and §33.1-375. Splits collection of revenue. Sought to exempt political signs and special event signs	
1998	HB603EH1	Orrock, others	§33.1-375.1 - Added 3 day take-down rule to campaign signs and also added "other signs and advertising erected for no more than 3 days" (See 3 below)	
1998	HB603ER	Orrock, others	§33.1-375.1 - Added "other signs and advertising erected for no more than 3 days	
1998	CHAP0835	Orrock, others	§33.1-375.1 - Added "other signs and advertising erected for no more than 3 days	§33.1-375 approved 4/22/1998
1999	HB1994	Rollison	§33.1-375.1 - Added clause to Orrock allowing local governing bodies to enter into agreements with the Commissioner to enforce 33.1-373	
1999	HB199RER	Rollison	§33.1-375.1 - Added clause to Orrock allowing local governing bodies to enter into agreements with the Commissioner to enforce 33.1-373	

Year	Bill ID	Patron	Summary	Final Status
1999	CHAP0195	Rollison	§33.1-375.1 - Added clause to Orrock allowing local governing bodies to enter into agreements with the Commissioner to enforce 33.1-373. Local governing body must hold a public hearing first.	Approved 3/17/1999
2000	HB642	Sen Comm on Trans/ Rollison	§33.1-375.1 - Added in a clause allowing local governments to enforce 33.1-373 and collect all the revenue. Repealed Repeals July 1, 2000, "sunset" on authorization for the Commonwealth Transportation Commissioner to enter into agreements with local government authorities for removal of illegal signs and other illegal advertising from highway rights-of-way.	
2000	HB642S1	Sen Comm on Trans	§33.1-375.1 - Added in a clause allowing local governments to enforce 33.1-373 and collect all the revenue. Repealed July 1, 2000, "sunset" on authorization for the Commonwealth Transportation Commissioner to enter into agreements with local government authorities for removal of illegal signs and other illegal advertising from highway rights-of-way.	Approved 4/26/2000
2002	**SB166**	**Byrne**	**§33.1-373 - Increased fine to $1,000.00 per sign for Planning District 8 only. (See 4 below)**	
2002	HB764	Watts, others	§33.1-375.1 - Sought to exempt political signs and allow other "signs and advertising for more than 3 days. Would allow localities to prohibit campaign sign erection more than 45 days before an election or larger than six square feet - if they had entered into an agreement with the Commissioner in enforcing 33.1-373	
2002	HB264	McQuigg	§33.1-375.1 - Same as HB764 except struck political sign clause and allowed "the placement of temporary directional signs through the use of permits".	
2003	HB2152E	Rust	§33.1-355 - Not relevant since affects 33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	

Year	Bill ID	Patron	Summary	Final Status
2003	HB2152ER	Rust	§33.1-355 - Not relevant since affects 33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	
2003	CHAP0321	Rust	§33.1-355 Not relevant since affects 33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	Approved 3/16/2003
2003	HB1857	House - Scott, etc. Senate - Byrne , etc.	§33.1-375.1 - Similar to HB 764 and 264 but adds that "…limitations applicable to agreements entered into under subsections A through C of this section **need** not apply to agreements entered into under this subsection.	
2003	HB1857E	House - Scott, etc. Senate - Byrne , etc.	§33.1-375.1 - Deletes weird population requirement in HB1857 and replaces **need** with **shall**.	
2003	HB1857ER	House - Scott, etc. Senate - Byrne , etc.	§33.1-375.1 - Amends and allows localities to enter into agreements with the Commissioner to "act as his agent in removing illegal signs from highway rights-of-way	
2003	CHAP0311	House - Scott, etc. Senate - Byrne , etc.	§33.1-375.1 - Amends 33.1-375.1 and allows localities to enter into agreements with the Commissioner to "act as his agent in removing illegal signs from highway rights-of-way"	Approved 3/16/2009
2003	HB264	McQuigg	§33.1-375.1 - same as HB 264 2002 version	
2004	HB941	Pollard	§33.1-355 - Not relevant since affects §33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	
2004	**HB941**	**Petersen**	**§33.1-355 and §33.1-375.1 - Contains numerous definitions of "advertising" and includes political signs as advertising. It also allows political signs but only for 3 days prior and 3 days after elections.**	
2005	HB804	Petersen	§33.1-355 and §33.1-375.1 - Slightly modified version of HB941	
2005	SB845	Deeds	§33.1-375.1 - Similar to HB 264, allows Charlottesville to enforce ROW.	

Year	Bill ID	Patron	Summary	Final Status
2005	HB1632	Van Yahres	§33.1-375.1 - Similar to HB 264, allows Charlottesville to enforce ROW.	
2008	HB692	Armstrong	§33.1-355 - Not relevant since affects §33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	
2008	HB373	Carrico	§33.1-355 - Not relevant since affects §33.1-355 except when it applies to signs authorized by counties that are affixed to county-owned public transit passenger shelters	
2009	SB830S1	Sen Comm on Trans	§33.1-373 and §33.1-375.1 - Modifies §33.1-375.1 includes 3 day rule for political signs, etc. Re civil penalties, changes "shall" to "may".	
2009	SB530ES1	Cuccinelli	§33.1-373 and §33.1-375.1 - Substitutes "may" for "shall" regarding $100 civil penalty. Substitutes "may" for "shall" regarding fine for each occurrence. Modifies enforcement so that each locality has same authority as Commissioner to enforce 33.1-373	
2009	SB830	Cuccinelli	§33.1-375.1 - "any county, city, or town" may act as agents to enforce §33.1-373.	
2009	HB1992	Bulova	§33.1-375.1 - all penalties and costs go to the "affected locality". Commercial signs and advertising OK Saturday thru following Monday.	
			1 - Precursor of §33.1-375?	
			2 - A black day for §33.1-373	
			3 - This might be the first example of rule that political signs must be taken down 3 days after election	
			4 - Planning district 8 = Arlington, Loudoun, Prince William, Fairfax, and City of Alexandria	

APPENDIX A

SUMMARY OF ENVIRONMENTAL BILLS OF INTEREST 2009 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 2009 and indicates whether they "Passed", "Failed" or were "Carried Over". For the most part, the summaries are from the Virginia General Assembly Legislative Information System. By going to the LIS Web site (http://leg1.state.va.us/), the entire bill as well as its history and patrons can be reviewed. Unless otherwise noted, the summaries provided below 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 933 Mufflers on motorcycles. Provides that motorcycles shall use a muffler system in good working order that meets federal standards. FAILED

SB 973 Virginia Resources Authority; loans for renewable energy. Authorizes the Virginia Resources Authority to finance renewable energy projects and permits localities to lend funds obtained through the assistance of the Virginia Resources Authority to any person for the purpose of producing or purchasing renewable energy or renewable energy related equipment, systems, or products. FAILED

SB 982 Regulation of stormwater. Requires localities to provide full or partial waivers of charges to any person who develops, redevelops or retrofits outfalls, discharges or property so that there is a permanent reduction in post-development stormwater flow and pollutant loading, as long as a stormwater permit has been obtained from either the Department of Conservation and Recreation or the Department of Environmental Quality when such permit is required. Under current law, localities have the option of providing such waivers and permits. APPROVED

SB 1050 Virginia Natural Resources Commitment Fund; funding. Provides for the Department of Conservation and Recreation to determine the annual funding needs for agricultural best management practices and to provide the same to the Governor. The bill also changes the formula for allocating moneys in the Virginia Natural Resources Commitment Fund. Eight percent will be distributed to the soil and water conservation districts, 55 percent will be used for matching grants for BMPs on lands within the Chesapeake Bay watershed, and 37 percent will go to matching grants outside the Chesapeake Bay watershed. APPROVED

SB 1114 Stormwater management; emerging technology. Directs the Virginia Soil and Water Conservation Board to adopt regulations that provide for the evaluation and potential inclusion of emerging or innovative stormwater control technologies that may prove effective in reducing nonpoint source pollution. APPROVED

SB 1145 Greenhouse gas emissions; mandatory reporting. Requires that the State Air Pollution Control Board adopt regulations requiring the reporting of greenhouse gas emissions from stationary sources that consume carbon-emitting feedstocks. The regulations would apply only to those sources that emit more than a *de minimis* amount of greenhouse gas and that are already required to report emissions of other air pollutants. To the extent possible, reporting requirements will incorporate standards and protocols developed by other widely recognized and verified greenhouse gas inventory programs. Beginning in 2010 and every three years thereafter, the Virginia Department of Transportation is required to provide the Department of Environmental Quality with data necessary to maintain a greenhouse gas emissions inventory for roads throughout the Commonwealth. The Board is also authorized to establish a voluntary program allowing persons to register voluntary reductions in direct or indirect emissions of greenhouse gases. The voluntary program may include the reporting of reductions in emissions from motor vehicle fleets owned by persons otherwise required to report emissions from stationary sources. FAILED

SB 1471 Stormwater control and water or waste systems; Real property; Commonwealth's title. Authorizes the Governor, at the request of a local authority and in a form approved by the Attorney General, to disclaim any and all rights, title, and interest of the Commonwealth in and to lands used for stormwater control systems or water or waste systems if he finds (i) there is no greater public need or purpose than such use or (ii) that public use and necessity have been established. Such disclaimer shall be filed with the appropriate court and shall have the legal force and effect of disclaiming, releasing, and renouncing all of the right, title, and interest of the Commonwealth in and to such lands. APPROVED

SJ 332 Constitutional amendment (first resolution); property exempt from taxation. Authorizes the General Assembly to enact laws to permit localities to exempt from property taxes, any property, including real or personal property, equipment, facilities, or devices, constructed or designed to conserve energy and natural resources in a manner that meets or exceeds performance standards established for such purposes. The amendment also deletes the authorization for the General Assembly by general law to directly exempt from property taxes such property and property designed to abate pollution or transfer or store solar energy. APPROVED

SJ 345 Resolution; encouraging the increased usage of recycling receptacles. Encourages state and local governments to increase the usage of recycling receptacles at public places and governmental facilities. PASSED

House Bills

HB 1758 Bonds; flood mitigation. Authorizes issuance of bonds not to exceed $100 million to be used as matching funds for localities' flood mitigation projects that are approved by the Department of Conservation and Recreation. FAILED

HB 1775 Invasive species. Charges the Secretaries of Natural Resources and Agriculture and Forestry with the responsibility of developing an invasive species management plan to prevent the introduction of invasive species and to control and eradicate those species that are present on Virginia's lands and waters. The Secretary of Natural Resources will establish an advisory group consisting of state agency heads, and representatives of various stakeholder groups to develop the plans and assist in coordinating and implementing the recommendations of the plan. This bill is identical to SB 1211. PASSED.

HB 1788 Alternative on-site sewage systems. Clarifies the locality's power to regulate nonconventional sewage disposal systems by prohibiting localities from prohibiting the use of such systems. This bill is identical to SB 1276. APPROVED

HB 1828 Localities and water authorities; rate incentives for green roof construction. Allows localities and water authorities to offer rate incentives for green roof construction. APPROVED

HB 1930 Certification of stormwater development property. Authorizes the Department of Conservation and Recreation to certify stormwater management development properties as being designed, constructed, or reconstructed for the primary purpose of abating or preventing pollution. Such a certification allows the local government to tax the property at a different rate from other classifications of real property. This technical change is necessary because responsibility for administering the stormwater program was moved from DEQ to the Department of Conservation and Recreation. APPROVED

HB 1931 Water Facilities Revolving Fund. Authorizes the Virginia Resources Authority to provide a portion of the fees it receives for administering the loan fund to DEQ to cover some of that agency's costs for administering the construction assistance loan program. APPROVED

HB 1975 Local incentives for green roofs. Authorizes counties, cities, and towns to grant incentives or provide regulatory flexibility to encourage the use of green roofs in the construction, repair, or remodeling of residential and commercial buildings. The incentives or regulatory flexibility could include (i) a reduction in permit fees when green roofs are used, (ii) a streamlined process for the approval of building permits when green roofs are used, or (iii) a reduction in any gross receipts tax on green roof contractors as defined by the local ordinance. This bill is identical to SB 1058. APPROVED

HB 1991 Establishment of stormwater programs by localities. Extends the period of time that localities have to adopt a local stormwater management program. Currently, they are required to adopt a program no sooner than 12 months and no later than 18 months after state regulations have become effective. This bill would extend the time for adoption from no sooner than 15 months to no later than 21 months. The Virginia Soil and Water Conservation Board can grant an

extension to the locality of an additional 12 months if the Department of Conservation and Recreation finds that such an extension is warranted. A locality can adopt a program earlier than the minimum time frame with the consent of the Board. The bill also requires that the regulation that establishes local program criteria and delegation procedures not become effective until after July 1, 2010. APPROVED

HB 1995 Transportation; supplemental funding for Northern Virginia. Adds the City of Fairfax to the localities in Northern Virginia who are to use the first 50 percent of the revenues received by the Northern Virginia Transportation Authority solely for urban or secondary road construction and improvements and for public transportation purposes. This bill is identical to SB 1137. APPROVED

HB 2168 Stormwater offsets. Authorizes permit issuing authorities to allow stormwater permit holders to comply with nonpoint nutrient runoff water quality criteria by acquiring nonpoint nutrient offsets that have been certified under the Chesapeake Bay Nutrient Exchange Program. The offsets have to be in the same tributary as the permitted activity and generated in the same or adjacent eight digit hydrologic unit code. The permit issuing authority may only allow the use of nonpoint nutrient offsets when the permit applicant demonstrates that (i) alternative site designs have been considered that may accommodate on-site best management practices (BMPs), (ii) on-site BMPs have been considered in alternative site designs, (iii) appropriate on-site BMPs will be implemented, and (iv) full compliance with postdevelopment nonpoint nutrient runoff compliance requirements cannot practicably be met on site. The bill also requires an offset broker to pay the permit issuing authority a fee equal to six percent of the amount paid by the permittee for the offsets. APPROVED

HB 2171 Electrical generation from agricultural waste. Excludes any farm or aggregation of farms that owns and operates facilities within the Commonwealth for the generation of electric energy from waste-to-energy technology, including methane digesters, from regulation as a public utility, public service corporation, or public service company. To be eligible for such designation, a person must obtain at least 51 percent of its annual gross income from agricultural operations and produce the agricultural waste that is used as feedstock in the generation of the electricity. Such generator will be permitted to interconnect to the electric grid in accordance with regulations to be adopted by the State Corporation Commission. The measure also provides that such generators of electricity shall not be considered "manufacturers" under any provision of the Code of Virginia. APPROVED

HB 2177 Rechargeable battery recycling. Authorizes localities to ban the disposal of certain rechargeable batteries in any waste-to-energy or solid waste disposal facility within its jurisdiction, provided the locality has implemented a recycling program that is capable of handling all rechargeable batteries generated within its jurisdiction. APPROVED

HB 2202 Greenhouse gas emissions; mandatory reporting. Requires that the State Air Pollution Control Board adopt regulations requiring the reporting of greenhouse gas emissions from stationary sources that consume carbon-emitting feedstocks. The regulations would apply only to those sources that emit more than a *de minimis* amount of greenhouse gas and that are already required to report emissions of other air pollutants. To the extent possible, reporting

requirements will incorporate standards and protocols developed by other widely recognized and verified greenhouse gas inventory programs. Beginning in 2010, the Virginia Department of Transportation is required to provide the Department of Environmental Quality with data necessary to maintain a greenhouse gas emissions inventory for roads throughout the Commonwealth. The Board is also authorized to establish a voluntary program allowing persons to register voluntary reductions in direct or indirect emissions of greenhouse gases. The voluntary program may include the reporting of reductions in emissions from motor vehicle fleets owned by persons otherwise required to report emissions from stationary sources. FAILED

HB 2351 Virginia Natural Resources Commitment Fund; funding. Provides for the Department of Conservation and Recreation to determine the annual funding needs for agricultural best management practices and to provide the same to the Governor. The bill also changes the formula for allocating moneys in the Virginia Natural Resources Commitment Fund. Eight percent will be distributed to the soil and water conservation districts, 55 percent will be used for matching grants for BMPs on lands within the Chesapeake Bay watershed, and 37 percent will go to matching grants outside the Chesapeake Bay watershed. APPROVED

HB 2417 Covenants regarding solar power. Clarifies that restrictive covenants prohibiting the installation of solar panels existing prior to July 1, 2008 may be amended to allow such installation if the amendment is adopted by the membership of the community association in accordance with such association's governing documents. APPROVED

HB 2480 Real property tax; commercial property in Northern Virginia and Hampton Roads. Requires localities to use the revenue from the special real property tax on commercial property in localities embraced by the Northern Virginia Transportation Authority or the Hampton Roads Transportation Authority solely for (i) new road construction and associated design and right of way acquisition, (ii) new public transit construction and associated design and right of way acquisition, (iii) other initial capital costs related to new transportation projects and the operating costs directly related thereto and (iv) the issuance costs and debt service on bonds to support the capital costs permitted in (i) through (iii). Under current law, the localities must use the revenue for transportation purposes that benefit the special regional transportation tax district to which the locality belongs. APPROVED

HB 2598 Department of Conservation and Recreation; purchasing certain abandoned railroad rights-of-way. Grants the Department of Conservation and Recreation a right of first refusal to purchase certain abandoned railroad rights-of-way. FAILED

HJ 713 Compact fluorescent light bulb; Study; Department of Environmental Quality to study disposal of compact fluorescent bulbs; report. Requests the Department of Environmental Quality to study the environmental impact of the expanded use of compact fluorescent light bulbs in the residential sector. In conducting its study, the Department of Environmental Quality shall examine the impact on landfills, proper disposal or recycling in private residences, and public education opportunities. The study should determine the most effective ways to encourage and promote the environmentally sound management of compact fluorescent light bulbs containing mercury. The Department of Environmental Quality shall include in its

recommendations strategies for (i) educating consumers on the benefits of proper management of a product that contains mercury and the need to recycle such bulbs; (ii) publicizing options for proper disposal; and (iii) working with the private sector to develop ways to allow the public to conveniently recycle fluorescent light bulbs. FAILED

APPENDIX B

EQAC RESOLUTIONS AND POSITIONS NOVEMBER 2008 THROUGH OCTOBER 2009

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Due to formatting, the resolutions and positions may not appear precisely as they were originally transmitted.

County of Fairfax, Virginia

MEMORANDUM

March 30, 2009

Chairman Bulova and Board Members:

My name is Stella Koch. I am the Chair of the Environmental Quality Advisory Council and am testifying on the Council's behalf.

EQAC supports the establishment of a stormwater service district and the implementation of an assessment of a penny and a half on property tax. In 1998 with the initiation of the first stream assessment (results were published in 2001), it became evident the County's streams were degraded. Since that point in time the County has made systematic and consistent efforts to improve the health of our streams. We believe that a healthy environment and healthy waters are as essential to a good quality of life as a good school system and safe streets.

A brief history of Fairfax County's stream protection efforts:

The EQC Policy

In 1975, Fairfax County adopted within the Comprehensive Plan an Environmental Quality Corridor (EQC) policy, which recommends protection of stream valley buffers and other environmentally sensitive areas. In 1981, Fairfax County incorporated more detailed delineation criteria into the policy, and the policy was refined again in the 1990 Policy Plan; the 1990 guidance remains applicable. **The EQC Policy has resulted in over five thousands of acres of stream valley land protected and remaining in a natural vegetated buffer state, which provides the backbone of our trail system in the county.**

The Occoquan Policy

1982, Fairfax County downzoned 64 square miles of the Occoquan watershed from one acre to five acre per lot zoning to protect streams and drinking water supplies.

County Stream Assessment

The first Countywide stream assessment was initiated in 1998, with results published in January 2001. Over half of the County's streams are in Poor or Very Poor condition.

Stream Protection under the Chesapeake Bay Preservation Ordinance

In 1993, Fairfax County adopted the Chesapeake Preservation Ordinance in which lands adjacent to the **perennial portion (**as delineated by USGS maps) **of streams were designated as Resource Protection Areas**; and that RPA designation resulted in 520 linear miles of **stream valley buffers being protected under this ordinance**. In 2003 the Chesapeake Bay

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Preservation Ordinance was amended and strengthened. Additionally, in 2002 and 2003 Fairfax County DPWES staff surveyed all Fairfax County streams to ascertain perenniality and created a map showing such perennial segments. In 2004, the Fairfax County Board of Supervisors adopted this map as guidance for RPA delineation, which resulted in an additional 340 miles of perennial stream buffers being protected. **Fairfax County now has approximately 860 miles of perennial stream segments protected under the Chesapeake Bay Preservation Ordinance.**

Headwater Protection

In winter of 2008 the Board adopted language for inclusion in the Comprehensive Plan to support protection of the upstream intermittent and ephemeral portions of Fairfax County streams.

All of you as Supervisors have constituents whose houses have been flooded or whose backyards are washing away because of large volumes of unchecked stormwater runoff. There are problems: eroding streams banks threaten roads and bridge abutments, dams in your districts need to be safely maintained, pipes and other stormwater infrastructure need to be replaced, and culverts need to be protected. Implementation of the watershed plans is important as a proactive means to protect streams and begin to address the effects of decades of degradation because of inadequate stormwater management. And the degradation of our streams has consequences not just here at home; we export our stormwater, its sediments and pollutants to the Potomac River and ultimately the Chesapeake Bay. The Bay will not recover until all the counties in its 64,000 square mile watershed deal with their stormwater runoff. And Federal requirements to that effect will only tighten. But ultimately this is a backyard issue. The residents of Fairfax County deserve healthy clean streams.

We recognize the difficulties you face in balancing a budget in very challenging financial times; however EQAC advocates the initiation of the Stormwater Service District and the penny and a half. To not do so maybe be penny wise but it will ultimately prove pound-foolish.

SMK:nhk

cc:
Jimmie D. Jenkins, Director, DPWES
Randy W. Bartlett, Deputy Director, DPWES—Stormwater and Wastewater Programs
Environmental Quality Advisory Council
EQAC file, March 2009

County of Fairfax, Virginia

MEMORANDUM

April 2 , 2009

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Chairman Bulova and Board Members:

My name is Stella Koch. I am the Chair of the Environmental Quality Advisory Council and am testifying on the Council's behalf.

EQAC appreciates and accepts the significant budget trimming that has to occur this year to allow the county to achieve a balanced budget. However there are four proposed program reductions affecting the environmental that we would like to bring to your attention.

AIR QUALITY

<u>On the proposed closing of the Fairfax County air quality monitoring program</u>

Fairfax County is part of Washington DC regional nonattainment area for both the 8-hour ozone standard and for particulate matter. One of the proposed budget cuts would eliminate the staff that services the four Fairfax County air quality monitors but not the monitors themselves. Because these four monitors have Health Department data that shows exceedances for ozone, Fairfax will not be in a position to close its four air quality monitors because that would place them in violation of relevant air quality regulations (CFR 40 Part 58, Subpart B §58.14). EQAC is somewhat at loss as to how the monitors will operate without appropriate staff and data collection.

We have these concerns:

- All the Fairfax monitors will show exceedancs of the new federal ozone standard: the Mount Vernon monitor even exceeded the old ozone standard;
- Newer revised federal standards will be even harder to meet. We therefore believe staffing these four monitors is essential
- This information is critical for informing the residents of the Metropolitan Washington DC area, including Fairfax County, about the quality of the air that we breathe;
- The loss of this data would likely make it difficult to demonstrate attainment of the standard as ozone levels decrease.

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We urge you to fund the staff of air quality monitoring program.

On the proposed elimination or reduction of service on certain bus routes

Pages 74-75 of the Lines of Business Reduction Impact Statements show that over 1.000.000 bus trips would be eliminated by the proposed budget cuts. We have concerns that this may exacerbate the VOC and NOX pollution by creating more single occupancy vehicle traffic. EQAC notes the potential differences between air pollution from buses and the amount of air pollution if that same number of people were in single occupancy cars could be significant.

We also have concerns about the social impacts these reductions may have as they may disproportionately affect the at-risk populations who do not have access to personal transportation.

We urge the Board to be aware of both the air quality implications and social implications as they consider these budget cuts.

Loss of the deer and geese management programs.

Retention of the deer/geese management program is critical since even a one-year hiatus would cost the county much of the progress that has been made over the past decade. Since much of the deer management program has been conducted in our parks, there are now areas of regrowth in the understory vegetation, which is critical to the biodiversity of parkland vegetation and the sustainability of habitat for many smaller animal species.

Goose management has become ever more critical since increasing numbers of the geese in our area have become resident rather than migratory. Scientific studies have shown that fully one-third of the fecal coliform pollution of our lakes, ponds, and watercourses is due to the excrement of geese and ducks. Some of these lakes and watercourses are an irreplaceable part of our drinking water supply, and the shores of these waterbodies are made unusable for recreational purposes due to the fouling by goose excrement. Because there is a dearth of natural predators, the goose egg addling programs are crucial to keeping the goose population in check.

For both of these programs, any break in attempting to control these populations merely gives the deer and the geese an even more competitive advantage for population increases.

We urge the board to consider a way to continue these programs.

Disproportionate Cuts to the Natural Resource Management Program in the Park Authority Budget

While members of EQAC may understand why this happened, we have significant concerns that the over 40% cut in the Natural Resource Management Program represents a disproportionate cut on for one section of the Park management system. We ask that you seek some balance in these cuts.

We hope you will factor these concerns into your budget considerations. Thank you for this opportunity to speak.

SMK

cc:
Environmental Quality Advisory Council
EQAC file, March 2009

County of Fairfax, Virginia

MEMORANDUM

April 16, 2009

Chairman Bulova and Board Members:

There was a robust discussion at the last EQAC meeting on April 7 concerning the funding for stormwater management in the upcoming budget. The focus of the discussion was largely on implementation of the watershed plans and the potential lack of funds for that specific goal of implementation of those plans if the penny and a half is not fully funded. Many of the members of EQAC had been contacted by citizens who were members of stream associations and/or had served on the watershed planning committees voicing their concerns and continued support for the implementation of these plans. EQAC fully supports implementation of the watershed plans. We offer this additional information to the testimony already presented by EQAC earlier this month on environmental concerns for the budget.

EQAC thanks the Board for its continued support and focus on environmental issues.

SMK:nhk

cc:
Jimmie D. Jenkins, Director, DPWES
Randy W. Bartlett, Deputy Director, DPWES—Stormwater and Wastewater Programs
Environmental Quality Advisory Council
EQAC file, April 2009

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County of Fairfax, Virginia

MEMORANDUM

DATE: May 22, 2009

TO: PLANNING COMMISSION

FROM: Noel H. Kaplan, Senior Environmental Planner
Environment and Development Review Branch, DPZ

SUBJECT: Transmittal of EQAC statements relating to protection of headwaters areas of streams through regulation

At its May 13, 2009 meeting, the Environmental Quality Advisory Council (EQAC) received a briefing from the Department of Public Works and Environmental Services on the status of discussions that may lead to the development of regulatory protection for headwaters areas of streams (areas above Resource Protection Areas (RPAs) designated pursuant to the Chesapeake Bay Preservation Ordinance). EQAC has been participating in discussions regarding this matter with the Planning Commission's Environment Committee and staff. Subsequent to this briefing, EQAC adopted, by a unanimous vote of members present, the following statements relating to this issue:

- *EQAC considers headwaters areas/streams that are found above existing designated Resource Protection Areas to be of exceptional importance.*

- *EQAC recognizes that there are challenges at this time to a regulatory approach for protecting these areas but does not want the county to abandon the idea altogether in the long term--EQAC supports protection and restoration of these areas to the maximum extent possible.*

- *EQAC supports efforts to protect headwater streams through watershed management plans, buffer restoration projects and education/voluntary efforts at this time.*

I am transmitting EQAC's statements separately to the Planning Commission in light of the Environment Committee's anticipated discussion of this matter on May 28. The Board of Supervisors is being copied on this memorandum.

Thank you for your attention.

NHK

cc:
Board of Supervisors
Jimmie D. Jenkins, Director, DPWES
James W. Patteson, Director, Land Development Services, DPWES
Environmental Quality Advisory Council
EQAC file, May 2009

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ENVIRONMENTAL QUALITY ADVISORY COUNCIL

Resolution Supporting Legislation Discouraging the Use of Plastic Bags

July 8, 2009

WHEREAS, plastic bags are widely used by stores for packaging purchased goods; and

WHEREAS, many of these bags are released to the environment where they are a threat to wildlife and aquatic organisms; and

WHEREAS, plastic bags ultimately are broken up into small fragments that are often confused with food by fish; and

WHEREAS, paper bags (particularly where composed of materials with high recycled content) provide an alternative to plastic bags, are biodegradable and do not pose the similar risks to the environment; and

WHEREAS, the use of paper bags, while preferable to plastic, still poses risks of releasing greenhouse gases if incinerated or even greater risks if buried in a landfill; and

WHEREAS, the use of more permanent bags that can be reused should be encouraged because they reduce the problems associated with plastic and paper bags; and

WHEREAS, multiple bills were introduced in the Virginia legislature in 2009 that proposed banning plastic bags, imposing fees for bags needing disposal and encouraging the use of bags that can be reused, and similar bills are expected for the next legislative session.

THEREFORE BE IT RESOLVED that the Environmental Quality Advisory Council recommends that the Board of Supervisors support legislation that discourages the use of plastic bags and encourages the use of reusable bags; and

BE IT FURTHER RESOLVED that EQAC recommends that the Fairfax County Board of Supervisors support legislation that would establish fees for disposable bags in order to encourage the use of bags that will be reused.

POSITION STATEMENT FORM

(Completed form to be provided to the Legislative Committee)

GENERAL SUBJECT AREA -- TITLE OF PROPOSAL:

REDUCING ENVIRONMENTAL CONTAMINATION FROM PLASTIC AND PAPER BAGS

PROPOSAL:

Support legislation to reduce the use of plastic disposable bags. If disposable bags are provided they should be paper with a high recycled content and with a nominal fee/deposit of a nominal amount, such as 5-10 cents. The use of reuseable bags should be encouraged.

SOURCE:

Environmental Quality Advisory Council, July, 2009

BACKGROUND:

Plastic bags do not completely degrade in the environment. They present a real threat to wildlife and aquatic organisms. In the open ocean, plastic bags break up into small pieces that resemble food that fish ingest. While plastic bags may be recycled or disposed of so that they are not released to the environment, many plastic bags end up in fields, streams, lakes, rivers and the oceans. Paper bags are disposable and are expected to pose fewer environmental risks. Paper bags in Fairfax County can be recycled or disposed of as trash, where they would be incinerated. Incinerated bags will release some carbon dioxide, which is less harmful to the atmosphere than methane, a far more potent greenhouse gas. Discarding paper bags after one use is also resource intensive in terms of trees and all of the efforts to harvest trees and manufacture the paper.

The goal should be to encourage the use of reusable bags. In order to discourage the use of single use throw away bags, a nominal deposit/fee should be required for each bag.

In the 2009 legislative session, the following three bills were introduced that addressed paper and/or plastic bags:

- House Bill 2010 would have established a $0.05 per bag fee for each disposable paper or plastic bag provided to consumers in grocery stores, convenience stores and grocery stores. Durable plastic bags that have handles, are at least 2.25 mm thick, and are designed for multiple reuse would be exempted from the fee, as would be bags used to package ice cream, meat, fish or poultry
- Senate Bill 873 would have banned the use of plastic carryout bags by retailers at the point of sale, with the exception of durable plastic bags

with handles that are at least 2.25 mm thick and that are designed for multiple reuse.

- House Bill 1814 was identical to Senate Bill 873.

Each of the three bills was left in the committee to which it was referred.

The Fairfax County Board of Supervisors' 2009 General Assembly Final Legislative Report does not indicate that the Board of Supervisors took a position on any of these bills.

RECOMMENDATION:

(*Do not fill out-- This will be indicated by the Legislative Director and County Executive)*

POSSIBLE SUPPORT OR OPPOSITION BY ORGANIZATIONS:

(List any organizations or groups, if any, which might be in favor of or against the proposed position)

Support from environmental and civic organizations is expected for bills that encourage the reuse of bags, ban plastic bags or require deposits for disposable bags. We expect at least some retail establishments and consumer groups may oppose such legislation.

STAFF CONTACT PERSON(S):

(Provide name and phone number of County staff person(s) best able to provide any additional research or necessary information)

Noel Kaplan (EQAC staff liaison)
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Fairfax County Department of Planning and Zoning
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Phone: 703-324-1380
Fax: 703-324-3056
Email: Noel.Kaplan@fairfaxcounty.gov

County of Fairfax, Virginia

MEMORANDUM

DATE: July 30, 2009

TO: Board of Supervisors

FROM: Stella Koch, Chairman Stella M. Koch
Environmental Quality Advisory Council

SUBJECT: EQAC position regarding proposed state stormwater management regulations

It is the understanding of the Environmental Quality Advisory Council that county staff will be forwarding, for the Board's consideration at the August 3, 2009 Board meeting, comments regarding proposed state stormwater management regulations. EQAC has spent considerable effort in tracking the proposed regulations. We recognize that there are concerns over the implementation and maintenance of Low Impact Development (LIDs) practices, but we also recognize that much progress in stream protection can be accomplished by implementation of such practices. We urge the Board to support the goals and efforts of the state in these proposed regulations in terms of the proposed technical standards. However, we also recognize a need for localities to be able to establish fees and fiscal programs that would be sufficient to provide for the administration of such a program and EQAC supports Fairfax County's request for the state to build that into any new stormwater program.

SMK:nhk

cc: Anthony H. Griffin, County Executive
Robert A. Stalzer, Deputy County Executive
Jimmie D. Jenkins, Director, Department of Public Works and Environmental Services
Randy W. Bartlett, Deputy Director, Stormwater and Wastewater Programs, DPWES
James W. Patteson, Director, Land Development Services, DPWES
Michelle Brickner, Assistant Director, Land Development Services, DPWES
EQAC file, July 2009

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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 2009 Environmental Excellence Awards were:

Organization Award:	Earth Sangha
Business Award:	Allen Wayne, Ltd.
County Employee Award:	Carl Sivertsen

Earth Sangha is a 501(c) 3 volunteer-based nonprofit environmental organization that was founded in 1997. The nomination that was submitted in support of the award states: "for more than a decade it has pursued an ambitious ecological restoration program to restore native forests and meadows, stabilize streams and control invasive alien plants, principally in Fairfax County." Earth Sangha has pursued a wide range of efforts that support county environmental objectives, including the establishment of a native plant nursery that supplies native trees and other plants for restoration projects throughout the county, a Native Arboretum project at the Marie Butler Leven Preserve, and riparian buffer restoration projects. The nomination notes that, in 2008 alone, Earth Sangha mobilized over 10,000 hours of volunteer service. Much of the organization's work is done in partnership with a wide range of governmental, educational, nonprofit, community and other organizations, including a number of county agencies. Earth Sangha provides invaluable support to the county's watershed management efforts and to the county's park system.

Allen Wayne, Ltd. is a Fairfax County-based printing, graphics and Internet services firm that has been recognized for its leadership and commitment in the use of environmentally-responsible technologies in its print production process. As noted in the nomination, the firm's environmental commitments include: the use of paper manufactured from trees grown in Forest Stewardship Council-accredited forests; the use of soy-based inks that are derived from sustainable materials and that contain lower volatile organic compounds than petroleum-based inks; and the use of "chemistry-free" metal printing plates that require less processor cleaning and maintenance and operate at greater levels of efficiency than more traditional equipment.

Carl Sivertsen, an Environmental Health Specialist III with the Fairfax County Health Department, has been recognized for his dedication, leadership and enthusiasm in providing outreach on disease-carrying insect and other environmental health issues. It is clear from the nomination that,

in his efforts to reduce the number and severity of cases of insect-borne diseases, he has created within the Health Department an enthusiasm for public health and outreach that can, perhaps, best be described as infectious. During the eligibility period for the 2009 award, he organized and participated in over two dozen outreach events, including the organization, coordination and implementation of the Health Department's 2008 presentation at Celebrate Fairfax. He also performed approximately 300 site visits addressing complaints and did so in an efficient and effective manner, solving 98% of his cases within a 72-hour period. His nomination refers to his "enthusiasm, friendly demeanor, ingenuity, persistence and determination," as well as his ability to leverage resources through partnerships with other groups, agencies and businesses.

EQAC congratulates all award recipients.

In past years, Environmental Excellence Awards have been awarded to the following people and organizations:

2008

County Resident Awards:	Chet McLaren
Organization Award:	Katherine K. Hanley Family Shelter Project Management Team
Business Award:	"Jack-the-Ripper" Certified Arborists, Inc.

2007

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

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 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 2009 ANNUAL REPORT

A&F	**Agricultural and Forestal**
ACM	**Assessment of Corrective Measures**
ANS	**Audubon Naturalist Society**
APC	**Aviation Policy Committee (regional)**
APR	**Area Plans Review**
AQI	**Air Quality Index (federal)**
ARE	**Annual Report on the Environment**
BMP	**Best Management Practice**
BOS	**Board of Supervisors (county)**
BRAC	**Base Realignment and Closure (federal)**
CADD	**Computer-Aided Design and Drafting**
CAIR	**Clean Air Interstate Rule (federal)**
CAP	**Corrective Action Plan**
$CBOD_5$	**Chemical and Biological Oxygen Demand (5-day test)**
CCTV	**Closed circuit television**
CDC	**Centers for Disease Control and Prevention (federal)**
CESQG	**Conditionally Exempt Small Quantity Generator**
CFI	**Covanta Fairfax, Inc.**
CFL	**Compact fluorescent light**
CO_2	**Carbon Dioxide**
COG	**Metropolitan Washington Council of Governments (regional)**
CRD	**Commercial Revitalization District (county)**
CRP	**Community Residential Program (county)**
CTB	**Commonwealth Transportation Board (state)**
CY	**Calendar Year**
dB	**Decibel**
dBA	**Decibel (A-weighted level scale)**
D.C.	**District of Columbia**
DCR	**Department of Conservation and Recreation (state)**
DDT	**Dichloro-Diphenyl-Trichloroethane**
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**
DPWES	**Department of Public Works and Environmental Services (county)**
DPZ	**Department of Planning and Zoning (county)**
DU/AC	**Dwelling Units per Acre**
E/RRF	**Energy/Resource Recovery Facility**
ECC	**Environmental Coordinating Committee (county)**
EDA	**Economic Development Authority (county)**
EECCC	**Energy Efficiency and Conservation Coordinating Committee (county)**
EHD	**Epizootic hemorrhagic disease**
EHI	**Environmental Hazards Investigations Section, Fairfax County Department of Health**
EIP	**Environmental Improvement Program (county)**
EPA	**Environmental Protection Agency (federal)**
EQAC	**Environmental Quality Advisory Council (county)**
EQC	**Environmental Quality Corridor (county)**
FAA	**Federal Aviation Administration**
FAR	**Floor Area Ratio**
FCB	**Forest Conservation Branch (county)**
FCDOT	**Fairfax County Department of Transportation**
FCPA	**Fairfax County Park Authority**
FCPD	**Fairfax County Police Department**
FCRP	**Fairfax County Restoration Project**
FJLEPC	**Fairfax Joint Local Emergency Planning Committee (regional)**
FY	**Fiscal Year**
GHG	**Greenhouse gas**
GIS	**Geographic Information System**
Hazmat/HazMat	**Hazardous Materials**
HB	**House Bill (state)**
HHW	**Household Hazardous Waste**
HID	**High intensity discharge**
HMIS	**Hazardous Materials and Investigative Services Section of the Fairfax County Fire and Rescue Department**
HOT	**High Occupancy Toll**
HOV	**High Occupancy Vehicle**
IAQC	**Interstate Air Quality Council (regional)**
ICPRB	**Interstate Commission on the Potomac River Basin (regional)**
IESNA	**Illuminating Engineering Society of North America**

IIHS	**Insurance Institute for Highway Safety**
IMA	**Invasive Management Area**
IPLS	**Integrated Parcel Lifecycle System**
IT	**Information Technology**
kBTU/SF	**Thousands of British Thermal Units per square foot**
kWh	**Kilowatt hours**
LDS	**Land Development System (county)**
LED	**Light-emitting diode**
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**
LT2ESWTR	**Long Term 2 Enhanced Surface Water Treatment Rule (federal)**
MCL	**Maximum Contaminant Level**
MD	**Maryland**
mgd	**Million gallons per day**
mg/l	**Milligrams per liter**
MLC	**McLean Land Conservancy**
MPO	**Metropolitan Planning Organization**
MPSTOC	**McConnell Public Safety and Transportation Operations Center (county)**
MS4	**Municipal Separate Storm Sewer System**
MW	**Megawatts**
MWAA	**Metropolitan Washington Airports Authority (regional)**
MWAQC	**Metropolitan Washington Air Quality Committee (regional)**
NAAQS	**National Ambient Air Quality Standards**
NMCPCP	**Noman M. Cole, Jr. Pollution Control Plant (county)**
NOx	**Oxides of Nitrogen**
NPDES	**National Pollutant Discharge Elimination System**
NRCS	**Natural Resources Conservation Service (federal)**
NRMP	**Natural Resource Management Plan**
NTU	**Nephelometric Turbidity Unit**
NVCT	**Northern Virginia Conservation Trust**
NVCWP	**Northern Virginia Clean Water Partners (regional)**
NVRC	**Northern Virginia Regional Commission (regional)**
NVRPA	**Northern Virginia Regional Park Authority**
NVSWCD	**Northern Virginia Soil and Water Conservation District**
OCRR	**Fairfax County Office of Community Revitalization and Reinvestment**

OWML	**Occoquan Watershed Monitoring Laboratory**
PAWS	**Plan and Waiver System (county)**
PCB	**Polychlorinated Biphenyl**
PFM	**Public Facilities Manual (county)**
PM	**Particulate Matter**
$PM_{2.5}$	**Particulate Matter less than 2.5 microns in diameter**
Ppb	**Parts per billion**
ppm	**Parts per million**
PTI	**Public Technology Institute**
QA/QC	**Quality Assurance/Quality Control**
RBRC	**Rechargeable Battery Recycling Corporation**
RPA	**Resource Protection Area**
SARA	**Superfund Amendments and Reauthorization Act of 1986 (federal)**
SAV	**Submerged aquatic vegetation**
SB	**Senate Bill (state)**
SDWA	**Safe Drinking Water Act (federal)**
SIP	**State Implementation Plan**
SO_2	**Sulfur Dioxide**
SOCs	**Synthetic Organic Compounds**
SWANA	**Solid Waste Association of North America**
SWM	**Stormwater Management**
TCC	**Transportation Coordinating Council (regional)**
TDM	**Transportation Demand Management**
TMDL	**Total Daily Maximum Load**
TOD	**Transit Oriented Development**
TPB	**Transportation Planning Board (regional)**
UDIS	**Urban Development Information System**
UFMD	**Urban Forest Management Division (county)**
$\mu g/m^3$	**Micrograms per cubic meter**
UOSA	**Upper Occoquan Sewage Authority**
USDA	**United States Department of Agriculture**
USGS	**United States Geological Survey**
V/C	**Volume to Capacity Ratio**
VA	**Virginia**
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**

VIMS	**Virginia Institute of Marine Science**
VOF	**Virginia Outdoors Foundation**
WMATA	**Washington Metropolitan Area Transit Authority**
VPDES	**Virginia Pollutant Discharge Elimination System**
VRE	**Virginia Railway Express**
VSMP	**Virginia Stormwater Management Program**
WID	**Watershed Improvement District**
W&OD	**Washington and Old Dominion**
ZAPS	**Zoning and Planning System (county)**
ZOAWP	**Zoning Ordinance Amendment Work Program (county)**