2019 Annual Report on the Environment

Environmental Quality Advisory Council

A Fairfax County, Virginia Publication

To request this information in an alternate format, contact the Fairfax County Department of Planning and Development: (703) 324-1380 TTY 711

The Cover Photo was taken in the vicinity of
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Environmental Quality Advisory Council

TRIBUTE TO NOEL KAPLAN

Noel Kaplan served as the trusted liaison to the Environmental Quality Advisory Council (EQAC) from 1987 until his retirement from Fairfax County in 2019. During his time as liaison, Noel provided the council with authoritative information and advice necessary for council members to fulfill their obligations.

One of Noel's primary duties was the annual coordination, editing, and formatting of EQAC's Annual Report on the Environment, with related outreach to more than 50 separate county, state, federal, and regional agencies. The crafting of the report allowed the council to assess the quality of the physical environment, report our findings in a comprehensive manner, bring together and consider all aspects of environmental quality, direct attention to the resolution of environmental quality matters, provide a means of communication with the community, and promote an awareness of environmental quality. With his guidance, the Annual Report evolved into a trusted source of environmental information, documenting not only the current state of those resources, but trends and council recommendations for future actions.

Through the years, Noel coordinated hundreds of presentations to the council across a wide spectrum of topics, which provided valuable insights into environmental issues and allowed council members to fulfill their charter as advocates of preserving, protecting, and enhancing the physical environment of the county. Other duties included the coordination of the EQAC student member selection process, the Environmental Excellence Awards, and annual legislative recommendations.

In addition to his role as EQAC liaison, Noel demonstrated a firm commitment to the environmental health of the county through his many other duties as a senior environmental planner. Noel worked tirelessly on a wide array of environmental initiatives and helped define nearly all environmental policies within Fairfax County, laying the foundation for an environmental ethos and touching the lives of people living, working, and recreating in the county.

For his legacy of service to the Environmental Quality Advisory Council and the community, we express our sincere appreciation to Noel and wish him the best in his future endeavors.

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ANNUAL REPORT on the ENVIRONMENT 2019

Fairfax County, Virginia

Environmental Quality Advisory Council

November 2019

Printed on FSC-certified paper with recycled content

A companion Data Appendix is available on-line at
www.fairfaxcounty.gov/eqac

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EQAC'S PRIORITY RECOMMENDATIONS

Each of the chapters presented in this report contains comments and/or recommendations for actions that, in our view, would further progress in support of the Board of Supervisors' Environmental Vision or related environmental considerations. However, we wish to highlight our priority recommendations for 2019. These are presented in the same order as they appear in the report and do not reflect an order of importance to EQAC.

EQAC has three priority recommendations this year:

1. DEVELOPMENT OF A RESILINCE PLAN

Develop and Implement Climate Adaptation/Resilience Plan

EQAC recommends that the Board of Supervisors direct the development and implementation of a climate adaptation/resilience plan, which would help to minimize the impacts of climate change. The objective of this adaptation/resilience plan would be to reduce the adverse impacts of climate change (e.g., flooding, power outages) on local residents, businesses, and critical infrastructure and to help reduce the long-term costs of extreme weather event and other climate change impacts.

2. UPDATES TO LAND USE PLANS / CREATION OF COUNTY-WIDE GREEN PLAN

Update the State of the Plan

EQAC recommends that the Board of Supervisors authorize an update to the State of the Plan document. The last State of the Plan covered 2000-2010. Since then the county has seen significant growth and changes in process and technology. The plan transitioned from APR to Fairfax Forward with holistic and in-depth reviews, and now to SSPA. A review of the plan and the effects of the processes is timely. With the creation of a county-wide natural resource plan as mentioned below in the funding section there will be a complementary understanding of the unbuilt natural resources of the county.

Develop Concept for Future Development Map

EQAC recommends that the Board of Supervisors authorize the development of a Concept for Future Transportation, Development, and Green Infrastructure. The 1992 Concept for Future Development map has evolved into the Comprehensive Plan - Special Planning Areas[1] and is used within the Countywide Transit Network Study to design the proposed High Quality Transit Network. These reflect the reality that the 1990 Future has largely been realized and that a new future map that looks out 20 to 50 years is needed.

[1] https://www.fairfaxcounty.gov/planning-development/comprehensive-plan/special-planning-areas

3. FUNDING

Adequately Fund Staff Project Reviewers
EQAC recommends that the Board of Supervisors direct the County Executive to increase the capability of Land Development Services (LDS) to adequately evaluate environmental impacts during the review of development plans by hiring additional staff or contracting to fill this need.

Create an Additional Wildlife Position
EQAC recommends that the Board of Supervisors direct the County Executive to assess the need and feasibility of funding or otherwise increasing staff capacity in the Fairfax County Police Department or other county agency for the hiring of a full-time wildlife assistant.

Fund the Creation of a County-Wide Natural Resources Management Plan
EQAC recommends the Board of Supervisors direct the County Executive to develop a comprehensive natural resources digital map and plan for the county. As the county continues to grow at a rapid pace, the combination of this map and plan would be an instrumental resource to inform decision making about our ecological resources. The Comprehensive Plan, for example, prioritizes the identification and protection of EQCs. This natural resources map and plan would complement the details of the county's Comprehensive Plan and help the board more effectively achieve its Environmental Vision. With private land accounting for over 80 percent of the county, it is important that this map and plan include the ecological resources on all of the county's land, including both park and non-park land.

Continue to Adequately Fund the EIP
EQAC commends the Board of Supervisors for their significant funding support of the Environmental Improvement Program (EIP)[2] with the FY 2019 Adopted Budget including $535,000 towards ecologically important programs such as the Invasive Management Area program, Watershed Protection and Energy Conservation Matching Grant Program, and stream bank and meadow restorations.

Increase Stormwater Funding
EQAC thanks the Board of Supervisors for past funding and recommends that the funding for the Stormwater Program once again be increased either by an increase in the Stormwater Service District rate in FY 2021 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100 or that the increase occur through a change in the tax rate. EQAC understands that this increase will not fully meet stormwater management needs and therefore suggests that additional increases be continued each fiscal year until adequate funding to support the program is achieved.

[2] Page 109, 5.3.2 FY 2019 Funding and Projects
https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/sustainability-initiatives-report-fy2019.pdf

INTRODUCTION

The Environmental Quality Advisory Council is pleased to present to the Board of Supervisors its 2019 Annual Report on the Environment. This report serves a threefold purpose:

- To assist the board in evaluating ongoing environmental programs and to provide the basis for proposing new programs
- To aid public agencies in coordinating programs to jointly address environmental issues
- To inform residents and others who are concerned with environmental issues

In June 2017, the Board of Supervisors adopted an update of its Environmental Vision document (https://www.fairfaxcounty.gov/environment/environmental-vision). We decided last year that the updated Environmental Vision provided an opportunity to better align our Annual Report on the Environment with the updated Environmental Vision; we have followed the same structure this year.

Our report format presents a structure that builds from the seven core service areas identified within the vision document. The first six chapters of our report address individual core service areas from the vision document:

- Land Use
- Transportation
- Water
- Waste Management
- Parks and Ecological Resources
- Climate and Energy

The seventh core service area, Environmental Stewardship, touches upon all of the other core service areas and is therefore integrated within each of the other chapters. We have, though, included a brief discussion of environmental stewardship later in this introduction, and we have included in the companion Data Appendix a section highlighting the related work of numerous organizations.

We have added the following chapters to this framework in order to ensure sufficient coverage of issues that are addressed at least to some extent in the Environmental Vision but have not been identified as core service areas in the vision document:

- Air Quality
- Wildlife Management
- Technology

We have, as applicable, included at the beginning of each chapter the parallel vision statement from the Environmental Vision document (the vision statement for the Environmental Stewardship section of the Environmental Vision document is presented after this introduction). Each chapter then provides an overview of the issue, highlighting critical concerns,

accomplishments, ongoing efforts and the status of the issue. Each chapter closes with our comments and/or recommendations.

We are carrying forward in this report the following features from past reports:

- An overview of EQAC and our activities during the last year
- The "Scorecard" section presenting a progress report on the recommendations we issued in our last report
- A "spotlight" on Fairfax County Public Schools (presented in an appendix)

We have also added an appendix that provides a brief overview of highlights from the 2018 Virginia General Assembly session relating to environmental issues.

While we are covering a substantial breadth of subject matter in this report, we have attempted to do so concisely, and we have chosen to favor higher-level discussions of critical concerns over the exhaustive presentation of details. We have, though, provided a parallel data appendix to this report on our website (www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/annual-report-environment/2018), and readers who are seeking more in-depth presentations of data, trends, and background information are encouraged to visit this site. We also encourage readers who are interested in more information about the county's environmental initiatives to peruse the county's Fairfax County Sustainability Initiatives document: www.fairfaxcounty.gov/environment/sustainability-initiatives.

The Data Appendix includes the following:

- A more detailed summary of environmental bills of interest from the 2018 Virginia General Assembly
- An update of the table we've provided in the last several reports identifying how to report environmental crimes and concerns
- Copies of EQAC's resolutions and positions over the last year
- An overview of organizations focused on stewardship efforts and best practices supporting government and non-government resources and broader environmental needs

The following information from past reports is no longer being provided in this report but is available on-line:

- An identification of Environmental Improvement Program projects that have been selected for funding (see Section 5 of Fairfax County Sustainability Initiatives: www.fairfaxcounty.gov/environment/sustainability-initiatives
- Identification of recipients of Environmental Excellence Awards: www.fairfaxcounty.gov/environment/environmental-excellence-awards

This report focuses on activities affecting the environment in 2018. However, in some cases, key activities from 2019 are also discussed.

This report has been written by members of EQAC and reflects our collective efforts and views. While we have prepared and are responsible for this report, the production of this report would not have been possible without the considerable efforts of many people.

As we have done in all of our recent past reports, we thank and acknowledge the work of two particular individuals. First, we need to thank Joe Gorney of the Environment and Development Review Branch, Department of Planning and Development. Joe provides county staff support to EQAC. Joe 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, Joe makes publication of the document possible. Again 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.

In addition, 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.

EQAC relies on considerable contributions that have been provided by numerous organizations and individuals. These agencies and organizations have, collectively, dedicated hundreds of hours to the collection and presentation of information that has informed our review of each of the issues presented in this report. In past reports, we attempted to include all of the information that had been provided to us; the result was reports that were several hundreds of pages in length. It is not possible to present the full extent of this information concisely, and we have chosen, beginning with our 2017 Annual Report, to not attempt to do so. This does not, though, detract from our appreciation for the tremendous efforts that have been made by all of these agencies and organizations for our benefit. While we have not presented much of the information we collected for this report, all of this information has essential to our understanding of the issues addressed in this report, and our ability to craft appropriate and meaningful recommendations would not have been possible without each and every piece of information we received. EQAC therefore extends its appreciation to the following for their critical support for this effort:

Alice Ferguson Foundation
Clean Fairfax
Coalition for Smarter Growth
Fairfax Alliance for Better Bicycling
Fairfax County Department of Cable and Consumer Services
Fairfax County Department of Code Compliance
Fairfax County Department of Human Resources
Fairfax County Department of Information Technology
Fairfax County Department of Management and Budget
Fairfax County Department of Planning and Development
Fairfax County Department of Procurement and Material Management

Fairfax County Department of Public Works and Environmental Services
Fairfax County Department of Transportation
Fairfax County Department of Vehicle Services
Fairfax County Executive's Office
Fairfax County Facilities Management Department
Fairfax County Fire and Rescue Department
Fairfax County Health Department
Fairfax County Land Development Services
Fairfax County Office of Environmental and Energy Coordination
Fairfax County Park Authority
Fairfax County Police Department
Fairfax County Public Schools
Fairfax County Restoration Project
Fairfax County Wetlands Board
Fairfax County Wildlife Management Specialist
Fairfax Master Naturalists
Fairfax ReLeaf
Fairfax Water
Federal Aviation Administration
George Mason University
Interstate Commission on the Potomac River Basin
Metropolitan Washington Airports Authority
Metropolitan Washington Council of Governments
Northern Virginia Conservation Trust
Northern Virginia Regional Commission
Northern Virginia Soil and Water Conservation District
NOVA Parks (Northern Virginia Regional Park Authority)
Occoquan Watershed Monitoring Laboratory
Potomac Conservancy
Reston Association
United States Geological Survey
Upper Occoquan Service Authority
Virginia Cooperative Extension, Fairfax County
Virginia Department of Environmental Quality
Virginia Department of Forestry
Virginia Department of Game and Inland Fisheries
Virginia Department of Transportation
Virginia Outdoors Foundation

As evident from this list of agencies and organizations, EQAC has many partners. We thank and commend them all, as well as all others who work to preserve and enhance the environment of the county.

Finally, EQAC wishes to commend the efforts of the county's interagency Environmental Coordinating Committee (ECC), which is now chaired by Chief Financial Officer Joe Mondoro. We appreciate our semiannual meetings with ECC and ECC's continued efforts at managing

environmental actions within the county. We also appreciate ECC's coordination of the staff responses to the recommendations within EQAC's *Annual Report on the Environment*. We also recognize the ongoing efforts of the interagency Energy Efficiency and Conservation Coordinating Committee.

A FEW WORDS ABOUT ENVIRONMENTAL STEWARDSHIP

Board of Supervisors Environmental Vision:
"An informed community works together with Fairfax County and its partners to care for and responsibly manage our treasured natural resources. In partnership, Fairfax County will continue to coordinate and promote education and outreach programs that encourage personal stewardship and promote initiatives at a countywide level."[3]

We noted in the introduction to this report that the report is formatted such that it generally tracks the structure of the Board of Supervisors' Environmental Vision document. We have included chapters in this report based on six of the seven core service areas identified within that document. The seventh core service area, Environmental Stewardship, touches upon all of the other core service areas and is therefore integrated within each of the other chapters.

As we have noted in previous Annual Reports, environmental quality is a team effort. We need partnerships with government, commercial, and volunteer organizations to improve our environment. Many agencies, organizations, and individuals contribute in innumerable ways to the stewardship of our precious environmental resources, and the excerpt above from the Board of Supervisors' Environmental Vision document is essential to achieving the vision statements for each of the other six core service areas. We have chosen to not present a separate chapter within the body of the report for environmental stewardship; this is not because we feel that it is lacking in importance in comparison to the other six core service areas, but instead because it is so broadly encompassing as to be an essential component of each of these core service areas rather than a separate consideration. We have, however, included within the Data Appendix a brief discussion of organizations that focus on environmental stewardship efforts and best practices supporting government and non-government resources and broader environmental needs.

[3] 2017 Fairfax County Environmental Vision, Section 2 G, pg. 32, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

SUMMARY OF EQAC ACTIVITIES: NOVEMBER 2018 THROUGH OCTOBER 2019

Between November 1, 2018 and October 31, 2019, EQAC held 12 meetings, including one public hearing, two joint meetings with the Fairfax County Environmental Coordinating Committee, and one joint meeting with the Fairfax County Park Authority Board. In addition, meetings of ad hoc EQAC committees were held during the course of the year. During this period, EQAC issued six resolutions and positions (see the list below, with details provided in Appendix D of the Data Appendix). On November 20, 2018, EQAC presented its 2018 Annual Report on the Environment to the Board of Supervisors. On October 22, 2019, EQAC presented the 2019 Environmental Excellence Awards (see www.fairfaxcounty.gov/environment/environmental-excellence-awards).

KEY AGENDA ITEMS

November 14, 2018

- Discussion of organizational structure and resources for energy and climate functions in Fairfax County
- Annual Report on the Environment: Concluding thoughts and preparation for the November 20 presentation to the Board of Supervisors

December 12, 2018

- Briefing on Fairfax County recycling program
- Briefing on Fairfax County Environmentally Preferable Purchasing Policy
- 2018 Annual Report on the Environment: Review of the November 20, 2018 presentation to the Board of Supervisors (BOS)
- Establishment of a nominating committee for EQAC officers for CY 2019
- Preparation for the January 9, 2019 public hearing

January 9, 2019

- Annual public hearing
- Election of officers for CY 2019
- Consideration of correspondence to the BOS regarding recycling and environmentally-preferable purchasing

February 13, 2019

- Briefings on regional efforts supporting climate resiliency
  - Dr. Dale Medearis, Northern Virginia Regional Commission
  - Stephen Walz, Metropolitan Washington Council of Governments
- Follow-up to the January 9, 2019 public hearing, including approval of the public hearing minutes and summary
- Identification of agenda items for the March 13, 2019 joint meeting with the Environmental Coordinating Committee (ECC)
- Review of lighting letter to the BOS

- Review of student member application materials

March 13, 2019
- Joint meeting with the ECC (comprised of senior county staff)
  - Briefing on FY 2020 Advertised Budget Plan
  - Briefing on proposed changes to the county's environmental organization
  - Briefing on county strategic planning process
  - Briefing on pilot project to track Board-Appointed Committee (BAC) hours
- Briefing on water quality monitoring - Occoquan Watershed Monitoring Laboratory
- Update on Dulles Airport Noise Contours
- Discussion of Fairfax Joint Local Emergency Planning Committee (FJLEPC)

April 10, 2019
- Briefing on Fairfax County Erosion and Sediment Control program
- Discussion of Staff Responses to 2018 Annual Report on the Environment recommendations
- 2019 Annual Report on the Environment kickoff
- Development of EQAC's position on the FY 2020 Advertised Budget Plan

May 8, 2019
- Briefing on easements
- Discussion of potential EQAC memo to the BOS regarding easements
- Preparation for July 9, 2019 Joint BOS-EQAC meeting
- 2019 Annual Report on the Environment (finalize chapter author assignments & establish chapter review schedule)
- Establish Environmental Excellence Awards selection committee

June 12, 2019
- Update on easements
- Review agenda for July 9, 2019 Joint BOS-EQAC meeting
- Discussion of legislative proposals
- Selection of preferred student member candidate & alternate

July 10, 2019
- Joint meeting with the Fairfax County Park Authority (FCPA) Board
  - Presentation of Natural Resource Management Plan
  - Presentation of Deer Management Plan
- Follow-Up discussion of joint EQAC-FCPA Board meeting
- Follow-Up discussion of July 9, 2019 Joint BOS-EQAC meeting
- Discussion of legislative proposals
- Review of Annual Report on the Environment sections

August 14, 2019
- Presentation of BAC Volunteer Hours Pilot Project
- Final review of legislative proposals for the 2020 General Assembly
- Final review of Living Shorelines memorandum

- Selection of Environmental Excellence Awards
- Review of Annual Report on the Environment sections
- Establish agenda for the September joint meeting with the ECC

September 11, 2019

- Joint meeting with the ECC
  - Briefing on potential changes to County Chesapeake Bay Preservation Ordinance and Public Facilities Manual
  - Briefing on Green Building Plan Amendment
  - Briefing on Living Shorelines
  - Briefing on Community-Wide Energy and Climate Action Plan
- Review of Annual Report on the Environment sections
- Set annual public hearing date

October 10, 2019

- Review of Annual Report on the Environment sections
- Scheduling of a briefing for the Chesapeake Bay Total Maximum Daily Load Phase III Watershed Implementation Plan
- Discussion of potential memorandum to Planning Commissioner Hart

Approved minutes of EQAC meetings, along with presentations given at these meetings, are available from EQAC's website, at www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/minutes.

EQAC RESOLUTIONS AND POSITIONS

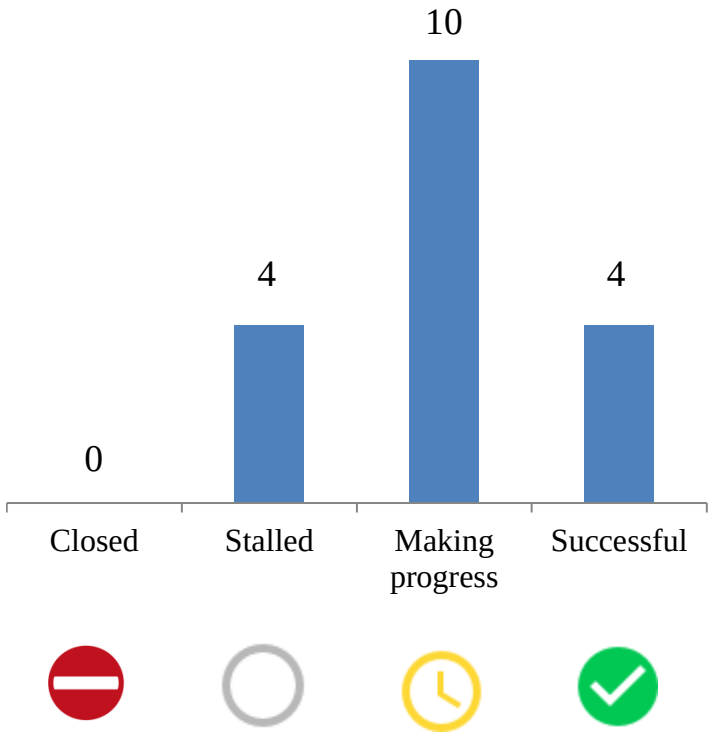
February 26, 2019:	Conversion of Streetlights to LED
March 21, 2019:	Consideration of Updates to Airport Noise Policies
July 19, 2019:	Recommendations for incorporation into Fairfax County's State Legislative Positions for 2020
July 19, 2019:	Input to County Executive's Review of Green Building Policies for County Facilities
July 25, 2019:	Implementation of a Living Shorelines Loan Program
October 10, 2019:	Follow-up correspondence regarding Legislative Position Statement for California Advanced Clean Cars Standards

Details are available in the Data Appendix as well as EQAC's website, at www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/resolutions.

SCORECARD
Progress Report on 2018 Recommendations

SC-1

Status of recommendations



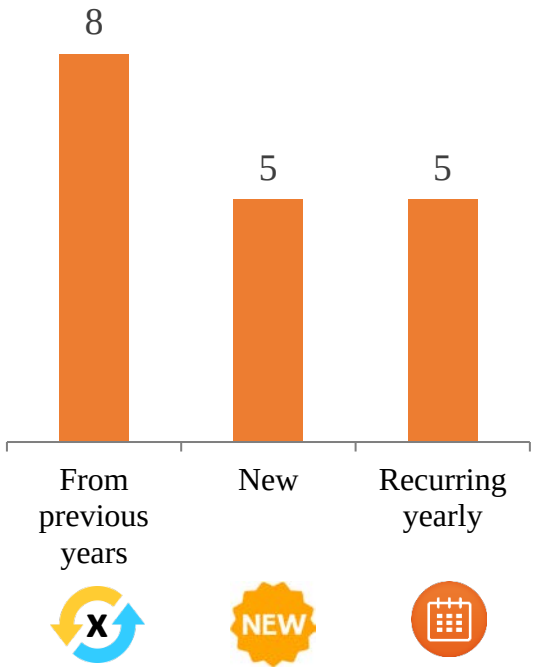
Closed: The recommendation will not be implemented.

Stalled: Little or no progress was made towards implementation.

Making progress: Substantial progress was made towards implementing this recommendation.

Successful: The recommendation was implemented.

Age of recommendations

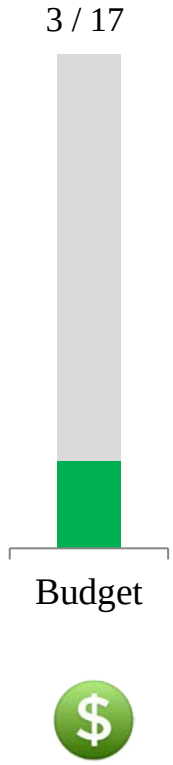


From previous years: Recommendation has been previously included; Each icon indicates the number of total years it has been included.

New: New, long term recommendation.

Recurring yearly: Short- term, yearly recurring recommendation.

Budget



Budget: Ratio of issues which would most easily be addressed via a line-item in the budget.

I. LAND USE

	Land Use: Four Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC has been an advocate for holistic planning processes and supports the Site Specific Plan Amendment (SSPA) Process. Holistic approaches align with the vision to consider economic, social and environmental factors resulting in vibrant, healthy and desirable places. EQAC recommends that the SSPA process continue to: 1. Prioritize large study areas that encompass multiple projects. 2. Include a robust screening process to make sure the most appropriate projects are considered at a site-specific level. 3. Continue to develop Policy Plan amendments that result in better environmental outcomes across all projects.	1. Staff continues to implement the Comprehensive Plan Amendment Work Program to schedule large area (area-wide) and countywide Policy Plan amendments that involve large study areas or countywide needs, in addition to site-specific plan amendments 2. The robust screening process is effective. During the 2017 North County SSPA with district-level community task forces, four out of the original ten nominations submitted were added to the work program . 3. Policy Plan amendments are continuing to progress along with the SSPA process.	Successful  .

	Land Use: Four Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	**<u>Land Development Applications and Information</u>** EQAC supports the new PLUS system being developed to create a single system of record for land development. We recognize the complexity of developing a system crossing multiple agencies and support the process to make sure all requirements are considered. In particular, we recommend that PLUS be able to track the quantity of development (gross floor area and number of residential units) along with use type (residential and nonresidential) at each stage of development activity from Plan amendment through zoning approval, site plan approval and building permit issuance. EQAC commends the work being done in Tysons to track development activity at the building level and to provide details in the Tysons Annual Report. We recommend that the other mixed-use centers also be tracked, similar to the Tysons model. At any given point of time there should be accurate information about the existing development as well as the development that can be expected in the next five to 20 years, based on the development pipeline from the PLUS system.	The project to design, configure and implement the Planning Land Use System (PLUS) is underway. County staff will work with the system implementer to design a solution that demonstrates how data capture at the building level can be quantified and reported, as system design activities are completed this year.	Making progress  EQAC continues to support this effort and will continue this recommendation until the system is fully implemented.

	Land Use: Four Recommendations	Action taken by Agency or Department	Status / EQAC Comments
3	**<u>Environmental focus on Comprehensive Plan review committees</u>** The Tysons Corner Land Use task force had representation by many stakeholders, including a designated environmental representative. That focus on environmental perspectives created a strong set of guidelines that included stream protection, open space, walkability and energy conservation. EQAC recommends that an environmental representative be appointed to future task forces and review committees to align with the Board of Supervisors' Environmental Vision from the very first committee meeting.	This recommendation has not been addressed, although staff notes that the recommendation is directed to the Board of Supervisors and not to county staff, in that the Board determines the membership of its task forces.	Making progress  With the Site Specific Plan Amendment process implemented, EQAC continues to recommend the board designate an environmental representative on land use-related task forces and committees.
4	**<u>Light Pollution—Outdoor Lighting Ordinance</u>** EQAC recommends the lighting work group, reconstituted in 2018, continue working towards the goal of updating the 2003 Outdoor Lighting Ordinance.	Outdoor lighting is on the 2018 Priority 1 Zoning Ordinance Amendment Work Program (ZOAWP). In 2019, staff will continue to work with the lighting work group and other stakeholders to develop recommendations for updating the standards in the current Ordinance.	Making progress 

II. TRANSPORTATION

	Transportation: Three Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	Consistent with the recommendations of the Transportation Advisory Council at the May 2018 meeting of the Board of Supervisors' Transportation Committee, EQAC recommends a thorough study of emerging technologies such as autonomous vehicles, connected vehicles, smart streets and related solutions that would utilize data and an environment of connected sensors to manage the transportation system. New technology may disrupt the well-established patterns illustrated by the commuting data, yield the efficiencies described in the Board of Supervisors' Environmental Vision or help to identify and address gaps in equity of access. The study recommended by the TAC would help the county prepare for and take advantage of these technologies.	County staff has several ongoing efforts relevant to this recommendation. These consist of an Alternative Service Feasibility Study by FCDOT that is expected to be completed in 2019, exploration of a pilot project to deploy autonomous shuttle vehicles, and hosting of a Smart Cities Readiness workshop with a focus on transportation.	Making progress  EQAC appreciates that county staff are taking these several actions, but believes they are somewhat ad hoc and would like to see a broader comprehensive study of emerging technologies. Such a study should be looking at a wide array of emerging technologies and planning for actions relevant to both county and non-county operations over a multi-year period. EQAC believes that it is important to consider in a comprehensive manner the joint impacts all of the expected advances in transportation technology may have on transportation modes and patterns in the County in the medium- and long-term, so that this information can inform future planning decisions.

	Transportation: Three Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	Continue investment in transit, bicycle and pedestrian projects where possible in support of the Bicycle Master Plan and the Transit Development Plan.	Fairfax County DOT is continuing to implement the Bicycle Master Plan and the Trails Plan through a variety of activities. In 2018, 30 miles of on-road bike infrastructure were added. FCDOT is also continuing to implement the transit development plan through service changes and transit planning studies, including the Fairfax Connector route from Vienna Metro to the Pentagon Transit Center, and the service connecting the Franconia-Springfield Metro Station and Inova Mount Vernon Hospital.	Making progress  EQAC appreciates that the county has funded new bicycle and pedestrian projects at a level more than 5 times higher than noted in their 2006 10-year goal; also its continued efforts to work with VDOT on adding bicycling infrastructure in conjunction with re-paving activities. EQAC also appreciates county efforts to include funding for all Fairfax Connector bus service changes within its FY 19 approved budget. EQAC's ongoing interest is in seeing continued support of funding at similar or greater levels for implementing the Bicycle Master Plan, the Trails Plan, and the Transit Development Plan.

	Transportation: Three Recommendations	Action taken by Agency or Department	Status / EQAC Comments
3	If changes reducing fuel economy standards or vehicle emissions standards are proposed by the U.S. Environmental Protection Agency, work with regional partners through the Metropolitan Washington Council of Governments to oppose reducing standards which protect the environment and the interests of consumers. With an overwhelming share of commuting trips coming from personal vehicles, these standards are critical to mitigating climate and air quality impacts from transportation.	Fairfax County addressed this recommendation through its efforts as a member of the Metropolitan Washington Air Quality Committee, the COG CEEPC, and the NCR TPB. Those three groups submitted a letter on October 17, 2018 to USEPA and USDOT in support of the existing emission standards, and opposed to proposed changes in CAFÉ and tailpipe CO2 emission standards for passenger cars and light duty trucks.	Successful  This recommendation has been addressed through the letter submitted October 17, 2018 to USEPA and USDOT in support of the existing emission standards.

III. WATER

	Water: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC recommends that Fairfax County continue to 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 funding for the stormwater program will come entirely from funds generated through the Service District rates. EQAC also realizes that there is a need for increasing capacity within the Department of Public Works and Environmental Services to provide these services. **EQAC recommends that the Stormwater Service District rate be increased in FY 2020 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100. EQAC understands that this increase would not fully meet stormwater management needs and therefore suggests that additional increases be continued each fiscal year until adequate funding to support the program is achieved.** This would, once again, result in more funding for modest watershed improvement programs and a somewhat more realistic infrastructure replacement timeline. We realize that there will be a need for additional increases in funding for water quality projects to meet future permit conditions, and for infrastructure reinvestment, as the system is continually growing and aging.	The county was able to fully fund the amount requested by the quarter penny rate increase through an increase in property values, and thus an increase in tax revenue, without needing to increase the tax rate itself.	Successful 

	Water: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	The county has evolved a series of policies and ordinances to protect stream valley lands and other environmental assets (i.e., the Floodplain Regulations of the Zoning Ordinance, the Environmental Quality Corridor policy of the Comprehensive Plan, and the Chesapeake Bay Preservation Ordinance). EQAC recommends that those policies and ordinances should remain unchanged or enhanced when possible.	No negative changes were made to existing policies that protect local waters and water quality.	

IV. WASTE MANAGEMENT

	Waste Management: Three Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	County Procedural Memorandum PM12-21 Environmentally Preferable Purchasing Policy (EPPP) for all county departments should be reviewed and implemented by the Board of Supervisors to assure it will encourage all county contractors, as well as other trash disposal and recyclables processing facilities, to manage materials according to their best environmental use in an economical way. Consideration should be given to making this document public and included in all aspects of procurement. This will require changes to future procurement and contracts.	As of 6/14/19, DPMM has one of two FTE positions filled on its newly created Sustainable Procurement Team and is currently recruiting for the second. In addition, DPMM is considering making the EPPP available to bidders. An update to the EPPP is planned.	Stalled  One of two positions have been filled. However no actual action on providing the EPPP policy to bidders or schedule to update the EPPP has been made. With no time commitment and no actual progress, EQAC concludes this recommendation is stalled. See Recycling coordination discussed below.

	Waste Management: Three Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	Conduct an Increased Recycling, Reduce, Reuse Solid Waste Study. The Board of Supervisors should commission a study reporting on changes to Fairfax County methods to increase recycling viability, local market opportunities and economic and environmental effectiveness. Most importantly, the study should identify changes to Virginia law that may be needed to provide options for higher recycling rates to address the changed recycling market. Numeric targets and measurement methods should be established for each recommendation. This study should be guided by the EPPP discussed above. It is imperative that the study consider regional action and cooperation. Finally, it should be recognized that recycling, reduction and reuse have environmental benefits that justify the balanced expenditure of public and private money.	DWES in coordination with DPMM has hired a consultant for the study and are in the data review phase currently. They expect the draft report in late October and final in November. Report out to the BOS would follow after final report delivery.	Making progress  DWES are to be commended for moving expeditiously to implement this recommendation. EQAC looks forward to the results of the study, and in particular, the environmental effectiveness of various methods evaluated. We hope DPMM can move forward with the EPPP to provide meaningful coordination with DWES
3	EQAC continues to recommend that the Board of Supervisors support changes to Virginia law to provide for a local option Disposable Bag Litter Abatement program and statewide container redemption fee (bottle bill) to reduce litter and increase recycling.	The County retained the "Reducing Environmental Contamination from Plastic and Paper Bags" position in the 2019 legislative program. Legislation related to plastic bags was considered by the 2019 General Assembly, but was defeated, as was the case in previous sessions. One such bill also included local authority on single use bottles, but that legislation was defeated as well.	Stalled 

V. PARKS AND ECOLOGICAL RESOURCES

	Parks and Ecological Resources: One Recommendation	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC recommends that the Board of Supervisors increase full time staff capacity for Fairfax County Park Authority's (FCPA) Natural Resource Management program in support of the Citizen Science Program. The program will directly support the board's Environmental Vision by ensuring the fourth and final program area of the Natural Resource Management Plan (Fostering Stewardship and Expanding Natural Capital) is appropriately staffed. By staffing this program, the county will directly benefit in several ways: increased capacity for ecological restoration activities through developing and maintaining a volunteer workforce for ecological restoration activities (in addition to its successful Invasive Management Area program); developing and maintaining strategic partnerships to manage natural areas; furthering natural resource-based education within the agency; and the creation of programs that inform county decision-making. This program will also benefit county residents by meeting growing customer needs for citizen science projects.	No action has been taken by FCPA. If this recommendation was accepted by the Board of Supervisors, one additional merit position and $93,000 per year would be required to maintain the program. If dedicated, recurring funding is not identified, the Park Authority will continue to investigate auxiliary sources of funding.	Stalled  As mentioned in the recommendation itself, board approval for this position would directly support the Environmental Vision by ensuring the fourth and final program area of the Natural Resource Management Plan, Fostering Stewardship and Expanding Natural Capital, is appropriately staffed.

VI. CLIMATE AND ENERGY

	Climate and Energy: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC recommends that Fairfax County develop a community-wide climate and energy action plan to reduce GHG emissions in the private sector, which is the source of 97 percent of the county's GHG emissions. Development of this plan should be based on a transparent and collaborative process and would be in accordance with the Board of Supervisors' endorsement of the Mayor's National Climate Action Agenda on June 6, 2017, the goals established by the 2017 Environmental Vision and regional (MWCOG) climate goals. In support of this work: • EQAC recommends that the Board of Supervisors direct county staff to publish an annual Greenhouse Gas Inventory Report for county operations. Such action will assist the public in better understanding the trends in county energy use and the results of investments in energy efficiency and renewable energy measures. The annual report should cover years 2006 to the reporting year. The report prepared by the Fairfax County Public Schools provides a useful model • EQAC recommends that the 2019 annual report on the Fairfax County Operational Energy Strategy should compare county progress to the board's goal in the Environmental Vision and the Cool Counties	The Board of Supervisors endorsed a timeline and structure for a Community-Wide Energy and Climate Action Plan (CECAP), at their June 18, 2019 Environmental Committee meeting. Following this meeting, staff kickstarted the CECAP Initiation Phase, which is expected to last through Summer 2019. Current staff duties include: • Standing up an internal Coordinating Team and Steering Committee, a stakeholder-led Energy and Climate Task Force and district-level Focus Groups; • Developing a Scope of Work for contractual services to support CECAP development and community outreach; and • Filling two new staff positions, funded by the Board in May 2019, to oversee development and implementation of the CECAP. Pending Board approval in September of $750,000 from FY2019 Carryover funds for consulting support and plan development, staff expects to commence the CECAP Planning Phase in Fall 2019. Community outreach will begin at this time.	Making progress  .

	Climate and Energy: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
	Declaration for a 20 percent reduction in GHG emissions from 2010 to 2020.		
2	EQAC recommends that the Board of Supervisors direct the development and implementation of a climate adaptation/resilience plan, which would help to minimize the impacts of climate change. The objective of this adoption/resilience plan would be to reduce the adverse impacts of climate change (e.g., flooding, power outages) on local residents, businesses and critical infrastructure and to help to reduce the long-term costs of extreme weather events and other climate change impacts.	Staff recommend that the Board endorse the establishment of an internal steering committee to develop a request for information proposal. The information would be used to develop a request for proposal to select a contractor to develop a climate adaptation and resiliency plan for Fairfax County. Alternatively, the staff believes that a steering committee composed of relevant County agencies could develop recommendations that would be provided to the Board of Supervisors to address this recommendation.	Making progress  On Feb. 5, 2019, the Board directed the Environment Committee to consider a timeframe for this plan. While preliminary work to support the development of a climate adaptation/resilience plan has been initiated, the development of such a plan has yet to start.

VII. AIR QUALITY

There were no recommendations in the 2017 Annual Report

VIII. WILDLIFE MANAGEMENT

	Wildlife Management: One Recommendation	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC recommends that the Board of Supervisors fund or otherwise increase staff capacity in the Fairfax County Police Department or other county agency for the hiring of a full-time wildlife assistant. At its current staffing and funding levels, the Fairfax County Deer Management Program is sustaining its impact year to year, but is unable to grow in order to better address the needs of the county. The Canada Geese Management Program is operating at a low capacity due to limited staffing for outreach and training of volunteers. Over the past several years, turnover of the part-time wildlife assistant position(s) have been extremely high, resulting in the training of new hires taking a significant amount of time away from growing the management programs. With a full-time position, additional data analysis (e.g. of VDOT deer-collision data) could be completed, additional education and outreach of the county wildlife programs could be implemented and program services could be expanded to include inventory and population monitoring of additional wildlife taxa (i.e., bats, birds, reptiles, amphibians, coyotes).	Staffing of a full-time wildlife assistant position for the Wildlife Management Specialist Office was requested internally for FY 2019. The Animal Services Division recommended that one of the part-time Naturalist positions be converted to a full-time wildlife assistant position allowing for continuity and support toward the workload in the various supported programs and initiatives. However, due to fiscal constraints and other critical public safety staffing needs within the FCPD, the full-time wildlife assistant position was not authorized for FY 2019 and is not included in the updated Public Safety 5-year staffing plan (FY 2019 —FY 2023). Staff concurs that the Wildlife Management Office is currently understaffed to meet the growing demands for services, education/outreach and operations related to the various supported programs and initiatives. Increasing staff capacity within the FCPD or creating a wildlife assistant position in another county agency to work jointly with the FCPD Wildlife Management Specialist would serve to meet growing customer needs for the wildlife program if resources were available.	Stalled  Increasing staff capacity within the FCPD or creating a wildlife assistant position in another county agency to work jointly with the FCPD Wildlife Management Specialist would serve to meet growing customer needs for the wildlife program if resources were available. EQAC recommends that the BOS, through its Environmental Committee, evaluate the feasibility of increasing funding for the FCPD to support a full-time wildlife assistant position, or creating a comparable position within another county natural resource department to work jointly with the FCPD Wildlife Management Office.

IX. TECHNOLOGY TO UNDERSTAND THE COUNTY

	Technology: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	**Expanding GIS Data and Applications** EQAC recommends that the county pursue regular acquisition of both LIDAR and multi-spectral data based on their value to environmental stewardship. Additionally, environmental agencies should continue to grow the utilization of field data collection using mobile GIS tools.	In 2018, the Department of Public Works and Environmental Services (DPWES), the GIS Division of the Department of Information Technology and the U.S. Department of the Interior entered into one-time Funding Agreement to capture quality level one LiDAR data of Fairfax County and its immediate neighbors to the east in 2019. The County of Arlington, City of Alexandria and the City of Fairfax have all agreed to be contributors to the project as well, funding the square mileage that covers their jurisdictions. The new tools available today for mobile GIS have brought down costs of field data collection and today mobile GIS use is increasing as agencies incorporate mobile devices into their business processes and Enterprise GIS implementing an on-line portal.	Making progress 

	Technology: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	**<u>Access to Data</u>** EQAC recommends that the county continue its efforts to ensure convenient public access to GIS and other environmental data.	GIS Division launched a publicly available general viewer called JADE in the summer of 2019. The JADE allows users to perform custom mash ups of the data unrestricted by the thematic viewers above. With JADE users can create custom maps and obtain automated reports. The JADE offers another way for the public to view and use the GIS data. (Note: JADE was formerly referred to as a public-facing version of GEM.)	Making progress

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I. LAND USE

Board of Supervisors Environmental Vision:
"The county will continue to refine and implement land use policies and regulations that accommodate anticipated growth and change in an economically, socially and environmentally sustainable and equitable manner while revitalizing older commercial centers, protecting existing stable neighborhoods, supporting sustainability and supporting a high quality of life. The development priority will be mixed use, pedestrian and bicycle-friendly transit-oriented development in activity centers. Policies and regulations will result, throughout the county, in the development and enhancement of vibrant and vital pedestrian and bicycle-friendly places where people want to live, work, shop, play, learn and thrive in a healthy environment, ensuring the protection, enhancement and restoration of natural resources, and the provision, in building and site designs, for the efficient use of resources."[1]

BACKGROUND

Fairfax County covers approximately 395 square miles with over 1.152 million residents and 418,000 households[2]. As the population has grown and the county has transitioned toward a more urban environment, the Comprehensive Plan and the decision-making processes for how land is used have also evolved. When the first environmental vision was adopted in 2004, the county was fast approaching "build-out," whereby little vacant or undeveloped land was available. To continue growing after build-out, the focus of land use across the county shifted from new development to revitalization and redevelopment. The County is now well into that transformation and significant development continues to provide new jobs and housing. These changes allow the county to continue to grow and prosper within a finite environmental footprint and have the potential to improve negative environmental impacts from older projects.

Historical Context

The Board of Supervisors' (Board) newly adopted vision statement for land use (presented above) continues to focus on policies and regulations that support growth while protecting the environment and existing stable neighborhoods. The vision builds on an impressive environmental legacy that began in 1971 when the Board made a significant commitment to implementing planning across the county to control growth. The book No Little Plans[3] documents when, *"in the early 1970s citizens and elected officials … tried to thwart the negative effects of rapid urbanization by spending eighteen months and $1.5 million on a planning program to control the rate and direction of future growth."* Through lawsuits and settlements the planning process was established.

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[1] 2017 Fairfax County Environmental Vision, Section 2 A, pg. 6, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf
[2] Demographic Reports 2018, County of Fairfax, Virginia
[3] No Little Plans, Fairfax County's PLUS Program for Managing Growth, Grace Dawson, 1977

The legacy continued into the 1980s when the Board took action to protect the Occoquan watershed. More than 38,500 acres of property were down-zoned from one-acre to five-acre development, *"citing a study that predicted the Occoquan reservoir could turn into a smelly swamp if some action is not taken."* Over two dozen landowners *"filed an unprecedented barrage of lawsuits challenging the county's right to control growth in its less developed west."*[4] In one of the longest court cases at the time in the County, the Board's 1982 downzoning action was upheld in a landmark 1985 Circuit Court decision. The decision preserved the five-acre zoning of the watershed, helping to protect the water quality of the Occoquan Reservoir. It also reinforced the ability of local governments in Virginia to implement their comprehensive plans and enabled jurisdictions to effectively plan for the future.[5]

In 1988, the Commonwealth of Virginia approved the Chesapeake Bay Preservation Act (Bay Act), which is one of the county's most important laws protecting land and waters. To comply with the Bay Act, the Board of Supervisors enacted a Chesapeake Bay Preservation Ordinance in 1993 that regulates the kinds of development that can occur in Fairfax County, particularly, Resource Protection Areas (RPAs), which are lands adjacent to water bodies. The 1993 Ordinance states that *"RPAs shall consist of sensitive lands at or near the shoreline that have intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts that may cause significant degradation to the quality of state waters. In their natural conditions, these lands provide for the removal, reduction, or assimilation of sediments, nutrients, and potentially harmful or toxic substances in surface runoff entering the Bay and its tributaries, and minimize the adverse effects of human activities on state waters and aquatic resources."* [6]

In December of 2001, the Commonwealth adopted amendments to the Chesapeake Bay Preservation Area regulations. The centerpiece of the revised regulations was that RPAs would now be designated around all water bodies with perennial flow. As the County considered regulations to comply with this amendment, developers and environmentalists struggled with the balance between protection and development. The County again established a strong environmental precedent by approving a scientifically valid process to identify water bodies with perennial flow. During the first two years of the Perennial Streams Identification and Mapping project, 330 additional miles of streams were added to the existing RPA network.[7] This was a significant result and set the standard for other jurisdictions. As noted in the quality assurance report of mapping project:

> *"Nature has always been under pressure from human populations; the only thing that has really changed over time is the size and complexity of those pressures."*

[4] Downzoning Of Occoquan Draws Suits, Washington Post, October 12, 1982: https://www.washingtonpost.com/archive/local/1982/10/12/downzoning-of-occoquan-draws-suits/54293db0-aa79-4d59-a6c0-28806a536afd/

[5] Fulfilling The Promise: The Occoquan Watershed In The New Millennium, Report of the New Millennium Occoquan Watershed Task Force, Final January 27, 2003: https://www.novaregion.org/DocumentCenter/View/247/OTFFinalReport12703?bidId=

[6] Fairfax County Streams Mapping Project Quality Control/Assurance Methodology and Results, December 2004 https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/pdf/01_ps_qc_full_ada_v2.pdf

[7] ibid

Build-Out and Urbanization: Tysons as Fairfax Downtown and Revitalization

In 2004 the County continued the legacy of Environmental leadership and adopted a 20-year environmental vision. The vision was clear:

> *"The Board of Supervisors supports these two environmental principles:*
> *1. The conservation of our limited natural resources must be interwoven into all government decisions. There is a direct link between the vitality of ecological resources and the quality of life for our citizens.*
> *2. We must be committed to provide the necessary resources to protect our environment."*

Between 2004 and today, the transition from development to redevelopment/revitalization while improving the environment within the larger built environment and the overall quality of life have dominated land use discussions. Revitalization and redevelopment are complex endeavors requiring coordination across the community and significant public and private investment.

The most significant transformation since 2004 has been in Tysons Corner, which is redeveloping into the county "downtown." As new Metro stops were being developed through Tysons it was obvious that planning for a new city required a holistic and visionary process. In May 2005 the Board established the Tysons Land Use Task Force to coordinate public outreach during the planning process. Over the next three years, this 36-member group of Board-appointed citizens developed a vision for Tysons based on best practices in transit-oriented developments and public input from a series of community workshops. The Task Force presented its recommendations to the Board in September 2008.[8]

Tysons is an economic engine and is now becoming a functional downtown with shopping, commercial uses, and residential uses aligned with multi-modal transportation and thoughtful public spaces. The adopted plan amendment significantly improves the environmental quality by rebuilding older development with modern practices. All new development proposals within Tysons are expected to retain on-site and/or reuse the first inch of rainfall to the extent practicable in order to mimic the runoff characteristics of a good forested condition. In addition, development proposals are expected to provide green building measures that support the goal of obtaining Leadership in Energy and Environmental Design (LEED) credits for Sustainable Sites and Water Efficiency.[9] Achieving adopted storm water performance guidelines generally requires the incorporation of multiple strategies, depending on the soil and site conditions.[10]

The planning effort for Tysons won a national award for urban planning. Development is continuing per the plan and up to 100,000 residents and 200,000 employees are expected in Tysons by 2050. Ongoing development in Tysons is being realized with significant construction, an effective public/private partnership guiding the community, and new residents moving into the urban core.[11] The Comprehensive Plan calls for 20 percent of new residences to be set aside as workforce or affordable housing for all proposals seeking to utilize the redevelopment option.

[12] www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan
[12] www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan
[12] www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan
[12] www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan

The affordable housing guideline goes beyond the county's current policy of 12 percent, with housing to be made available to residents making from 50 to 120 percent of the Area Median Income.

Following the Tysons planning process, the County continued to emphasize holistic planning across mixed-use areas of the County. A new comprehensive plan review process called Fairfax Forward was adopted to leverage this holistic planning and align County resources in areas that were targeted for growth.

On July 1, 2007, the Office of Community Revitalization (OCR) was created to focus on revitalization efforts county-wide. OCR, now the Community Revitalization Section of the Department of Planning and Development, continues to facilitate strategic redevelopment and investment opportunities that align with the community's vision to improve the economic vitality, appearance, and function of those areas.

The Fairfax County Comprehensive Plan and Zoning Ordinance

The Comprehensive Plan[12] and the Zoning Ordinance[13] are the primary documents that guide decisions and specify legal requirements for land development in the county. The Comprehensive Plan is required by state law to be used as a guide in decision-making about the built and natural environment, and must be regularly reviewed. The Zoning Ordinance contains legal regulations for building in the county. These documents are regularly updated and the process by which they evolve determines the scale, scope and pace of changes to the county landscape into the future.

The current edition of the Comprehensive Plan consists of several components. The Policy Plan outlines the objectives, policies and guidelines that guide planning and development review in order to achieve county goals. The Policy Plan functional sections and website links are:

Land Use	Transportation	Housing
Environment	Economic Development	Heritage Resources
Public Facilities	Human Services	Parks and Recreation
Revitalization	Visual and Performing Arts	Chesapeake Bay Supplement

The Plan includes four Area Plans (Area I, Area II, Area III and Area IV) that identify key elements for implementing the Policy Plan's goals and objectives at the planning district and community levels. The Comprehensive Land Use Plan Map illustrates planned land uses, transportation improvements, and public facilities, with the Countywide Transportation Plan Map and the Countywide Trails Plan Map providing a detailed view of those respective elements of the Plan.

Comprehensive Plan - Special Planning Areas

The Comprehensive Plan also documents Special Planning Areas.[14] These areas were first identified as the Concept for Future Development and Land Classification System published in

[12] www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan
[13] www.fairfaxcounty.gov/planning-zoning/zoning-ordinance
[14] https://www.fairfaxcounty.gov/planning-development/comprehensive-plan/special-planning-areas

1990 and revised in 2012. When the concept map was initially created in 1990, the focus was developing Tysons as the Urban core and establishing growth around Metrorail stations that provided multi-modal transportation options. The Concept Map was also referenced in workshops for the Countywide Transit Network Study to design a High Quality Transit Network.

With the original concept largely realized, EQAC sees a need to formulate a new 30 to 50-year conceptual document.

Comprehensive Plan and Development Potential

The Fairfax County Comprehensive Plan is continuously reviewed and amended to reflect changes in the built environment and county values and priorities. While the amount of undeveloped land available across the county has decreased, the Plan potential, or the number of units that can be built in the county, has increased. When the county was approaching build-out, there was 6.1 percent vacant space available. New amendments typically consider larger and taller buildings as part of redevelopment, which allow continued growth in the same footprint. In regards to residential uses, this means more multi-family complexes. For nonresidential uses, this means higher office buildings with multiple uses.

The planned growth potential is necessary to support projected demographic increases in population and housing units. Based on county demographic projections, the county will add approximately 50,000 residents every five years, from 2017 through 2045.[15] These residents will require roughly 25,000 additional housing units. In order to maintain the environmental vision, the new neighborhoods being developed will look very different than the traditional Fairfax County single-family neighborhoods. Some examples of these new mixed-use neighborhoods are Merrifield, Springfield Town Center, and Reston Station.

Recent Development Progress

Tysons is a national example of increased plan potential while protecting the environment. The growth plan for Tysons was to increase the number of residents from 17,000 to 100,000 and double the number of jobs from 100,000 to 200,000. Development since Metrorail began service in Tysons has already increased the number of residents to approximately 21,000. The current development totals in Tysons are:

- 990 thousand square feet delivered since 2018
- 3 million square feet under construction
- 633 thousand square feet approved by site plan

The Metropolitan Washington Council of Governments (MWCOG) tracks all projects in the metropolitan region. The 2018 report shows that commercial construction slowed from 2017 to 2018 by 28%. The 114 new commercial buildings added last year represent the lowest annual building total since the end of the Second World War. Altogether, 10.4 million square feet of new space was added, a decline of more than four million square feet from 2017. However, even

[15] www.fairfaxcounty.gov/demographics/fairfax-county-general-overview

with the slowdown, Northern Virginia accounted for more than half of all new construction in the region with 5.5 million square feet of commercial space in 2018.[16]

Development Concerns

The balance between strong protections and development continue today. Within special study areas, such as Tysons and mixed-use areas, development is done holistically and considers many project impacts, including environmental resources, transportation facilities, schools, parks and others. Development and redevelopment outside special study areas are smaller and not as comprehensively reviewed.

This year there were several development projects brought to the attention of EQAC that raised environmental concerns about building on fragile or protected land. One example was a proposal to build a single-family home on an undeveloped parcel at 4104 Woodlark Drive. As documented in the Annandale Blog:

> *"In what could be seen as a major victory for the environment, the Chesapeake Bay Preservation Ordinance Exception Committee (ERC) agreed that a house should not be built on a vacant lot subject to flooding at 4104 Woodlark Drive in Annandale. The committee was established by the Fairfax County Board of Supervisors to review applications for development activities within Resource Protection Areas (RPAs). Following a lengthy, highly technical discussion, the ERC voted Dec. 12 to deny an application for a single-family house on an undeveloped wooded lot with an RPA.[17]"*

A larger example occurred during construction at the Inova Center for Personalized Health and related projects on Gallows Road on the former Exxon Mobil site. Community members reported excessive sediment runoff into Holmes Run. Local citizens from the Friends of Accotink Creek and the Friends of Holmes Run raised the issue to the landowner and the County. After much discussion, moderated site visits, and public hearings during the Comprehensive Plan amendment process, the parties have started to communicate and share concerns. Development near stream valleys effects many downstream neighborhoods. The partnership between Inova and the friends of streams organizations is an important precedent for future projects.

A third example was brought to the attention of EQAC by the Hunters Valley Association regarding an effort to build a large, septic-based assisted living facility in an environmentally sensitive area abutting a RPA in Hunter Mill. There were many environmental concerns with this proposal including a request to vacate a conservation easement on a steep slope and failure to identify a seep on the property. The planning commission indefinitely deferred the proposal and it was subsequently withdrawn. During the planning commission hearing it was noted that there have been very few conservation easements vacated across the county and further that there is no policy for taking such an action.[18]

While EQAC does not generally comment on individual projects, these projects may indicate that development pressures are increasing on areas that are inappropriate for development. The

[16] Commercial Construction Indicators 2018, published by COG June 2019
[17] https://annandaleva.blogspot.com/2018/12/committee-rejects-application-for-house.html, Dec 13, 2018
[18] Planning commission video: https://www.youtube.com/watch?v=Gp_MVvJR2hE&feature=youtu.be

environmental legacy and regulations that are in place should be respected as fragile lands become increasingly proposed for development.

EQAC also reviewed the Fairfax County Land Use and Development Services Strategic Assessment produced by Gartner for the County.[19] This study was presented to the NVBIA-NAIOP-Fairfax Committee Meeting, a collaboration between members of Northern Virginia Building Industry Association (NVBIA), Commercial Real Estate Development Association (NAIOP) Northern Virginia, and Fairfax County. The goals of the process are designed to *"Improve the Speed, Consistency and Predictability of the Development Review Process"*

The report background states that:

- *"Fairfax County is at a critical juncture as it faces challenges impacting economic development and building activity within the County.*
- *Long recognized as a leader of regulatory process execution and in the vanguard of continuous improvement and innovation for land use and development, competition from surrounding jurisdictions and other factors have driven the County to reassess its current mode of operations to respond to industry's desire for faster and more predictable service.[20]"*

The strategy should balance the development industry goals with the environmental vision of the county and be developed in the context of County values. A faster review process may not be the highest quality process and projects such as those noted above may be the result. In all development projects, EQAC believes the result should be a net benefit to the environment. Redevelopment is an opportunity to apply better standards and technology. Fragile and natural lands should remain protected.

The State of the Plan, 2000-2010

In 2012, the county published a comprehensive review of changes to the Plan over the past 10 years. As part of the State of the Plan review, the authors identified several themes that emerged from all 284 Plan amendments that were adopted. These themes included:

1. Encouragement of Intensity and Land Use Flexibility in Mixed Use Centers
2. Protection of Low Density Residential Neighborhoods
3. Avoid Re-Planning Industrial Areas
4. Expansion of Medical Facilities
5. Revision of Policy Plan Regarding Acquisition of Land for Public Parks
6. Environmental Policy Issues in Area Planning Process

The themes and trends clearly showed that Fairfax County could continue to grow and accommodate new population and businesses into the future. The Board of Supervisors' vision and associated objectives aligned with the State of the Plan and could guide future revisions to the Plan.

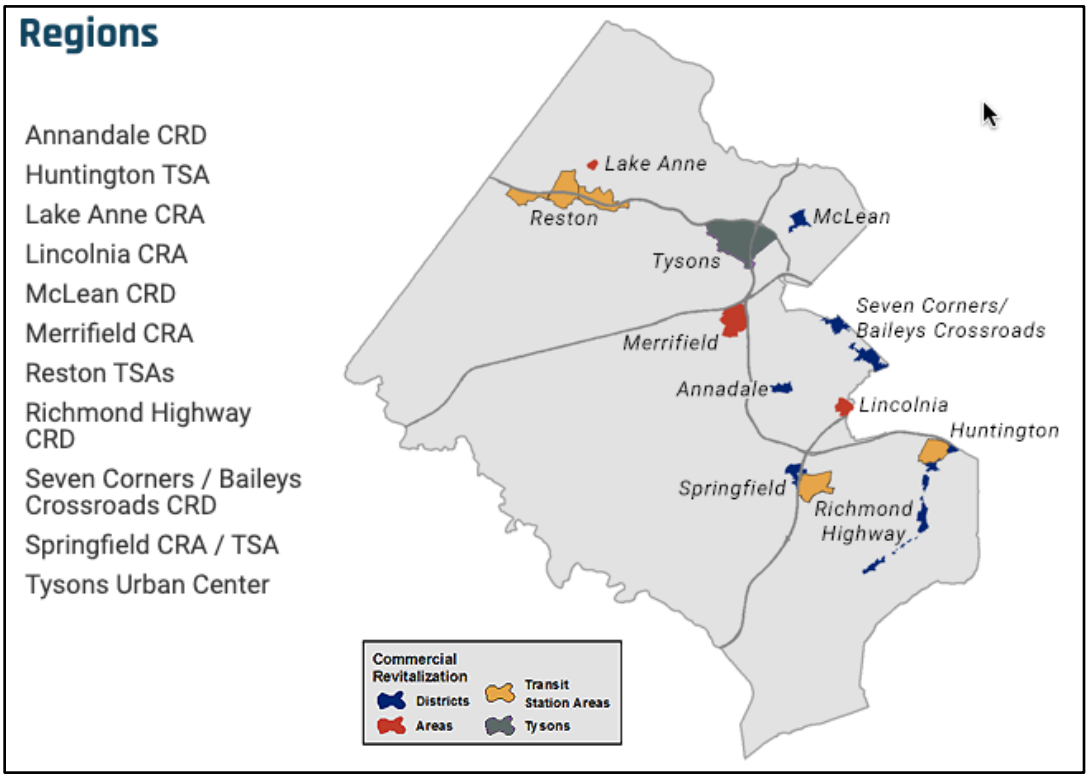
[19] https://www.fairfaxcounty.gov/landdevelopment/sites/landdevelopment/files/assets/documents/pdf/nvbia/fairfax-vision-and-recommendations.pdf
[20] https://www.fairfaxcounty.gov/landdevelopment/sites/landdevelopment/files/assets/documents/pdf/nvbia/fairfax-vision-and-recommendations.pdf

Since 2010, there have been many improvements in our approach to revitalization and redevelopment and in the Comprehensive Plan update process. In addition, significant infrastructure investments identified on the Comprehensive Plan map have been implemented.

With so many advances and changes, and with the effective realization of the Concept for Future Development map, it is EQAC's view that this may be an appropriate time to consider longer-term conceptual land use and transportation goals and their potential integration into the Comprehensive Plan. EQAC sees a particular need to consider within this effort transit connectivity to and among the county's mixed-use centers, along with the extent to which the Tysons Urban Center should be considered as a major hub within the Metropolitan Washington, D.C. region. EQAC plans to explore these ideas with county staff in the future; we may have more specific recommendations subsequent to these discussions.

Mixed-Use Areas and Community Revitalization Services (CRS)

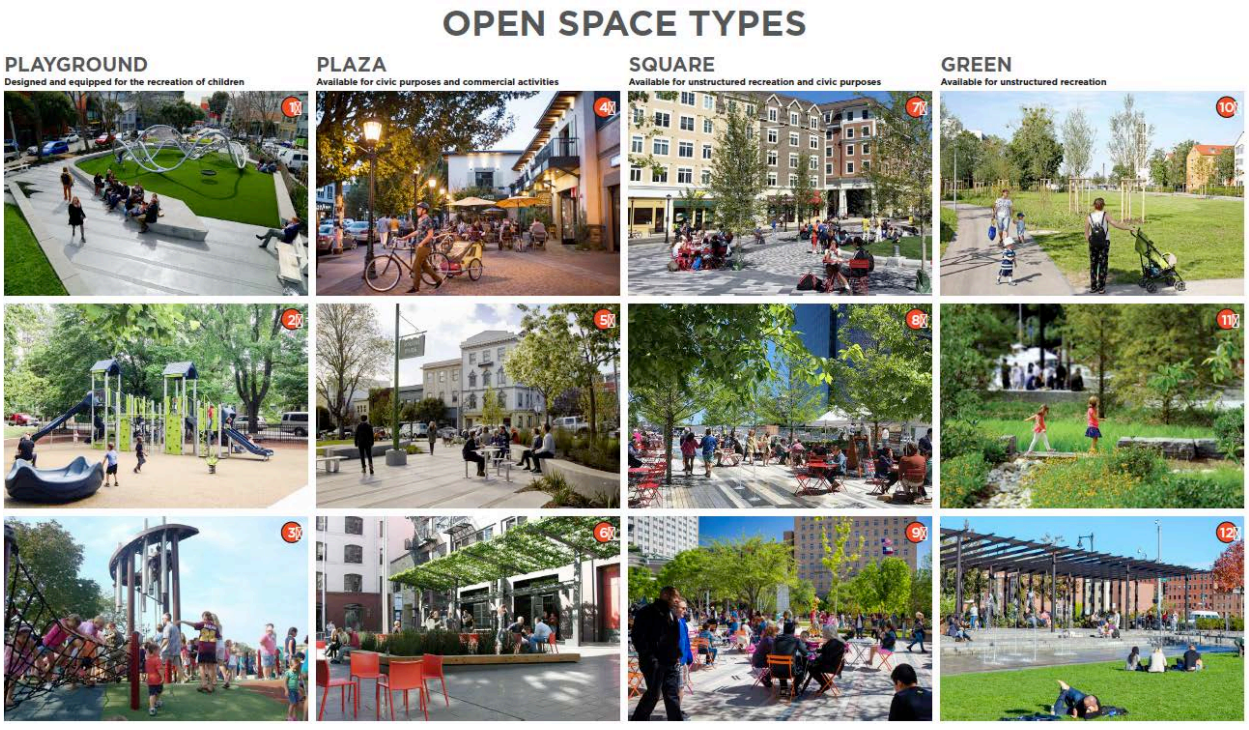
As Tysons becomes the county downtown, other mixed-use areas become the neighborhoods that surround that downtown with their own character and revitalization needs. The current CRS focus regions are shown below.



These areas have the highest growth potential and are the most important places to balance high quality redevelopment and environmental stewardship. Three recent reports/studies are illustrative of the environmental concerns that citizens share and could be used to synthesize environmental priorities into a future strategy:

1. 2017 Reston Annual State of the Environment Report:[21] The Reston Association (RA) Environmental Advisory Committee called out future development pressures and is advocating a Biophilic city[22] approach to redevelopment. Biophilic design calls for a different approach to urban design through creatively incorporating nature into the daily lives of their residents. They point out that *"Unfortunately, the development and re-development pressures currently facing Reston have the potential to impact Reston's land uses and to disrupt its existing connections to the natural environment. Consequently, we believe RA (and when appropriate, in cooperation with Fairfax County and others) should develop guidelines, policies, and programs that not only protect the unique, environmentally sensitive nature of Reston but also act to preserve and to enhance the many ways its residents are connected to nature. … Tapping into the emerging Biophilic Cities Network also should be explored as a means to identify and to share urban development strategies and projects that may be applicable to Reston's growth while benefitting the environmental health of its residents where they work, play, and live."*

2. The McLean Community Business Center (CBC) Study[23] is being used to revitalize an established CBC in the shadow of Tysons. The county has engaged StreetSense as a consultant to help develop the form and sense of place through a community participation process. The study asked a series of important questions about open space that illustrate the importance of the environment to all CBCs:



[21] 2017 Reston Annual State of the Environment Report (RASER)
[22] http://biophiliccities.org/about/
[23] https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/mcleancbcstudy/mcleancbc-frameworkplan-openhouse.pdf

a) Which photo overall do you think best represents the open space type that you would be likely to use in the CBC?
b) Which characteristics of the open space type do you like and why?
c) Which characteristics of the open space type do you dislike and why?
d) What open space types do you think are most appropriate for the CBC and why?
e) Do you think open space in the CBC is more vital for active use (gathering, programmed events and celebrations) or for passive use (reflection, buffered areas, green opportunities without programming)
f) What kind of open space amenities/features/programs do you think are necessary in the CBC?

These questions are essential to keeping McLean a vibrant and attractive CBC.

3. Neighborhoods such as Annandale, Baileys Crossroads, and the Richmond Highway Corridor[24] that relied primarily on automobile transportation are now facing multi-mode transportation challenges. As Tysons, Reston, Vienna, Merrifield, and other areas show, multi-modal transportation is one of the keys to successful revitalization. The combination of multimodal transit + high quality amenities, including parks, shopping, and jobs, create a desirable place to live and work. It also creates an environmentally sustainable path to growth with fewer vehicle miles traveled per person and opportunities to be outside and enjoy parks and trails within a built environment. The focus on bus rapid transit and enhanced pedestrian and bicycle opportunities along Richmond Highway is the first step toward revitalization. On the other hand, a recent decision by Arlington County to cancel their portion of the Columbia Pike Streetcar project makes revitalization and reinvestment through Baileys and into Annandale more difficult.

Reston recognizes that development needs to be done is a way that allows connectivity to nature. McLean is considering how to incorporate open space into the CBC. Other mixed-use areas have multi-modal transportation challenges and need to be integrated into a strategic transportation future.

While EQAC has, within this report, separated its Land Use and Transportation chapters, they are both necessary for revitalizing mixed-use areas. The hub and spoke design of Metrorail should be expanded into a network topology that provides access to both Tysons and D.C. as urban centers. Bus rapid transit and light rail, as envisioned for Richmond Highway, can be incorporated into all CBCs. New development must conform to the current standards and should meet the objectives in the board's environmental vision, resulting in:

- Efficient transportation providing work/life proximity and multi-modal opportunities
- A healthier environment, with tree preservation and native species landscaping, walkability, open space and urban agriculture
- Energy-efficient buildings conforming to green building standards
- Efficient water management with better stormwater management practices and less impervious surface coverage

[24] https://www.fairfaxcounty.gov/planning-zoning/embark-richmond-highway/about

Comprehensive Plan Evolution

Major revisions to the Comprehensive Plan took place in 1975 and 1991. The 1991 plan, which was the foundation for the 2017 edition, was developed around 18 goals for Fairfax County (a 19th and a 20th goal were later added). From 1991 through 2013, updates to the Plan were vetted through an Area Plans Review (APR) process, with public participation, within each district. The review process cycled every five years to consider developer-proposed or community projects and to incorporate them into the Plan.

By 2013, it was recognized that the APR process was not sufficient for a growing county facing build-out and transitioning from development to redevelopment and revitalization. EQAC was one of the advocates for a more comprehensive and consistent process. Reasons for the change included:

- Mixed-use centers needed a comprehensive focus, such as was done for Tysons. The APR process was opportunistic based on development opportunities, not comprehensive based on community goals, so special planning was necessary to augment the APR process.
- Too many amendments were requested "out of turn" (independently of the APR process) so that the cycle was not being followed consistently.
- Staff resources were being stressed managing the APR process and special processes while also supporting out of turn amendment requests.

The Board of Supervisors adopted the Fairfax Forward process on July 9, 2013 to replace the APR process and align resources with priority projects. The Board action establishing Fairfax Forward included a review of the efficiency, effectiveness, accessibility, and impact of the new process and pilot work program. The review, concluded in spring 2016, identified evaluation themes to be addressed:

- Difficult transition from APR to Fairfax Forward
- Outstanding questions about community participation in the process
- Impact on schedule from Board-authorized Plan amendments
- Better communication through online channels - internet and social media

The review resulted in a combined process called the Site Specific Plan Amendment (SSPA) process, which was adopted in July 2017. SSPA includes many of the components of Fairfax Forward, e.g., the Comprehensive Plan Amendment Work Program to schedule plan amendments, and holistic planning objectives. It also introduced a modified countywide review process with a careful screening process. Projects that are accepted during the county review are added to the work program for further review. Together these processes should cover most of the development types and reduce the need for special Board-authorized projects.

The initial phase of the 2017 North County SSPA process – the screening process – was effective at identifying projects for further review. Through consideration by district task forces, staff, and the Planning Commission, followed by consideration and approval in July 2018 by the Board of Supervisors, ten nominations were accepted into the screening process. Of the ten, four have been subsequently added to the work program from the Providence, Sully, and Dranesville districts. The recommendations, summary document, and revised Plan Amendment Work

Program are available online: www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/sspa/staff_report_final.pdf .

For the complete Plan Amendment Work Program, which included SSPA applications, site-specific (Board-authorized) amendments, activity center and neighborhood planning studies, and countywide policy amendments, 19 Plan amendments were adopted or rescinded in 2018. Of that total, 16 amendments were adopted in 2018. Currently, there are 21 plan amendments under review, including six mixed-use center studies, four countywide amendments, and 11 minor plan amendments. The work program, which describes the active and pending plan amendments and studies is online at: www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/sspa/workprogram/adopted_work_program.pdf

EQAC supports the holistic approach for area plans that is reflected in the Comprehensive Plan Amendment Work Program. A thorough work program review is necessary to manage the complexity of revitalization. We also support regular updates to the Comprehensive Plan Policy Plan volume. Modern and relevant policy should reduce the need for site-specific amendments and improve consistency across all developments. The Policy Plan revisions are an essential part of upgrading the Comprehensive Plan.

Future Planning with Technology

The county has been expanding the use of technology across all departments, and especially through the use of the county's geographic information system (GIS). With information growth, it is appropriate to integrate different parcel-based systems into a centralized system. Such an effort is currently underway through the Planning and Land Use System (PLUS) effort. This system brings different types of parcel information together into an authoritative repository. It will also incorporate better information about mixed-use parcels, where residential, retail, and commercial activities occur at the same location.

With the new SSPA process, it is important to make all the information available for decision-making boards and to present it in a manner that is effective for stakeholders without experience in technology. When the PLUS system is available, the system information should be able to support graphical representations to augment decision-making. Realistic visualization techniques should be developed and applied for review boards. GIS should be leveraged and pilot projects that combine GIS with PLUS and other data should be developed.

Zoning

Planning and zoning are both necessary in the development process. The Comprehensive Plan is required by state law to be used as a guide in decision-making about the built and natural environment. The Zoning Ordinance is intended to implement the adopted Comprehensive Plan for the orderly and controlled development of the county. While the Plan describes what should be developed, the zoning codifies what legally can be built. Zoning defines the requirements that affect all aspects of a development, including land use and transportation. The Zoning Ordinance is regularly reviewed through the Zoning Ordinance Amendment Work Program.

The county's Zoning Ordinance has been in its current form for over 40 years.[25] In March 2017, the county started work on the Zoning Ordinance Modernization, or "zMOD," initiative.

Zoning Ordinance amendments can have significant impacts on the environment. One that is currently underway revises Planned Development Housing (PDH)[26] districts. PDH districts were created in the 1980s for large greenfield housing subdivisions, but have recently been used for smaller, infill developments. Their purpose and intent is to exchange higher quality design and environmental protection for more flexible provisions such as lot size and yards.

Green Buildings and Green Neighborhoods

Fairfax County has demonstrated leadership in green building policy. In 2008, the county adopted its Sustainable Development Policy for Capital Projects, [27] which guides green building design for county projects. Currently, 28 county buildings have satisfied the certification criteria established by the Leadership in Energy and Environmental Design (LEED®) program of the U.S. Green Building Council (USGBC); of these, 14 have been certified as LEED Gold buildings and 14 have been certified as LEED Silver buildings.

In July 2014, the Board of Supervisors adopted a green building policy amendment to the Comprehensive Plan[28] with several changes including:

- Adding support for reuse of and for greening/retrofitting existing buildings
- Adding language to encourage energy and water usage collection and performance monitoring, and participation in regional and local evaluations of outcomes
- Adding language to encourage the use of natural lighting
- Adding support for solid waste and recycling management practices
- Adding Industrial Areas for a green building commitment
- Clarifying expectations for public-private partnerships
- Adding support for infrastructure for electric vehicle charging

The next evolution of green buildings is green neighborhoods and green building codes. USGBC, the Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC) have developed LEED for Neighborhood Development (LEED-ND), a rating system for neighborhood planning and development based on the combined principles of smart growth, New Urbanism, and green infrastructure and building. The goal is to establish a national standard for assessing and rewarding environmentally superior green neighborhood development practices within the framework of the LEED Green Building Rating System.

LEED-ND presents concepts and criteria that have been applied throughout mixed-use planning. The formalization of a program provides a quantitative format to evaluate the relative "green-ness" of revitalization plans. Both LEED-ND and the Biophilic Cities Network that Reston Association mention are examples of 2020-thinking towards environmentally positive growth.

[25] www.fairfaxcounty.gov/planning-zoning/zmod
[26] www.fairfaxcounty.gov/planning-zoning/zoning-ordinance/work-program
[27] https://www.fairfaxcounty.gov/environment/green-buildings
[28] Provided to EQAC 2014 by Department of Planning and Zoning—Planning Division

In 2018, the USGBC along with other international bodies released the 2018 International Green Construction Code (IgCC). The IgCC is a model code that has wide applicability for incorporating resilient, high-performance green building strategies into buildings across the globe. The IgCC frames the essential construction building blocks on which future resilient initiatives can develop and expand. The goal is to provide criteria for energy efficiency, resource conservation, water safety, land use, site development, indoor environmental quality, and building performance that can be adopted broadly. Mahesh Ramanujam, president and CEO of USGBC, noted that *"with the 2018-IgCC, we are helping people build upon [LEED], as well as on the universal truth that every human being deserves to live in spaces that foster longer, healthier lives."*

Going beyond green building standards are a new generation of standards to address climate change by eliminating external energy in buildings. The concept of a Net Zero Energy Building (Net Zero), one which produces as much energy as it uses over the course of a year, is emerging from research to reality. The National Institute for Building Science provides information on Net Zero along with codes and standards to begin adopting the technology online:
https://www.wbdg.org/resources/net-zero-energy-buildings
https://www.energy.gov/eere/buildings/zero-energy-buildings

Light Pollution

Background
Light pollution (sometimes called "light trespass") 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. The county adopted a new and modern Outdoor Lighting Ordinance in 2003. An online brochure provides an excellent explanation of these rules (www.fairfaxcounty.gov/planning-zoning/sites/planningzoning/files/assets/documents/zoning/lightingbrochure.pdf).

A number of potential revisions to enhance the existing provisions of the 2003 ordinance have been identified. These changes include situations not addressed in the 2003 ordinance as well as advances in lighting technology, such as Light Emitting Diode (LED) lights and sensors. In 2010, staff coordinated with a work group consisting of representatives from the International Dark Sky Association, developers, the lighting industry, county residents, and staff from the Fairfax County Park Authority and Fairfax County Public Schools to discuss potential revisions to the outdoor lighting provisions. Unfortunately, the amendment was delayed. The lighting work group was subsequently reconstituted and met on May 1, 2018 to re-start the process of updating the ordinance. The enhancement of the existing provisions should be pursued. As lighting technology and applications continue to evolve, periodic review of the lighting performance standards in the Zoning Ordinance should take place.

Enforcement
The responsibility for ensuring compliance with glare and illumination standards for residences and other private properties lies primarily with the county's Department of Code Compliance. Complaints are either filed by individuals directly with the Department of Code Compliance or

are forwarded by a staff member from a Board of Supervisors district office. Complaints have usually been associated with fast food or other commercial establishments, security lighting for residences, athletic facilities (e.g., ball fields, driving ranges), or churches. The inspectors typically resolve violations with informal enforcement such as a verbal warnings regarding violations and measures to remedy the violations. A written notice of violation or civil action can be used if needed. Beyond the general glare standards, the county is frequently able to negotiate or impose additional "before-the-fact" restrictions through proffers or development conditions as part of rezoning, special permit, and special exception processes.

Streetlights

On behalf of Fairfax County, Dominion Energy Virginia (Dominion) owns, operates, and maintains about 56,800 streetlights within Fairfax County. The vast majority of these streetlights are high-pressure sodium vapor and mercury vapor. In Summer 2018, a regional group completed a successful negotiation with Dominion Energy for new rates for the conversion of streetlights to LED fixtures. As part of this multi-faceted agreement, Dominion expanded the number of LED fixture types available to Fairfax County and other localities from two to 18, provided both 3000 Kelvin (K) and 4000K color temperatures for most fixtures (most converted lights in Fairfax County will be 3000K), established flat-rate pricing for conversion of existing streetlights to LEDs, restructured its monthly pricing, and reduced the monthly rate for some of the most commonly-used wattages.

On February 26, 2019, in a memo to the BOS, the EQAC voiced their support of the county's initiative to convert more than 56,800 streetlights to LED. In its FY2019 Third Quarter Review, the Board budgeted $1.8 million to fund the first year of a 5-year program by DPWES to convert more than 56,800 streetlights to high-efficiency LED fixtures. Given that over 15 percent of the electricity consumption by Fairfax County government operations in 2017 was from street light use, this program will not only provide an annual cost savings to the County but will further its climate initiatives. Further, on July 16, 2019, the Board of Supervisors voted to approve amendments to the Fairfax County Public Facilities Manual that require the use of LED streetlights for all new development.

COMMENTS AND ONGOING CONCERNS

1. Affordable Housing
   EQAC commends the continued focus on affordable housing in the Communitywide Strategic Housing Plan and the Economic Success Strategic Plan. There are many development efforts under way with significant relevance to the county's housing goals. EQAC suggests that the county:

   a. Continue to expand options for affordable housing by investing and partnering appropriately in locations that need increased affordable options
   b. Identify vacant property with good transit options that provide new tenants with quality of life amenities, improved commuting options, and better residential/commercial or mixed-use utilization

c. Include considerations for energy efficient affordable housing and financing to support energy efficiency retrofits for private dwellings and for low income multi-family residences

2. Holistic Comprehensive Planning Process
EQAC is an advocate for holistic planning processes and supports the Site Specific Plan Amendment (SSPA) Process. Holistic approaches align with the vision to consider economic, social, and environmental factors resulting in vibrant, healthy, and desirable places. Prior reports elevated this topic to a recommendation. With the successful completion of the North County SSPA we are moving this to a comment, but plan to continue tracking the process through the South County process to ensure that SSPA continues to:

a. Prioritize large study areas that encompass multiple projects
b. Include a robust screening process to ensure that the most appropriate projects are considered at a site-specific level
c. Develop Policy Plan amendments that result in better environmental outcomes across all projects

EQAC also supports the role of an environmental representative be appointed to future task forces and review committees dealing with land use. The Tysons Corner Land Use task force had representation by many stakeholders, including a designated environmental member. The focus on environmental perspectives created a strong set of guidelines that included those related to stream protection, open space, walkability, and energy conservation.

3. Social Media Innovation
EQAC commends the county for embracing new technology and leveraging the World Wide Web to share and interact with the public. The county should continue to integrate social media into the planning process and outreach efforts. The Route 7 Corridor Transit Study included a crowd sourcing map that was the most frequently used source of input for the project with over 300 comments.[29]

4. Streetlights
EQAC commends the county staff and the Board for negotiating an agreement with Dominion Power to improve the more than 56,800 streetlights in Fairfax County. EQAC believes the changes will result in more pleasing lighting at lower costs and less energy usage.

RECOMMENDATIONS

1. Update the State of the Plan and Concept for Future Development Map
EQAC recommends that the Board of Supervisors authorize an update to the State of the Plan document. The last State of the Plan covered 2000-2010. Since then the county has seen significant growth and changes in process and technology. The plan transitioned from APR

[29] http://www.novatransit.org/uploads/studiesarchive/2017Envision%20RT7%20Report.pdf

to Fairfax Forward with holistic and in-depth reviews, and now to SSPA. A review of the plan and the effects of the processes is timely.

EQAC recommends that the Board of Supervisors authorize the development of a Concept for Future Transportation, Development, and Green Infrastructure. The 1992 Concept for Future Development map has evolved into the Comprehensive Plan - Special Planning Areas[30] and is used within the Countywide Transit Network Study to design the proposed High Quality Transit Network. These reflect the reality that the 1990 Future has largely been realized and that a new future map that looks out 20 to 50 years is needed.

2. Land Development Applications and Information
EQAC supports the development of the new PLUS system to create a single system of record for land development. We recognize the complexity of developing a system crossing multiple agencies and support the process to ensure that all requirements are considered. EQAC recommends that PLUS be able to track the quantity of development (gross floor area and number of residential units) along with use type (residential and nonresidential) at each stage of development activity from Plan amendment through zoning approval, site plan approval, and building permit issuance.

EQAC commends the work being done in Tysons to track development activity at the building level and to provide details in the Tysons Annual Report. EQAC recommends that the County track other mixed-use centers with the same detail as Tysons. At any given point of time there should be accurate information about the existing development as well as the development that can be expected in the next five to 20 years, based on the development pipeline from the PLUS system.

3. Development Pressure
EQAC recommends that the County continue the legacy of strong environmental protections and adopt a policy that all future development provides a net environmental benefit to the County. This includes new development in mixed-use centers with dense growth potential, as well as infill development where fragile lands that are unsuitable for development are under development pressure.

4. Green Buildings
EQAC supports a review of the green building standards. EQAC recommends that the Board of Supervisors encourage standards that incorporate neighborhood certifications/designations, including LEED-ND and Biophilic Cities, the International Green Construction Code, and Net Zero energy standards, as developed by the Department of Energy and the National Renewable Energy Laboratory.

5. Light Pollution - Outdoor Lighting Ordinance
EQAC recommends that the Board update the performance standards in the Zoning Ordinance to include a maximum color temperature standard in 2020.

[30] https://www.fairfaxcounty.gov/planning-development/comprehensive-plan/special-planning-areas

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II. TRANSPORTATION

Board of Supervisors Environmental Vision:
"A dependable, safe, efficient, accessible, and multi-modal transportation network is necessary to support the travel needs of Fairfax County residents now and into the future. The county will continue to develop policies and strategies that reduce the dependence on single-occupancy vehicle trips through smart development, efficient use of the transportation system, and by expanding the county's bicycle, pedestrian and transit infrastructure. The county will pursue transportation strategies in support of regional attainment of air quality standards."[1]

INTRODUCTION

Transportation is a key element impacting the quality of life for county residents, and transportation planning choices must be made which balance myriad concerns, including, but not limited to, convenience, cost, efficiency, and environmental impact. Fairfax County residents and visitors are overwhelmingly dependent on automobile transportation due to the long distances that often must be traveled, as well as the lack of convenience (actual or perceived) of alternative options such as mass transit, bicycling, or walking. Yet it is this heavy dependence on automobiles that has resulted in some of the worst traffic congestion in the United States and, with that congestion, large amounts of wasted time and productivity, as well as added pollution from vehicle emissions that degrades our air quality and contributes to climate change.

Recognizing that many of the county's transportation challenges stem from this dependence on automobiles, the Board of Supervisors Environmental Vision for transportation places a special emphasis on reducing the dependence on single-occupancy vehicle (SOV) trips. EQAC notes that while there were several relevant activities ongoing in Fairfax County during 2019 or planned for the near future, the overall progress in reducing dependence on SOV trips over the past year has been very limited. This chapter therefore will also place a primary emphasis on how the various transportation initiatives currently being undertaken, or planned for the future, can contribute to a reduction in SOV trips, and will also identify new opportunities that may further this goal.

BACKGROUND

Roles and Responsibilities

Transportation solutions for the county are the primary responsibility of the Fairfax County Department of Transportation (FCDOT) and are implemented in partnership with agencies and authorities that share responsibility for transportation infrastructure and services. While the county controls land use policy, the Virginia Department of Transportation (VDOT) maintains

[1] 2017 Fairfax County Environmental Vision, Section 2 B, pg. 11, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

most of the roadways in the county. The county operates the Fairfax Connector bus system, but both the Metro system and Virginia Railway Express (VRE) are operated by regional authorities. Public private partnerships (P3s) have emerged as a policy tool to grow a pool of capital by attracting private investment to provide transportation solutions. Fairfax County has been at the forefront of P3 implementation for both roadway projects (I-495 Express Lanes, I-95 Express Lanes, and Transform 66), and transit infrastructure (Wiehle-Reston East Garage).

Environmentally responsible solutions will continue to require collaboration with these stakeholders. This interrelationship is documented both in the Environmental Vision as well as other key policy documents such as the Metropolitan Washington Council of Governments (MWCOG) Region Forward initiative[2] and the county's Economic Success Strategic Plan[3].

It should also be noted that many infrastructure projects - from sidewalks to grade separated interchanges - can take years to plan, design, and construct, so year over year change may be limited due to the time scale involved. Additionally, transportation measures like vehicle miles traveled, time in congestion, and transit ridership are heavily influenced by population growth and employment.[4] Fairfax County and the Washington, DC metropolitan region in general have historically had lower unemployment rates than the rest of the U.S. and this trend has continued despite the recent recession.[5] Consequently, the region continues to attract new workers and experience population growth, which drives the demand for transportation system capacity.

Traffic Congestion and Travel Choices

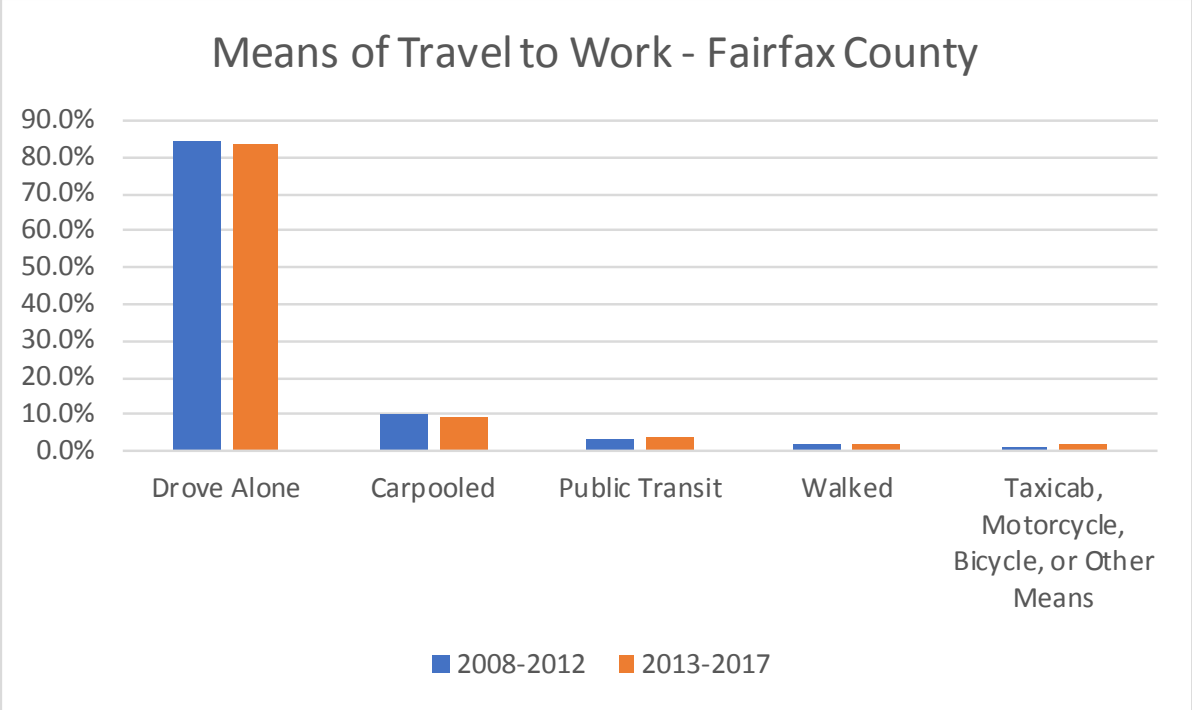
The heavy reliance on SOV use has earned the Washington, DC metro area the distinction of having the 2nd worst traffic among U.S. cities, and the 19th worst traffic among all cities globally.[6] It is estimated that drivers in the Washington, DC metro area spend on average approximately 155 hours per year (nearly a full week) in congestion at a cost of $2,161 per driver per year.[7] While similar data doesn't exist for Fairfax County alone, and it can be assumed that traffic congestion is worse as one gets closer to the downtown Washington, DC area, there is no doubt that Fairfax County's contribution to this ranking is substantial.

Understanding current and past conditions that lead to the extreme traffic congestion in Fairfax County will allow us to be able to more accurately assess the most appropriate potential solutions. Means of travel to work data for Fairfax County from the U.S. Census Bureau's American Community Survey, shown in Figure II-1, provide some insight into recent patterns.[8]

[2] https://www.mwcog.org/regionforward/
[3] https://www.fairfaxcounty.gov/economic-success/economic-success-plan
[4] Downs, Anthony. *Traffic: Why It's Getting Worse, What Government Can Do*, Brookings Institute, 2004. www.brookings.edu/research/traffic-why-its-getting-worse-what-government-can-do/
[5] Economic Indicators 2000-2018, Fairfax County Department of Management and Budget, www.fairfaxcounty.gov/budget/economic-indicators
[6] 2018 Traffic Scorecard Report, INRIX, 2018. http://inrix.com/scorecard-city/?city=Washington%2C%20DC&index=19
[7] The cost of congestion is based on an economic analysis that takes into account the cost of wasted time as well as wasted fuel.
[8] American Community Survey, U.S. Census Bureau. Commuting Characteristics by Sex, 2007-2011, 2012-2016 U.S. Census Bureau

There has not been significant change in the travel means selected by Fairfax County residents in the past decade and all changes that have been observed are small and fall within the margin of error. Additional data about travel patterns in this region may become available soon.[9]

Figure II-1



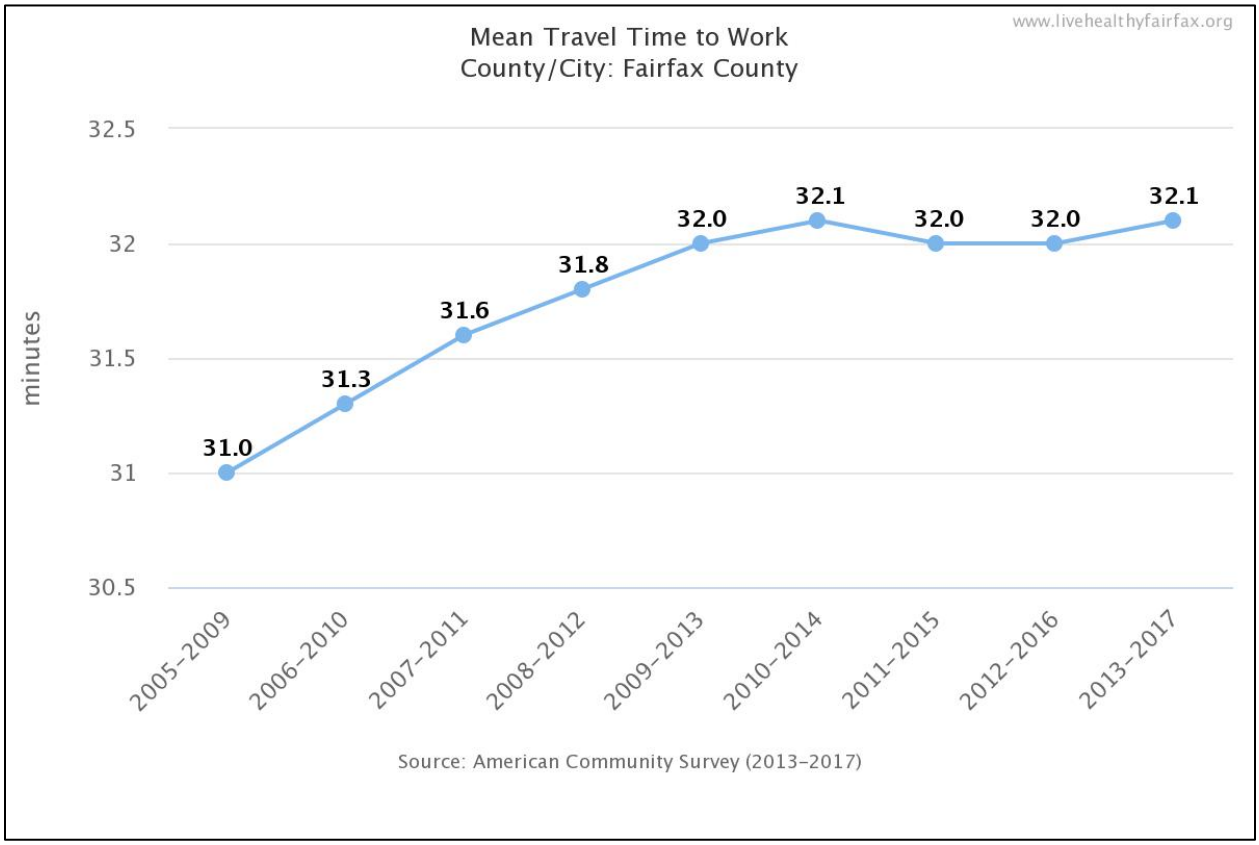
Source: U.S. Census Bureau's American Community Survey.
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B08534&prodType=table

Similarly, and as might be expected, there has been no meaningful change in mean travel time to work. As can be seen in Figure II-2, the mean travel time to work during the period 2013-2017 was 32.1 minutes, up slightly from 32.0 minutes the previous period. And more notably, this value has remained largely unchanged over the past 15 years.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_S0801&prodType=table

[9] The MWCOG/TPB travel survey (conducted once per decade) was conducted in 2018 however data were not available in time to be included in this ARE (https://regionaltravelsurvey.com). The TPB's Regional Travel Survey involves tens of thousands of invitation letters and follow-up postcards sent to randomly selected households.

Figure II-2



Source: Live Healthy Fairfax, www.livehealthyfairfax.org

Beyond the means of travel, travel distance also serves as a proxy measure for the level of activity generating environmental impacts to air quality and climate emissions. VDOT estimates daily vehicle miles traveled in Fairfax County - daily total vehicle miles traveled increased from more than 27.1 million miles in 2017 to 27.9 million miles in 2018, an increase of nearly three percent.[10] More notable is where this increase took place. While travel on interstates within the county was unchanged, travel on primary roads increased by three percent and travel on secondary roads increased by more than 6 percent.

County Agencies Involved

- Department of Human Resources – Has the ability to implement programs impacting commuting options for county employees
- Department of Planning and Development – Considers the impacts on transportation systems and congestion in evaluating development projects as well as the impacts of transportation projects on development

[10] 'Daily Vehicle Miles Traveled by Physical Jurisdiction', VDOT. 2017, 2018.
www.vdot.virginia.gov/info/resources/Traffic_2017/VMTReport_1230_2017.pdf
www.vdot.virginia.gov/info/resources/Traffic_2018/VMTReport_1236_2018.pdf

- Department of Public Works and Environmental Services – Coordinates with FCDOT and VDOT to ensure that county transportation-related infrastructure is developed and constructed following sound environmental policies and principles
- Department of Transportation – Provides leadership in planning and implementing all major transportation initiatives in the county as well as coordination with VDOT and the Northern Virginia Transportation Commission (NVTC)
- Department of Vehicle Services – Maintains the county's (including Fairfax County Public Schools') fleet of vehicles to provide safe, reliable, efficient, and environmentally sound transportation services

Other Authorities and Actors Involved

- Fairfax County Public Schools – Develops plans to transport students to school and operates a fleet of school buses and maintenance vehicles
- Metropolitan Washington Airports Authority – Oversees operation of Dulles International Airport and Ronald Reagan National Airport and operates the Dulles Toll Road
- Metropolitan Washington Council of Governments – Serves as a coordinating body for local governments in considering regional transportation issues
- Northern Virginia Transportation Authority – Responsible for long range transportation project planning, prioritization, and funding for regional transportation projects
- Northern Virginia Transportation Commission – Serves as a regional forum for discussion and analysis of transit issues; co-owner of Virginia Railway Express
- NOVA Parks (formerly the Northern Virginia Regional Park Authority (NVRPA)) – Administers and maintains the Washington and Old Dominion (W&OD) park and its trails
- Virginia Department of Transportation – Owns and maintains most of the roadways in the county
- Washington Metropolitan Area Transit Authority – Operates the Metrorail and Metrobus transit systems

COMMUNITY OUTREACH

Community outreach related to reducing dependence on SOV use includes efforts by the county and others to provide improved access to information on transit services and teleworking[11]. To make transit more accessible, predictable, and convenient, FCDOT is coordinating with other county staff on a real-time bus information system ("BusTracker") as part of the wider implementation of the "Clever Devices" fleet Intelligent Transportation System technology. BusTracker, which is accessible by text, phone, or website, provides real-time bus arrival information at all Fairfax Connector bus stops in Fairfax County. Before and after its launch, a significant marketing effort was undertaken to raise awareness using various communication channels including social media, websites, print media, and news articles.

The Fairfax County Commuter Services (FCCS) continued to promote telework as a commuting alternative through in and out-of-home marketing efforts directed at commuters (including geo-targeted social media advertising, proactive media engagement, on-air and online radio

[11] FCDOT input for 2019 ARE; July 3, 2019.

advertising, outdoor advertising, and cross-promotion opportunities), and direct engagement with Fairfax County employers, in collaboration with the Virginia Department of Rail and Public Transportation's TeleworkVA! Program. Outside of employer outreach programs, including telework promotion, FCCS has continued its ride matching service assisting 15,773 customers with ridesharing arrangements and the guaranteed ride home program.

MASS TRANSIT

Fairfax County has a number of mass transit options, most notably Metrorail, Virginia Railway Express (VRE), Metrobus, and Fairfax Connector Bus, and each has its own focus and role in reducing SOV trips. In addition, an increasing number of private operators of buildings (primarily office and multifamily) are offering private shuttles, typically to nearby Metrorail stations.

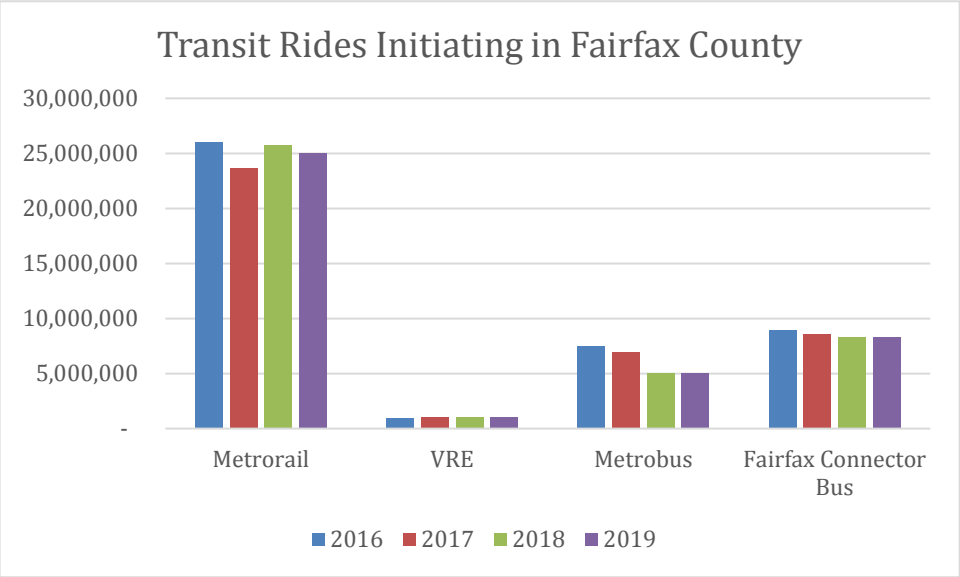
Usage patterns of mass transit differ by region of the county and by day and time of the week. In general, VRE, private shuttles run by multifamily communities and office building operators, and select Fairfax Connector routes are in operation only during weekday rush hour periods, while other services such as Metrorail, Metrobus, and most Fairfax Connector Bus services are available at all times of the day and on weekends, though often with significantly reduced schedules on weekends, holidays, and during off-peak hours.

Figure II-3 presents an overview of trends for the past three years along with estimates for 2019 for transit rides originating in Fairfax County. In general, the use of mass transit by residents of Fairfax County has been decreasing in recent years, with a significant decline in ridership on Metrobus, a small decline in Metrorail ridership, and relatively unchanged ridership on VRE and Fairfax Connector buses.

Metrorail

WMATA's Metrorail is the largest transit service in Fairfax County and the region and provides more trips than all other transit options combined. Fairfax County is served by four rail lines - Orange, Blue, Yellow and Silver. A number of key Metrorail projects had a significant impact on Fairfax County residents in 2019 and will continue to do so into 2020. Most notable are the platform reconstruction projects initiated in 2019 (and those planned for 2020), as well as the opening of Phase 2 of the Silver Line in 2020.

Figure II-3



Note: 2019 Values are estimates.
Source: Fund 30000, Metro Operations & Construction, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/pm/30000.pdf
Fund 40000, County Transit Systems, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/pm/40000.pdf

During the summer of 2019 a number of Metro stations on the Yellow and Blue Lines south of National Airport were closed for approximately 3 months to allow for the complete rebuilding of the station platforms.[12] While these closures were timed to coincide with the time of year when ridership would be at its lowest, disruptions to Fairfax County residents boarding and leaving Metro at these stations were significant. To provide additional commuting options, Fairfax Connector deployed additional buses on routes from the closed Metro stations to the Pentagon, where commuters could connect to Metrorail. These buses were pulled from other Fairfax Connector routes, which left a void on the routes from which the buses were redeployed. To address this void, the Fairfax County Department of Neighborhood and Community Services and FCDOT entered into an innovative partnership to use Fastran buses in place of the Fairfax Connector buses that were lost temporarily, as they were deployed to the closed Metro stations.[13] Ridership data for the Fairfax Connector during this period was not available at the time of the drafting of this report, but it is worth noting that during previous significant Metro shutdowns, there was a significant increase in ridership as commuters sought alternatives.[14]

[12] Stations in Fairfax County that were closed for platform reconstruction in summer 2019 were Eisenhower Avenue and Huntington on the yellow line and Van Dorn Street and Franconia-Springfield on the blue line.
[13] "Passengers to See Blue and White Fastran Buses on Some Fairfax Connector Routes Beginning June 3," FCDOT News Release, May 31, 2019. https://www.fairfaxcounty.gov/connector/news/c15_19
[14] "Thousands Flock to Fairfax Alternatives During Metro Shutdown," WTOP, August 28, 2018. https://wtop.com/tracking-metro-24-7/2018/08/thousands-flock-to-fairfax-alternatives-during-metro-shutdown/

Metro has announced plans to conduct similar platform reconstruction in Summer 2020 at eight stations, including all of the Orange Line stations located in Fairfax County (East Falls Church, West Falls Church, Dunn Loring, and Vienna).[15] These closures will present similar challenges to those in Summer 2019, though some may be mitigated by the presence of several Silver Line stations near to the closed Orange Line stations. Nevertheless, advance planning will be required to inform residents of the closures, which at this point have not been widely announced, and to put in place alternatives to help ease the impacts of the closures. The partnership that resulted in the use of Fastran buses as a means to free up the larger Fairfax Connector buses for use as shuttles may serve as a model to be replicated for the Summer 2020 Orange Line closures, as well as for other challenges faced by the county in moving residents from SOV trips to increased use of mass transit. It is also recommended that final ridership data for the Summer 2019 period during which the stations on the Blue and Yellow Lines were closed be reviewed and studied to inform planning for route changes associated with the Summer 2020 closures.

Metro has announced a projected opening of mid-July 2020 for Phase 2 of the Silver Line, which will extend service beyond the current terminus at Wiehle-Reston East to the Dulles International Airport (IAD) and into Loudoun County and will add three new stations in Fairfax County at Reston Town Center, Herndon, and Innovation Center. While the opening of these stations and those in Loudoun County will likely result in improved traffic in the area of the Wiehle-Reston East station, as it will no longer be the terminus of the line, it will also be important to ensure that plans are put in place to avoid significant increases in traffic near the new stations. A goal should be to increase the use of alternative modes of transportation to reach the new stations, in turn limiting short SOV trips that will create congestion as people drive their cars to park at the station. The need for first-mile/last-mile solutions presents an opportunity to promote a wide variety of established and emerging transportation options, including biking, walking, more frequent bus service, and possibly even new modes of transportation such as electric scooters which are widely used in Washington, DC and the inner suburbs, and are being piloted in Fairfax City. A recent study by DePaul University of scooter use in Chicago found that scooters were used for trips of 2 miles on average and primarily for trips to transit stations as well as in lower-income areas.[16]

Metrorail trips originating in Fairfax County in FY 2019 are estimated to be 25.0 million, a decrease of 2.8 percent from the 25.8 million in FY 2018.[17]

Fairfax County's contribution to Metrorail capital and operating expenses is determined using several formulas that include factors such as the jurisdiction of residence of passengers, the number of stations located in a jurisdiction, the amount of service in a jurisdiction, the jurisdiction's population, and the jurisdiction's population density. For FY 2020, the county's

[15] Platform Improvement Project Details, WMATA. https://www.wmata.com/service/rail/PlatformProject/Project-Details.cfm

[16] "DePaul Study: Scooters are Being Used for Trips to Transit, and in Low-Income Areas," Streetsblog Chicago, August 22, 2019. https://chi.streetsblog.org/2019/08/22/depaul-study-scooters-are-being-used-for-trips-to-transit-and-in-low-income-areas/

[17] Fund 30000, Metro Operations & Construction, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/pm/30000.pdf

required contribution totaled $99.2 million, which represents a 7.5 percent decrease from the FY 2019 contribution of $107.2 million. This decrease is wholly attributable to a decrease in the contribution for capital construction expenditures.[18]

Virginia Railway Express (VRE)

VRE provides service on two commuter rail lines, connecting Fredericksburg and Manassas to Union Station in Washington, DC, with multiple stops in Fairfax County. Unlike WMATA and Fairfax Connector, VRE is a commuter service, operating during peak periods on weekdays. VRE serves as an alternative to commuting by car for those living in parts of Fairfax County that are not served by Metro (particularly the South County area). The VRE's future improvement plans are guided by their System Plan 2040, which was adopted in 2014 and is about to complete its first phase in 2020.[19] While Phase 1 focused on low-cost improvements to the system, Phase 2, which covers the period 2021-2030, is aimed at significantly increasing ridership through increases in train frequency, the addition of reverse-commute trains, and other initiatives. The plan's overall goal is to reach 40,000 daily riders by 2040, which will be double the number of riders compared to when the plan was adopted.

One important point to note is that the VRE's System 2040 plan was adopted in 2014, which was before the announcement that Amazon's HQ2 would be locating at National Landing in Crystal City. Since the announcement by Amazon, there has been a marked increase in home sales prices, not only in the immediate vicinity of National Landing, but in Fairfax County and beyond, with home prices in Fairfax County increasing six percent in May 2019 over the previous year.[20] While it is too early to know the exact impacts that Amazon's move will have on transportation in Fairfax County, it is reasonable to expect that homes located near VRE stations will be in high demand by Amazon employees who could commute to the VRE's Crystal City station, thereby putting extra pressure on the VRE system. This may necessitate changes to VRE's overall plans.

Fairfax County's contribution to VRE capital and operating expenses is based on ridership originating in the county, and in 2019 there was a significant increase in this ridership. As a result, for FY 2020 the county will contribute $6.3 million, which represents a 16 percent increase over the FY 2019 contribution. This increase also makes Fairfax County the largest

[18] Fund 30000, Metro Operations & Construction, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/volume2/30000.pdf

[19] System Plan 2040, Virginia Railway Express, 2014. https://www.vre.org/about/studies-and-reports/2040/

[20] "Amazon's HQ2 Prompts Housing Price Spikes in Northern Virginia, Washington Post Analysis Shows," Washington Post, June 13, 2019. https://www.washingtonpost.com/business/2019/06/13/amazons-hq-is-already-making-arlingtons-housing-prices-skyrocket/

contributor to the system, with county funding representing 35.2 percent of total system funding, slightly ahead of Prince William County, which contributes 34.3 percent.[21]

Metrobus

WMATA's regional bus service, Metrobus, has 57 bus routes serving Fairfax County. The vast majority of Metrobus routes in the county serve areas inside the Beltway, with additional service outside the Beltway concentrated in the Providence, Braddock, and Springfield districts. Metrobus rides originating in Fairfax County have been declining steadily in recent years, from 7.54 million in FY 2016, to 6.90 million in FY 2017 and 5.05 million in FY 2018. Ridership in FY 2019 is estimated to be unchanged from FY 2018 levels. It is important to note that this decrease of nearly 33 percent over the three-year period from 2016-2018 comes at the same time as a decrease in the total number of Metrobus routes operating in the county, from 68 routes to 57 routes (a decrease of 16 percent).[22]

In Summer 2018, Fairfax County approved a pilot program that allows students at Justice High School (formerly J.E.B. Stuart High School) to receive free rides on select Metrobus routes. This program is similar to the county-wide program that allows all high school students to ride free-of charge on Fairfax Connector buses. During the 2018-2019 school year, results showed that 35 percent of Justice High School (HS) students signed up for a pass, and those students took approximately 3,500-4,000 trips per month. Based on the success of the Justice HS pilot, the county is considering running a similar pilot at either Marshall HS, Falls Church HS, or Annandale HS in the 2020-2021 school year.[23]

Fairfax County's contribution to Metrobus capital and operating expenses is determined using several formulas that include factors such as jurisdiction of residence of passengers, number of stations located in a jurisdiction, the amount of service in a jurisdiction, the jurisdiction's population and the jurisdiction's population density. For FY 2020, the county's contribution totaled $87.3 million, which represents a 1.4 percent increase from the FY 2019 contribution of $86.1 million.[24]

Fairfax Connector Bus

In FY 2018 Fairfax Connector served 88 routes with a fleet of 308 buses. In 2018 and early 2019 two new routes (Routes 699 and 698) were added as the result of two approved grant

[21] Fairfax Subsidy for Virginia Railway Express to Increase, Inside NOVA, January 2, 2019. https://www.insidenova.com/news/fairfax/fairfax-subsidy-for-virginia-railway-express-to-increase/article_278f6a5e-0ea0-11e9-a7a0-8fe9fb4c29bd.html

[22] Fund 30000, Metro Operations & Construction, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/pm/30000.pdf

[23] Free Metrobus Pilot Program Could Come to Tysons-Area High School, Tysons Reporter, May 17, 2019. https://www.tysonsreporter.com/2019/05/17/free-metrobus-pilot-program-could-come-to-tysons-area-high-school/

[24] Fund 30000, Metro Operations & Construction, Department of Transportation FY 2020 Adopted Budget Plan: Performance Measures. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/volume2/30000.pdf

applications to the Northern Virginia Transportation Commission (NVTC) for the implementation of express bus service along I-66 using the managed High Occupancy Toll (HOT) lanes inside the Beltway, which opened in December 2017 as part of the Transform 66 Project. Route 699 began operating in December 2017 with 11 daily departures during each of the morning and evening rush hours transporting passengers between the Fairfax County Government Center and downtown Washington DC. As of December 2018, it was providing over 2,300 passenger trips per week. On January 22, 2019, route 698 began passenger service, providing a direct link from the Vienna Metrorail Station to the Pentagon with 10 daily departures during the morning and evening rush hours.[25]

In 2020 Fairfax Connector will be putting in place new and updated routes in conjunction with the opening of the new Metrorail Silver Line stations at Reston Town Center, Herndon, and Innovation Center. FCDOT is currently completing a route optimization study of the Reston-Herndon area to improve the efficiency and effectiveness of fixed-route bus service based on the opening of Phase 2 of the Silver Line, within existing funding constraints. The preferred bus transit network produced by this effort will include a mix of feeder, circulator, and fixed-route bus services that are designed to reduce travel times and enhance access to activity centers in both Reston and Herndon. This new feeder bus network will encourage those living within a few miles of the stations to use transit. The preferred alternative will be forwarded to the Board of Supervisors (BOS) for their consideration in early 2020.

New developments in Reston are also including proffers to encourage their residents and employees to use transit.[26] For example, the developers of Reston Station have agreed to develop a Transportation Demand Management (TDM) plan aimed at reducing the number of weekday peak hour vehicle trips generated by the residential and office uses within the property. More specifically, the developer has agreed to a goal of reducing the PM peak hour vehicular trips by a minimum of 45 percent (from a calculated baseline) following the implementation of all phases of development for the new residential and office uses. This goal will be achieved by encouraging greater use of transit such as Fairfax Connector buses, Metrorail, and other alternative means of transportation.[27]

As future options are being evaluated for route optimization associated with bus service to Metro, VRE, and commercial centers, FCDOT may want to monitor innovative new approaches being taken by other jurisdictions in the DC metropolitan area. One such approach currently being piloted in Montgomery County is an on-demand shuttle service called Ride On Flex which offers corner-to-corner service on 11-passenger buses.[28] The service operates with no fixed stops, routes, or schedules. Passengers set a pick-up via an online app and a shuttle meets the passenger at a nearby corner. Each ride costs less than $2 and delivers the passenger from the pick-up point to any location within a pre-defined zone. The service is currently operating on

[25] Fund 40000, County Transit Systems, FY 2020 Adopted Budget Plan. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/volume2/40000.pdf
[26] FCDOT Response to EQAC, July 3, 2019.
[27] FCDOT Response to EQAC, September 18, 2019.
[28] Montgomery County Department of Transportation, https://www.montgomerycountymd.gov/DOT-Transit/flex/

weekdays during rush hour in the immediate areas around the Glenmont and Wheaton Metrorail stations and during mid-day hours in the area around Rockville Town Center. It is designed to provide first-mile/last-mile service within a limited area and to bring transit into neighborhoods.

NON-MOTORIZED AND EMERGING TRANSPORTATION

Fairfax County has an active role in planning and supporting non-motorized and emerging transportation modes of transport. While Figure II-1 shows that these remain only a small percentage of the modes used in the county for travel to work, their continued and increasing use is a key element in helping the county to reduce its reliance on the use of SOVs. As considered in this report, these include bicycle and pedestrian transportation (scooter, e-bike, and moped) and emerging technologies, such as autonomous vehicles, connected vehicles, and smart streets solutions that would use data and a network of connected sensors to manage the transportation system.

Bicycle and Pedestrian Transportation

FCDOT staff advances the county's bicycle and pedestrian programs in direct coordination with other agencies. The bicycle coordinator works with VDOT in their annual paving program based on the Bicycle Master Plan in the county's Comprehensive Plan. During the 2018 paving cycle, approximately 30 lane-miles of bike lanes were added (down from 60 miles in 2017).

As part of the Bicycle Master Plan, Fairfax County set targets for plan implementation and overall performance for the 10-year period 2015-2024.[29] These targets include:

- By 2024, triple the number of bicycle trips over baseline levels (assumed 2012 or 2013);
- By 2024, increase by five-fold the number of center line miles of on-road bicycle facilities, and minimize gaps in the bicycle network; and
- By 2024, reduce bicycle crash and fatality rates by increasing the numbers of people bicycling and maintaining or reducing the total number of crashes and fatalities involving bicyclists.

To track the rate of Master Plan implementation, to keep the public informed on plan progress, and to report the benefits of the overall plan to Fairfax County, an annual Bicycle Master Plan performance tracking program was suggested. Information was not provided about whether such a tracking program was developed or whether the county is making progress toward the Master Plan targets. At a minimum, targeted implementation of a bike counting program is recommended to allow quantification of biking in the county along routes near the planned I-66 trail, currently under construction, which will provide a baseline of information that could be used to evaluate the relative change in bicycling use after the I-66 trail is completed, as well as along the Fairfax County Parkway Trail, which serves as an important bicycle feeder to the W&OD Trail.

VDOT noted that their policy is to initiate all highway construction projects with the presumption that walking and bicycling will be accommodated. Pedestrian and bicycle facilities

[29] Countywide Bicycle Master Plan, 2014, Phase 2 (section 6.5), https://www.fairfaxcounty.gov/transportation/bike/master-plan

identified in Fairfax County's Comprehensive Plan are included in the scope of larger VDOT roadway improvement projects. For example, VDOT, in cooperation with Fairfax County, is planning to build a new 10-foot shared-use path from near Tysons One Place and Fashion Boulevard to Route 123 and Old Meadow Road via a new bicycle/pedestrian bridge over I-495. The project will improve bicycle and pedestrian safety and connectivity in the Tysons area. This is currently in right-of-way acquisition, and planned construction is scheduled to begin in Spring 2021.[30]

FCDOT noted that the Fairfax County Parkway widening and Popes Head Road interchange concept includes a continuous shared use path on one side, which will fill existing gaps and add safe crossings. That project is still in design, and there is no date yet to begin right of way acquisition or construction.

Scooter, E-Bike, and Moped Transportation

These modes of transport are gaining use in Fairfax County, other jurisdictions, such as Arlington County, and other nearby urban/suburban areas. Information was not provided about the extent to which these modes are being used in the county nor about how the county views and supports these modes relative to other programs, such as Capitol Bikeshare. In July 2019, the BOS Transportation Committee provided information related to the regulation of electric scooter companies including a proposed scooter ordinance/program which is scheduled to be presented to the BOS in December 2019.[31]

Emerging Technologies

Technologies such as electric vehicles, autonomous vehicles, connected vehicles, and smart streets solutions have the potential to disrupt the well-established patterns illustrated by the commuting data and substantially increase commuting efficiencies in the county, including addressing gaps in the equity of access. These technologies also have the potential to create major challenges and inefficiencies if not adequately understood and considered as medium and long-term planning decisions are made. EQAC notes that a thorough study of emerging technologies, such as recommended by the Transportation Advisory Council at the May 2018 meeting of the Board of Supervisors' Transportation Committee, would help the county prepare for and take advantage of these technologies. This would go beyond ad hoc efforts, such as the autonomous shuttle pilot project in Merrifield, an Alternative Service Feasibility Study by FCDOT, and hosting of a Smart Cities Readiness workshop. Such a study should assess the wide array of emerging technologies and actions relevant to both county and non-county operations over a multi-year period, including the impacts of significant growth in electric vehicle usage and the need for a built-out electric vehicle charging infrastructure throughout the county. EQAC believes that it is important to consider in a comprehensive manner the collective impacts all of the expected advances in transportation technology on transportation modes and patterns in the

[30] VDOT reply to EQAC request. Letter to Mr. Fred Selden, Director, Department of Planning and Zoning, from John C. Muse, District Environmental Manager. July 29, 2019.
FABB reply to EQAC request. May 22, 2019.
[31] "Regulation of Electric Scooter Companies," FCDOT, July 9, 2019.
https://www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/btc/item-3-scooter-regulations-070319.pdf

County in the medium (5-10 year) and long-term (10-30 year), so that this information can inform future planning decisions.

In addition, EQAC notes the benefits of visual mapping tools to assist residents to better understand the range of activities in the county to improve the transportation network and to reduce the dependence on SOV trips. EQAC notes the initial efforts by the county to visually display projects on the county web site, such as the more than 100 unfunded capital and operating projects important for improving the efficiency and safety of the county's transportation network (https://www.fairfaxcounty.gov/transportation/tpp-2017). However, those maps are not connected to the broader set of GIS-enabled maps that the county is currently supporting (e.g., Jade – see discussion in the Technology chapter) nor do they show the full range of relevant ongoing and planned projects (e.g., those with Transform 66). Residents would need to reconcile information from these multiple sources to better understand and contribute to a meaningful discussion about opportunities to reduce their dependence on SOV trips.

Transportation Demand Management

The Transportation Demand Management (TDM) program is a policy tool that supports the goal of reducing SOV dependence. Through the land use entitlement process, commitments are obtained from developers to provide employees or tenants with alternatives to SOV travel or to otherwise incentivize the use of such alternatives. Through transit incentives and car or van pools, TDM reduces SOV use. As of December 2018, there were 114 land development cases with proffered TDM commitments, of which 24 report annually on the progress toward their goals based on the applicable phase of their development.[32] In addition, the number of employers with TDM programs in place in FY 2019 is estimated to be 294, an increase of 3.5 percent from the 284 with programs in FY 2018.[33] EQAC will continue to monitor information about TDM programs being used in Fairfax County, including the quantitative impacts of those programs.

NOISE

Background information about transportation-related noise is contained in the 2018 Annual Report on the Environment (https://www.fairfaxcounty.gov/planning-development/environmental-quality-advisory-council/annual-report-environment). Additional information can be found in the Land Use chapter of this report. In 2019, the MWAA issued a report about the generation of new noise contours (https://www.flydulles.com/iad/dulles-international-noise-contour-map-update).

MAJOR PROJECT UPDATES

While numerous transportation projects are being developed and implemented at any given time across the county, there are currently two major projects that have such broad impacts that a specific update is warranted.

[32] FCDOT Response to EQAC, September 18, 2019
[33] "FY 2020 Adopted Budget Plan: Performance Measures," FCDOT. https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/pm/40.pdf

Transform 66

During 2019, construction was underway to transform Interstate 66 (I-66) between US Route 29 in Prince William County and Fairfax Drive (Route 237) in Arlington County, which consists of activities within and outside of Fairfax County. Branded as "Transform 66," planned improvements consist of projects east and west of I-495/Capital Beltway.

East of I-495 is the Transform 66 – Inside the Beltway Project. The project is being administered as a design-build project to add an additional lane on I-66 eastbound from the Route 267/Dulles Connector Road to Fairfax Drive, a new ramp-to-ramp direct access connection from eastbound I-66 to the West Falls Church Metro Station at the Route 7 interchange, and a new bridge for the W&OD Trail over US 29/Lee Highway.

In January 2017, the Northern Virginia Transportation Commission (NVTC) and the Commonwealth of Virginia signed a 40-year Memorandum of Agreement (MOA) authorizing the use of a portion of the toll revenues from I-66 Express Lanes Inside-the-Beltway to fund multimodal transportation projects that benefit commuters in the I-66 corridor. Two projects approved by the Commonwealth Transportation Board were for enhanced bus service routes in Fairfax County. Information was not provided to assess the impact of the Inside the Beltway Project on the environment and the impact on SOV trips, but EQAC will continue to be interested in information related to these impacts as it becomes available.

West of I-495 is the Transform 66 Outside the Beltway Project, which is a public private partnership (P3) between the Commonwealth of Virginia and the I-66 Express Mobility Partners (I-66 EMP). The $3.7 billion project scope consists of multimodal improvements to 22.5 miles of the I-66 corridor, including:

- Two express lanes (tolled) in each direction from I-495 to Gainesville
- Three general purpose lanes in each direction
- New transit service and park-and-ride lots
- Eleven miles of new bike and pedestrian trails
- Safety and operational improvements at key interchanges

During 2019, there have been multiple ongoing construction activities within Fairfax County related to Transform 66 Outside the Beltway - these will continue in 2020 and beyond. The project is scheduled for completion in December 2022. Additional transportation projects in the I-66 Outside the Beltway corridor are being funded by a $500 million concession fee from I-66 EMP through projects recommended by the Northern Virginia Transportation Authority (NVTA) and approved by the CTB. Eight of the 15 concession fee projects are in Fairfax County.[34]

As part of this project, an I-66 trail will be made available from the western edge of the county (in Centreville) to I-495. The I-66 trail will consist of newly-constructed sections as well as existing facilities. Parts of the trail will be delivered by EMP, other parts by FCPA, and others by VDOT. A preliminary layout of these trail sections shows that the trail will be a conglomeration

[34] VDOT reply to EQAC request. Letter to Mr. Fred Selden, Director, Department of Planning and Development, from John C. Muse, District Environmental Manager. July 29, 2019.

of various types of trail segments, some of which will be located adjacent to vehicular travel lanes, while others will include more separation. Preliminary designs show various trail segments inside the sound barrier, including those closer to I-495.

Embark Richmond Highway

In cooperation with Fairfax County, VDOT is administering a project to widen US 1/Richmond Highway from four to six lanes between Jeff Todd Way and Napper Drive with separate bicycle and pedestrian accommodations while reserving a median width necessary to accommodate a future planned Bus Rapid Transit (BRT) system (the BRT is a separate project administered by the Fairfax County Department of Transportation). VDOT held a National Environmental Policy Act (NEPA) public hearing/public information meeting in October 2018; an Environmental Assessment, including a Preliminary Noise Study, was approved for public review and comment at this meeting. A Design public hearing meeting was subsequently held in March 2019. Approval of the public hearing design plans as well as a NEPA decision from the Federal Highway Administration are anticipated in late 2019/early 2020. Right of way acquisition and utility relocation is scheduled to begin thereafter and construction is anticipated to start in summer 2022[35].

The Richmond Highway BRT project was selected by the Commonwealth Transportation Board for fiscal year 2020 (Round 3) "Smart Scale" funding, which consisted of $50 million to help fund the $544.8 million project. The proposed BRT system will ultimately run along Richmond Highway from the Huntington Metro Area to Fort Belvoir. This multi-modal project also includes nine new transit stations, a cycle track for cyclists, sidewalks, accommodation for automobiles, and other motorized vehicles and Intelligent Transportation System improvements[36].

COMMENTS

1. **WMATA Funding**
   The council commends the Board of Supervisors, county leadership, and staff, as well as leaders throughout the region, for their continued efforts to provide dedicated funding for WMATA. From an environmental standpoint, sustaining Metro's core Metrorail and Metrobus services provides a direct alternative to SOV travel and supports compatible bus, bicycle, and pedestrian facilities.

2. **Disruption of East-West Travel**
   The potential for disruption in the primary east-west travel corridor caused by the concurrence of outdoor Metro station reconstruction on the Orange Line (planned for 2020) and construction of the I-66 Express Lanes is concerning. Careful management of this work is important to limit impacts on I-66 users, transit users, and residents in adjacent neighborhoods.

[35] Ibid.
[36] Ibid.

3. First-Mile/Last-Mile Solutions

EQAC would like to see the county work to further integrate innovative approaches into first-mile/last-mile solutions in areas around existing and new Metro stations to ensure that secondary road traffic congestion doesn't continue to worsen, as it has in the past year. Innovative approaches that warrant consideration include assessing the possibility of broadening the use of smaller buses on shorter fixed routes to allow more frequent departures, evaluating on-demand shuttle services, and implementation of a scooter program, as is currently being considered by the Board of Supervisors.

RECOMMENDATIONS

1. Transportation Technology

EQAC recommends that the county undertake a comprehensive study to evaluate the impacts that all of the expected advances in transportation technology (electric vehicles, autonomous vehicles, etc.) may have on transportation modes and patterns in the County in the medium and long-term, so that this information can inform future planning decisions.

2. Bicycle Master Plan

EQAC recommends that a program be put in place to assess the impacts of past and future implementation of the Bicycle Master Plan, including the establishment of performance measures that can be tracked over time. The results of such an assessment will provide valuable information on the efficacy of the plan in reducing SOV trips in favor of increased cycling, and will allow county staff to identify needed changes to the Master Plan. Activities that should be considered as part of this effort include: begin updating and integrating the Bicycle Master Plan and countywide trails plan; track the rate of Master Plan implementation and inform the public about plan progress toward established metrics; and conduct targeted implementation of a bike counting program to allow quantification of cycling in the county.

3. Transportation Projects on GIS Mapping Applications

EQAC believes that it is important for the public to see proposed capital transportation projects (funded and unfunded) on GIS mapping applications. Such a display could be offered via the new Jade application or a similar online tool. This could help improve transportation efficiency and reduce dependence on SOV trips.

4. Alternatives to SOV Travel

EQAC recommends that the County Executive direct FCDOT to evaluate all options, beyond traditional fixed-route bus services, to limit the number of individuals travelling to and from the new Silver Line Metrorail stations in single-occupancy vehicles (SOVs). FCDOT indicated in comments to EQAC that a route optimization study is being completed that will improve the effectiveness of fixed-route bus service "within existing funding constraints." Given the potential negative impacts that increased SOV travel to the new Metro stations might have on traffic in neighborhoods surrounding the stations, EQAC believes that it is important to consider options that might require additional funding. This includes the use of alternative and emerging options such as the use of smaller circulator buses, on-demand shuttles, shared electric scooter programs, shared e-bike programs, etc.

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III. WATER

Board of Supervisors Environmental Vision:
"Fairfax County considers the protection, restoration and enhancement of environmental quality through the sustainable management of its water resources to be one of its highest priorities. Through its policies, regulations, and outreach to the community, the county will implement the best available technology, including advanced and innovative practices to protect and restore streams, wetlands and associated aquatic resources, promote water conservation and ensure the most effective stormwater management, advanced wastewater treatment, and the safest, most reliable drinking water supply for future generations."[1]

INTRODUCTION

The following statement can be found in the Introduction to the Water section of the Board of Supervisors' Environmental Vision. It captures well the concept of "One Water."

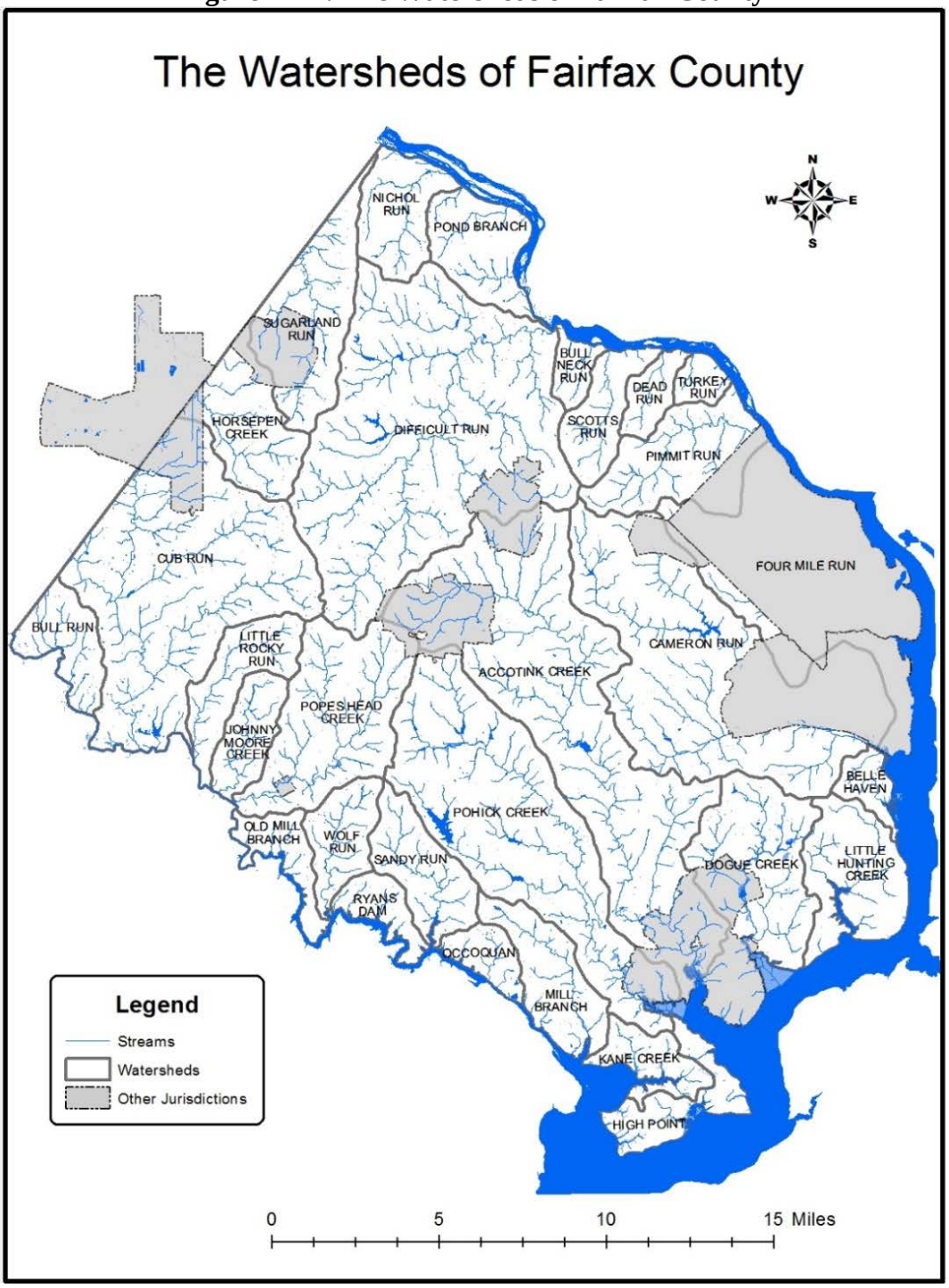
> *"Water is the essence of life – without it, life on our planet would not exist. The availability of clean water and presence of functioning aquatic systems are fundamental to sustaining viable ecosystems and human societies. Fairfax County's natural aquatic resources are vast; its 30 watersheds encompass myriad wetlands, tidal marshes, lakes, ponds and reservoirs – and include well over 1,000 miles of streams and associated riparian corridors. Fairfax County highly values water as an essential part of our ecosystem through protecting and restoring the natural environment, helping provide safe drinking water, and preserving the aesthetic and recreational opportunities these natural resources provide for county residents."*

This "one water" concept envisions water as a resource regardless of its location or condition in any one subsystem. This is the lens through which water is viewed in this chapter of the Annual Report on the Environment.

The concept of "one water" is illustrated in how our streams fit into the larger water ecosystem. The largest watershed in the county is Difficult Run (58 square miles), with ten smaller streams that drain into its main stream. Difficult Run, 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 of Fairfax County ultimately drains to the Potomac River, which drains to Chesapeake Bay.

[1] 2017 Fairfax County Environmental Vision, Section 2 C, pg. 17, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

Figure III-1: The Watersheds of Fairfax County



While the natural world does not draw distinct lines for water movement throughout the ecosystem, human management of water does fall into three separate management systems:

1. **Drinking Water** - We draw in surface waters from rivers and lakes and then treat that water, often of compromised water quality, to drinking water standards. Groundwater is the source of water provided by public and private wells.

2. **Wastewater Management** – Sewage is collected in closed systems from homes and business; we treat the raw sewage in facilities to remove pollutants and then return the treated waters to groundwater or surface waters.

3. **Stormwater Management** - Stormwater management is the art and science of managing surface water runoff, often polluted, to protect our streams, ponds, lakes, rivers, and infrastructure. It includes the restoration of those biological resources to ecologically healthier systems.

Ultimately the health and condition of our rivers, streams, and ponds are a reflection of how we have managed our drinking water needs, wastewater, and stormwater.

DRINKING WATER

The majority of the county's drinking water supply comes from the Potomac River and the Occoquan Reservoir. For a small number of residents, community wells and private wells provide drinking water.

An overview of drinking water must include a discussion of water treatment facilities and the degree of monitoring within the system. It must also include regional and local policies for land use/source water protection and water allocation agreements, especially during droughts.

Wells

There are 14,624 single family residences and businesses served by individual well water supplies in Fairfax County. See the Water section of the Data Appendix for a discussion of permits issued regarding wells.

The Virginia State Health Department Office of Drinking Water regulates the 44 public well water supplies in Fairfax County. The operators of these systems are required to conduct quarterly water sampling and analysis.

Potomac River and Occoquan Reservoir Supplies

Fairfax Water withdraws water from the Potomac River near the James J. Corbalis Water Treatment Plant and from the Occoquan Reservoir at the Frederick F. Griffith Water Treatment Plant. Fairfax Water provides drinking water to nearly two million people in Northern Virginia, including most residents of Fairfax County. Fairfax Water also provides drinking water to the Prince William County Service Authority, Loudoun Water, Virginia America Water Company (City of Alexandria and Dale City), Town of Herndon, Town of Vienna, Fort Belvoir, and Dulles International Airport. As of 2014, the systems of both the City of Fairfax and the City of Falls Church were incorporated into Fairfax Water's system.

Fairfax Water provided 60.735 billion gallons of drinking water in 2018. These surface waters must be treated prior to use.

Table III-1
Fairfax Water - Water Supply Sources, 2017

Sources	Gallons (in billions)
Occoquan Reservoir (Griffith)	22.731
Potomac (Corbalis)	32.421
Purchased	5.497
Untreated	0.086
TOTAL	**60.735**

Source: Fairfax Water

Treatment

Fairfax Water meets all state and federal regulatory requirements. In addition, analyses are performed to monitor the quality of Fairfax Water's raw water sources, water within the treatment process, and water within the distribution system. Water undergoing the treatment process is continuously monitored for pH, turbidity, coagulation efficiency, and disinfectant residuals using technically advanced online monitoring systems. Chlorine, pH, and temperature testing is also performed at sample sites throughout the system using portable instrumentation.

Fairfax Water provides highly advanced treatment for the water served to its customers. A study conducted by the Water Research Foundation concluded that using a combination of ozone and biological activated carbon is very effective in removing broad categories of endocrine disrupting chemicals, personal care products, and pharmaceuticals. Fairfax Water uses both ozone and biological activated carbon at both of its treatment plants as part of its multi-barrier water-treatment approach that also includes coagulation, sedimentation, filtration, and disinfection. Additional information about Fairfax Water's treatment process and water quality is available at www.fairfaxwater.org/water-quality.

Facilities

Fairfax Water Occoquan Reservoir Facilities

The Frederick P. Griffith, Jr., Water Treatment Plant, sourced by the Occoquan Reservoir, came on line in 2006. It is currently operating at an average of 62 million gallons per day (mgd) and has a current maximum capacity of 120 mgd. The plant is designed for a future capacity of 160 mgd.

Fairfax Water Potomac River Facilities

The James J. Corbalis, Jr., Water Treatment Plant, sourced by the Potomac River, is currently operating at an average of 89 mgd and has a current maximum capacity of 225 mgd. The plant is designed for an ultimate capacity of 300 mgd.

Washington Aqueduct Facilities
Fairfax Water purchases treated water from the U.S. Army Corps of Engineers, Washington Aqueduct Division, treated at the Dalecarlia and McMillan water treatment plants in Washington, DC.

For a discussion of treatment processes at each plant, see the Water section in the Data Appendix.

Monitoring Treated Drinking Water Supplies

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. Fairfax Water's current Water Quality Report is available for review on its website at: www.fairfaxwater.org/water-quality.

Included in this report are details of the following contaminants:

Disinfection By-Products
In 2018, Fairfax Water monitored surface source water and finished drinking water for 60 volatile organic compounds (VOCs). No VOCs were detected in the source water. In the finished water, no VOC compounds were detected during regulatory testing with the exception of trihalomethanes, a subset of VOCs commonly found in chlorinated systems. Trihalomethanes are by-products of chlorination water treatment and are suspected carcinogens at elevated levels. Trihalomethanes were found at low levels - the 2018 distribution system averages continue to be below the federally-mandated Maximum Contaminant Levels (MCLs) for total trihalomethanes.

In addition to trihalomethanes, Fairfax Water tested for another type of by-product of chlorination called haloacetic acids. Like trihalomethanes, haloacetic acids continue to be below the required MCL. The presence of chlorine in drinking water supplies remained below the required Maximum Residual Disinfectant Level.

Metals
Fairfax Water tests for the following regulated and unregulated metals: aluminum; antimony; arsenic; barium; beryllium; cadmium; calcium; total chromium; copper; iron; lead; manganese; magnesium; mercury; nickel; potassium; selenium; silicon; silver; sodium; thallium; and zinc. For those metals that are regulated, the levels in 2018 continued to be below their respective MCLs. Lead and copper testing for the Lead and Copper Rule is discussed in a separate section below. The concentration levels for unregulated metals were within the expected range. Test results for these and other constituents are available online at: www.fairfaxwater.org/water-quality.

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 allow a determination of 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.

Fairfax Water has completed monitoring the Potomac River and Occoquan Reservoir for compliance with Round 2 of the Environmental Protection Agency (EPA) Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR Round 2). 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 LT2ESWTR Round 2 monitoring program began in April 2015 and involved the collection of one sample from water treatment plant sources each month for a period of two years. Monitoring for compliance with the LT2ESWTR Round 2 was completed in March 2017.

Under the LT2ESWTR Round 2, the average *Cryptosporidium* concentration determines whether additional treatment measures are needed. A *Cryptosporidium* concentration of 0.075 oocysts/Liter triggers additional water treatment measures. Fairfax Water's raw water *Cryptosporidium* concentrations were below this threshold and no additional treatment was required. Results for LT2ESWTR Round 2 monitoring for the period of 2015-2017 are as follows:

Source (before treatment)	Mean *Cryptosporidium* Concentration (Oocysts/Liter)[1]	Additional Treatment Measures Required?[2]
Potomac River	0.000	No
Occoquan Reservoir	0.007	No

[1] Data from the LT2ESWTR Round 2 monitoring for the period of 2015-2017
[2] Based upon final bin assignment under the EPA LT2ESWTR Round 2 guidelines

Additionally, the Washington Aqueduct was required to perform separate *Cryptosporidium* monitoring of the Potomac River for LT2ESWTR Round 2 in 2017. The results from the monitoring indicated that no additional treatment measures were required.

After the LT2ESWTR Round 2 monitoring period ended, Washington Aqueduct continued to monitor the Potomac River for *Cryptosporidium* on a monthly basis. In 2018, *Cryptosporidium* oocysts were detected in samples collected in February, March, April, June, and November. There are no regulatory limits for *Cryptosporidium*; however, results in 2018 were at levels indicating no additional treatment measures are necessary (based upon LT2ESWTR Round 2 criteria). Results for Washington Aqueduct *Cryptosporidium* monitoring in 2018 are summarized below:

Source (before treatment)	*Cryptosporidium* Concentration Range (Oocysts/Liter)[1]	Additional Treatment Measures Required?[2]
Potomac River (Great Falls & Little Falls)	0.093 – 0.35	No

[1] Data from 2018
[2] Based upon final bin assignment under the EPA LT2ESWTR Round 2 guidelines

New Unregulated Contaminants

An emerging water quality issue of particular interest 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, research to date has not demonstrated an impact on human health from these compounds at the trace levels identified in drinking water.

There are tens of thousands of compounds that are considered potential endocrine disrupting compounds or pharmaceuticals and personal care products. Fairfax Water considered the feasibility of monitoring and implemented a targeted program focused on constituents most likely to be relevant. Fairfax Water then evaluated its treatment process to determine which compounds would not be readily removed through treatment. Finally, the list was narrowed to determine which compounds could be measured in water. This provided an initial list of 20 compounds that were most likely to be present. In 2010, Fairfax Water again performed a comprehensive review, which included the current project results as an additional part of the information database. Based on this review, Fairfax Water began testing an updated list of 25 compounds on a routine basis.

As part of the special monitoring, Fairfax Water tested its source waters, the Potomac River and the Occoquan Reservoir, and its treated water. As expected, trace amounts of a very few compounds were found in the Potomac River and Occoquan Reservoir sources. Trace amounts of a very few compounds were also found in the treated water at a very low frequency. To date, research shows no indication of human health concern at the levels found in Fairfax Water's source or treated waters, and Fairfax Water concluded its special monitoring in 2014. To view the results from Fairfax Water's monitoring of these compounds and learn more about emerging water quality issues, please visit the Water Quality section of the Fairfax Water website at: www.fairfaxwater.org/water-quality.

A study conducted by the Water Research Foundation concluded that using a combination of ozone and granular activated carbon is very effective in removing broad categories of endocrine disrupting chemicals, personal care products, and pharmaceuticals. Fairfax Water uses both ozone and granular activated carbon at both of its treatment plants as part of its multi-barrier water-treatment approach that also includes coagulation, sedimentation, filtration, and disinfection. Additional information about Fairfax Water's treatment process and water quality is available at www.fairfaxwater.org/water-quality.

Bacteriological Parameters
Fairfax Water has over 150 sites (taps) spread out over the entire distribution system that are tested approximately twice per month for bacteriological parameters. In 2018 Fairfax Water collected almost 3,700 samples at these sites as part of the ongoing efforts to ensure safety and water quality.

Lead and Copper
Since 1992, Fairfax Water has tested for lead and copper in customer tap samples in accordance with EPA's Lead and Copper Rule and results have consistently been below the action level established by the rule. Based upon historically low results, Fairfax Water is currently on reduced monitoring, which only requires monitoring on a triennial basis for the main system and the separate closed system maintained by Fairfax Water, supplied by Arlington County (referred to as Arlington Special).

The last triennial study for the Fairfax Water main system was performed in 2017. In 2017, the 90th percentile value for lead in Fairfax Water's main system was 0.63 parts per billion (ppb), compared to the EPA action level of 15.0 ppb. For copper, the 90th percentile value in 2017 in the main system was 0.11 parts per million (ppm), compared to the EPA action level of 1.3 ppm. As this report was being prepared, Fairfax Water was in the middle of the current monitoring period for the Arlington Special system. Monitoring for this system was to have been completed between June and September 2018.

In 2018, Fairfax Water completed triennial monitoring of the Arlington Special system. The 90th percentile value for lead in Fairfax Water's Arlington Special system was 0.27 parts per billion (ppb), compared to the EPA action level of 15.0 ppb. For copper, the 90th percentile value in 2018 in the main system was 0.021 parts per million (ppm), compared to the EPA action level of 1.3 ppm.

Additional information on these programs and more can be found at:
www.fairfaxwater.org/water-quality.

Protecting Drinking Water Sources

Potomac River Water Quality Monitoring
The Metropolitan Washington Council of Governments (MWCOG) coordinates with state and local government officials, scientists from local universities, and other regional experts who collect and analyze water quality monitoring data from local waters. MWCOG, in turn, shares this body of knowledge, which is useful for evaluating the effectiveness of management actions, with its members through fact sheets and periodic workshops. The most recent of these, "New Data on Nutrient Dynamics and SAV in the Potomac Estuary," was held in winter 2017. (Meeting materials can be downloaded at: https://www.chesapeakebay.net/channel_files/25553/sav_syn_summary_nov_2017b.pdf). The workshop explored the insights derived from new monitoring data on the timetable for achievement of water quality standards in the Potomac estuary.

Metropolitan Washington Council of Governments Chain Bridge Monitoring Program

At Chain Bridge, the river transitions from a free-flowing stream to one influenced by tidal currents, making this fall line location a good spot to monitor the quality and quantity of upstream flows to the Potomac River estuary. MWCOG contracts with the Occoquan Watershed Monitoring Laboratory (OWML) to operate an automated monitoring station at Chain Bridge to gather data on the amounts of nutrients, sediment, and other constituents flowing into the upper estuary. The station, which has been operated continuously since 1983, provides the most comprehensive fall line monitoring data in the entire Chesapeake Bay region. In 2018, MWCOG staff convened a workgroup to assess the Chain Bridge Monitoring Program to determine if changes were needed to the existing scope of work. Members of this workgroup, including a representative of Fairfax County, recommended a number of modifications that will be incorporated into MWCOG's Regional Water Fund work program for FY 2019. Data from the OWML's Chain Bridge monitoring station is available at: (http://www.owml.vt.edu/).

Possible Contaminant Identification

In 2002, Fairfax Water 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/swap.

In 2016, Fairfax Water developed a geographic information system based tool that catalogs storage facilities, pipelines, roads, rail crossings, and other potential sources of contaminants in the watershed upstream of drinking water utility intakes in the Potomac and Occoquan watersheds. Additional vulnerabilities and contaminant sources were noted and ranked based on risk for drinking water treatment facilities.

Salt Management Strategy (SaMS) in Northern Virginia

Fairfax Water has observed increasing trends for both sodium and chloride in the source waters since the 1980s, especially in the Occoquan Reservoir. Many studies have indicated that this is a national trend. Furthermore, chloride water quality impairments have been linked to winter deicing/anti-icing activities. Sodium and chloride in the source waters cannot be removed by the conventional water treatment process. If the concentration of these parameters continues to increase in the source waters, membrane treatment might be the only viable, but extremely expensive, option. To address this issue throughout the Northern Virginia region, the Virginia Department of Environmental Quality (VDEQ) has gathered a Stakeholder Advisory Committee (SAC) and formed six workgroups to work towards development of a Salt Management Strategy, (SaMS). Fostering collaboration between all stakeholders involved in or impacted by snow and ice management and the application of road salts is intended to encourage long-term support for improved practices that protect public safety and lessen the negative impacts on the environment, infrastructure, and public health. The implementation of best management practices (BMPs), such as training and certification programs, and improved salt application equipment and practices can achieve multiple goals. Fairfax Water is an active participant in the SAC, as well as the different workgroups. More information on the initiative is available at: http://www.deq.virginia.gov/SaMS.aspx.

In 2018, the Micron Semiconductor Facility in Manassas announced a planned expansion of its plant. The facility, which adds sodium as part of the manufacturing process, is located within the

Occoquan watershed and sends pre-treated wastewater to the Upper Occoquan Service Authority (UOSA) facilities. Following the formation of Technical Review Committee (TRC) and convening of the Occoquan Watershed Monitoring Subcommittee by VDEQ, the region put forth a consensus recommendation to limit Micron's sodium discharge to UOSA to a maximum weekly average concentration of 100 mg/L. The Occoquan Watershed Monitoring Subcommittee of the State Water Control Board endorsed the recommendation, and Micron, expressing its commitment to its own policy to protect the environment, agreed to abide by this limit. This agreement represents a significant step in controlling the increase of sodium discharges from point source facilities located the Occoquan watershed.

Monitoring Groundwater

On January 1, 2014, the Eastern Virginia Groundwater Management Area was expanded to include the areas of Fairfax County located east of Interstate 95 (See: 9VAC25-600-20).

The law requires that no person shall withdraw, attempt to withdraw, or allow the withdrawal of groundwater greater than or equal to 300,000 gallons in any month within a groundwater management area, except as authorized pursuant to a groundwater withdrawal permit, or as excluded in the new Groundwater Withdrawal Regulations, 9VAC25-610-50. (See: www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterWithdrawalPermittingandCompliance/GroundwaterWithdrawalPermitsFees.aspx).

All certified water well system providers must register with VDEQ each private well, as defined in the Groundwater Withdrawal Regulations, 9VAC25-610-10, that is constructed in a groundwater management area after September 22, 2016. The registration shall be made within 30 calendar days of the completion of well construction.

There is one groundwater monitoring USGS well in Fairfax County (385638077220101) that is part of a larger USGS monitoring system of 174 wells found throughout Virginia.

Keeping the 1982 Ban on Uranium Mining

One potential risk to drinking water supplies could be the lifting of the 1982 ban on uranium mining in Virginia. Reports on uranium mining in Virginia have been prepared by the National Academy of Sciences, Fairfax Water, Chmura Analytics, Virginia Beach, and RTI Socioeconomic.

At this time, the only uranium deposits that appear to be potentially economically viable for mining are in Pittsylvania County, where mining would have no impact on Fairfax County. However, the concern exists that there are other uranium occurrences in Virginia and that past uranium mining lease agreements have been established in Fauquier County, within the Occoquan watershed.

The Occoquan Reservoir is one of the county's primary sources of drinking water, and the quality of this drinking water source can be adversely affected by activities occurring within its watershed. There are serious concerns about the lifting of the moratorium in light of numerous and substantial questions and concerns regarding the potential for adverse environmental impacts

to Virginia and the Occoquan Reservoir if uranium were to be mined or milled within the Occoquan watershed.

It is EQAC's view that it would be premature to lift the moratorium on uranium mining in Virginia or to draft regulations pertaining to uranium mining without first addressing concerns identified by the National Academy of Sciences in its report. See EQAC's resolution on retaining the ban at:
www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resoultions%20and%20positions/2013/2013%20august--legislative%20proposal--uranium%20mining--reiteration%20of%202012%20proposal.pdf

In June 2019, the Supreme Court upheld a Virginia law that bans uranium mining within the Commonwealth in a ruling that affirmed the powers of the State to regulate mining on private lands.

Protection of the Occoquan Reservoir Initiatives

During the latter part of the 1960s, the Occoquan Reservoir exhibited signs of advanced eutrophication, such as frequent and intense algal blooms (including cyanobacteria), periodic fish kills, and taste and odor problems. All these issues threatened the health of the reservoir as a water supply source. Although the reservoir is only partially drained by Fairfax County streams (about 17 percent of the watershed is located in Fairfax County), the county has provided leadership in the region for land use modifications to protect water quality. For a detailed description of the following actions that have been taken regionally and locally in support of the protection of this resource, see the Data Appendix volume of this report:

- Occoquan Policy (1971)
- Upper Occoquan Service Authority (1978)
- Fairfax County's "Downzoning" Action and Best Management Practice Requirement (1982)
- Fairfax Water Shoreline Easement Policy (2004)
- Fairfax County New Millennium Occoquan Watershed Task Force Report (2003)

Protecting the Potomac Ecosystem during Drought Conditions and Providing Adequate Drinking Water for a Growing Region

In order to provide adequate supplies of drinking water and to protect the Potomac River ecosystem during low flow periods (droughts), the three major water utilities in the Washington metropolitan area (Fairfax Water, Washington Aqueduct, and Washington Suburban Sanitary Commission) became signatories to agreements that lay out the rules for allocation of water during low flows. Upstream dams, the Jennings-Randolph Dam on the Potomac River and the Savage River Dam, along with Seneca Lake in Montgomery County, Maryland were constructed. Releases from these reservoirs can be used to augment natural river flows during times of drought.

During droughts, the Washington metropolitan area's three major water suppliers and the Interstate Commission on the Potomac River Basin (ICPRB) Cooperative Water Supply Operations on the Potomac section (CO-OP) track reservoir storage, Potomac River flow, and water use to ensure that Potomac River flow is adequate to meet environmental flow and water

supply demand requirements. Since the creation of the region's cooperative water supply system in 1982, low flow conditions necessitating the release of water from upstream reservoirs to augment Potomac River flow have occurred in only three years: 1999, 2002, and 2010. Since 2010, flow in the Potomac River has been more than adequate to meet drinking water withdrawal needs by the region's major water suppliers and no additional releases from upstream reservoirs to augment water supplies have been needed. During the Fall of 2017, ICPRB's CO-OP staff members conducted the daily monitoring stage of CO-OP drought operations from September 19, 2017 to October 13, 2017 and from October 20, 2017 to October 30, 2017. Low temperatures and sufficient precipitation, groundwater, and streamflow conditions have made drought operations unnecessary over the 2018 Winter and Spring seasons. Information on water supply status, recent Potomac River flow, reservoir storage, water supply outlooks, and precipitation maps can be found in the "Drinking Water and Resources" section of the ICPRB website under "Cooperative Water Supply Operations on the Potomac": http://www.potomacriver.org/focus-areas/water-resources-anddrinking-water/cooperative-water-supply-operations-on-the-potomac/.

In 2014, ICPRB CO-OP implemented a real-time Low Flow Forecast System (LFFS) for use during CO OP drought operations. The tool is based on the Chesapeake Bay Program Watershed Model and the National Weather Service's Community Hydrologic Prediction System. The LFFS uses real-time National Weather Service data and forecasts to provide 15-day forecasts of Potomac River basin stream flows. The purpose of the tool is to provide information to assist ICPRB CO OP staff members in making reservoir release decisions. In 2018, the Chesapeake Bay Watershed Model was updated to Phase 6, which features improved representation of land use and land cover and a new land segmentation. The LFFS was also updated to provide more reliable warning messages to CO-OP staff in case of model or data acquisition failure.

In 2017, ICPRB CO-OP implemented a data-portal in an effort to automate year-round data sharing. The data portal is currently collecting daily information on drinking water withdrawals made by Fairfax Water, Washington Aqueduct, and the Washington Suburban Sanitary Commission. The data portal is also reporting a15-day forecast of total water production for each of the above mentioned water suppliers. These services are currently shared privately among the data submission participants for CO-OP drought operations, but may be made available to the Mid-Atlantic River Forecast Center and other interested stakeholders in the near future in order to better inform their Potomac River low-flow forecasts. In 2018, a Potomac basin map of 1-day, 3-day, and 7-day cumulative precipitation totals by sub-watersheds was added to the data portal. The precipitation totals are computed by the LFFS based on gridded multi-sensor precipitation estimates provided by the Middle Atlantic River Forecast Center. The map is publicly available at:
https://icprbcoop.org/drupal4/products/precip_map.

Sustained low flows due to drought or excessive withdrawals can damage river ecosystems. Withdrawals by these three utilities have the potential to affect the Potomac River Gorge, stretching from above Great Falls down to Roosevelt Island. As described by the Nature Conservancy:

> *"This 15-mile river stretch is one of the country's most biologically diverse areas, home to more than 1,400 plant species. Scientists have identified at least 30 distinct natural vegetation communities, several of which are globally rare and imperiled. The Gorge also supports a rich array of animal life, from rare invertebrates to the bald eagle and fish like the American shad. In total, the Potomac Gorge provides habitat to more than 200 rare plant species and natural communities, making it one of the most important natural areas in the eastern United States."*

On April 8, 2003, the Maryland Power Plant Research Program and the ICPRB 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."* This issue has yet to be clearly addressed.

For a detailed discussion of the history and concerns over this issue please see the Data appendix.

Planning Water Supplies for a Growing Region

Every five years since 1990, the CO-OP section of ICPRB has conducted a 20 year forecast study of demand and resource availability on behalf of the three major Metropolitan Washington Area (MWA) water utilities (including Fairfax Water). The most recent study (2015) provides forecasts of water demand and availability through the year 2040 by analyzing demand trends, population growth, and available water resources. It also provides recommendations for future planning. This study is available at: www.potomacriver.org/wp-content/uploads/2015/08/ICP15-04a_Ahmed.pdf.

The 2015 Demand Study identified the need for additional water supplies by 2040 to meet the growing water demands in the region. To address this need, the WMA Water Supply Alternatives Study provided an evaluation of potential structural and operational alternatives available to the utilities for the years 2040 and 2085 that would enable them to improve future system reliability in the face of growing demands, decreasing river flows due to increases in upstream consumptive use, and the potential impacts of climate change. The final report is available at: www.potomacriver.org/wp-content/uploads/2017/08/ICP17-3_Schultz.pdf:

The June 3, 2014 Fairfax County Board of Supervisors adoption of an amendment to Fairfax County's Comprehensive Plan facilitates the reconfiguration and conversion in phases of the quarry located adjacent to the Griffith Water Treatment facility to a future water supply storage facility. On June 2, 2015, Fairfax Water and the quarry operator received zoning approvals for this action. The quarry water supply storage facility will help to provide additional water supply storage and to reduce dependency on the Potomac River during periods of drought.

The ICPRB recognizes the following:

> "*Over 6 million people and diverse ecosystems depend on the interstate water resources of the Potomac river basin. Responsible management of this resource will require collaborative*

planning that bridges political boundaries. An adaptive basin-wide comprehensive water resources plan serves as a roadmap for the sustainable use of this interstate resource now and into the future."

COMMENTS

1. **Water Treatment**
   Fairfax Water provides highly advanced drinking water treatment for its customers. It tests raw water, treated water, and tap water for water quality assurance. Its treatment facilities and distribution system are well maintained. Fairfax Water has begun a comprehensive system reliability project to protect its system from future vulnerabilities. The project includes additional storage, as well as back-up power for major facilities.

2. **Ban on Uranium Mining**
   Lifting the 1982 Ban on Uranium Mining could potentially threaten the Occoquan water supply.

3. **Potomac River Low Flow Regime**
   Given the unpredictability of rainfall patterns in recent years, the lack of a well-documented scientific basis for a low flow regime for the Potomac River during drought conditions should be addressed as part of the drought resiliency planning in order to assure adequate protection for both the Potomac River ecosystems and adequate planning for regional water supplies.

4. **Protection of Drinking Water**
   Although the Occoquan Reservoir is shared by several jurisdictions and Fairfax County has slightly less than one-fifth of the land draining into the reservoir, Fairfax County has led the region in land use policies to protect drinking water. These efforts to manage land use and control stormwater runoff to minimize effects on the Occoquan Reservoir should be commended and should continue and be augmented when possible.

WASTEWATER MANAGEMENT

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 (maintained by Fairfax County) 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 through which the water infiltrates into the ground and ultimately reaches groundwater. The only small treatment plant remaining in the county serves the Harborview subdivision of Mason Neck.

A 1980 Comprehensive Plan policy delineated an approved sewer service area (ASSA) in order to manage the density of development for the protection of water quality throughout the county. Since the adoption of this policy, development outside the ASSA has been partially driven by the need to accommodate acceptable onsite wastewater system infrastructure. Public sanitary sewer

service is restricted to the ASSA. However, there are sections within the ASSA that rely on septic systems for treatment of wastewater.

Wastewater produced within the ASSA, which covers approximately 290 square miles of the total 400 square mile jurisdiction, is conveyed by county's 3,380 mile-long collection system. The collection system delivers wastewater to five advanced wastewater treatment plants (designed for nutrient removal) located in the metropolitan area.

The collection system includes 63 wastewater pumping stations, two stormwater pumping facilities, one water reuse system, 57 permanent flow metering stations, 11 rain gauge stations, and 135 grinder pump and associated pressure sewer systems.

The treatment of sewage is a complex shared responsibility among jurisdictions. Of the 100 millions of gallons per day (mgd) collected through the sanitary sewer system, approximately 40 percent is treated by the county-owned Noman M. Cole, Jr. Pollution Control Plant (NMCPCP) in Lorton. The remaining 60 percent of the wastewater is conveyed for treatment, under inter-jurisdictional agreements with DC Water (approximately 30 percent), the Upper Occoquan Service Authority (UOSA - 13 percent), Alexandria Renew Enterprises (15 percent), and Arlington Water Pollution Control Plant (two percent). The combined Fairfax County allocated capacity of these five treatment plants is 157 mgd (which includes one mgd reserved capacity with Loudoun Water's Broad Run Treatment Plant).

There are two sewage treatment facilities located in Fairfax County:

Upper Occoquan Service Authority (UOSA)

UOSA is an independent authority that operates an advanced water reclamation facility in Centreville, Virginia and serves the western portions of Fairfax and Prince William counties, as well as the cities of Manassas and Manassas Park. A video, Drinking Water (www.uosa.org/DisplayContentUOSA.asp?ID=1021), shows individuals comfortably drinking the treated water from plant and showcases the high degree of treatment. This system was one of the early pioneers of indirect potable reuse in the country. UOSA discharges directly into the Occoquan Reservoir. For a chart showing the results of monitoring flows from the plant and an update on the disposal of biosolids and lime solids generated by the plant see the Water section of the Data Appendix. UOSA continues to meet its performance criteria.

Noman M. Cole Jr. Pollution Control Plant (NMCPCP)

The NMCPCP, located in Lorton, is a 67 mgd advanced wastewater treatment facility that incorporates preliminary, primary, secondary, and tertiary treatment processes to remove pollutants from wastewater. The plant is owned and operated by the Fairfax County Department of Public Works and Environmental Services' Wastewater Division. The original plant, which began operation in 1970 at a treatment capacity of 18 mgd, 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 advanced treatment facility for wastewater in Fairfax County should be commended for its leadership in producing treated water for reuse. The facility's YouTube video does an excellent job of explaining the process: www.youtube.com/watch?v=UdddK1YcFK8.

Treated wastewater of 14.62 billion gallons, at a daily average of 40.06 million gallons, was discharged to Pohick Creek during CY 2018. The Noman Cole Plant continues to more than meet the performance standards for the limits of parameters monitored. The facility's performance in 2018 is summarized in Table III-2.

Table III-2
NMCPCP Permit Requirements and 2018 Performance Averages

Parameter	Limit	Performance
Flow	67 mgd	40.04mgd
$CBOD_5$	5 mg/l	< 2 mg/l
Suspended Solids	6 mg/l	0.77 mg/l
Total Phosphorus	0.18 mg/l	0.09mg/l
Chlorine Residual	0.008 mg/l	< QL**
Dissolved Oxygen	6.0 mg/l (minimum)	8.5 mg/l
pH	6.0-9.0 (range)	6.4 – 7.9
E. coli Bacteria	126/100 N/MCL*	1 N/MCL*
Ammonia Nitrogen	1.0 – 2.2 mg/l (seasonal)	< QL
Total Nitrogen (Annual)	3 mg/l	2.07mg/L

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

During CY 2018, 4,620 wet tons of ash, generated from incineration of byproducts from wastewater treatment process at NMCPCP, were disposed of at the I-95 landfill. During CY 2018, NMCPCP supplied 500.2 million gallons of reuse water to customers in Fairfax County.

The improved water quality of Gunston Cove (which receives effluent from NMCPCP), the Occoquan Reservoir (which receives effluent from UOSA), and the Potomac River (which receives effluent from Blue Plains), are testament to the high standards of treatment in the last decades by these facilities. The 2018 Gunston Cove Report from George Mason University is of significant note as the improvements documented in the past few years of monitoring are exceptional and due largely to the high levels of treatment at the Noman Cole plant. Likewise, monitoring at the Occoquan Watershed Monitoring Lab documents the effectiveness of the UOSA treatment plant.

Maintenance of the Noman Cole Plant and the Conveyance System

The Wastewater Collection Division (WCD) of the Department of Public Works and Environmental Services is responsible for: the operation and maintenance of the sewers, force mains, pump stations, and metering stations; maintaining the asset management system program; and overseeing the planning, design, and construction of Capital Improvement Program (CIP) projects.

The Gravity Sewer Branch's (GSB) cleaning and maintenance program includes tracking, scheduling, and conducting routine inspection and/or cleaning of line segments. A total of 501

miles of sewer lines were cleaned in FY 2018. Greater efforts in sewer inspection and cleaning activities result in decreases in the number of preventable overflows and backups in the system. WCD determines the occurrences per 100 miles and uses it as one of the measured performance indicators. Fairfax County gravity sewers consistently have fewer occurrences of backups and overflows than the median level, established in a study conducted by the American Water Works Association and Water Environment Foundation (WEF), and occurrences of backups and overflows were below the 25th percentile for each of the last five fiscal years. The general trend is that occurrences are infrequent events due to the county's aggressive maintenance and rehabilitation program. GSB is also responsible for managing the county's septage pump and haul operations.

The Closed Circuit Television (CCTV) Group's primary function is to detect defects in the sanitary sewer system using specialized CCTV equipment and make repair recommendations. Once these defects are identified, recommendations for their repair are made. The group inspects sewer lines for possible infiltration, deterioration, structural integrity, and any blockage that may lead to sewer overflows or backups. The group is also responsible for inspecting all new sanitary sewer lines. Using the guidelines set out in the Fairfax County Public Facilities Manual, inspectors ensure that only properly constructed sewer lines and manholes are accepted into the county's sewer system. A total of 208 miles of sewer lines were inspected in FY 2018.

WCD utilizes trenchless technologies for sewer rehabilitation. These technologies provide significant cost savings over traditional open cut repairs, with the additional benefits of reduced disruption to residents, the surrounding environment and traffic. For FY 2018, 195,165 linear feet of 8-inch through 18-inch diameter gravity sewers were rehabilitated using cured-in-place pipe (CIPP) repair. It should be noted that approximately 83 percent of the county's gravity sewer network is eight-inch diameter pipe.

The WCD flow metering program is a vital operation in monitoring and recording wastewater flows entering and leaving the county. In FY 2015, a wireless cellular system pilot study concluded that 3G communication technology would provide efficient and streamlined connection for flow monitoring as compared to the existing modem connection previously equipped at metering stations. In FY 2017, WCD completed replacing outdated communication equipment in all flow metering stations with a 3G communication technology system.

The Pump Station Branch is responsible for the operation, maintenance, repair, and rehabilitation of the County's pump stations, metering stations, and force mains. The pump stations' SCADA system provides remote monitoring, alarm management, and limited control capabilities for the pump stations on a Local Area Network (LAN). Several initiatives have been implemented to the vital SCADA system ensuring dependability, and uninterrupted operation. Programmable Logic Controllers (PLC) and upgraded Human Machine Interface (HMI) screens have been installed as part of pumping station rehabilitations to provide user friendly graphics, monitoring and operation at the facility, and remote pump operation, ultimately providing a more reliable and efficient operating system. The PSB also maintains 60 backup power generators, located at pumping stations throughout the County service area, in order to ensure continuation of wastewater pumping and flow during power outages.

The Projects and Assets Branch is responsible for monitoring and recommending adjustment to the WCD's asset management strategies and objectives, minimizing wastewater collection and conveyance asset whole life cost, and maintaining an acceptable level of service while managing risks associated with asset failure. In February 2014, the WWM Asset Management Team was formed to develop a dynamic asset management program for prioritizing and optimizing the operation, maintenance, and capital asset reinvestment of the WCD linear assets. Several phases of the of the Asset Management program has been completed, including the standardization of the CCTV inspection system to meet the National Association of Sewer Service Companies (NASSCO) standards, NASSCO training and certification of all participating staff, and implementation of a CCTV data management software, WinCAN. The final phase, implementation of the asset management InfoAsset Planner Decision Support System, will bring all the current and future condition assessment data together for prioritization, to enhance WCD capital project implementation, and to optimize O&M scheduling. InfoAsset Planner will utilize available GIS data from the County and other agencies, CCTV inspection data from WinCAN and vendors, O&M data from Infor EAM, and condition assessment data generated from different task orders, to dynamically prioritize each asset for monitoring, optimal O&M, or rehabilitation and replacement.

Fairfax County's Pretreatment Program

Fairfax County has long recognized the need for an effective, enforceable pretreatment program to protect the county's wastewater collection, conveyance, and treatment infrastructure against interferences, and to prevent pollutants of concern from passing through the wastewater treatment facilities to receiving surface waters.

The pretreatment program incorporates all of the elements of an effective program, including discharge prohibitions, local limits, compatible pollutant limitations, control mechanisms (permits and discharge authorizations), pretreatment requirements, slug control plans, hauled waste requirements, discharge monitoring, facility inspections, and compliance reporting. In addition, the county has established pollution prevention and waste minimization policies for a number of business sectors, including safe disposal of perchloroethylene at dry cleaners, installation and maintenance of sediment traps at marble, granite and stone fabricators, best management practices for fats, oils, and grease (FOG) at food service establishments, and acceptable chemical use in cooling water systems. Wastewater Management's (WWMs) Industrial Waste Section (IWS) is responsible for implementing the pretreatment program, and updating the program as needed based on new policies and regulations. Industrial and commercial wastewater generated in the county is treated at the county's Noman M. Cole, Jr., Pollution Control Plant (NMCPCP), and, through service agreements, at wastewater treatment plants in five neighboring jurisdictions: DC Water's Blue Plains Advanced Wastewater Treatment Plant in Washington DC, Arlington County's Water Pollution Control Plant, AlexRenew's Wastewater Treatment Plant in the city of Alexandria, Upper Occoquan Service Authority's Regional Water Reclamation Plant in Centreville, and Prince William County Service Authority's Advanced Wastewater Treatment Plant in Woodbridge.

Approximately 1.3 mgd, or 1.5 percent of the total average daily wastewater flow in the county, is allocated to significant industrial users (SIUs), who are permitted by the county. Continuous industrial waste surveys ensure that the county has the latest information on categorical SIUs,

(e.g., metal finishing facilities) and non-categorical SIUs. This information is maintained in a business database that is purchased every three years from a vendor.

During FY 2019, the Pretreatment Program achieved full compliance with all applicable pretreatment requirements. A list of these notable accomplishments can be found in the data appendix.

WWM permanently closed its northern Septage Receiving Facility at Colvin Run. Septage haulers were directed to deliver septage to alternate receiving facilities, including the NMCPCP Septage Receiving Facility and inter-jurisdictional facilities in the surrounding jurisdictions. Hauler waste manifests in FY 2019 show that the majority of the septage collected in the northern part of the county is being disposed of at the Upper Occoquan Service Authority's Regional Water Reclamation Plant in Centreville and the Blue Plains Advanced Wastewater Treatment Plant in Washington DC. Both of these facilities are closer geographically to northern Fairfax County than the NMCPCP Septage Receiving Facility.

In FY 2019, the Pretreatment Program continued to develop short and long-term initiatives to enhance its capacity to ensure the viability of the Program and protect the County's collections system and treatment assets. These initiatives include:

- Conducting a system-wide assessment and mitigation of unsafe levels of hydrogen sulfide in the County's sanitary sewers to better protect workers and minimize infrastructure deterioration.
- Monitoring and tracking sources of corrosive hauled wastewater originating from food service establishments that do not practice proper management of grease waste. If not properly disposed of, this waste can ferment and cause corrosive damage to the county sanitary sewer.
- Development of an app to streamline inspection of food service establishments. Using this app, inspection data will be automatically uploaded to a GIS layer for improved ease in tracking the status of corrective actions for required waste grease management.

Water Reuse at the Noman Cole Plant

Fairfax County created a program to reuse treated wastewater. This water can be safely used to water lawns, in commercial car washing businesses, in construction and other industrial uses. By reusing water, we save drinking water and prevent pollutants such as nitrogen and phosphorus from entering our rivers and streams.

The Water Reuse Project uses clean wastewater from the Noman M. Cole Jr. Pollution Control Plant for irrigation and industrial purposes. A pipeline was installed from the plant in Lorton to: Covanta Fairfax, Inc. Resource Recovery Plant; the Laurel Hill Golf Course; and South County ball fields.

Septic Systems

An estimated 21,634 homes and businesses are served by onsite sewage disposal systems in Fairfax County. 1,189 of these systems are alternative sewage disposal systems, which require more extensive maintenance than conventional systems. The operation and maintenance of all

onsite sewage disposal facilities is regulated by the county's Health Department, which reported that, in 2018, 141 new Sewage Disposal Permits were issued to single family residences: 36 percent (51) of systems were permitted as conventional systems and 64 percent (90) were permitted as alternative systems.

In the event of a sewage disposal system failing, residents are given the option to dispose of sewage using a pump and haul method. Among properties permitted in 2018, ten alternative and two conventional system permits were issued for residents to utilize pump and haul as a result of a failing onsite sewage disposal system. In addition, 3,991 septic-tank pump outs also took place. In order to meet the needs of residents and commercial building operators, the Fairfax County Health Department continues to work with the public to evaluate and assess whether conventional, alternative, or public sewer disposal systems are best suited for each property.

Areas of the county with marginal or highly variable soils that have been deemed unbuildable in the past are now being considered for development using alternative onsite sewage disposal technology. These alternative systems are also becoming the norm for developers who want 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 may not be aware of their responsibilities for maintaining these systems. Education from the private and government sectors are essential to prevent a high failure rate of these more complex systems.

Monitoring the Success of Improved Treatment

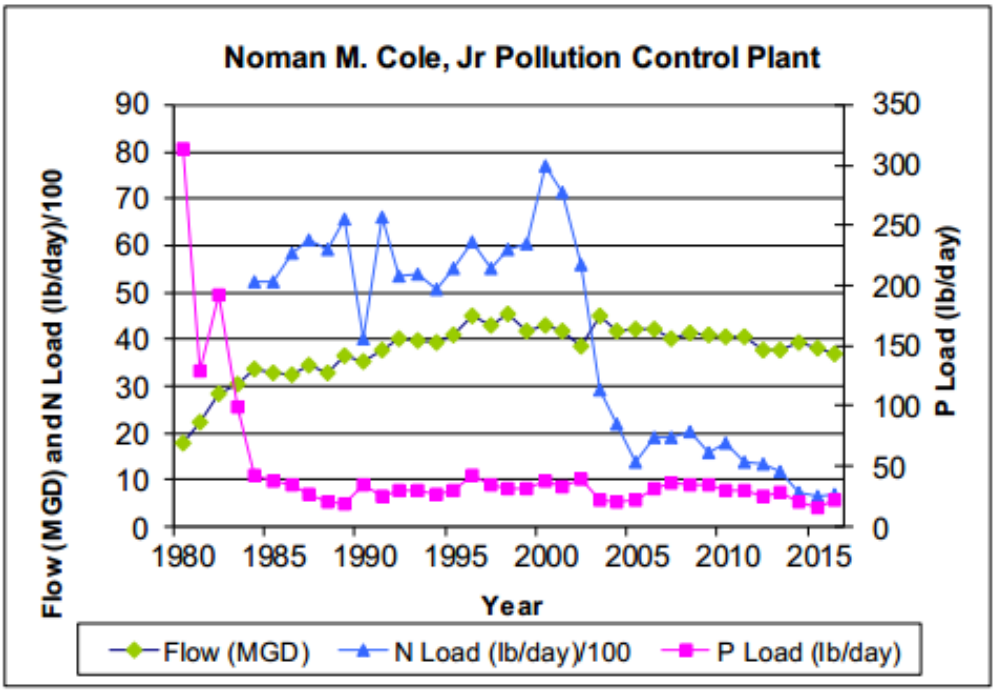
Occoquan Watershed

The Occoquan Watershed Monitoring Laboratory (OWML) has administered a comprehensive hydrologic and water quality monitoring program in the Occoquan Watershed since 1972. The program is jointly funded by Fairfax Water and the six jurisdictions within the watershed. OWML operates nine automated stream monitoring and flow gauging stations on the major tributary streams of the watershed. These stations record stream flow and automatically collect flow-weighted composite water samples during storm events. Under base flow (non-storm flow) conditions, samples are collected weekly during the Spring, Summer and Fall seasons and approximately biweekly in the Winter. In late 2006, additional equipment was installed at the stream monitoring station on Bull Run at Virginia Route 28 to continuously monitor dissolved oxygen, temperature, pH, conductance, turbidity, and nitrate in the stream. Seven stations in the Occoquan Reservoir are sampled on the same weekly/biweekly schedule. OWML also operates thirteen rain gage stations in the watershed and two weather stations, including one which provides solar radiation data.

Synthetic organic compounds (SOCs) have been monitored quarterly in the Occoquan Watershed since 1982. The program is funded by the Fairfax County Health Department and was established under a recommendation by EQAC. Water samples at stream and reservoir stations and sediment samples at reservoir stations are monitored quarterly. Fish samples are taken at three reservoir stations semi-annually.

OWML had no contract for SOC monitoring for FY 2017. Therefore, OWML collected the samples during the year, as this was a relatively modest cost, but postponed the analysis. Therefore, results for only the first half of the calendar year 2016 are available, as samples for FY 2017 (July 2016-June 2017) have not yet been analyzed.

The results available for calendar year 2016 indicate that it was an excellent year, as no SOCs were detected at any level of concern in either water, sediment, or fish samples. Of course, these results could change when the samples currently being analyzed from 2016 are added to the



database, but past history of the program indicates that the likelihood of that happening are very small. Overall, the partial available results of the SOC monitoring in 2016 show that the watershed conditions with regard to SOCs continues to be excellent.

General water quality in the Occoquan Reservoir has also remained stable over the years. While the reservoir continues to be enriched with nutrients (eutrophic), the water quality has not deteriorated from what it has been for some time now. The OWML monitoring program serves as a means of providing advance notice should any conditions deteriorate, whether in the short- or the long-term. Updates continue to be made to the OWML website (www.owml.vt.edu), and stakeholders can continue to access near real-time field data at various stream sites.

DPWES Wastewater Management Public Education and Outreach Efforts

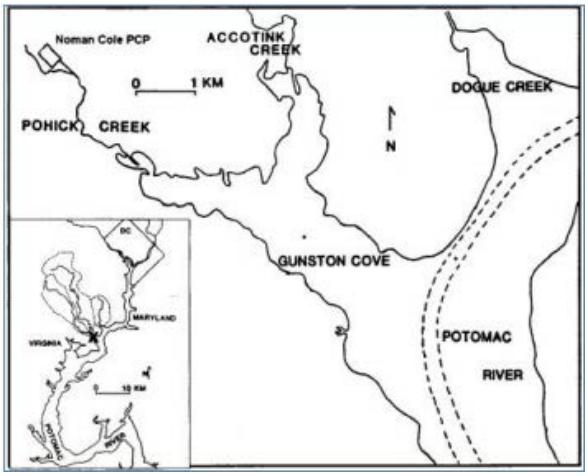
The Outreach and Education Program provides support to all three divisions of Wastewater Management. The goal of this effort is to develop and implement targeted outreach and education programs to engage and raise customer awareness and engender stakeholder support, which are among some of the key attributes of effectively managed wastewater utilities. The educational programs are focused on supporting county schools with curriculum-based environmental and water quality learning that support the Virginia Standards of Learning (SOL)

and Science, Technology, Engineering, and Mathematics (STEM) initiatives. The community outreach is focused on promoting environmental messages and customer actions using a variety of forums and tools, including local cable networks and newspapers, Metro buses and Metrorail, Facebook, Twitter, and Slide Share, but also one-on-one engagements with residents, governmental representatives, and stakeholders who support the Wastewater Management Program. See the Water section of the Data Appendix for a list of 2018 initiatives.

Gunston Cove Aquatic Monitoring Program

The strong and effective wastewater management efforts of the county and a robust monitoring program demonstrate that effective water quality improvements can promote natural aquatic ecosystem restoration. The Gunston Cove has proven an extremely valuable case study in eutrophication recovery for the Bay region and internationally. Increased coverage of Submerged Aquatic Vegetation (SAV) in Gunston Cove are expected to further enhance the biological resources and water quality of this part of the tidal Potomac River. For clear and comprehensive video on the program see: https://cos.gmu.edu/perec/our-research/gunston-cove-study/#.XZJfVS2ZNmM.

Below are excerpts from previous Gunston Cove reports:



"Gunston Cove is an embayment of the tidal freshwater Potomac River located in Fairfax County, Virginia about 12 miles (20 km downstream of the I-95/I-495 Woodrow Wilson bridge. The Cove receives treated wastewater from the Noman M. Cole, Jr. Pollution Control Plant (NCPCP) and inflow from Pohick and Accotink Creeks which drain much of central and southern Fairfax County. The Cove is bordered on the north by Fort Belvoir and on the south by Mason Neck. Due to its tidal nature and shallowness, the Cove does not undergo seasonal thermal stratification, and its water mixes gradually with the adjacent tidal Potomac River mainstem. Thermal stratification can make nutrient management more difficult, since it can lead to seasonal oxygen-diminished bottom waters that may result in fish mortality. Since 1984 George Mason University, with funding and assistance from the Wastewater Management Program of Fairfax County, has been monitoring water quality and biological communities in the Gunston Cove area including stations in the Cove itself and the adjacent river mainstem."

"The Chesapeake Bay, of which the tidal Potomac River is a major sub-estuary, is the largest and most productive coastal system in the United States. The use of the Bay as a fisheries and recreational resource has been threatened by over-enrichment with nutrients (phosphorus, nitrogen). As a major discharger of treated wastewater into the tidal Potomac River, particularly Gunston Cove, Fairfax County has been proactive in decreasing nutrient loading since the late 1970's. Treatment plant effluent chlorine and solids concentrations

have also been reduced or eliminated. The reduction in loadings has been achieved even as flow through the plant has remained high."

"Study results from previous year reinforced the major trends reported in recent years which provide documentation of major improvements in the Cove's water quality and biological resources. Of continuing interest is the shifting fish populations:

Long-term Species Composition Changes

The species composition and community structure are changing throughout the time of the survey as indicated by trawl and seine catches. The expansion of SAV beds in the inner cove seems to be driving some of these changes. The main trend related to increasing SAV beds is a decline in White Perch and an increase in Banded Killifish. A detailed multivariate analysis of the community structure shifts in the Gunston Cove fish community since the start of the Gunston Cove survey has recently been published (De Mutsert et al. 2017). Another community shift can be seen in the catfishes. Since the introduction of the invasive Blue Catfish in Gunston Cove in 2001, Blue Catfish has become prevalent in the trawl catches, while the abundances of other catfishes (Brown Bullhead, Channel Catfish, White Catfish) have been declining. The trend in Blue Catfish abundance is currently not increasing, and seems to have reached a plateau. Potentially, a new stable state has been achieved with high Blue Catfish abundances and low abundances of other catfishes. We do collect some Brown Bullhead specimens in the fyke nets, but abundances are low there as well. More fyke net collections are needed to determine if there is a spatial shift of Brown Bullhead towards SAV beds, which would not be unusual for this species that prefers vegetated habitat.

Another interesting community change is an increase in collections of Striped Bass. We only find Striped Bass in low numbers, but because of its high commercial and recreational value, it is worth mentioning. While Striped Bass is thought to occur in more saline waters, this semi-anadromous species does come up to tidal freshwater areas to spawn, and we find juvenile Striped Bass in our seine and trawl collections.

Other observed long-term changes are the decline in Alewife and Blueback Herring. These declines are in concurrence with declines observed coast-wide, and do not have a local cause. It is a combination of declining suitable spawning habitat and overfishing (either targeted fishing that ended in 2012, or as bycatch of the menhaden fishery). Relative high abundances of juvenile Alosines in the trawl and seine samples in 2015 and 2018 could be an indication of the start of a recovery since a moratorium on fishing was imposed in 2012.

With the reported increases and decreases in species abundances it is interesting to evaluate the effect of these community structure changes on the overall diversity of the fish community. This is analyzed by calculating the Simpson's Index of Diversity for each year from 1984 to 2018 (Figure 184, Table 27). The Simpson's Index of Diversity (calculated as 1-(Σ (n i /N) 2)) was 0.806 in 2018, and shows no increasing or decreasing trend over time. In this index the communities with higher diversity have higher values (approaching 1). Calculating the index shows that the Cove represents a healthy and stable diversity. Overall, the fish species found in Gunston Cove are characteristic of Potomac River tributaries."

For information on *"Successes of Restoration and Its Effect on the Fish Community in a Freshwater Tidal Embayment of the Potomac River, USA,"* see www.mdpi.com/2073-4441/9/6/421.

COMMENTS

1. **Noman Cole Plant**
   The Noman Cole plant has been a leader in sewage treatment due to significant upgrades throughout the years. With the advent of the asset management system in the 2009 for the sewer conveyance system, both the plant and the conveyance system should continue to be maintained to industry standards. EQAC commends the Water Reuse Program and encourages extending the program when possible.

2. **Alternative Septic Systems**
   Public education and monitoring of the new alternate septic systems performance is necessary.

3. **Long-Term Monitoring and Biological System Recovery**
   Monitoring by the Occoquan Watershed Monitoring Lab on the reservoir and by George Mason on Gunston Cove should continue. The over 15-year lag time between water quality improvement in the treated water at the Noman Cole Plant and the recovery in Gunston Cove is a cautionary tale on the necessity of long term monitoring and realistic expectations for the time it takes for biological systems to recover.

4. **Funding of the Occoquan Watershed Monitoring Lab**
   Funding of the Occoquan Watershed Monitoring Lab budget has remained flat for almost 10 years. With these budget constraints, it is impossible for the lab to look to adding emerging contaminants, such as endocrine disrupting compounds (EDCs), or other compounds to those already being monitored. This could have a significant impact on the knowledge base as compounds such as emerging contaminants become more important to monitor and follow. This merits a continued discussion in the coming years.

PROTECTING INFRASTRUCTURE AND RESTORING STREAMS, PONDS AND LAKES – MANAGING STORMWATER

Stormwater Management

Stormwater management is the art and science of protecting our streams, ponds, lakes, and rivers from polluted water runoff. Effective stormwater management also protects our built environment, bridges, roads, and buildings from damage from flooding and increased stream volumes.

Unlike drinking water and wastewater treatment processes, stormwater management is an emerging science with changing understandings and solutions: www.youtube.com/watch?v=_PiLQyFy7Pg.

Stormwater management requires a complex integration of public and private facilities, differing choices for restoration and protection, ongoing inspections and maintenance for all facilities, and public education and involvement in handling runoff. It requires inspections of development sites for adequate stormwater protections. Imperative in all this is monitoring the results of facilities and treatments on water quality. The results of these combined efforts should lead to protected infrastructure and clean healthier streams, including the Potomac River, the Occoquan River/Reservoir, and, ultimately, the Chesapeake Bay.

Impervious Surfaces and Damaged Streams

Because of the diffuse and intermittent nature of runoff pollution, it is difficult to control. Polluted runoff consists of nutrients, including nitrogen and phosphorus (organic matter, fertilizer), which can stimulate excessive algal growth in ponds, streams, and rivers. Other runoff pollutants are sediment (from erosion, construction sites, eroded stream banks, and road sand), toxics (oil, paint, pesticides, chemicals, and metals), pathogens and bacteria (animal waste, failing septic systems, and leaking sewer systems), and trash. In areas with buildings, roads, and parking lots, the water flows over these surfaces into storm drains. Storm drains lead to streams. Anything that goes into a storm drain ultimately flows into a nearby stream.

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, the amount of stormwater runoff increases, which flows into streams more quickly. Increased uncontrolled runoff causes stream erosion, resulting in scouring, down cutting, and over-widening of stream channels and loss of streamside vegetation. 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. Loss of shade results in increased water temperatures. During summer storms, runoff from heated impervious surfaces also raises water temperatures.

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 lead to habitat loss, water quality problems, and damage to utilities and infrastructure.

Figure III-2: Healthy Stream Components

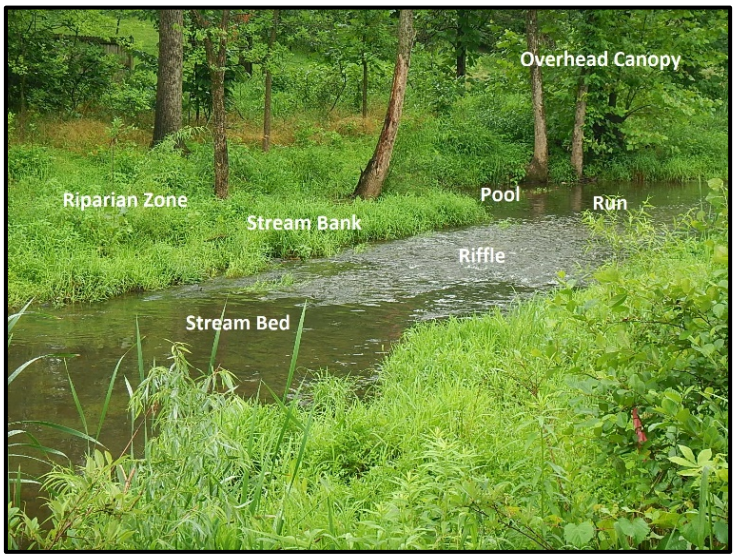


Figure III-3: An Unhealthy Stream

Photos provided by Fairfax County Department of Public Works and Environmental Services

Stormwater runoff is treated by either constructing facilities that capture the rainfall on site and infiltrate it into the ground or by conveyances and facilities that carry the water off site to facilities that treat and release the water into streams or lakes. The purpose of stormwater management is to manage both the quality and quantity of water coming off sites because of increased impervious surfaces. Management removes pollutants and controls volume to reduce flooding and the erosive quality of increased water flow on streambanks and bottoms.

Assessing and Monitoring the Condition of our Streams

The Fairfax County Department of Public Works and Environmental Services (DPWES), Fairfax County Park Authority (FCPA), Virginia Department of Environmental Quality (VDEQ), U.S. Geological Survey (USGS), and local water treatment plants and other organizations regularly conduct water quality monitoring and testing. The Northern Virginia Soil and Water Conservation District (NVSWCD) 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. The county collects data both system wide and for specific watersheds. The county also collects data that focuses on specific stormwater treatment methods to monitor their effectiveness. Initiatives range from various long-term trend evaluation studies to specific experimental studies of the effectiveness of different restoration activities and environmental programs being carried out by Fairfax County.

For additional information on other monitoring results, see the Water section of the Data Appendix.

The *"Stream Protection Strategy Baseline Study,"* published in 2001, provides a holistic initial ecological baseline assessment of county streams. The Stream Protection Strategy Baseline Study can be viewed online at: www.fairfaxcounty.gov/publicworks/stormwater/stream-protection-strategy-baseline-study.

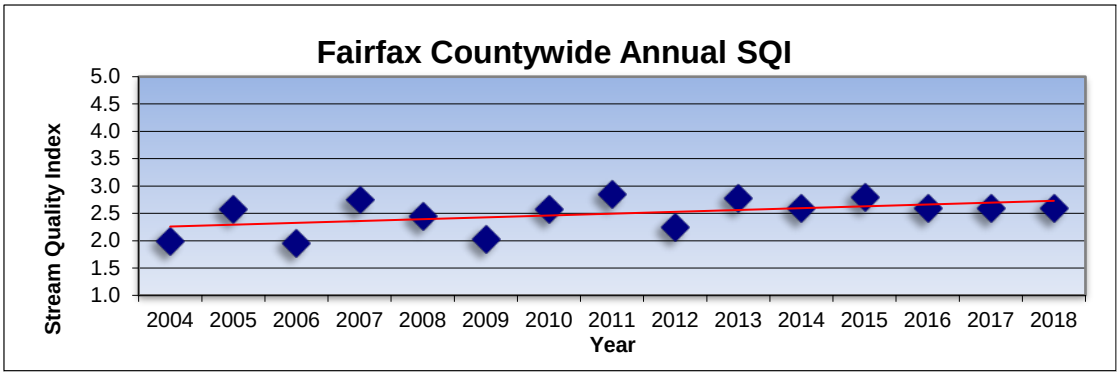
Completed in 2004, the *"Stream Physical Assessment Study"* provides baseline field reconnaissance data for the county's watershed management plans, including information on habitat conditions, impacts on streams, general stream characteristics, and geomorphic classification of stream type. The county is in the process of redoing stream physical assessment. The original baseline countywide stream assessment can be obtained by going to: www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program.

"The Stream Quality Assessment Program," borne from the 2001 Stream Protection Strategy Baseline, has been assessing conditions in the streams of Fairfax County annually. This comprehensive monitoring program uses a statistically valid methodology called probabilistic monitoring to annually evaluate the physical, chemical, and biological conditions of streams.

Biological monitoring efforts indicate that more than half of the county's waterways are in "Poor" to "Very Poor" condition However, Fairfax County streams have shown a slight amount of improvement since 2004, when the current monitoring program began. Although the changes have been relatively minor, they have occurred against a backdrop of continued urbanization and population growth

The Stream Quality Index (SQI) is based on annual data collected on resident populations of benthic macroinvertebrates. As benthic macroinvertebrates are good indicators of water quality, the SQI is used to evaluate long-term trends in the overall health of streams. Each of the 40 randomly selected locations is placed in one of five rating categories (excellent, good, fair, poor, or very poor) based on the diversity of benthic macroinvertebrates found in that stream segment. An index value ranging from one to five, with a higher number indicating better stream quality, is calculated for the year based on the percent of sampling locations that fall into each rating category. Over the last four years, the countywide annual SQI score has leveled out at a score of around 2.6 (see Figure III-4).

Figure III-4: Annual Stream Quality Index



Source: Department of Public Works and Environmental Services, September 2019

The *"Bacteria Monitoring Program"* provides information on the general levels of bacteria in streams, but also is used as a screening tool that can identify areas of concern for further, more intensive investigations of potential sources (e.g. sewer leaks). As recommended by the U.S. Environmental Protection Agency, the bacterium *Escherichia coli* (*E. coli*) is used by Fairfax County as the water quality indicator for fecal contamination in surface waters. To determine levels of *E. coli* in county streams, grab samples of stream water were taken at 40 sites in 17 watersheds throughout the county. Staff collected samples five times during the year. Four samples were taken during the peak growing season (April to October) and one sample was taken during the Winter months.

In April 2019, this screening program identified unusually high levels of *E. coli* bacteria in the headwaters of the Accotink Creek watershed. Further investigation and testing revealed that a downed tree had ruptured a sanitary sewer line adjacent to the stream, yielding the high *E. coli* levels. Stormwater staff alerted Wastewater staff to the problem and immediate action was taken to create a bypass and replace the broken pipe. The bacteria monitoring program helped identify, and alerted Wastewater staff to, a previously unknown impact to water quality. This synergistic approach to identifying and solving problems among DPWES divisions had an immediate, positive effect to county waters.

The hope is to see increases in the long term trends in stream health as a result of improved stormwater management practices and the continued implementation of watershed improvement projects countywide. More information on the Stream Quality Assessment Program can be found online at: www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program.

Additionally, the potential human health risk associated with wading or swimming in streams is assessed based on analyses of *E. coli* bacteria found in streams.

In partnership with the United States Geological Survey (USGS), Fairfax County continues to manage a water resources monitoring network to determine sediment and nutrient trends and loadings in county streams. The goal of this long-term cooperative program is to first establish baseline water resources characterizations and constituent loads. Ultimately, this information will be used to evaluate relations between the observed watershed conditions and the best management practice (BMP) implementation activities in the monitored watersheds.

This monitoring effort will enter the 12th year of record within the coming year, providing sufficient data to begin trend analysis, along with a substantial data analysis and reporting effort to begin understanding the effects of project implementation within the monitored watersheds. Additional information on the program including a link to the five continuous stream gages can be found online at: www.usgs.gov/centers/va-wv-water/science/fairfax-county-water-resources-monitoring-network?qt- science_center_objects=0#qt-science_center_objects.

The *"Dry Weather Screening Program"* is a regulatory-required program in which at least 100 stormwater outfalls are inspected during "dry" periods to help identify improper connections or significant pollutants draining to the storm sewer system. In 2019, the program identified a significant source of total dissolved solids, as evidenced by a large exceedance of the state standard for conductivity. The source of the pollutants was ultimately tracked to a FCPS-

operated salt storage facility. Staff worked with the FCPS facility managers to implement best management salt storage practices to prevent additional downstream issues. Additionally, the screening program located a stormwater outfall with human sewage and suds deposited in the stream channel. The resulting investigation showed there was at least one improper connection from a 300+ unit apartment building to the storm system. Follow-up investigations and guidance to the facility resulted in re-plumbing one improper connection related to sewage and additional connections related to washing machines. While this program does not locate significant water quality problems each year, the corrective actions in 2019 had an immediate positive impact on the improvement of county waters.

Northern Virginia Soil and Water Conservation District Volunteer Monitoring
The District monitors various sites throughout the county four times per year.

Reston Volunteer Stream Water Quality Monitoring Program
The Reston Association (RA), the community association for the planned community of Reston, monitors another eleven sites in the Difficult Run, Sugarland Run, and Horsepen Creek watersheds. Reston Volunteer Stream Water Quality Monitoring Program Volunteers and RA staff monitor Reston's streams four times a year using the Virginia Save Our Streams (SOS) protocol. The data is uploaded to the Virginia SOS online database, which provides DEQ with data on a regular basis. So far in 2019, as of the date of preparation of this report, RA has had 23 events with 115 volunteers collecting data at Reston's monitoring sites.

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 affect urban ponds and lakes include thermal stratification, reduced water clarity, decreased dissolved oxygen levels, trash, and nuisance invasive vegetation.

Reston Lakes Monitoring and Management
The Reston Association has an active watershed and lake management program. Four lakes (Audubon, Anne, Thoreau, and Newport) are monitored each year between April to September, along with two ponds, Bright and Butler. Dissolved oxygen, temperature, pH, conductivity, total phosphorus, Secchi depth transparency, chlorophyll a, phytoplankton, and zooplankton are monitored. *E. coli* bacteria testing has been conducted in Lake Audubon for annual swimming events. Detailed monitoring information and data can be found in the Reston Lakes Annual Monitoring Report. This report and other information about Reston's lakes can be obtained from: http://www.reston.org/Parks,RecreationEvents/NatureEnvironmentalResources/LakesWatersheds/LakeReport/tabid/945/Default.aspx.

As part of the monitoring efforts on Reston's lakes, the presence of algae and invasive aquatic plant species is also identified. In 2019, Lake Thoreau was treated four times and Lake Anne was treated five times to prevent blue-green algae blooms. Copper Sulfate was used to control the algae blooms.

Total Maximum Daily Loads

Many bodies of water in Fairfax County have been designated as being "impaired" under the federal Clean Water Act. For each of these bodies of water, a "Total Maximum Daily Load" (TMDL) must be prepared in order to identify pollutant load reductions that would be needed to remedy the impairment. To date, several TMDLs have been established for streams and embayments in the county. Impairments identified include: bacteria (fecal coliform and/or *E. coli*); sediment (benthic impacts); Polychlorinated biphenyls (PCBs); and chloride. More information about these TMDLs is available in the Water section of the Data Appendix.

The Accotink Creek TMDL is not part of the current group of TMDL action plans that the county submitted to VDEQ on March 31, 2017. The Accotink Creek TMDL will have an action plan created for it when the permit is renewed in April 2020. For a full description of the Accotink TMDL, see the Water section of the Data Appendix.

Watershed Management Plans

Between 2003 and 2011, a total of 13 watershed management plans, which cover all 30 county watersheds (www.fairfaxcounty.gov/publicworks/stormwater/watersheds), were developed and adopted by the Board of Supervisors. From this planning effort, more than 1,700 structural and non-structural projects were proposed to help restore and protect our vital natural resources. The overarching goals for the watershed plans are:

1. Improve and maintain watershed functions in Fairfax County, including water quality, habitat and hydrology
2. Protect human health, safety, and property by reducing stormwater impacts
3. Involve stakeholders in the protection, maintenance, and restoration of county watersheds

Recent data suggest that the most effective cost of achieving nutrient (Total Nitrogen & Total Phosphorus) and sediment goals (Total Suspended Solids) is through stream restorations (see Table III-3, below).

Watershed Projects

Stream Restorations

In fiscal year 2019, the county completed seven stream restoration and ten outfall stabilization projects. These projects restored approximately 2.97 miles of stream channel using natural channel design principles. The county often leverages resources and obtains grant funding from VDEQ through the Stormwater Local Assistance Fund (SLAF) for these projects.

Table III-3: Watershed Management Plan Projects and Stormwater Update Completed Facilities FY 2010-2018				
Practices	**Number Installed**	**Capital Cost (dollars per pound per year)**		
		Total Nitrogen (TN)	**Total Phosphorus (TP)**	**Total Suspended Sediment (TSS)**
Stream Restoration	34	$1,650	$5,860	$20
Pond Retrofits	51	$3,150	$32,900	$25
Infiltration Swales & Trenches	14	$9,780	$123,000	$171
Dry Swales	9	$4,400	$51,000	$73
Bioretention (Rain Gardens)	27	$7,400	$65,500	$87
Pervious Pavement	27	$25,500	$238,800	$325

Source: Department of Public Works and Environmental Services

- Dead Run – Segments 2 & 3 @ Mclean Central Park – restoration of ~3,200 linear feet
- Lake Martin Tributary @ Foxwood HOA – restoration of ~1,364 linear feet
- Long Branch Tributary @ Long Branch Falls – restoration of ~ 800 linear feet
- Pohick Creek Trib @ Greentree Village Park – restoration of ~2,500 linear feet
- Pohick Creek Trib @ Queen Victoria Court – restoration of ~3,300 linear feet
- Scotts Run Tributary @ Windy Hill Road – restoration of ~ 650linear feet
- Dead Run Drive Outfall Restoration – restoration of ~60 linear feet
- Midhill Place Outfall Restoration – restoration of ~55 linear feet
- Shetland Court Outfall Restoration – restoration of ~191 linear feet
- Glenbrook Road Outfall Restoration – restoration of ~274 linear feet
- Ulysses Court Outfall Restoration – restoration of ~490 linear feet
- Florence Lane Outfall Restoration – restoration of ~128 linear feet
- Woodgate Lane Outfall Restoration – restoration of ~580 linear feet
- Innisvale Drive Outfall Restoration – restoration of ~475 linear feet
- Robey Avenue Outfall Restoration – restoration of ~160 linear feet
- Olley Lane Outfall Restoration – restoration of ~70 linear feet

Reston Association Stream Restoration Efforts

Wetland Studies and Solutions, Inc. (WSSI) constructed their final stream restoration for Reston Association on July 31, 2019. This site is called Wiehle Avenue South. This project connects with the previously completed Wiehle Avenue North restoration. WSSI will continue to monitor each of the restored streams in Reston for 10 years from the constructed date.

In addition to the stream restorations constructed by WSSI, Fairfax County will be initiating a stream restoration on Snakeden Branch between Wakerobin Lane and Cedar Cove Court. Work is scheduled to start later this Fall (see: https://www.fairfaxcounty.gov/publicworks/stormwater/snakeden-branch-lake-audubon-difficult-run).

Flood Remediation/Reduction Programs

Since 2003, several communities in the eastern portion of Fairfax County have been damaged by significant floods. Brief descriptions of efforts to address flooding in two communities are discussed below. The Climate and Energy chapter of this Annual Report on the Environment addresses these concerns from the perspective of climate resiliency and adaptation.

Belle Haven

For the Belle Haven Watershed Flood Damage Project, the U.S. Army Corps of Engineers (USACE), on behalf of Fairfax County, worked to determine if there were technically-feasible and cost-effective flood damage reduction alternatives for the Belle Haven watershed. The USACE last updated cost estimates and cost benefit ratios for several floodwall/levee alignments in April 2014, with the most expensive alternative being approximately $34 million. Community and National Park Service support for a mitigation option is needed before construction plans can be developed.

Huntington Flood Remediation Project

In June 2006, the Huntington community experienced flooding from Cameron Run, with more than 160 homes affected. The community again experienced flooding in September 2011. In November 2012, Fairfax County voters approved a $30 million stormwater bond to fund the design and construction of a levee and pump station to protect the homes and other property in the Huntington neighborhood from future storms up to and including 100-year storm events. This bond also funded stormwater improvements throughout the entire county. ARCADIS U.S., Inc. was hired in June 2013 to prepare environmental analyses, coordinate permitting, and perform the design work. The construction contract, through a bidding process, was awarded to Archer Western Contractors. Construction started in February 2017 and was substantially completed in June 2019. Additional information can be accessed through the County website at: https://www.fairfaxcounty.gov/publicworks/huntington-levee.

Stormwater Management Facilities and Infrastructure

As depicted in Figure III-5, the current number of stormwater management facilities in Fairfax County's inventory is 6,992. Much of the inventory consists of manufactured (proprietary) devices, infiltration trenches, underground and rooftop detention facilities, and sand filters. Approximately one-third of the inventory is comprised of wet and dry ponds and the remaining 21 percent of the inventory consists of green infrastructure (GI) practices. GIs include bioretention gardens, swales, tree filters, permeable pavement, and green roofs.

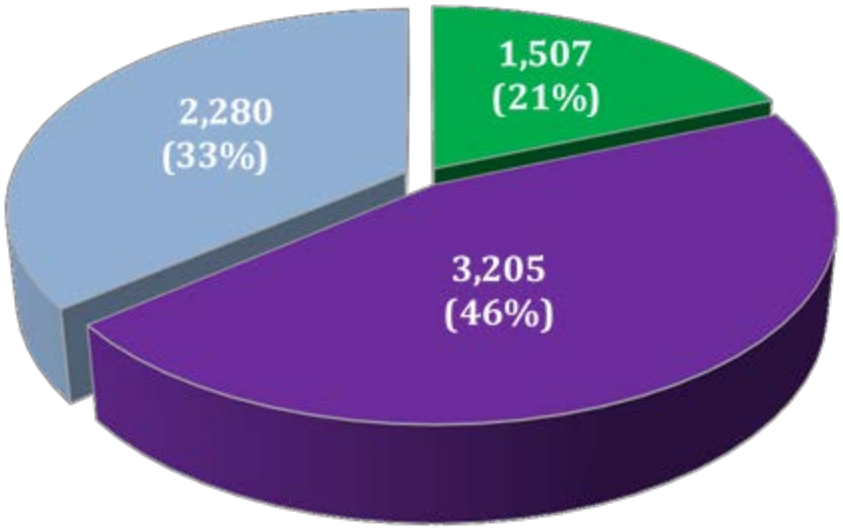
Of the 6,992 facilities in the inventory, 2,205 are county-maintained and 4,787 are privately maintained. Figure III-6 shows the breakdown of county-maintained and private facilities by type. Most of the public inventory is comprised of dry ponds located in residential subdivisions.

As shown in Figure III-7, as of June 30, 2019, 399 stormwater management facilities were added to the inventory in FY 2018 and 405 facilities were added in FY 2019. Compared with the number of facilities added in FY 2018, the total number of GIs and Non-Ponds/Non-GIs added to the inventory in FY 2019 has doubled while the total number of ponds added has increased marginally. This trend may indicate that GIs and non-ponds/non-GIs are a preferred stormwater

management option at the design stage due to less land disturbance involved with the construction, lower construction costs, and a lack of space to construct ponds.

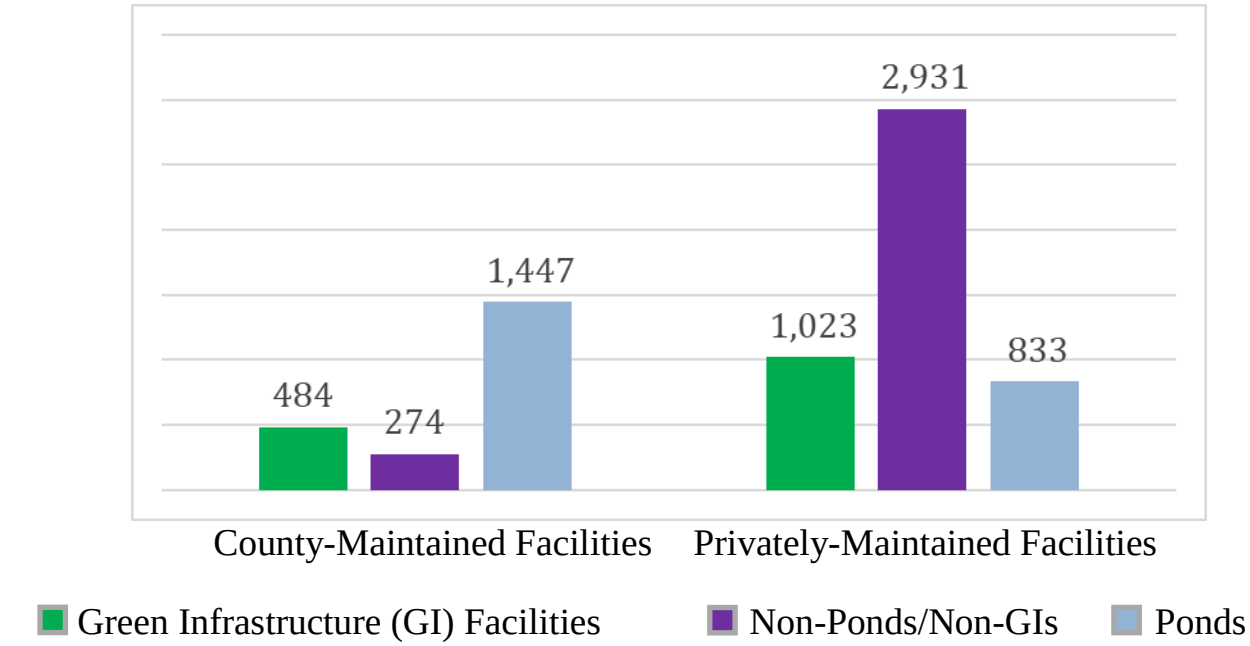
In FY 2019 (July 1, 2018 – June 30, 2019), 1,310 of the 2,205 county-maintained stormwater management facilities were inspected (60 percent) and 988 of the 4,787 privately-maintained stormwater management facilities were inspected (21 percent). These inspection rates are consistent with the Municipal Separate Storm Sewer System (MS4) program requirements to inspect county-maintained facilities with a preventative maintenance program at least once every two years, county-maintained facilities without a preventative maintenance program at least once a year, and privately-maintained facilities at least once every five years.

Figure III-5: Stormwater Management Facility Inventory as of June 30, 2019
(Facility Inventory by Type)



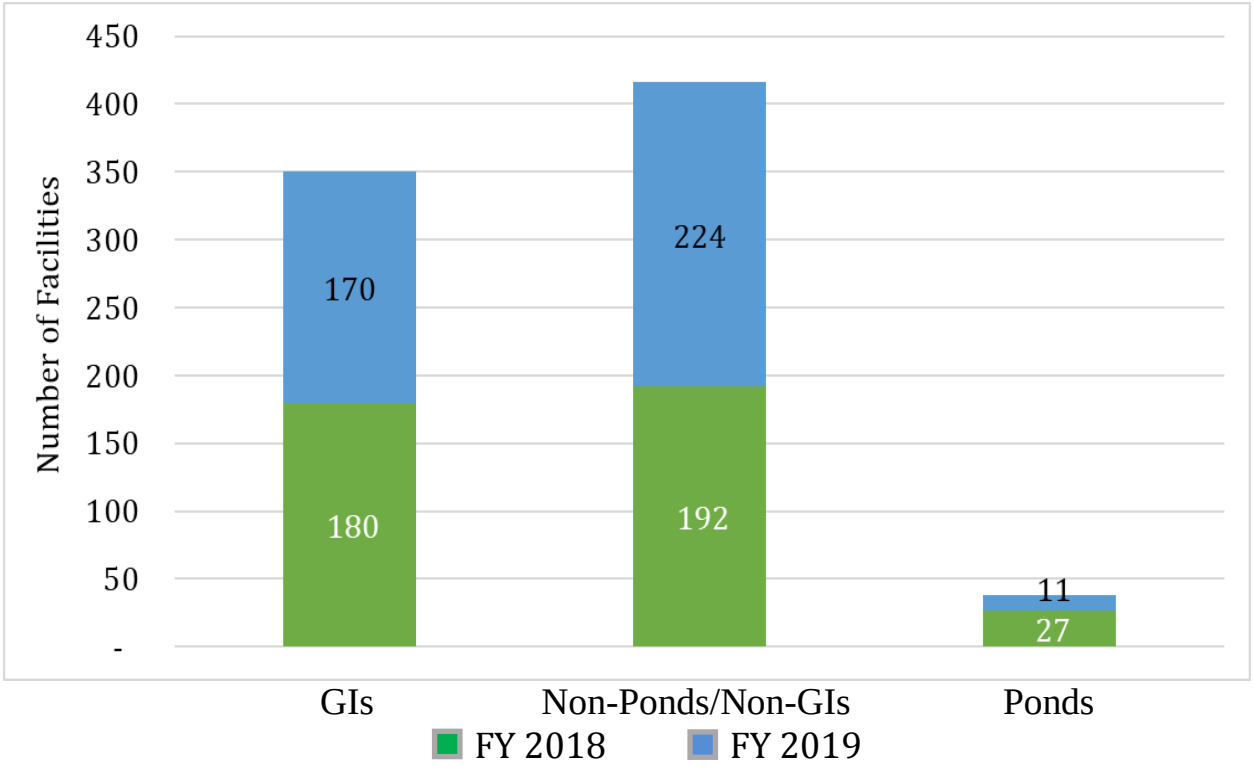
Source: Department of Public Works and Environmental Services

Figure III-6: Stormwater Management Facility Inventory Distribution as of June 30, 2019 (Facility Inventory by Maintenance Responsibility)



Source: Department of Public Works and Environmental Services

Figure III-7: Number of Facilities Added in FY 2018 and FY 2019, as of June 30, 2019



Source: Department of Public Works and Environmental Services

The county Maintenance and Stormwater Management Division (MSMD) performs preventative maintenance for 1,865 county-maintained stormwater facilities. In FY 2019. 1,407 ponds were serviced, which involves removing trash, sediment, and debris from the trash rack, control structure, and inflow channels within 25 feet of the control structure. At each stormwater management facility, deposited sediment is removed from the trickle ditch upstream of the control structure and appropriately disposed of offsite. The cleaning helps keep the facility functioning as designed. In addition, MSMD performed preventative maintenance on 458 GI practices. In FY 2019, non-routine maintenance (sediment removal, structural repair, invasive plant control, etc.) was performed on 139 facilities, which included 56 ponds, 76 GIs and 7 non-ponds/non-GIs facilities.

MSMD continued a partnership with the Fairfax County Sheriff's Office to use Community Labor Force (CLF) crews to help remove trash in most publicly maintained stormwater ponds. During FY 2019, the CLF work crews removed trash from over 1,300 ponds.

To ensure that dams meet state safety requirements, county staff with expertise in dam design and construction perform annual inspections of 19 state regulated dams that are operated by DPWES. Critical items such as the stability of the dam embankment and the function of the water control structures are addressed on a priority basis. Routine items such as mowing are scheduled seven times per year.

The county's storm drainage systems, valued at more than $1 billion, include 1,291 miles of pipes and almost 64,000 storm structures up to 80 years old. Between July 1, 2018 and June 30, 2019, MSMD continued implementation of its storm drainage condition assessment program. Staff inspected 287.1 miles of storm pipes consisting of about 11,852 pipe segments and as many storm structures by visual ground surface observations. Internal pipe condition assessment video and photo documentation was completed for 50.1 miles of storm pipe. These inspections combined resulted in about 27 percent of the storm drainage network being photographed or screened for structural deficiencies and maintenance needs, consistent with the MS4 program requirement to inspect 100 percent of the county's storm drainage system every five years and at least 15 percent annually. In addition, 2.5 miles of storm pipe in the county's inventory were rehabilitated or renewed through replacement or by lining the entire pipe segment using trenchless technology (cured-in place pipe lining) methods, and 10.5 miles of pipe and structures were cleaned, cleared, and maintained. Ten outfall channel restoration projects totaling 5.278 linear feet were completed during FY 2019. These are in addition to the stream restoration projects noted earlier.

Virginia Department of Transportation - Stormwater Treatment

Runoff from nearly 1,000 acres of impervious road surfaces are treated through a system of more than 200 stormwater basins and other measures throughout the county under the Virginia Department of Transportation's (VDOT's) Virginia Pollutant Discharge Elimination System (VPDES) General Permit (for discharge of stormwater from small municipal separate storm sewer systems (MS4s) within the urbanized areas of Virginia). Total maximum daily loads (TMDLs) have been developed for sediment, nitrogen, and phosphorus by the Environmental Protection Agency and VDEQ. The MS4 permit requires VDOT to implement best management practices (BMPs) to reduce these pollutants of concern by five percent in 2018, 35 percent in

2023, and 60 percent in 2028. VDOT is currently evaluating BMP opportunities within its rights-of-way, as well as facilities to achieve these reduction limits, including, but not limited to, street sweeping; structural BMP enhancements/retrofits; outfall channel stabilization; and stream restoration/stabilization.

Erosion and Sediment Control Inspections, Stormwater Compliance Inspections

In FY 2019, 911 erosion and sediment control (E&S) permits were issued by Fairfax County, authorizing disturbance of 10,135 acres of land. During that time period, 24,529 E&S inspections and 489 stormwater inspections occurred. A total of 260 E&S violations notices were issued and 19 stormwater violations were issued. They were resolved.

Public Outreach

There are numerous ways to reach county residents and many methods are employed by the staff of the Stormwater Planning Division of DPWES to inform and educate the community.

Fairfax County addresses nonpoint source pollution through public education in partnership with surrounding jurisdictions. As a member of the Northern Virginia Clean Water Partners, Fairfax County has continued to support the regional stormwater education campaign commenced in 2003. By pooling outreach funds with surrounding jurisdictions, the campaign reaches a wider audience. The campaign has used radio and television advertising in an effort to reduce pollution-causing behaviors among Northern Virginia residents. Clean Water Partners uses television, print, Internet advertising, and its website (www.onlyrain.org) to distribute messages linked to specific stormwater problems.

The county has numerous award-winning watershed education and outreach programs that are regularly utilized by the Fairfax County Public School system and others. These programs include the *"Stormy the Raindrop"* education campaign, the *"Create a Caddisfly"* (for our younger residents), and the *"Stream Crime Investigation"* (SCI) and geomorphology labs designed for high school students. More information about these and other programs can be found on the Watershed Education and Outreach website: www.fairfaxcounty.gov/publicworks/stormwater/watershed-education-and-outreach.

The county has numerous handouts on dam safety, fertilizer use, etc. and is developing a manual for homeowners on maintaining their own private stormwater facilities.

More information about outreach efforts is provided in the Water section of the Data Appendix.

Organized Watershed Cleanups

Staffs of the Stormwater Planning Division, Solid Waste Management Program, Wastewater Management Program, Fairfax County Park Authority, and the Northern Virginia Soil and Water Conservation District continued to support large and small-scale volunteer cleanups coordinated by the Alice Ferguson Foundation, Clean Virginia Waterways, and Clean Fairfax.

Policies and Ordinances that Protect Stream Valleys and Streams

The county has had, for several decades, ordinance requirements and Comprehensive Plan policies that collectively support the protection and restoration of ecologically-valuable stream

valleys throughout the county. These sensitive areas include floodplains and wetlands along streams, as well as steeply-sloped areas near streams and floodplains. Where the aforementioned features are narrow in extent, they also include additional natural buffer areas along streams meeting defined minimum widths.

The county's Zoning Ordinance has included floodplain requirements in some form since adoption of the 1959 Zoning Ordinance. In 1963, the Board of Supervisors adopted a "Policy On What May Be Done in Flood Plains" to guide the interpretation of the Zoning Ordinance's floodplain provisions. This was the first expression of the *"County's desire to preserve the natural beauty and characteristics of flood plains where logically feasible …"* The requirement for approval of a special exception to build in a floodplain came into being with the 1977 adoption of the Flood Plain Overlay District. The Floodplain Regulations in essentially their current form were adopted by the Board of Supervisors in 1978 and have been updated periodically since that time. A major change occurred in 1985 when the overlay district was abolished and replaced with a floodplain definition. The current regulations substantially limit the nature and extent of uses that may occur within 100-year floodplains of streams in the county. The Use Limitations of the Floodplain Regulations establish that any such uses will occur in a manner that will be protective of upstream and downstream properties, that structures that will be provided within the floodplain will be designed sensitively in light of flood risk, and that the uses should meet environmental goals and objectives of the Comprehensive Plan.

The county's Comprehensive Plan contains a number of environmental policies, with the Environmental Quality Corridor (EQC) policy being of particular note. This policy, which was initially adopted by the Board of Supervisors in 1975 and which has been refined since that time, supports a Comprehensive Plan objective to *"identify, protect and enhance an integrated network of ecologically valuable land and surface waters for present and future residents of Fairfax County."* The core of the EQC system is the stream valley, including the following: all 100-year floodplains as defined by the Zoning Ordinance; steeply sloping areas adjacent to floodplains or streams; wetlands connected to the stream valleys; and, where the above features are narrow in extent, minimum buffer areas defined based on average slope adjacent to the stream channel or floodplain. The EQC policy is not an ordinance requirement, but it has been effective in protecting sensitive lands through commitments made and through conditions imposed during the county's zoning process.

The Chesapeake Bay Preservation Ordinance was initially adopted by the Board of Supervisors in 1993 to satisfy a requirement of Virginia's Chesapeake Bay Preservation Act and associated Chesapeake Bay Preservation Area Designation and Management Regulations. The ordinance establishes criteria for the designation of Chesapeake Bay Preservation Areas, including Resource Protection Areas (RPAs - along all perennial streams within the county and including certain 100-year floodplains) and Resource Management areas (RMAs - all other areas). Allowed and exempted uses and development in RPAs are limited, although exception provisions are available allowing case-by-case consideration of relief from these limitations. The ordinance also contains performance criteria governing those uses that are allowed within RPAs as well as uses within RMAs.

These regulations and policies have supported the creation of stream valley parks and stream valley trails and support the attainment of goals established within the county's watershed management plans. These protections should remain in place.

COMMENTS

1. **Stormwater Funding**

   EQAC commends the Board of Supervisors for its actions of the past years, initially authorizing one penny of the real estate tax to be dedicated to the stormwater management program in FY 2006 and establishing a Stormwater Service District in FY 2010 that is currently funded at 3.25 cents per $100 of assessed real estate value. Stormwater funding has increased from the original amount of $17.9 million for FY 2006 to $81 million for FY 2020.

   The Board of Supervisors' actions to provide for annual quarter cent increases in the Stormwater Service District Tax rate have allowed the county's stormwater program to increase stormwater infrastructure replacement, create a more comprehensive low impact development maintenance program and rehabilitate a number of older stormwater management dams, as well as other critical components. Much of the stormwater infrastructure in Fairfax County is reaching the end of its life cycle, and as the system ages it remains critical to maintain adequate inspection and rehabilitation programs to avoid infrastructure failures and ensure the functionality of stormwater treatment systems. It is also critical for the stormwater program to implement cost effective solutions, such as trenchless pipe rehabilitation technologies, naturalized stormwater management facilities, and partnerships with other county agencies, such as Fairfax County Public Schools and the Fairfax County Park Authority, to help protect and improve local streams.

   Continued increased funding should eventually reduce the reinvestment cycle to a manageable level under a 100-year replacement plan.

   In addition to supporting infrastructure reinvestment, the capital program funds critical capital projects from the watershed management plans including: flood mitigation projects; stormwater management pond retrofits; implementation of low impact development techniques; and stream restoration projects. It is important to note that these projects are necessary to address current community needs, mitigate the environmental impacts of erosion, and comply with the county's Municipal Separate Storm Sewer System (MS4) permit. The benefits of these projects include: reducing property damage due to flooding and erosion; reducing excessive sediment loading caused by erosion; improving the condition of streams; and reducing nutrient and sediment loads to local streams, the Potomac River, and the Chesapeake Bay.

   It has been estimated that the annual cost to comply with current and anticipated stormwater regulatory requirements and to implement a sustainable infrastructure reinvestment program would likely be somewhat under $100 million per year. EQAC supports meeting these challenging requirements through a phased approach that builds capacity over a period of

time that can be based on success and experience and should result in a more cost effective and efficient program.

It is also noted that, over the last several decades, Fairfax County has put into place a series of policies and rules that have protected streams and adjacent properties. It is noted that weakening these policies and ordinances could threaten the cohesive structure of watershed management initiatives that is evolving to manage our streams and ponds.

All of the efforts mentioned above are intended to protect our infrastructure and improve the water quality of our streams and rivers and eventually the Chesapeake Bay.

RECOMMENDATIONS

1. **Stormwater Funding Increase**
   EQAC recommends that Fairfax County continue to 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 that the funding for the stormwater program will come entirely from funds generated through the Service District rates. EQAC also realizes that there is a need for increasing capacity within the Department of Public Works and Environmental Services to provide these services.

   EQAC recommends that the funding for the stormwater Program be increased either by an increase in the Stormwater Service District rate in FY 2021 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100, or that the increase occur through a change in the tax rate. EQAC understands that this increase will not fully meet stormwater management needs and therefore suggests that additional increases be continued each fiscal year until adequate funding to support the program is achieved. This would, once again, result in more funding for modest watershed improvement programs and a somewhat more realistic infrastructure replacement timeline. We realize that there will be a need for additional increases in funding for water quality projects to meet future permit conditions and for infrastructure reinvestment, as the system is continually growing and aging.

2. **Policies and Ordinances**
   The county has evolved a series of policies and ordinances to protect stream valley lands and other environmental assets (i.e., the Floodplain regulations of the Zoning Ordinance, the Environmental Quality Corridor policy of the Comprehensive Plan, and the Chesapeake Bay Preservation Ordinance). EQAC recommends that those policies and ordinances remain unchanged or enhanced when possible.

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IV. WASTE MANAGEMENT

Board of Supervisors Waste Management Environmental Vision:
"Fairfax County will use integrated waste management principles to ensure future system capacity and sustainability. The objectives are an increase in the recovery of recyclable materials; a decrease in the amount of material disposed of; a decrease in greenhouse gas emissions by managing landfill gas; development of renewable energy and alternative fuels for buildings and vehicles; and preservation of open space, green space, and wildlife preserves."[1]

This Chapter addresses a range of Waste Management Issues including:

- County Solid Waste Management Program
- Environmentally preferable purchasing
- Department of Code Compliance and enforcement of illegal dumping
- Volunteer programs addressing litter and waste
- Key waste issues
- Waste management gaps in achieving the county's environmental vision
- Comments and Recommendations

COUNTY SOLID WASTE MANAGEMENT PROGRAM

The Fairfax County Solid Waste Management Program (SWMP) oversees the collection, transfer, and disposal of solid waste and recyclables within the county. The five components or functional elements of the county's system include the following:

1. **Solid Waste Collection and Transfer**
   Refuse that is collected from residents, commercial uses, and government facilities is transferred into tractor-trailers for delivery to the Energy Resource Recovery Facility (Covanta), which is operated by Covanta Fairfax, Inc., or other selected disposal sites. Approximately 90 percent of the solid waste generated by residents and businesses in the County is collected by private-sector firms.
2. **Solid Waste Disposal**
   Waste disposal takes place primarily at the Covanta facility, in which electricity is produced from the incineration of the waste. The resulting ash is landfilled at the county's I-95 Landfill Complex. When Covanta is down for repairs, maintenance, or any other reason, refuse is landfilled. SWMP staff works with Covanta and the landfills it uses to ensure that these facilities are properly managed and have a good compliance history.
3. **Composting & Recycling**
   - Composting involves the collection of organic materials, such as brush, grass, leaves, and food waste, that would otherwise have been disposed of as waste, and the processing of

[1] 2017 Fairfax County Environmental Vision, Section 2 D, pg. 20, https://www.fairfaxcounty.gov/living/environment/environmental-vision-waste-management.pdf

that material to produce a soil amendment. Composting is the largest contributor to reaching the recycling goals of the county.

- Like composting, recycling diverts materials, such as glass, paper, cardboard, metal, plastic, tires, and electronics, from the waste disposal stream for beneficial use. Residential curbside recyclables are sent to local material recovery facilities (MRFs) where the material is sorted and processed for sale. Contaminants, or "recycling residue," are sent to a landfill. Most recycling comes from businesses and includes paper, cardboard, construction debris, and metal. Business recycled materials are separated at the source and generally do not have the contamination issues of curbside recycling.

4. Source Reduction

Source reduction aims to reduce waste generation and therefore lessen the environmental impacts associated with waste handling, transportation, and disposal. SWMP source reduction strategies include public outreach initiatives including:

- Encouraging government operations and the general public to purchase and use products that are designed to be recyclable, durable, and sustainable goods, and, where possible, in concentrated forms
- Promoting the practice of purchasing and using reusable products, including reusable packaging
- Supporting government and private sector refurbishing of goods, to prolong product life
- Guiding government and the general public to purchase goods that utilize reduced or no packaging

5. Reuse

Reuse is the concept of using items multiple times, whether for its original purpose or to fulfill a different function. The SWMP promotes reuse through public outreach

Overview of County Solid Waste Operations

The SWMP operates two solid waste management facilities: the I-66 Transfer Station and the I-95 Landfill Complex. The Covanta facility is located adjacent to the I-95 complex. The SWMP also provides collection services of various items for approximately 43,000 single family homes and most county government offices.

I-66 Transfer Station Operations

The I-66 Transfer Station is operated on an old landfill, which accepted solid waste for disposal through 1982. After the landfill was closed, a transfer station was constructed at the facility. The SWMP transfers approximately 2,500 tons of solid waste to disposal and recycling facilities daily. These materials are a combination of county and privately collected refuse and recyclables. Refuse and recyclables deposited by local collection vehicles are transferred into tractor-trailers and transported to Covanta or recycling facilities for further processing.
The SWMP is also responsible for the operation and maintenance of the former landfill facility, including maintaining the cover on the closed landfill and the landfill gas[2] control system.

[2] Landfill gas is a complex mix of different gases created by the action of microorganisms within a landfill. Landfill gas is approximately forty to sixty percent methane, with the remainder being mostly carbon dioxide with small amounts of other volatile organic compounds. It is odorous unless properly handled.

The facility provides the following services:

- A customer convenience center for residents and small businesses opting to self-haul their refuse, recyclables, yard waste, and brush. The site also accepts construction and demolition debris and a wide range of specialty items such as tires, electronics, household hazardous waste, propane tanks, and scrap metal
- A brush grinding operation that processes brush and leaves into ground mulch. Most of the mulch is available for residents free of charge
- A landfill gas recovery system that uses a portion of the gas collected as an alternative fuel for heating adjacent buildings during the winter months
- A Donation Station where residents can drop-off reusable items such as books, clothes, and small appliances for redistribution to charitable organizations for resale

I-95 Landfill Complex Operations

The I-95 Landfill accepted municipal solid waste for disposal through 1995. Since that time, most material disposed at the landfill has been incinerator ash. The SWMP is responsible for the operation and maintenance of the facility, including the maintenance of the final cover on closed landfill sections, the landfill leachate control system[3], and the landfill gas system. The complex has the same services as the I-66 facility with the addition of a glass processing plant, which can process glass bottles and jars into a range of materials for construction projects, aesthetic applications, or manufacturing feedstock. The landfill gas-to-energy facility at I-95 is owned and operated by Aria Energy LLC. Aria purchases the landfill gas produced by the closed landfill. It uses this gas to generate electricity that it sells to Dominion Energy and it delivers compressed landfill gas by dedicated pipeline to the county's Noman M. Cole wastewater treatment plant for use as an alternative fuel.

Covanta Fairfax, Inc.

The county contracts with Covanta Fairfax, Inc. to accept the county's municipal solid waste at the Energy Resource Recovery Facility in Lorton. Covanta burns solid waste to power steam turbines that generate electricity. The facility began commercial operations in June 1990. Covanta reports that the plant generates approximately 80 megawatts (MW) of electricity, which is sold to Virginia Dominion Energy. 80 MW is enough power to meet the needs of approximately 80,000 homes.

Newington Collections Operations

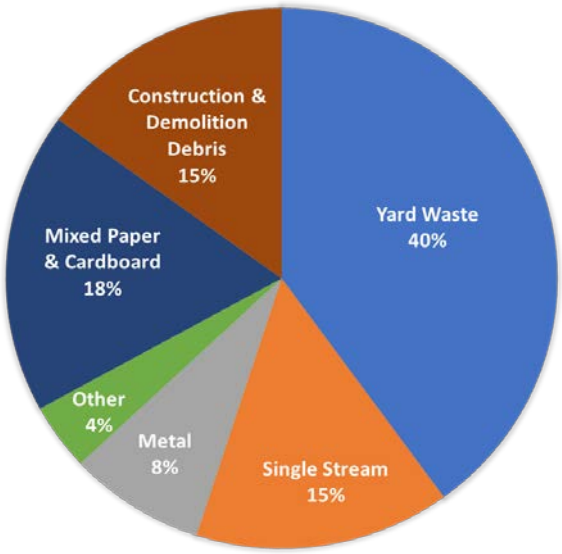
The SWMP provides curbside collection services for refuse, recyclables, yard waste, and bulky items within Sanitary Districts. Vacuum leaf collection is provided within some sanitary districts. In total, the SWMP services approximately 43,000 single family homes or about 10 percent of county households. The SWMP also provides collection services for most county owned properties.

[3] Leachate is the liquid that drains or 'leaches' from a landfill. It contains both dissolved and suspended material and is difficult to treat.

Recycling Program

Recycled materials diverted from disposal reduce the cost of managing solid waste, providing a range of environmental benefits. Yard waste, single stream recyclables[4], and paper account for more than 70 percent of the county's recycling rate, which stands at 49%. The breakdown of the major components used to generate the recycling rate is as follows:

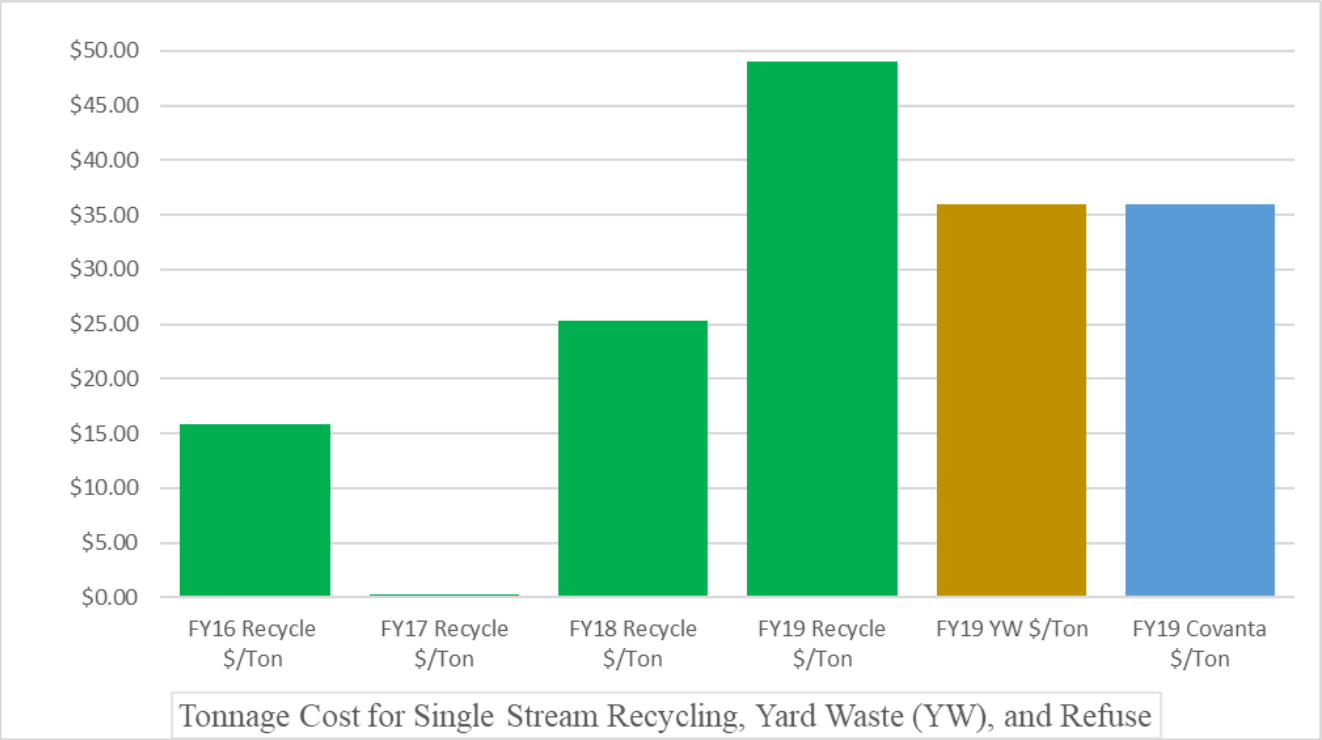
- Yard Waste (40 percent) – Yard waste is either mulched or composted and some is distributed to county residents and businesses.
- Mixed Paper and Cardboard (18 percent) – Much of the paper and cardboard recycled is collected from businesses.
- Curbside-Single Stream Recyclables (15 percent) – Recyclables are principally sent to privately operated Material Recovery Facilities (MRFs) where they are sorted into marketable materials.
- Construction & Demolition Debris (15 percent) - Data regarding these debris are generated by processors who recycle these materials, which they receive from Fairfax County.
- Metal (8 percent) - Data regarding metals are generated by processors who recycle these materials, which they receive from Fairfax County.
- Other (4 percent) - this is a combination of materials such as electronics, batteries, used oil, tires, wood, plastic, used antifreeze, used oil filters, and glass.



As shown above, curbside (single stream) recycling accounts for only 15 percent of the County's recycling stream. This 15 percent is the amount sent to MRFs for sorting. It is estimated that up to 30 percent of the materials sent to MRFs cannot be conventionally recycled and are ultimately used as landfill cover.

China no longer accepts recycled material from other countries, as it formerly had done. As a result, the state of curbside recycling, nationally and internationally, is in flux. The following chart depicts the cost per ton to process and recycle materials generated from the curbside collection program in sanitary districts as compared to the cost for yard waste and solid waste disposal. As shown, in the past, recycling was substantially cheaper than the processing of waste at the Covanta facility. Recycling is now more expensive than the waste-to-energy process. The increased processing cost for recyclables, as well as the materials sale value, is a direct result of contamination reduction requirements at the sorting facilities and market conditions. The impacts of the changing program have led to an increased focus on contamination reduction and proper recycling in the community.

[4] Single Stream recyclables refers to the mix of materials - metal, paper, cardboard, plastic, and glass, that is collected curbside from residences.



Data for Municipal Solid Waste (MSW) (the waste materials sent to Covanta for processing) and recycling during the period 2012-2019 indicates the following:

- MSW has declined approximately 7 percent
- Recycling has declined approximately 21 percent
- Total MSW and recycling combined has declined approximately 14 percent

SWMP Enforcement Program

The SWMP Code Enforcement Unit regulates the private and public sector waste collection industry within the county. The standalone unit (separate from the Department of Code Compliance) was established within the SWMP to focus on solid waste collections due to the complexity and importance of waste management in Fairfax County. The unit responds to resident and business complaints, conducts random compliance inspections, and initiates legal enforcement actions when necessary. The unit also provides education, outreach, and compliance assistance to the regulated community.

Community Outreach and Education

The SWMP has focused on community outreach and education programs that take advantage of its partnerships with other municipalities in the region, county agencies, Fairfax County Public Schools, community organizations, commercial businesses, and private sector waste collection companies. Outreach programs include: GoRecycle campaign with the Metropolitan Washington Council of Governments (MWCOG); visits to commercial establishments in targeted business sectors and apartment buildings; providing support, publicity, educational exhibitions, and displays at county festivals; events specifically dedicated to recycling and sustainability themes; public speaking at community and industry events; and providing technical support and advice to

county decision-makers on emerging solid waste management technologies and issues. The SWMP also leverages social media platforms and the county webpage to share program information.

Household Hazardous Waste (HHW)

A HHW drop off facility at the I-66 Transfer Station allows for a fast, convenient means of disposing of not just household hazardous waste items such as paints, pesticides, herbicides, aerosols, pool chemicals, household cleaners, solvents, and fluorescent bulbs, but also electronics (e-waste), motor oil, antifreeze, batteries (all types), cooking oil, ink/toner cartridges, select cylinders including propane, and more. All of these operations are under one roof and supervised by trained, certified county staff. Another key benefit of this program is that the material is diverted from Covanta for disposal to more appropriate hazardous waste facilities. Additionally, the HHW program continues to add to its growing list of sustainability initiatives, which include cooking oil and ink/toner cartridge recycling programs, and a partnership with Habitat for Humanity to recycle latex paint. The newest program under development is known as "PREP" (Propane Recycling & Extraction Program). PREP will offer a convenient and safe way of recycling propane cylinders by removing the last few remnants of propane found in most "empty" gas cylinders and allowing for the safe crushing and recycling of the steel containers.

Very Small Quantity Generators of Hazardous Waste

Businesses or Fairfax County government agencies that generate small quantities of hazardous waste may qualify as Very Small Quantity Generators. This program provides a legal and affordable solution to hazardous waste disposal. The benefit of the program is that it offers prices well-below the normal cost of disposing of hazardous wastes directly with a hazardous waste disposal contractor. Additionally, the program eliminates painstaking recordkeeping requirements by businesses and institutions that contract for disposal directly with hazardous waste disposal service providers. Seven collection events are completed or planned for 2019.

Regional Coordination

The SWMP is working with MWCOG partners to evaluate solid waste and recyclables management in the Northern Virginia region. The effort is targeted to help evaluate regional solid waste management best practices in order to make informed decisions now and in the future.

Future Programs

The SWMP has initiated several programs that will soon be more fully implemented. These include:

- Fairfax County Donation Station - The SWMP is moving forward with its commitment in the 2017 Board's Environmental Vision to transform the County's two solid waste and recycling facilities into *resource management* facilities. The Board's direction was *"to ensure and act where possible to create a business environment that treats waste more like an asset than a liability, so that materials are directed to the highest and best use depending on current market conditions and technology."* This is being achieved by partnering with a national reuse company to establish reuse drop off centers at the I-66 Transfer Station and the I-95 Landfill Complex.

- Food Waste Composting - A pilot-scale composting project at the I-95 Complex will begin by composting yard waste only. Following review by the Virginia Department of Environmental Quality (VDEQ), the SWMP will begin introducing source-separated residential food waste into the program. The intent of this pilot is to demonstrate "proof of concept," and to encourage the private-sector to develop similar, larger capacity to serve the community at large.
- Organics Collection and Recycling - The SWMP encourages and supports private-sector efforts to offer compostable food waste collection to residences and businesses throughout the county. Currently, the county website lists two firms that have registered with the SWMP to provide residential and commercial food waste collection (for composting).

Environmental Preferable Purchasing

The Department of Procurement and Material Management (DPMM) manages the Environmentally Preferable Purchasing (EPP) Policy through the Green Purchasing Program. EPP is the procurement of goods and services that have reduced effects on human health and the environment when compared with competing goods or services that serve the same purpose. In simple terms, EPP means "Buying Green." The goal of EPP is to help Fairfax County departments use their purchasing power to reduce the environmental and public health impact of county government operations through the purchase, distribution, and use of environmentally preferable products to the extent that the products perform satisfactorily and can be acquired at similar total cost and provide the best value for the county.

Fairfax County employees can use the DPMM Environmentally Preferable Purchasing Buyer's Guide to both help the environment and make a fiscal impact while doing their jobs. The guide, subtitled "What we buy matters," answers questions related to environmentally preferable purchasing. The buyer's guide offers ideas for buying environmentally preferable goods and services and provides examples and details of the paybacks that green purchasing offers the county.

On July 17, 2009, Procedural Manual (PM) 12-21 established an Environmentally Preferable Purchasing Policy for all County Departments. EQAC was unable to find the Environmental Preferable Procurement Policy (EPPP) on the County Website and none of the current solicitations on the County's website refer to such a policy. Currently, the policy is an internal document that is applied on an ad-hoc basis at the discretion of DPMM and the soliciting department. The interdepartmental subcommittee has not met in several years. While the policy is being applied to the procurement described above, it has not been used to apply these principals to the actual end use of other recycled materials processed by the SWMP. Additionally, the policy is not available to the public or to county vendors unless added ad-hoc to a particular procurement action. However, DPMM has added staff and created a Sustainable Procurement Team to address this issue. In addition, DPMM is considering making the EPP available to bidders. An update to the EPP is planned.

Fairfax County Department of Code Compliance

The Department of Code Compliance (DCC) receives and investigates code complaints covering a wide range of issues, including zoning complaints, signs, noise, lighting, and illegal dumping. Citizens that have waste dumping issues can call or contact DCC[5] for resolution, referral, and tracking. Where appropriate, DCC issues citations for dumping on public and private property and for leaking trucks. Citation statistics are included in the Data Appendix of this report. DCC indicated in 2017 that when complaints came into DCC, the staff would either take charge of the complaint or, if the complaint needed to be referred to another agency, would refer the complaint, but continue to track the action and resolution status. The website does not appear to include the tracking of complaints by DCC as indicted to EQAC. While DCC actions can address specific code violations, county streams continue to have trash, plastic bag, and bottle contamination. Shown here is a photo from Little Hunting Creek in the Lee District.

Volunteer Organizations addressing Litter and Waste

Alice Ferguson Foundation

The Alice Ferguson Foundation's (AFF) mission is to connect people to the natural world, sustainable agricultural practices, and cultural heritage in their local watersheds through education, stewardship, and advocacy. AFF has multiple programs, including the Potomac River Watershed Cleanup, Trash Free Schools, The Litter Prevention Campaign, Trash Free Initiative, and more. Details are located at: https://fergusonfoundation.org/.

Clean Fairfax

Clean Fairfax is a private, nonprofit corporation, which operates in close cooperation with the SWMP and several other agencies within the county government. Clean Fairfax focuses on environmental education and produces the county's official Earth Day and Arbor Day event, called Springfest Fairfax.

Current Status of Key Issues

Glass

In recent years, glass collected in curbside recycling bins has increasingly ended up in landfills. This is because glass is broken during the collection process and becomes mixed with recycling residue (small bits of plastic and paper) as part of the sorting process, making it difficult to recover. Some of the broken glass clings to other valuable materials as a contaminate and damages expensive processing equipment during sorting. The remaining glass passes through the

[5] https://www.fairfaxcounty.gov/code/illegal-dumping

sorting process and is comingled with small pieces of plastic and paper and other materials that are not recycled. This material is used as landfill cover. While this has the benefit of reducing the amount of clean landfill cover (soil) that is used at the landfill and is superior to placing glass in the trash, the best option for recycling glass bottles and jars is to take them out of the single stream recycling process.

As a result of the challenges to the recycling of glass within the single stream recycling process, the SWMP installed and operates a 20 ton per-hour glass recycling system at the I-95 Landfill Complex. In order to allow glass recycling, the county now maintains purple, glass-only recycling containers within the county.[6] To date, the SWMP has installed eight purple drop off locations throughout the county to make glass recycling convenient for residents. Additional efforts are being made to add new locations throughout the county. The SWMP also developed a glass only purple can drop off program with neighboring jurisdictions, including the City of Alexandria, Arlington County, and Prince William County. No glass should be curbside recycled.

Environmental Impact Study

The SWMP is working with a consultant to conduct a study to compare the environmental impacts of current waste management practices. The study will consider power generation offsets, greenhouse gas emissions, costs, social/demographic issues, and traffic for current waste disposal practices, as compared to landfilling. The goal for the study is to evaluate the environmental impacts of waste management practices so that the county can make informed decisions now and in the future.

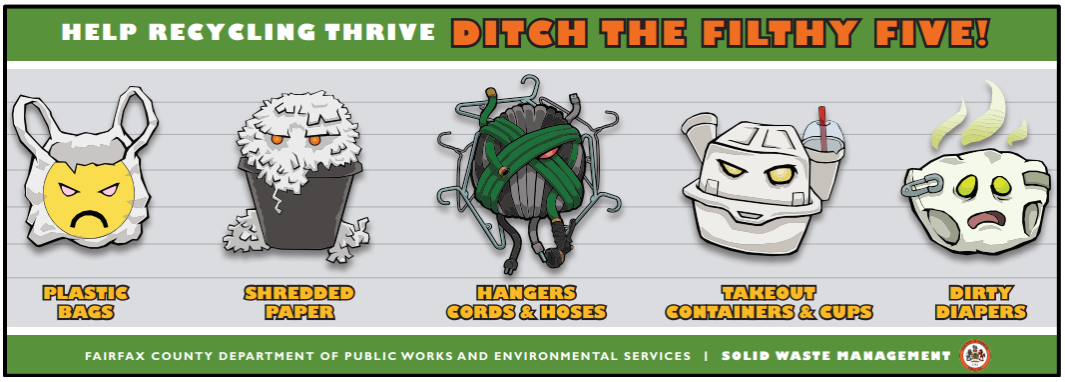
Recycling Education and Outreach

The SWMP has increased outreach efforts to raise awareness about reducing contamination. Several posts have been shared on the Fairfax County Environment Facebook page. Sharing program messages on social media reaches residents directly and fosters two-way communication. Designated county staff are able to respond to questions and comments, combat rumors, and learn which program areas require further explanation.

Companies and municipalities that relied on international markets have been hit hard and are making major adjustments to the way they process recyclables to reduce contamination. While commodity prices are declining, these changes are increasing the cost to process, transport, and market recyclables. Cleaning up the recycling stream is required as result of changes to import/export policies. The general confusion about what can or cannot be recycled in a residential recycling bin is addressed with County's "Always/Never" sheet, shown below. The

[6] www.fairfaxcounty.gov/publicworks/recycling-trash/glass.

"Ditch the Filthy Five" flyer is also being used to help educate residents about items that should never be placed in residential recycling bins.



One of the methods the team intends to employ to reduce contamination is to eliminate the use of plastic bags to collect and dispose of recyclables by encouraging the use of reusable bags made from waterproof material and imprinted with images of what residents can/can't be recycle. This method has proven successful in other jurisdictions.

Recycling Markets

Although the state of recyclables markets is an international problem, the SWMP has made efforts to mitigate its reliance on recycling alone to reduce waste. This includes a renewed

emphasis on reducing contamination by increasing community education and explaining to residents and businesses that "wishful" recycling of inappropriate items makes processing more costly. Programs are currently being developed to encourage residents to put only specific materials in the recycling bin that are loose, clean, and dry.

It is also important to promote "closed loop" thinking – buying items with recycled content. There are many manufacturers that produce recycled-content goods here in the United States. Helping residents and businesses find American goods made from recycled material will encourage more sustainable manufacturing locally.

Modifications to the market that have worked well in other states include a ban on single-use plastic bags and the introduction of bottle deposit/refund laws. States with such laws have significantly less litter and higher recycling rates for plastic and glass.

Gaps

Gaps in the Board of Supervisors' Waste Management Environmental Vision and in additional areas are as follows:

The Use of Integrated Waste Management to Ensure Future System Capacity and Sustainability

This practice is being followed. However, despite numerous studies and pilot programs, the Covanta facility is expected to remain the principal and dominant means of addressing the county's solid waste. The integration goal remains a gap until viable alternatives progress to practical implementation.

Increase Waste Recycling; Decrease Waste Disposal

The Board's Vision calls for an increase in the percentage of materials recycled and a decrease in the percentage of material disposed. Both MSW and recycled material have declined in the last six years. Most of that decline is from a decline in recycled materials. The reduction in total material is a positive trend. However, the data indicate concern about recycling and in particular curbside recycling, which has declined 46 percent from its peak.

A threat to the Board's recycling vision is the changed recycling market. While the County has numerous programs to increase recycling, the actual recycling rate is dropping and is expected to drop more with the changes brought by market forces. There are gaps in our knowledge of the cost-effectiveness and the environmental benefit of the county's recycling program. The net environmental and fiscal benefits of collecting recyclable materials curbside are in flux due to contamination. In the past, recycling has produced revenue for the county as well as environmental benefit. Due to market changes, recycling revenue is dropping and may continue to drop despite the best efforts by the SWMP. These two factors together mean that the actual environmental benefit of the County's recycling program is unknown, and that recycling is unlikely to provide an economic benefit for an indeterminate amount of time.

It is possible that new markets will emerge over time. However, accomplishing the Board's vision in these new markets will require a new paradigm. This could include dramatically decreasing the contamination of recyclables, creating local markets for specific materials such

as glass, a return to dual stream collection, a bottle deposit/refund bill, and more. These actions will go beyond what the SWMP can accomplish and may require Board action.

Illegal Dumping

The county has implemented Department of Code Compliance procedures to address citizen complains about illegal dumping. However, the County streams continue to be impacted by trash, plastic bags and bottles. In addition, it does not appear that DCC is tracking and following up on complaints as discussed previously with EQAC.

RECOMMENDATIONS

1. **Environmentally Preferable Purchasing Policies**
   County Procedural Memorandum PM 12-21 EPPP should be updated and implemented by the Board to assure that it will encourage all county contractors, as well as other trash disposal and recyclables processing facilities, to manage materials according to their best environmental use in an economical way. Consideration should be given to making this document public and included it in all aspects of procurement. This will require changes to future procurement and contracts.

2. **Disposable Bag & Bottle Bills**
   EQAC continues to recommend that the Board support changes to Virginia law to provide for a local option Disposable Bag Litter Abatement program and a Statewide container redemption fee (bottle bill) to reduce litter and increase recycling.

3. **Tracking of Waste-Related Complaints**
   DCC should track all complaints relating to waste and dumping. Some complaints will need to be referred to other agencies, but DCC should track all complaints and their status as resolved or not. A central point of contact and responsibility is key to trust.

4. **Recycling Outreach**
   An aggressive outreach program should be implemented by the county and private collectors regarding what should and should not be placed in curbside recycling bins, with a special emphasis on the use of purple bins for the collection of glass. Statistics should be collected on the success of reducing contamination and increasing recycling as a result of the outreach.

5. **Recycling Study**
   Use the on-going SWMP Environmental Impact Study to assess and obtain recommendations for the following:

   - The net environmental benefit of the current single stream, curbside recycling program
   - Options to increase or produce a net environmental benefit from recycling
   - The adoption of a disposal bag litter abatement program and a bottle bill to increase recycling and reduce litter and plastic environmental impacts

V. PARKS AND ECOLOGICAL RESOURCES

Board of Supervisors Environmental Vision:
"Parks, trails, and green space provide habitat and other ecological resources that promote the physical and mental well-being of residents through supporting healthy lifestyles and allowing for interaction with our natural environment. A comprehensive county trails system, such as the Cross-County and W&OD Trails, can provide means for environmentally responsible transportation. Ecological resources that include the soil, water, air, plants, animals, ecosystems and the services they provide are considered natural capital and green infrastructure. The public, or ecosystem, services provided by this green infrastructure are often more cost-effective than the engineered alternatives, and thus are managed as any other infrastructure or capital asset through deliberate inventory, planning, maintenance, enhancement, and restoration to ensure healthy, high functioning, and resilient ecosystems and environment. Maintaining healthy, natural ecosystems is a priority of Fairfax County."[1]

OVERVIEW

Fairfax County contains a total of about 227,331 acres. Just under 15 percent of Fairfax County land is classified as parks and recreation (33,174 acres; 14.6 percent) [2] with the majority of that acreage owned and managed by the Fairfax County Park Authority (FCPA) (23,890 acres in August 2019) and the Northern Virginia Regional Park Authority (NOVA Parks) (8,554 acres). Another 13,431 acres (5.9 percent, a decrease in 371 acres since the prior year) are classified as vacant or natural land.[2] Land in this "vacant or natural land" designation is zoned for residential, industrial, or commercial uses**Error! Bookmark not defined.** and continues to decrease in amount each year due to growth pressures within the county.

While not all of the acreage described above can be considered valuable as natural habitat, active recreation areas, private open space, and county and school properties all have the opportunity to enhance the environment (e.g. by reducing stormwater runoff and adding trees) if properly managed and/or designed.

Residential property accounts for 133,355 acres (58.7 percent, an increase over the prior year of 411 acres) of the county's area. This significant percentage underscores the impact that private property can have on our environmental services and natural capital.

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[1] 2017 Fairfax County Environmental Vision, Section 2 E, pg. 24, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

[2] 2019 Land Use and Zoning Data, Acres of Land by Existing Land Use Category (Planning District, Supervisor District & Human Services Region) www.fairfaxcounty.gov/demographics/find-data-topic

This chapter highlights significant agencies, programs, non-profits, and private land owners influencing the county's ecological resources. It also seeks to highlight the most pressing issues that the county currently faces on this topic. The topics of wildlife management, water, and stewardship opportunities will be covered in more detail by the chapters/appendix of the same name.

CURRENT STATUS OF RECREATIONAL PARKS

Recreational park land provides outdoor spaces for residents seeking healthy lifestyles (e.g. physical and mental well-being and environmentally responsible transportation through the use of trail systems) and allows for interaction with the county's natural environment. The Board's Environmental Vision supports creating more parks, trails, and green spaces, as well as more community parks, for active and passive recreation. It also advocates for a comprehensive interconnected trails system throughout the county and region. Recreational parks, while having a focus on benefits for residents, also come with various levels of ecological benefits, such as green corridors for wildlife and stormwater management.

Trail Updates

The 41-mile, multi-use Gerry Connolly Cross County Trail (GCCCT), which opened in 2006, connects the entire county from one end to the other. With much of the trail in active floodplains, much of the maintenance has been focused on hardening the surface to reduce the sediment loading into the streams from the erosion of the trail surface. Beginning in 2017, trail improvement projects have been executed and continue to be scheduled to keep pace with trail maintenance. These improvements are funded using the 2016 Park Bonds.

Within the Fairfax County Park Authority (FCPA), 158 projects have been evaluated using the Trail Development Strategy Plan (TDSP)[3]. Of those, a total of 31 have been completed (no new ones since last year's EQAC report), 11 are currently in design or construction phases, and three others have been identified for funding using 2016 Park Bond funds. Approximately 3 percent of the project funds will be used to mitigate the impacts of the construction on natural resources.

Within the NOVA Parks system, several natural surface trail sections have been rerouted and/or improved to enhance trail sustainability and reduce erosion, including work with the Potomac Heritage Trail Association. In addition, in late 2017, NOVA Parks conducted a comprehensive assessment of the 17-mile Bull Run Occoquan Trail (BROT) to initiate sustainable redevelopment of the entire trail. Many segments of the trail are located within the broad floodplain of Bull Run, while other segments are located in areas with steep slopes - both settings pose challenges for sustainability. The result of the assessment is a multi-year priority list of projects that includes trail sustainable reroutes and trail bridges over streams and tributaries. NOVA Parks also completed the placement of 40 mile markers along the Occoquan Watertrail[4].

[3] https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/plandev/trail-management/trail-development-strategy-plan.pdf
[4] https://www.novaparks.com/parks/pohick-bay-regional-park/things-to-do/occoquan-watertrail

Occoquan Regional Park Redevelopment

NOVA Parks completed its redevelopment of the Occoquan Regional Park with a ribbon-cutting on June 23, 2018. The project includes a new five-kilometer (5K) loop trail and an event building that includes a 1,600-square foot exhibit space with interpretive exhibits.

Tysons Redevelopment

The 2010 Comprehensive Plan for Tysons includes a conceptual park network map and new urban park service level standards of 1.5 acres per 1,000 residents and one acre per 10,000 employees. The Plan also includes a typology of urban park types (pocket parks, civic plazas, common greens, and recreation-focused parks), the Tysons Community Circuit (a recreational trail functioning as a continuous five mile loop around Tysons that links stream valley trails with on-road bike lanes and other bicycle and pedestrian paths), a recommendation for 20 new athletic fields to be built by 2050 (of which two have been built[5]), and guidance on restoration and enhancement of existing stream valley parks in Tysons. Due to the urban character of Tysons, the process of finding sufficient and appropriate space for these public facilities will require the collaboration of Tysons landowners in coordination with the county and other stakeholders.

The Land Use chapter also addresses the Tysons redevelopment, and more information can be found online at https://www.fairfaxcounty.gov/tysons/parks-and-public-facilities.

CURRENT STATUS OF ECOLOGICAL RESOURCES

Considering the county's continuing development, it continues to be important to actively preserve, protect, and enhance its current park land and ecological resources and, whenever possible, secure additional preserved land as well. The county's Comprehensive Plan[6] contains strong language in support of the Board's Environmental Vision, particularly in the Environment[7] section. The county should focus on the key objective of identifying, protecting, and enhancing an integrated network of ecologically valuable land and surface waters for present and future residents of Fairfax County via Environmental Quality Corridors (EQCs).[8]

This principle, which can be applied across agencies and organizations, aims to connect high value ecological core areas by identifying critical ecological links in the network of forested areas and for the development of strategies to protect and enhance critical components of this network. The "ecological spines" concept integrated into the Embark Richmond Highway Comprehensive Plan Amendment[9] is an example of an innovative way that the county is considering EQCs.

[5] p. 65 of the Tysons 2017-2018 Progress Report https://www.fairfaxcounty.gov/tysons/sites/tysons/files/assets/documents/pdf/annual_reports/tysons%20annual%20report%202018%20final%20for%20web.pdf

[6] https://www.fairfaxcounty.gov/planning-development/fairfax-county-comprehensive-plan

[7] https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/compplan/policy/environment.pdf

[8] Objective 9 of the Environment section of the Comp. Plan (link above in footnote 7) discusses EQCs.

[9] Page 16: https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/documents/compplanamend/embarkrichmondhwy/documents/2017-10.pdf#page=20

The Fairfax County Park Authority is a significant asset in the area for protecting and enhancing ecological resources, with ownership of approximately 10 percent of county land. Many of the 11 supporting objectives identified in the Parks and Ecological Resources section of the board's Environmental Vision overlap with the four management themes and 26 recommended actions of FCPA's Natural Resource Management Plan (NRMP) for park properties.[10] As this plan is implemented, it should result in improved preservation and protection of environmentally sensitive land.

Unfortunately, budget challenges faced by the county have resulted in serious funding shortfalls for parks and natural resources. Underscoring the discrepancy in funding versus need, FCPA's 2016 Needs Assessment[11] reported that an additional $2,350 per acre of annual funding (for all 17,000 acres of natural area owned by FCPA - close to $40M/year) would be needed to perform the necessary maintenance activities for the county's natural resources.

While FCPA is seeking to secure alternative funding for important projects such as the implementation of the Community Level Vegetative Classification and Mapping project, funding continues to be a need in other areas, such as the hiring of an ecologist to lead the Fostering Stewardship and Expanding Natural Capital program area of the NRMP (the last of four program areas without a merit position Ecologist III).

Outside of the county's park land, ongoing opportunities to enhance ecological resources and conservation corridors exist during site redevelopment, such as in the cases of the Embark Richmond Highway project, the Merrifield Suburban Center study, and Tysons redevelopment. This non-park land is a factor in the overall ecological health of the county. In that vein, the review of development plans by urban foresters using an ecological resources perspective is beginning to prove a challenge, due to increasing demands and the intensive staff time requirements needed to ensure good quality plans.

More broadly, the implementation of rules, regulations, and programs can result in positive environmental change on a wider scale across public and private land alike. The county's ongoing discussions of natural landscaping on county properties is an example of the potential to improve ecological resources in real and actionable ways.

As EQAC's focus is primarily ecological issues, the remainder of this chapter will focus on responsibilities and updates from various county organizations.

[10] The NRMP can be found online www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/nrmp012914.pdf. The Transportation, Water and Wildlife Management chapters of this report also address components of the Parks and Ecological Resources core service area of the Board of Supervisors' Environmental Vision.
[11] https://www.fairfaxcounty.gov/parks/sites/parks/files/Assets/documents/plandev/parkscount/needs-assessment-plan-050616.pdf

ORGANIZATION PROFILES

Fairfax County Park Authority (FCPA)

Created in 1950, the Park Authority has 427 parks on 23,890 acres of land and maintains 325 miles of trails.[12]

Guiding Documents

Three key documents guide FCPA in support of its ecological mission:

- *Great Parks, Great Communities Comprehensive Park System Plan*
  https://www.fairfaxcounty.gov/parks/publications/2010-2020-comprehensive-plan
  Adopted by the FCPA Board in 2011, this provides a long-range plan for the capital assets of the park system (land, natural and cultural resources, and facilities) and supports other policies and plans that guide decision making and operations of FCPA. Its recommendations are referenced during park-specific master plan processes and development plan review. Implementation takes place through land acquisition, capital development projects, maintenance, park planning, and resource management activities.

- *Parks and Recreation System Master Plan and FY19-23 Strategic Plan*
  https://www.fairfaxcounty.gov/parks/planning-development/fcpa-masterplan
  Approved by the FCPA Board in June 2018, and encompassing all existing FCPA plans and programs, this master plan provides a 10-year roadmap to guide the agency in meeting community needs through planning, operations, and programming. It builds on the findings from the 2016 Parks Count! Needs Assessment.[13] The goals and recommendations of the plan align with seven Park Authority Board-adopted park system guiding principles:

  - Inspire a Passion for Parks
  - Advance Park System Excellence
  - Meet Changing Recreation Needs
  - Be Equitable and Inclusive
  - Promote Healthy Lifestyles
  - Strengthen and Foster Partnerships
  - Be Great Stewards

  This document paves the way for setting measurable performance goals over the next several years to allow FCPA to better report how effective its actions have been in achieving the goals set forth in the plan.

- *Natural Resource Management Plan (NRMP)*
  https://www.fairfaxcounty.gov/parks/nature/natural-resource-management-plan
  Initially created in 2004, and updated and approved by the FCPA Board in 2014, this plan provides guidelines for FCPA's annual work plans. In support of this plan, the Natural

[12] www.fairfaxcounty.gov/parks/about-us; exact acreage from Kristen Sinclair, FCAP on 10/2/19 as of Aug. 2019

[13] https://www.fairfaxcounty.gov/parks/sites/parks/files/Assets/documents/plandev/parkscount/needs-assessment-plan-050616.pdf

Resources Branch restructured to provide program-level services that include: (1) Inventory and Planning; (2) Protecting Natural Capital; (3) Managing Wild Populations and Restoring Ecosystems; and (4) Fostering Stewardship and Expanding Natural Capital. All but the last area have Program Managers/Ecologists implementing recommended actions within their respective themes. The long-term implementation strategy was postponed to FY 2019 to coincide with the five-year progress review and coordination with the recently updated Park Authority Cultural Resource Management Plan.

NRMP Program Needs

As mentioned in the overview, the fourth and final program area of the NRMP, Fostering Stewardship and Expanding Natural Capital, remains unstaffed. Staffing this program would be particularly beneficial to the county due to the high return on investment (ROI) potential to be secured through increased capacity for volunteer programs. At full performance, the program is estimated to maintain a yearly return on investment between 160 percent and 300 percent (with a 2019 estimated value of $160,000 to $300,000) in the form of volunteer hours towards ecological restoration activities and citizen science benefiting the county. The county has seen repeated success and high return on investment for the Invasive Management Area (IMA) program, and this program is expected to contribute a similar positive value to the county in terms of volunteer support of natural resource management.

Land Acquisition

In FY 2019, FCPA added 37.9 acres to its park land inventory through land transfers and exchanges. Generally, FCPA concentrates on acquiring land along the county's interior stream valleys and land adjacent to current parkland. See the Data Appendix for details of land acquisitions.

A 2020 park bond for $100M has been proposed as part of the adopted Capital Improvement Program[14] with the goal of Land Acquisition and Park Development.

Invasive Plants and Insects

- *Invasive Plants*

  Invasive plant control projects, focused on monitoring, management, and outreach, occur at about 20 percent of the parks in FCPA (over 85 sites). Overall, monitoring to assess and prioritize management actions using the Non-Native Invasive Assessment and Prioritization (NNIAP) protocol have been completed on 17,000 acres of park land.

  The Invasive Management Area program, first established in 2006, continues its operations at 14 percent of FCPA properties (60 sites). In CY 2018, over 2,200 volunteers spent 8,000 hours (a $203,000 value[15]) restoring habitat through the removal of invasive plants and the planting of native species. See the Data Appendix for statistics regarding the history of this program.

[14] #13 on p. 103: https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/cip.pdf
[15] See this year's Parks & Ecological Resources Appendix Table A. V-5 for details of how this is calculated.

The Early Detection Rapid Response (EDRR) program, through which at least 11 surveys are held each year, finds new populations of certain invasive species and aims to eradicate them before they cause serious ecological harm. The program also adds this information to Early Detection and Distribution (EDD) maps that track invasive species across the country. Through this program, volunteers have identified two new invasive species on park land.

Partnerships are key to invasive plant control and FCPA joins with many organizations listed in this report to help increase capacity in this area. The Park Authority is a signatory for the National Capital Region Partnership for Regional Invasive Species Management (PRISM) and staff served on the Invasive Species Advisory Committee for the Virginia Invasive Species Management Plan update.

- *Invasive Insects*
  The Urban Forestry Management Division Forest Pests section contains a more robust summary of various invasive insects. However, it is noteworthy that in 2019, FCPA will receive $250,000 in funding from the Forest Pest Fund (Fund 40080) to remove dead ash trees in parks. More broadly, as part of the 2019 budget process, an amendment was adopted to the county code[16] to allow use of service district funds to remediate damage to trees caused by forest pests, including removal of damaged trees when indicated.[17]

Environmental Education

In FY 2017[18], over 46,000 registered students took park in 3,023 classes offered through FCPA's five nature centers. Details by type of class are available in the Data Appendix.

FCPA has additional programming not included in the numbers above:

- Resource interpretation programs at lakefront parks and RECenters
- Meaningful Watershed Education Experience "MWEE" project, which engages fourth and seventh grade students in a hands-on educational program about the importance of the Chesapeake Bay Watershed and connects the students to the outdoors

Natural Resource Mapping

In 2015, a natural resource geodatabase built on the Fairfax County GIS infrastructure was created to archive natural resource inventory data, ensure uniform data management, and allow for a centralized location to access natural resource information. Data collection, using tablet computers and mobile GIS combined with rapid assessment protocols, continues for all applicable natural resource field datasets including Non-Native Invasive Assessment Protocol (NNIAP) data, white-tailed deer browse impact (deer) data, and community level vegetative classification (vegetative communities) data. These datasets have been published to the county's

[16] Appendix I of the Code: https://library.municode.com/va/fairfax_county/codes/code_of_ordinances?nodeId=THCOCOFAVI1976_APXIFACOSPSEDICOININMACADIISDAHUGYMOCACEIDPE

[17] Page 6: https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2019/board/may07-board-summary.pdf

[18] Data was not received for FY2018.

enterprise GIS database and are available to county employees. The deer management program area map is available online to the general public[19].

Where available, national, regional, or state coordinated inventory methodologies are being adopted and tested. These inventory protocols are modeled after citizen science approaches for large scale data collection. FCPA is performing these inventories in testing or full performance for Early Detection and Rapid Response (EDRR), amphibians, breeding birds, and vernal pools. In addition, the designation of natural resource protection zones within individual park master plans has also been completed.

FCPA has secured funding for inventories of NNIAP and deer data collection efforts. A funding strategy has been identified for the vegetative communities inventory effort as well, which has classified and mapped 3,725 acres of natural vegetation communities in FY 2019 (and about 7,000 acres since the project began). However, it continues to seek funding from non-traditional sources to populate the geodatabase. It will also continue to investigate citizen science approaches to data collection, where possible.

Through these programs, 15 new rare plant populations, with some new species not previously known in the county, were identified; 375 additional acres of state rare vegetation communities were mapped; and six new rare bat locations comprised of three species were discovered.

Lake Accotink Sustainability Study

In 2014, funding was allocated to study Lake Accotink Park (Springfield) and to identify a more sustainable approach to management of the lake due to significant on-going sedimentation issues since the creation of the lake in 1940. The contractor Wetland Studies and Solutions, Inc. (WSSI) assisted in the study and, as part of its work, outlined a range of alternative approaches to address the sedimentation issues.

The Lake Accotink Sustainability Plan, including the range of concepts and cost comparisons, was completed May 31, 2017. Evaluation of appropriate sediment TMDLs was also undertaken, with recommendations being approved in May 2018 (sediment removal must remain at similar levels for any plan that would remove or alter the lake's dam).

Community input on the variety of options was gathered between 2016 and 2018, with the comment period closed as of May 28, 2018. Community response indicated a strong preference for retaining some amount of lake via dredging. The recommended approach (proceed with wet dredging to an eight-foot depth, transport dredge to Wakefield Park via a pipeline, and transport it via truck to a local quarry for disposal) was presented at a September 19, 2019 public meeting. Funding for dredging exceed FCPA's capabilities and staff is currently exploring options to move forward. FCPA is continuing analysis of this project. For detailed information, see: https://www.fairfaxcounty.gov/parks/planning-development/lakeaccotink.

19 https://fairfaxcountygis.maps.arcgis.com/apps/webappviewer/index.html?id=409cc24c643d453387f752ce6e06bcad

NOVA Parks

Note: EQAC did not receive updated information this year for NOVA Parks. This section remains unchanged from the previous report.

Founded in 1959, NOVA Parks now owns, leases, or holds easements on 12,860 acres of land, of which 8,554 acres are in Fairfax County.[20] In its conservation role, NOVA Parks is involved in implementing portions of the Environmental Quality Corridors concept and places emphasis on acquisition of the shoreline properties along the Potomac River, Bull Run, and Occoquan River.

Guiding Document: NOVA Parks' 2018-2022 Strategic Plan[21]
Adopted in July 2017, numerous objectives in the Strategic Plan directly support and further the supporting objectives of the Parks and Ecological Resources section of the Board of Supervisors' Environmental Vision.

Land Acquisition
Two recent acquisitions added 23.2 acres to NOVA Parks' land inventory. In April 2018, the acquisition of a 3.2-acre priority inholding at Pohick Bay Regional Park on Mason Neck was a rare opportunity to: restore and preserve a riparian buffer; prevent the redevelopment of three waterfront residential lots with large dwellings; and reduce impact on an ingress-egress easement that traverses park land. In May 2018, NOVA Parks acquired the 20-acre Battle of Upperville/Goose Creek Bridge Property in Loudoun County.

Invasive Plant Control
All NOVA Parks facilities continued efforts to remove non-native invasive plants and extensively replace them with native plants. Of particular note is the partnership with Virginia Dominion Energy to reestablish a native plant community along the W&OD Trail through the removal of invasive plants. Annually, NOVA Parks continues to plant more than 1,000 native trees, with an emphasis on riparian buffers.

Environmental Education
NOVA Parks offers a variety of educational programming including:

- *Roving park naturalist program*
  Provided over 100 nature programs, attended by approximately 8,000 Northern Virginia residents of various ages, on such topics as wetland ecosystems and forest animal habitat
- *Grants from the NOVA Parks Foundation through its Nature Nuts program*
  Awarded to 12 Fairfax County public schools for 785 children to attend environmental education field trips at Hemlock Overlook Regional Park
- *Adventure Links at Hemlock Overlook Regional Park (Clifton)*
  Offers a variety of outdoor and environmental education, and team development, programs for a variety of public and private organizations
- *Camp Grow at Meadowlark Botanical Gardens*
  Offers children the opportunity to explore nature through hands-on activities, gardening, discovery walks, crafts, music, storytelling, and animal programs

[20] https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/cip/nvrpa.pdf
[21] https://www.novaparks.com/2018-22-nova-parks-strategic-plan

Urban Forest Management *Division* (UFMD)

UFMD is the primary county agency responsible for managing trees and forests in Fairfax County. The county's urban forest is critical to enhancing the livability and sustainability of our community. Management of the trees within our urban forests to maximize the multitude of benefits they provide to residents is an essential step in successfully reaching the commitments and goals of the Board of Supervisors' Environmental Vision, the Tree Action Plan, the Strategic Plan to Facilitate Economic Success, the Cool Counties Climate Stabilization Initiative, and other county public health, livability, and sustainability initiatives and programs.

Current Tree Canopy

According to the 2017 i-Tree Eco Analysis, tree canopy covers approximately 51 percent of the entire county (which exceeds the 45 percent goal adopted by the Board of Supervisors in 2007). However, different methodologies for measuring tree canopies exist, and one important perspective is that *quality* of tree canopy is at least as important as the *quantity* (see UTC Analysis below).

- *i-Tree Eco Urban Forest Assessment*

  In Summer 2017, UFMD completed an i-Tree Eco urban forest assessment[22], which created a baseline of the structure, function, and value of the social, economic, and environmental benefits of the county's trees and forests. This field study of 204 plots updated an i-Tree Eco study conducted in 2009-2010 and may be used as the basis for a long-term forest health monitoring program. The study is essential in understanding our urban forest's vulnerability to pests and diseases.

  Examples of data contained in the report are estimations of the quantity of tree species that live throughout the county and, subsequently, data on how much carbon they sequester, how much oxygen they produce, and how much runoff they prevent. Overall, the report indicates that the county's tree coverage provides $32.1 billion in structural value. The quality of the tree canopy is important, and this analysis shows some interesting data:

  - 85 percent of tree species are native
  - 11 percent (the most dominant species as a family) are oak trees, which are known to support the greatest number of caterpillars[23] (a key food source for native bird populations)
  - 67 percent of trees are six inches in diameter or less, which, depending on the species, indicates a young canopy with possibly limited support for older growth ecological benefits, such as nesting cavities for native birds

- *Soil Testing Using i-Tree Eco Plot Locations*

  To complement the i-Tree Eco survey conducted in 2017, a pilot study was funded by Stormwater Planning to evaluate sampling methods to describe the microbiome (bacteria and fungi composition) of soils in Fairfax County. Results from the pilot study indicated that soil

[22] https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/ffcounty_ecoreport_1.pdf

[23] http://www.bringingnaturehome.net/what-to-plant.html

bacteria differ between newly restored streams and sites where restoration had occurred many years prior. This data has the potential to be extremely useful for analyzing ecosystem and forest health as well as a metric to gauge restoration success.

In 2018, the Forest Pest Management Branch requested and received Board of Supervisors approval to fund a graduate student from the University of Maryland to conduct a large-scale soil microorganism study using i-Tree Eco plot locations. These data will be collected in the Summer of 2019 and 2020 by Ms. Wood with logistical assistance by UFMD, Forest Pest Management Branch. Urban foresters, ecologists, and soil scientists from Fairfax County hope to utilize this information to assess soil health as it relates to other biological indicators of ecosystem health.

- *Urban Tree Canopy Analysis (UTC); comparing 2011 and 2015*
  In May 2017, the county received a new Urban Tree Canopy Analysis (UTC)[24] from the University of Vermont Spatial Analysis Laboratory. This land use analysis was based on high resolution satellite imagery, including Light Detection and Ranging (LIDAR) imagery, taken in 2015. A similar study was conducted in 2011. The analysis compared the two data sets and found that the amount of tree canopy in the county increased to 57 percent from 2011 to 2015, an increase of less than one percent. The amount of impervious surfaces also increased by one percent during the five-year period. It is anticipated that Fairfax County will acquire a new imagery and land cover dataset in 2020 with a tree canopy change analysis to be conducted in a subsequent year, likely 2021 or 2022.

  Although tree canopy change in Fairfax County has remained relatively stable, it is important to note that significant changes in tree canopy are occurring. The low amount of net change in tree canopy masks the dynamics that have occurred during the 2011 to 2015 time period. Over 8,000 acres of tree canopy were lost. Fortunately, this loss has been largely offset by new growth of existing trees and tree plantings.

  The UTC is a land use analysis and data layer, not merely a tree canopy study. These data are used not only by the Urban Forest Management Division, but also by the Stormwater Planning Division in calculating water quality and water quantity impacts of land use patterns, including impervious surfaces and tree canopy.

  UFMD recommends a shift from solely quantitative canopy goals toward development and implementation of qualitative forest management goals and metrics, including watershed management goals and green infrastructure planning. These efforts will be critical to ensuring the long-term health and sustainability of our urban forest.

  See the Data Appendix for additional details.

Forest Conservation Branch Activities

The Forest Conservation Branch (FCB) currently consists of nine full-time and four part-time urban foresters who work with a wide range of partners on a variety of urban forest management

[24] http://gis.w3.uvm.edu/utc/

issues. Two Urban Forester IIs were added in Fall 2016 to provide increased staff capacity to address the rapid growth of Infill Lot Development (ILD) plan submissions throughout the county, particularly in the Dranesville District, where a significant number of ILD plans were received for review. In FY 2019, a total of 2,757 requests for assistance by customers and partners were fulfilled by the Forest Conservation Branch, an increase of over 42 percent (823) over FY 2018. This increase in requests was more than double the increase from FY 2017 when a nearly 19 percent increase (307) occurred. This number is expected to continue to increase, as, in the Spring of 2019 at the request of LDS, the FCB expanded its review of infill plans to the entirety of the county (where it previously only reviewed plans within the Dranesville, Mount Vernon, and Providence districts). In addition, review of infill plans is more time intensive due to smaller builders often requiring more guidance through the development process. This increase in work has resulted in the need to sufficiently balance the quality of these reviews with staff and time constraints (i.e. 3 weeks to review plans).

Fairfax County Tree Commission (FCTC) Activities

The Tree Commission continues to be an active advisor to the Fairfax County Board of Supervisors, providing recommendations for improving the health and sustainability of Fairfax County's trees and urban forest. A public comment period was added as a regular meeting agenda item.

Beginning in 2017, the FCTC began drafting of a new Tree Action Plan (TAP) to replace the original, which is over a decade old. Much has changed since the original TAP was developed in our understanding of the benefits provided by trees and the stresses impacting them in our urban forest, including human and natural elements of the environment. The draft TAP was completed in 2018 and presented to the Board's Environmental Committee in October. The Tree Commission and UFMD Staff will be responding to Supervisor questions on the draft TAP in the Fall of 2019.

The Tree Commission issued two policy recommendations to the Board of Supervisors: 1) continued support of the County's strong environmental protections for trees in Resource Protection Areas and Environment Quality Corridors, and 2) the inclusion of native trees as a priority in the County-wide urban design guidelines.

A February 2019 Board Matter directed the Tree Commission to recommend to the Board low-cost and no-cost options along with public-private partnerships that can assist residents in planting additional trees that will increase the county's existing tree canopy. The Commission should report annually to the Board on progress and accomplishments[25].

Updates to Tree Conservation Ordinance and Guidance Documents

In 2018, Chapter 12 of the Public Facilities Manual was updated as part of Phase 1 of the PFM Flexibility Project. The updates included introduced soil volume guidelines, updated guidance on tree condition, and clarification on calculating tree canopy. Other administrative updates where made to remove outdated text, update figures, and fix acronyms. Phase 1 also re-established the PFM as guidelines and changed the syntax of text to replace "shall" to either "must" or "should."

[25] https://www.fairfaxcounty.gov/mountvernon/sites/mountvernon/files/assets/documents/boardmatters/02-05-2019final.pdf

Forest Pests

UFMD's Forest Pest Management Branch currently has five full-time and two part-time urban foresters. The core work of the branch addresses invasive forest pests that pose a threat to the county's urban forest. The staff not only works on forest pest management projects but also provides support for the wide range of UFMD projects and partnerships, notably outreach and education. As forest insects and diseases have emerged, they have been added to the program's mission.

- *Gypsy moth*[26]
  Gypsy moth (*Lymantria dispar*) caterpillar populations remained very low. There was no measurable defoliation reported in Fairfax County. Forest Pest Management staff continues to monitor the gypsy moth, but no control treatments were applied in 2019. However, gypsy moth populations are cyclical and it is not uncommon for outbreaks to occur following dormant phases.

- *Fall Cankerworm (native insect)*[27]
  The fall cankerworm (*Alsophila pometaria*) is an insect native to the eastern United States that feeds on a broader variety of hardwood trees than the gypsy moth. Periodic outbreaks of this pest are common, especially in older declining forest stands. The Mount Vernon, Mason, and Lee magisterial districts were the most recent areas to experience the most severe infestations and associated defoliation – population outbreak levels in the Winters of 2012 and 2013 were observed, but since 2014, the population has been declining. As a result of monitoring efforts in the Winter of 2018, staff determined that no insect populations warranted control measures in the Spring of 2019.

  Since 2014, staff has received input from civic groups regarding the strategies used to implement this control program. Staff has worked diligently to explore ways to refine and improve this program so that these concerns can be addressed.

- *Emerald Ash Borer*[28]
  The emerald ash borer (EAB), *Agrilus planipennis*, is an exotic beetle introduced from Asia which attacks ash trees (*Fraxinus sp.*) and can cause mortality in native ash species in as little as two years. First discovered in Michigan in the early 2000s, two infestations were discovered in Fairfax County in the town of Herndon and the Newington area in July 2008. In 2014, researchers in Ohio also observed EAB attacking white fringetree (*Chionanthus virginicus*), a close relative of ash.

  Trapping efforts revealed that beetle populations extend to all areas of Fairfax County. Staff is responsible for educating the public on how to manage the impending mortality and replacement of many thousands of ash trees. Education efforts emphasize hiring a private contractor to remove dead and dying trees and options for effective pesticides that may conserve ash trees in the landscape.

[26] Gypsy moth information: https://www.fairfaxcounty.gov/publicworks/caterpillar-look-alikes
[27] Fall Cankerworm information: https://www.fairfaxcounty.gov/publicworks/fall-cankerworm
[28] Emerald Ash Borer information: https://www.fairfaxcounty.gov/publicworks/emerald-ash-borer-fairfax-county

Current county control for EAB is provided through the following:

- *Tree injections*
  Insecticide is injected directly to the tree's vascular system and may provide control for up to three years. Since 2015, staff has treated 180 ash trees for EAB. Annual assessments are made on treated trees to evaluate their health and crown conditions based on parameters set in the EAB Management Plan.
- *Release of non-native EAB parasitic wasps*[29]
  2017 marked the first-year staff released just over 5,000 wasps (comprised of three different species) with permission from the U.S. Department of Agriculture in an attempt to control EAB numbers. In 2018, staff released 4,000 more wasps (again of the same three species). Staff have found new areas in the County that qualify for parasitoid release in 2019.

As mentioned in the FCPA Invasive Insects section above, the county has authorized the use of funds to remediate damage to trees caused by forest pests, including EAB.[30]

- *Hemlock Woolly Adelgid*
  Hemlock woolly adelgid (HWA) (*Adelges tsugae*) is a sap-feeding insect that infests and eventually kills hemlock trees. Native eastern hemlock is relatively rare in Fairfax County – the rarity of this species and the natural beauty that it imparts make it worthy of protection. Staff continues to inventory the county to identify the natural stands of eastern hemlock. Staff monitored the condition of treated hemlocks in 2019. Staff is continuing to research management options for hemlocks and HWA.

- *Thousand Cankers Disease*
  This relatively new disease was detected in black walnut trees (*Juglans nigra*) in Tennessee in August 2010, and observed in Spring 2011 near Richmond, Virginia. The disease is the result of an association of a fungus and the walnut twig beetle (*Pityophthorus juglandis*), native to the southwestern United States. The disease causes only minor damage to western walnut species. However, eastern walnut trees are very susceptible and infested trees usually die within a few years. Urban foresters established monitoring sites for the walnut twig beetle during summer 2012 and disease symptoms were found within the county.

  In 2017, Forest Pest staff learned that statewide and regional efforts yielded no walnut twig beetles (WTB) in traps deployed in 2016. To more closely monitor the insect's presence in Fairfax County, urban foresters deployed WTB traps in confirmed locations for 2018. WTB was positively identified from the traps that were deployed. Monitoring efforts will continue in 2019.

[29] The parasitoids were produced and supplied by the United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), EAB Parasitoids Rearing Facility, Brighton, MI. For parasitoids information call 866-322-4512.
[30] Page 6:
https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2019/board/may07-board-summary.pdf

- *Spotted Lanternfly*
  This insect, native to Asia, was found in suburban Philadelphia, PA in 2014. In January 2018, this insect was found in Frederick County, VA. It feeds on a broad range of host trees, including many that can be found in Fairfax County. This insect is not known to be in Fairfax County but has the potential to cause an impact if it were to become established here. Monitoring began in 2018 and continued the in Summer of 2019.

- *Other Pests*
  The Forest Pest Management Branch, in cooperation with VDACS, is monitoring for pests that are not yet known to exist in Virginia but would be problematic should they become established. Current trapping efforts include a variety of exotic wood-boring beetles, including oak ambrosia beetle (*Platypus quercivorus*) and sudden oak death disease (*Phytophthora ramorum*). Past efforts for trapping Asian longhorned beetle (*Anoplophora glabripennis*) ceased in 2016 on the basis that the current chemical attractant is not as effective as once thought.

Environmental Education

As a primary steward of trees and forests in Fairfax County, UFMD is involved with a myriad of educational programs.[31] UFMD leads school programs (e.g. Alien Invaders), hosts or participates in public meetings and community events (e.g. speaking to homeowner associations and participating in Fairfax SpringFest), and leads trainings (e.g. for Master Gardeners and Northern Virginia Urban Forestry Roundtables).

Partnerships

UFMD partners with an extensive list of agencies and organizations (many, but not all of them already listed in this report) in order to continue collaborating on tree preservation and planting and to effectively administer the Tree Conservation Ordinance. Recently, UFMD staff met with the Health Department's Health in all Policies Manager and FCPS Student Safety and Wellness Office to discuss further promotion of tree planting at the schools for the urban forest's contributions to health and wellness. UFMD will expand its awareness and act on additional opportunities to collaborate with partners in fields related to forest resources. These relationships help bring a more clear and comprehensive understanding of forest conservation and the effect of our management choices on the citizens, businesses, and government of Fairfax County.

Ecological Resources on Non-Park Land

The majority of land in Fairfax County is classified as "non-park" land (e.g. residential, government-owned, and commercial). While parts of this chapter touch on how various organizations are helping encourage ecological improvements on this type of property through outreach and education, this section seeks to highlight the linkage between regulations, land use decisions, and the county's broader ecological resources.

Doug Tallamy, professor of Entomology and Wildlife Ecology at the University of Delaware and author of Bringing Nature Home, addresses the potential of private land to be an ecological resource: *"Lawn should not be our default landscaping practice. If we cut the area of lawn [in*

[31] UFMD's Educations Programming site is: https://www.fairfaxcounty.gov/publicworks/education-programs

the U.S.] in half and [sic] we could create the equivalent of a new national park that is 20 million acres in size. That alone would create the biggest natural area in the nation, bigger than most of our national parks combined."[32]

Various Fairfax County ordinances and policies[33] provide guidance for private property owners on topics including, but not limited to:

- Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) located within the unincorporated areas of Fairfax County (Chapter 118, Chesapeake Bay Preservation)
- The conservation (i.e. preservation and planting) of trees during the land development process (Chapter 122, Tree Conservation Ordinance)
  - While this ordinance sets standards such as ten-year tree canopy requirements, it should be noted that, by law, LDS can allow development plans to take precedence over the requirements. Deviations, in whole or part, from the tree preservation target may be requested under conditions such as: (1) meeting the tree preservation target would prevent the development of uses or densities otherwise allowed by the Zoning Ordinance; or (2) construction activities could impact trees such that they would not likely survive for a minimum of ten (10) years[34]. Similarly, where strict application of the requirements would result in unnecessary or unreasonable hardship to the developer[35], exceptions to the tree canopy requirements can also be granted. In practice, it should be noted that the Urban Forest Management Division has been given the responsibility for the review and approval of any deviations to the tree preservation target and any modifications to the 10-year tree canopy requirement.
  - The Tree Conservation section of the Public Facilities Manual[36] provides support for the ordinance mentioned above. It provides incentives for planting native tree species and disincentives for planting non-native or invasive tree species, to meet tree and landscaping requirements in all development projects.
- Mitigating the harmful effects of erosion and sediment during land-disturbing activities (Chapter 104, Erosion and Sediment Control)
- Floodplains and Environmental Quality Corridors (EQCs) for the conservation of stream valleys as well as the broader health of our contiguous natural properties (the Floodplain Ordinance is codified as part of the zoning ordinance[37]; EQC Policy[38])
- Grass or lawn area areas located within Fairfax County for property other than those zoned for or active in farming operation (Chapter 119, Grass or Lawn Area)

[32] https://www.highcountrygardens.com/gardening/bringing-nature-home-interview-with-doug-tallamy/
[33] https://www.fairfaxcounty.gov/landdevelopment/codes-and-standards
[34] Chapter 122, Section 122-2-3. - Tree Preservation Requirements https://www.fairfaxcounty.gov/landdevelopment/codes-and-standards
[35] Chapter 122, Section 122-2-6. - Exemptions and Modifications https://www.fairfaxcounty.gov/landdevelopment/codes-and-standards
[36] Chapter 12; https://www.fairfaxcounty.gov/landdevelopment/public-facilities-manual
[37] https://www.fairfaxcounty.gov/planning-development/zoning-ordinance
[38] Objective 9 on p. 14: https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/documents/comprehensiveplan/planhistoricpolicy/2013/environment/3-14-2017.pdf

It is also worth noting that the fourth unstaffed program area of FCPA's Natural Resource Management Plan[39] would further contribute in this area through their goal to *"Work with adjacent landowners to expand natural areas beyond park boundaries through education, easements and cooperative agreements"* and to *"Encourage habitat expansion through native landscaping practices."*

Other Governmental Agencies and Programs

Local

- *Fairfax Chapter of the Virginia Master Naturalist Program*[40]
  The Fairfax Master Naturalists (FMN) is a chapter of the Virginia Master Naturalist Program. The FMN program consistently supports the mission of the Fairfax County Park Authority through its many contributions in the areas of stewardship, citizen science, and education and outreach.

  In order to stay certified, each year FMN volunteers must provide at least 40 hours of volunteer service and receive eight hours of advanced training. In 2018, 147 active FMN volunteers provided a total of 12,569 hours of service, including:

  - 4,222 hours of Education/Outreach
  - 2,800 hours of Stewardship
  - 3,584 hours of Citizen Science

  In addition to countywide contributions, the FMN program works with many partners to improve the environment, including the Virginia Department of Forestry, the Virginia Department of Conservation and Recreation, and the Virginia Department of Game and Inland Fisheries.

- *Fairfax County Public Schools (FCPS)*
  FCPS's policy for Environmental Stewardship (Policy #8542[41]) helps guide the schools in educating students and staff members on environmental stewardship responsibilities. Developing outdoor classrooms via wildlife habitats and gardens is a key outcome of the Get2Green[42] program. FCPS also partners with federal, state, and local organizations for the Urban Wildlife Habitat Program, which educates students, faculty, staff, and the general public about the importance of protecting and maintaining local wildlife habitats and gardens on campus.

[39] Page 10: https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/nrmp012914.pdf
[40] http://www.vmnfairfax.org/
[41] https://www.boarddocs.com/vsba/fairfax/Board.nsf/goto?open&id=867SG92A805A
[42] http://get2green.fcps.edu/

- *Fairfax County Restoration Project (FCRP)*[43]
  Originally formed in 2008, FCRP strengthens the relationship between people and nature through community action. FCRP connects, creates, and promotes efforts to restore ecosystem functions in Fairfax County through collaboration with public, private, and volunteer organizations.

  FCRP continues to be involved with the 495 Express Lanes project. The project corridor has suffered from unauthorized mowing, a high number of dead trees, and erosion problems. In early 2017, FCRP partners, several members of VDOT, representatives from the Virginia Secretary of Transportation's office, and Friends of Accotink Creek toured the planting areas of the Express Lanes from the Braddock Road to the Route 236 interchanges. Many deficient areas were documented and scheduled for repair and maintenance. Since that time, progress has been made, in terms of both construction and reforestation efforts. Plantings that were scheduled for the Spring of 2017 have taken place and many new, larger trees have been planted with good outcomes thus far.

  Additionally, FCRP continues to run the Reforest Fairfax[44] program, through which each $35 gift allows for the purchase of five seedlings to be planted during a Spring or Fall planting season, with all proceeds going directly to Fairfax ReLeaf. In 2017, two additional gifts were received, and 10 additional trees were planted (for program totals of 104 gifts purchased and 520 trees planted).

- *Fairfax County Wetlands Board*[45]
  The Fairfax County Wetlands Board provides resources for private citizens regarding tidal wetlands. Owners of property on waterfronts in Fairfax County may need a permit from the Wetlands Board before building or making changes on or near the shoreline of their property. These activities, known as land-disturbing activities, often require a permit if done in an area that by state law and local ordinance has been identified as a tidal wetland. An informational brochure, titled *"Important Information for Owners of Tidal Shoreline Property,"* helps to inform tidal shoreline property owners about laws and regulations that address land-disturbing activities on tidal shorelines and is available on the county's website.[46]

- *Land Development Services (LDS)*
  LDS administers the Public Facilities Manual,[47] which sets forth the guidelines which govern the design of all public facilities, which must be constructed to serve new development. This manual covers several important environmental topics, including a section for Tree Conservation.

[43] https://www.fcrpp3.org/; EQAC did not receive updated information this year; this section remains the same.
[44] http://reforestfairfax.org/
[45] https://www.fairfaxcounty.gov/bacs/BoardDetails.aspx?BoardID=23219
[46] https://www.fairfaxcounty.gov/landdevelopment/tidal-shoreline
[47] https://www.fairfaxcounty.gov/landdevelopment/public-facilities-manual

- *Northern Virginia Soil & Water Conservation District (NVSWCD)*[48]
  NVSWCD, a non-regulatory and advisory agency, engages and partners with the Fairfax County community so that members of the community may recognize their stewardship potential. NVSWCD plans and implements services and resources our community needs to be able to make informed decisions that will conserve natural resources. It also assists Fairfax County in complying with multiple regulations, such as the Municipal Separate Storm Sewer System Program and Chesapeake Bay Preservation Ordinance.

  In 2018, NVSWCD's website received 113,104 unique visitors, with: 94,465 viewing NVSWCD's *"Solving Drainage and Erosion Problems Online Guide for Homeowners;"* 5,354 downloading the *"Rain Garden Design and Construction Guide for Homeowners;"* 577 downloading the *"Residential Low Impact Landscaping Guide;"* and another 543 visiting NVSWCD's *"Earth Friendly Suburban Horse Keeping"* publication. 2,850 copies of the semi-annual *"Conservation Currents"* newsletter were also distributed. 1,931 individuals receive NVSWCD monthly email *"Watershed Calendar."*

  Since 2015, NVSWCD has promoted the county-funded Conservation Assistance Program to homeowner associations, civic associations, and places of worship. Additionally, the Virginia Conservation Assistance Program (VCAP)[49] afforded NVSWCD the opportunity to provide funding as a complement to the ongoing technical assistance provided to private properties. Both programs support the resolution of drainage and erosion concerns as well as the promotion of energy efficiency practices. To ensure that NVSWCD continues to provide high quality technical assistance to property owners and accommodate the high demand and interest from the public for VCAP, NVSWCD established a new and competitive process for applying for VCAP site visit requests that was initiated in FY 2019. Requests from homeowner associations and places of worship continue to be accepted on a rolling basis. Over the past year, NVSWCD supported eight CAP projects and 26 VCAP projects. See the Water section of the Data Appendix for a list of projects.

  In FY 2019, NVSWCD also participated in and supported numerous additional events and programs, including, but not limited to:

  - Responding to nearly 2,000 unique requests for assistance (phone, email, in-person)
  - Holding an annual native tree and shrub seedling sale. The theme this year was "Incredible Edibles." Over 550 customers purchased a total of 8,350 seedlings.
  - Hosting six "Green Breakfasts" each year focusing on a variety of environmental topics with an average attendance of 50 people
  - Organizing and leading the annual Sustainable Garden Tour (182 attendees)
  - Ongoing outreach including presentations (103 in 2018 on a wide variety of natural resource topics), participation in the annual Alice Ferguson Foundation Potomac Watershed Cleanup (1,343 volunteers collected 24 tons of trash at 57 sites), seminars to

[48] https://www.fairfaxcounty.gov/soil-water-conservation/
[49] VCAP is funded by an EPA Chesapeake Bay Implementation Grant through the Virginia Department of Environmental Quality.

build composters and rain barrels, and direct requests for assistance via phone, email or in-person
- Supporting the joint-venture storm drain marking program (1,328 storm drains marked)
- Judging for the county's Land Conservation Awards program
- Supporting certified site leaders monitoring 23 sites (down 5 from FY 2018) through its Volunteer Water Quality Monitoring Program; outreach through this program as well
- Preparation of Soil and Water Quality Conservation Plans (SWQCPs) as part of the establishment or renewal processes of Agricultural and Forestal Districts (A&F Districts)
- Attending quarterly, regional government-citizen forum - Potomac Watershed Roundtable

State and Federal

- *Agricultural and Forestal Districts*
  Landowners may apply to place their land in special Agricultural and Forestal (A&F) 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.

  In CY 2018, five districts were renewed for eight-year terms. In total, Fairfax County has 1,693.04 acres of local A&F Districts and 1,337.06 acres of state A&F Districts, for a total of 3,032.19 acres. More information can be found in the Data Appendix.

- *National Park Service*
  As of June 2015, the National Park Service held 38 conservation easements covering 326.67 acres in Fairfax County.

- *Virginia Department of Forestry (VDOF)*[50]
  VDOF continues to work with local government and non-governmental agencies on protecting, improving, and expanding tree cover in Fairfax County. These efforts include: providing technical assistance for community tree planting; public outreach and education on the care and benefits of trees; providing written and verbal assistance and plans to landowners; regulating timber harvests to protect water quality; and assisting landowners in reforestation of large areas.

  From October 1, 2016 through September 30, 2017, in Fairfax County, VDOF:

  - Wrote 13 forest management plans encompassing 503 acres
  - Held 46 education and outreach programs
  - Provided 55 technical assists to citizens on tree related matters, including tree care, selection, and values
  - Issued two Virginia Trees for Clean Water Grants to assist with community tree plantings
  - Had one timber harvest of 48 acres

[50] EQAC did not receive updated information this year; this section remains the same as last year's report.

- *Virginia Department of Environmental Quality*
  The Virginia Department of Environmental Quality (VDEQ) aims to protect and enhance Virginia's environment and to promote the health and well-being of the residents of the commonwealth. Its vision is to, by the end of the decade, is to have Virginians enjoy: cleaner water available for all uses; improved air quality that supports communities and ecosystems; and the productive re-use of contaminated land. A significant portion of its contributions are watershed related and are therefore discussed in greater detail in the Water Resources chapter.

- *Virginia Department of Transportation (VDOT)*
  Unused or otherwise grassy areas along roads can be, if managed properly, converted into productive ecological assets and/or habitat. VDOT includes landscaping on several road construction projects to enhance context-sensitive road design aesthetics. Recent and current projects in Fairfax County approved with landscaping and/or architectural treatments include:

  - I-66 Westbound, Spot 2 Improvements (Phase 2) – reforestation and landscaping between Westmoreland Street and Haycock Road was completed at the end of 2017.
  - I-495 Landscape Replanting - replanting work and maintenance of landscaping along the I-495 Inner Loop from the Springfield interchange to Old Dominion Drive continues this year into Spring 2019.
  - Jones Branch Connector – anticipated for completion in late 2019, this project will feature landscaping and other streetscape amenities.

  VDOT has the opportunity to choose native trees and plants to be integrated into any major projects, such as the Embark Richmond Highway Initiative and Transform 66.

  In addition, approximately 3.5 acres of right-of-way at four locations in Fairfax County continue to be managed as wildflower meadows under the Virginia Wildflower Program. VDOT initiated a Pollinator Habitat Program in 2014 to create naturalized areas planted with native nectar and pollinator plant species along state maintained roadways, within rest areas, and within park and ride lots. Revenue to support these programs comes from the purchase of "Wildflowers" or "Protect Pollinator" license plates from the Virginia Department of Motor Vehicles (VDMV). Maintaining current and planting new locations for either program are dependent the on available funding each fiscal year.

  For the second year in a row, in FY 2019, VDOT's Environmental Performance Program was used to assess VDOT's environmental performance on its construction projects. The program established a color rating (green, yellow, orange, and red) for a project's compliance with environmental commitments. A project's rating drives a communications protocol, with each successive color rating elevating the project within VDOT's organizational hierarchy for action. The program remains under development as VDOT's Construction, Environmental, and Location & Design Divisions are collaborating to establish an overall environmental performance metric for VDOT.

Overall, VDOT should also consider the long-term success metrics of the native-planted areas. Establishing monitoring criteria will ensure that these areas stay healthy and do not become an ecological drawback in an area, particularly due to invasive plants.

- *Virginia Outdoors Foundation*
  The Virginia Outdoors Foundation (VOF), created by an Act of the Virginia General Assembly (Chapter 18 of Title 10.1) in 1966, 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 2019, VOF held easements on more than 850,000 acres in 109 local jurisdictions across the commonwealth, with seven of those in Fairfax County, as shown in the Data Appendix.

Non-Profits and Homeowner Associations (HOAs)

Earth Sangha[51]
Founded in 1997, Earth Sangha is an independent, non-profit organization of volunteers who propagate local native plants, restore native plant communities, and control invasive alien plants. Earth Sangha's Wild Plant Nursery is the region's most comprehensive effort to propagate native plants directly from local forests and meadows, providing an ecological resource found nowhere else in the county (all and only local ecotype native plants). Earth Sangha works closely with DPWES, FCPA, FCPS, Master Naturalists, and several other organizations to supply plants to the public for ecological restoration.

Earth Sangha is also helping to restore a native arboretum located at the 20 acre Marie Butler Leven Preserve (McLean). The project began in 2004 with an agreement between the FCPA (which owns the Preserve) and Earth Sangha with the objective of creating a living botanical library. In 2016, Earth Sangha signed a 10-year lease to use the then-vacant Leven House in order to better assist with the management of the grounds. The preservation and rehabilitation of the house concluded in June 2017. Earth Sangha staff are now living on the premises as caretakers, which has allowed for rapid progress on the rehabilitation and enhancement of the grounds (e.g. invasive removal and native plantings).

Fairfax ReLeaf [52]
Fairfax ReLeaf is a private, non-profit 501(c)(3) organization dedicated to planting and preserving trees in Northern Virginia, preserving native habitat, and educating the public about the benefits of trees, in support of the county's efforts to increase tree canopy. Fairfax ReLeaf planted and distributed 5,481 trees and shrubs in CY 2018. Highlights of its 2018 plantings include:

- Planting/distribution of 3,714 trees and shrubs for HOAs and private property
- Support for plantings of nearly 800 seedlings at schools
- Planting of 255 trees and shrubs in riparian areas
- Planting of 984 trees and shrubs on park land

[51] http://www.earthsangha.org/
[52] http://www.fairfaxreleaf.org

- Financed the removal of more than a quarter-acre of 1 to 3-inch diameter bamboo on park & HOA land

Each year, Fairfax ReLeaf: continues to provide many opportunities for community groups to serve Fairfax County; seeks to partner with key county agencies; and increases its focus on the removal of invasive species.

Metropolitan Washington Council of Governments (MWCOG)
In 2018, MWCOG's Regional Tree Canopy Workgroup published a Regional Tree Canopy Management Strategy document[53] in cooperation with local forestry staff. This document is a guideline for local government staff to assist in the management and enhancement of forest cover at the community level. Furthermore, recommendations in the report are designed to support Region Forward[54] (MWCOG's Vision and Mission) Sustainability Goals for regional forest cover management, state and local initiatives to continue to improve air quality, and the Chesapeake Bay Program's targets and indicators to protect water quality and support a healthy regional green infrastructure.

A Regional Tree Canopy Subcommittee under the Climate, Energy & Environment Policy Committee has been tasked to implement strategy recommendations from the Regional Tree Canopy Management Strategy. Several important deliverables have been tasked for the subcommittee to complete within a two-year timeframe. Key documents prepared by the workgroup in advance of the kickoff meeting on June 14, 2019 can be found online.[55]

Nature Conservancy, The
The Nature Conservancy, a national nonprofit 501(c)(3), 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 ecologically valuable property. (This recommendation led to the public/private partnership with the Northern Virginia Conservation Trust). 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.

Northern Virginia Conservation Trust (NVCT)
NVCT has preserved over 670 acres [56]throughout Fairfax County through conservation easements, fee ownership, and partnerships. NVCT holds 57 conservation easements and owns three parcels in Fairfax County. In 2018, NVCT completed two new donated easements in the county. The first is a 3-acre waterfront tract within Pohick Bay Regional Park, which NVCT helped NOVA Parks secure in public ownership, increasing conservation management of the shoreline. The second is a 25-acre tract near Elklick Woodlands Natural Area Preserve, which

[53] https://www.mwcog.org/documents/tree-canopy-management-strategy/
[54] https://www.mwcog.org/committees/region-forward-coalition/
[55] https://www.mwcog.org/committees/regional-tree-canopy-workgroup/
[56] The decrease in acreage (this year when compared to last year) is due to an earlier reporting error which is now fixed. It is not due to a loss in land preserved.

hosts a globally rare plant community[57]. As one of the last large tracts in the area, it helps preserve scenic views along Pleasant Valley Road and protect water quality. NVCT is currently pursuing over a dozen prospects for protecting land, from stream valleys and wetlands to historic properties and forested tracts in residential areas, in partnership with interested landowners in Fairfax County. See the Data Appendix for a list and map of current properties.

NVCT continues to engage in outreach initiatives in Fairfax County to emphasize the importance of land conservation and the benefits of natural green space. In 2018, NVCT participated in several county events and continued to host volunteer cleanup and restoration workdays focused on removal of non-native invasive plants at NVCT and partner properties throughout the county.

Plant NOVA Natives (PNN)[58]

Plant NOVA Natives is the joint marketing campaign of a coalition of non-profit, governmental and private groups, all working to reverse the decline of native plants and wildlife in Northern Virginia. PNN encourages residents as well as public and commercial entities to install native plants as the first step toward creating wildlife habitat and functioning ecosystems on their own properties. PNN's full color booklet showcasing easily purchased local natives provides an approachable guide to get started with native plants. Building on this guide, PNN works across the spectrum to educate others on the ecological benefits of natives. Examples of its many outreach strategies are their work with nurseries to better label native plants and the provision of speakers for organizations wanting to learn more about native plants.

Potomac Conservancy[59]

Potomac Conservancy, a 501(c)(3) nonprofit land trust incorporated in 1993 which currently holds easements of four properties in the county, totaling 13.46 acres, with 0.14 of that being river frontage. The organization's efforts are focused on preserving quality lands and waters in the headwaters regions west of Fairfax County; as such, it no longer pursues conservation easements in Fairfax County.

In 2017, as part of its volunteer program, 77 volunteers, spending 154 hours, collected 500 pounds of native tree seeds (e.g. black walnut, shagbark hickory, chestnut oak and black oak) to help supply local nurseries. An additional 59 volunteers, spending 118 hours, planted 1,200 native grass plugs and 200 tree saplings near local waterways.

Reston Association

The Reston Association (RA) is the community association for the large, planned community of Reston (population >60,000), which was founded on the preservation and appreciation of natural areas and the connection of people to those areas. Over 1,300 acres of open space are maintained by Reston Association, including 800 acres of woodlands, four lakes, four wetlands, three ponds, and 50 meadows. The association continues to be an environmental innovator among community associations.

[57] https://www.fairfaxcounty.gov/parks/elklick
[58] https://www.plantnovanatives.org/
[59] https://potomac.org/

In 2017, for the first time, RA published the Reston Annual State of the Environment Report (RASER).[60] This document presents a comprehensive evaluation of the state and management of the environment in Reston with actionable steps to continue to improve its ecological quality. The 2018 RASER has recently been completed.

A locally related issue is that of the Hidden Creek Country Club's sale to the developer Wheelock Communities in 2017,[61] which raised the possibility that the course could be redeveloped into a housing community in the future. In addition to the possible loss of open space, development on this property could also negatively affect a cattail marsh located near holes four and five.

COMMENTS

1. **Fairfax County Park Authority (FCPA) Performance Goals**
   EQAC commends the FCPA for pursuing measurable performance goals in its new Strategic Plan FY 2019-2023. While some of these performance measures will require time to gather information, with the goal of setting baselines, this effort is worth the investment to ultimately be able to report on how well FCPA is achieving its mid and long-term targets.

2. **Ecological Resource Inventories**
   To best protect and preserve the county's ecological resources, it is important to know the details of the existing county inventory of resources so that plans can be crafted for the most efficient way to protect these resources. EQAC commends FCPA's continued work on inventorying its resources and the Urban Forest Management Division's work in identifying and quantifying resources, as mentioned in this chapter.

3. **Environmentally-Focused Program Support**
   EQAC commends the Board of Supervisors for crafting a solid Environmental Vision, which supports and endorses policies and programs such as the Tree Action Plan and the Environmental Improvement Program (EIP). These programs help support important efforts by the agencies mentioned. EQAC also commends FCPA for efforts to begin to implement the Natural Resource Management Plan without recurring funding. Going forward, it will be important to emphasize and measure the *quality* of the county's resources in addition to the *quantity*.

4. **Natural Landscaping Implementation Plan**
   EQAC commends the Board of Supervisors for directing staff to revisit the county's Natural Landscaping Implementation Plan, which was endorsed in 2007. EQAC commends county staff for encouraging engagement with range of community and staff stakeholders as it has evolved potential policy plan amendment language. This amendment has potential to influence actions both county and non-county properties, as it could, for example, ultimately

[60] http://www.reston.org/Parks,RecreationEvents/NatureEnvironmentalResources/NatureOverview/tabid/959/Default.aspx

[61] https://patch.com/virginia/reston/reston-golf-club-sold-could-be-turned-housing-complex

serve as a model for community associations or be expanded to private properties seeking rezoning. We look forward to the outcome of this initiative.

5. **Environmental Improvement Program (EIP) Funding**
EQAC commends the Board of Supervisors for their significant funding support of the EIP[62] with the FY 2019 Adopted Budget, including $535,000 towards ecologically important programs such as the Invasive Management Area program, Watershed Protection and Energy Conservation Matching Grant Program, and stream bank and meadow restorations.

RECOMMENDATIONS

1. **Increase Capacity for Environmental Review of Development Plans**
EQAC recommends that the Board of Supervisors direct the County Executive to increase the capability of Land Development Services (LDS) to adequately evaluate environmental impacts during the review of development plans by hiring additional staff or contracting to fill this need.

   Requests for assistance from the Forest Conservation Branch (FCB) of Urban Forestry, via LDS, increased more than 42 percent in FY 2018 following a nearly 19 percent increase in FY 2017, with that number expected to increase now that the FCB, at the request of LDS, has expanded its review of all infill plans in the County (where it previously only reviewed Dranesville, Mount Vernon, and Providence Districts). With staff and time constraints (i.e. three weeks to review plans) being static, quality is unfortunately at risk of being negatively impacted. Additional capacity is required to ensure that environmental protections of the county's ecological resources are sufficiently applied.

2. **Develop a Countywide Natural Resources Map and Plan**
EQAC recommends that the Board of Supervisors direct the County Executive to develop a comprehensive natural resources digital map and plan for the county. As the county continues to grow at a rapid pace, the combination of this map and plan would be an instrumental resource to inform decision making about our ecological resources. The Comprehensive Plan, for example, prioritizes the identification and protection of EQCs. This natural resources map and plan would complement the details of the county's Comprehensive Plan and help the board to more effectively achieve its Environmental Vision. With private land accounting for over 80% of the county, it is important that this map and plan include the ecological resources on all of the land within the county, including both park and non-park land.

3. **Support the Park Bond**
EQAC recommends that the Board of Supervisors support the $100M park bond during their Spring 2021 budget review. This bond would fund projects for natural resource stewardship, such as ecological restoration (Helping Our Land Heal projects), bamboo removal, funding

[62] Page 109, 5.3.2 FY 2019 Funding and Projects
https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/sustainability-initiatives-report-fy2019.pdf

for natural resource inventory and management planning, and funding for the establishment of additional state nature preserves, if eligible. This bond would continue to support the Board's Environmental Vision on points such as aiming to *"Create more community parks for active and passive recreation"* and providing opportunities for environmental stewardship.

4. <u>Staff FCPA's Final Natural Resource Management Plan Program Area</u>

EQAC recommends that the Board of Supervisors increase the full-time staff capacity (e.g. one merit Ecologist III) for the Fairfax County Park Authority in direct support of its Citizen Science Program (to staff the fourth and final program area of the Natural Resource Management Plan, Fostering Stewardship and Expanding Natural Capital). Doing so would also support the Board's Environmental Vision to *"Provide adequate resources to maintain and manage healthy native forests and ecosystems"* and *"provide opportunities for citizen science."*

FCPA can use bonds to fund initial ecological restorations. However, ongoing *maintenance* of the restorations is not permitted using bond dollars. FCPA would potentially develop the capacity for volunteers to do this and the role of this additional staff member is critical to doing so, helping to save money and preserving the county's ecological investments, particularly as this would supplement a potential 2020 park bond. This new position would be able to provide, over the long-term, recruitment and management of well-trained volunteer citizen scientists to assist in maintaining the county's actively managed parkland (restored through bond funding, for example).

Other benefits include developing and maintaining strategic partnerships to manage natural areas, furthering natural resource-based education within the agency, creating programs that inform county decision-making, and meeting county residents' desire for additional citizen science and stewardship opportunities.

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VI. CLIMATE AND ENERGY

Board of Supervisors Environmental Vision:
"The county will continue its leadership and commitment to promote and encourage energy efficiency and conservation efforts and renewable energy initiatives by employees, employers and residents. The county will work with local authorities, businesses, and residents to encourage sustainable reductions of the county's geographical emissions that will contribute to achieving the targets as identified by the Cool Counties Climate Stabilization Declaration and the Metropolitan Washington Council of Governments. The county also will continue to support attainment of air quality through regional planning and action."

BACKGROUND

The Fairfax County Environmental Vision[1] highlights actions that Fairfax County has initiated to address climate change. These actions include the county's leadership in the mid-2000s to adopt the Cool Counties Climate Stabilization Declaration[2] and its participation in regional efforts, as discussed below. The Environmental Vision, the related Fairfax County Sustainability Initiatives document,[3] and our previous annual reports highlight past actions by Fairfax County to reduce greenhouse gas (GHG) emissions. This chapter discusses actions during the past year and recommends additional actions for consideration by the Board of Supervisors.

During the past year, the county Board has made major advances in its climate and energy initiatives. However, in light of the transformational steps needed to successfully meet the county's Environmental Vision and to address its GHG reduction goals, substantial work remains to be done.

Ten years ago, the county committed to work with the local, state, and the federal governments to reduce emissions to 20 percent below 2005 emissions by 2020 in the Cool Counties Climate Stabilization Declaration. Given the progress summarized later in this report, it appears that the county is unlikely to meet its 2020 GHG reduction goal. However, we are encouraged that the Board of Supervisors has taken action to accelerate and increase its previous actions and plans, particularly with the approval of funding for the development of a Community-Wide Energy and Climate Action Plan (CECAP), as discussed later in this chapter. However, CECAP is likely to present the Board with a number of difficult and challenging decisions, and the Board will need to aggressively implement critical initiatives over the coming decades if we are to meet future GHG reduction goals.

The importance of the Board's recent actions and future challenges is underscored by the background statement in the Fairfax Green Initiatives, as follows:

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[1] See www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf (referenced July 31, 2017).
[2] See www.fairfaxcounty.gov/environment/cool-counties (referenced July 31, 2017).
[3] See www.fairfaxcounty.gov/environment/sustainability-initiatives (referenced July 31, 2017).

> *"Based on a new report from the United Nations' Intergovernmental Panel on Climate Change (IPCC), our planet is facing unprecedented climate changes requiring more immediate steps to reduce our carbon emissions. The IPCC, a group of the world's leading climate scientists, is urging governments to take action to reduce emissions by 45% by 2030 in order to keep global warming at a maximum of 2.7 degrees F (1.5C).* ***We believe Fairfax County must do more as well by accelerating and increasing our previous actions, plans and commitments.*** *(emphasis added)…. Our responses now must be proportional to the unprecedented climate changes now being reported and to their multiplying impacts."*[4]

The overwhelming consensus of the scientific community is that man-made GHG emissions have been the dominant cause of the observed warming of the climate since the mid-20th century.[5] We need to reduce such GHG emissions and to take action to minimize those climate impacts that we cannot mitigate.

While there are multiple sources of GHGs, the most significant source is carbon dioxide (CO_2). The adverse impact of CO_2 emissions has encouraged numerous governmental agencies to reduce such emissions through policies to increase energy efficiency and the use of renewable energy and other low carbon energy sources. CO_2 is released with the combustion of fossil fuels typically in the production of energy.

NOAA has summarized the impacts that we should expect from climate change through this century and beyond.[6] These impacts include:

- Temperatures will continue to rise.
- The frost-free season (and growing season) will lengthen.
- There will be changes in precipitation patterns.
- There will be more droughts and heat waves.
- Hurricanes will become stronger and more intense.
- Global changes in sea level are predicted to rise one to four feet by 2100.[7]

In the past year, the Washington DC metropolitan area also has seen some of the most extreme precipitation that it has experienced. For example, on July 8, 2019, rainfall rates in some areas

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[4] Joint Board Matter by Supervisors Storck, Foust, and McKay, *Fairfax Green Initiatives*, February 5, 2019, p. 1 (hereinafter cited as *Fairfax Green Initiatives*), *available at* https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-green-initiatives-joint-board-matter.pdf

[5] Intergovernmental Panel on Climate Change, *Climate Change 2014, Synthesis Report Summary for Policymakers, available at* www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf This report emphasizes that atmospheric concentrations of carbon dioxide are unprecedented in at least the last 800,000 years.

[6] National Oceanic and Atmospheric Administration, Global Climate Change, 2018, *available at* https://climate.nasa.gov/effects/

[7] Ibid.

reached 4 to 6 inches in an hour, and this intense rainfall overwhelmed city streets, submerged parking lots, and swamped basements.[8]

The Northern Virginia Regional Commission (NVRC) has highlighted impacts that are expected to result from climate change in Fairfax County. One example is its identification of potential impacts to the Belle Haven area of the county shown in Figure VI-1. The potential impacts that have been identified by NVRC are wide ranging and include, but are not limited to:

- General economic impacts due to extreme weather events
- Potential reduction in reliability of electrical systems and the electric grid due to heating and cooling
- Possible increased flood risks to property and infrastructure in flood-prone areas due to increased tidal flooding because of sea level rise and/or tidal surges
- Increased failure of septic systems, contaminating groundwater
- Increased demand for emergency management response to extreme weather events
- Expansion of flood-prone areas and an increase in flood frequency due to changes in precipitation patterns
- Increased health impacts due to excessive heat, vector-borne and communicable diseases

The health impacts from climate change in Virginia are expected to include an increase in mosquito and tick-borne infections, such as Lyme Disease, as well as an increase in the length and severity of the allergy season in Virginia.[9] In addition, the Centers for Disease Control have identified excessive heat as a significant influencing factor for climate-related respiratory illness, such as asthma.[10] Fairfax County residents over 65 are showing a higher incidence of hospitalization from respiratory problems in recent years.[11]

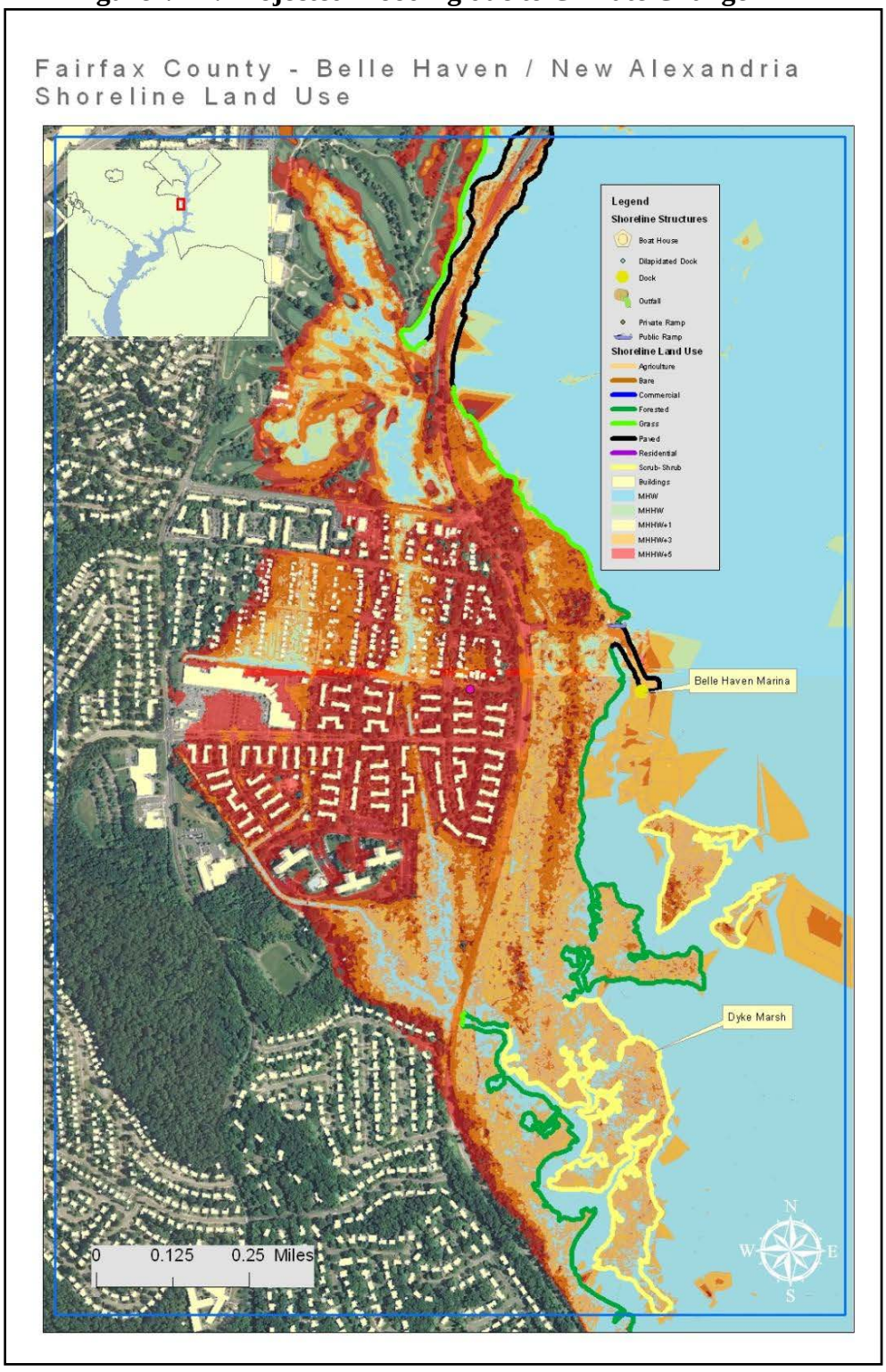
[8] See https://www.washingtonpost.com/weather/2019/07/08/washington-dc-flash-flood-how-why-area-was-deluged-by-months-worth-rain-an-hour-monday/?utm_term=.7befad5d9d94. (referenced on July 21, 2019)

[9] Natural Resources Defense Council, *Climate Change and Health in Virginia Issue Brief*, April 2018, *available at* https://assets.nrdc.org/sites/default/files/climate-change-health-impacts-virginia-ib.pdf?_ga=2.263595084.1328872708.1524495601-853793054.1524495601

[10] Fairfax County Department of Public Health, submission to EQAC, July 2019.

[11] Ibid. See also Fuhrmann, Christopher M., et al., "Impact of Extreme Heat Events on Emergency Department Visits in North Carolina (2007-2011)," Journal of Community Health, vol. 41, no. 1, Feb. 2016, p. 146.

Figure VI-1. Projected Flooding due to Climate Change[12]



[12] Northern Virginia Regional Commission. *Sustainable Shorelines and Community Management in Northern Virginia, Phase III*, 2013.

In 2018, the U.S. Global Change Research Program released a U.S. Climate Resilience Toolkit to help local communities plan for the impacts of climate change. This tool estimates the expected temperature and rainfall impacts by location.[13] For example, for the zip code of 22309 in the Mount Vernon District, an increase of between two to six degrees Fahrenheit is predicted by 2080.

The Intergovernmental Panel on Climate Change (IPCC) issued a report[14] on October 6, 2018 that helps to provide perspective for the importance of climate change impacts. A change of six degrees Fahrenheit is over two degrees Celsius. The new IPCC report highlights that an increase in temperature of two degrees Celsius would have substantial impacts, including the almost complete destruction of coral reefs and the thawing of nearly one million additional square miles of permafrost. If countries followed pledges in the Paris agreement (United Nations Framework Convention on Climate Change), warming would still increase by nearly three degrees Fahrenheit by the end of the century.[15] These increases in temperature are linked to increasing levels of GHGs in the atmosphere. Because total GHG emissions affect climate change, reductions from all parties are needed.

There are clear impacts that are taking place as a result of climate change and even more that are predicted, which are likely to have far-reaching, long-term adverse economic risks.[16]

This chapter summarizes activities that are underway in Fairfax County to reduce GHG emissions and increase energy efficiency and the use of renewable energy. In considering the impacts of climate change and the activities that contribute to climate change at a county level, it is also important to ask what we can do to mitigate the impacts of future climate change impacts. The recommendations at the end of this chapter address both taking steps to reduce the county's contribution to climate change and actions that can be taken to reduce the impacts of climate change.

FAIRFAX COUNTY CLIMATE GOALS AND GHG INVENTORY

The county's greenhouse gas (GHG) emission reduction goals are based upon the Board of Supervisors' 2007 Cool Counties Climate Stabilization Declaration,[17] its commitment to the climate goals of the Metropolitan Washington Council of Governments (MWCOG),[18] the

[13] See https://crt-climate-explorer.nemac.org/
[14] See: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf
[15] See: www.washingtonpost.com/energy-environment/2018/10/08/world-has-only-years-get-climate-change-under-control-un-scientists-say/?utm_term=.1ee927c35193
[16] See for example, The Risky Business Project, *Risky Business: The Economic Risks of Climate Change to the U.S.*, *available at* https://riskybusiness.org/report/national/
[17] Fairfax County, *Cool Counties Stabilization Declaration*, 2007, *available at https://www.fairfax-county.gov/environment/us-cool-counties-climate-stabilization-declaration*
[18] Metropolitan Washington Council of Governments, *National Capital Region Climate Change Report*, p. 10, a*vailable at* www.mwcog.org/file.aspx?D=nkj8YO%2fkjRN-NgtCccf1PKUintZaQWLtNS78xjv0EtdI%3d&A=qxBOq%2fgSA75HDE45SukELC%2fPqw%2frs%2fSm90AnaJ5ke4Q%3d

Climate and Energy Section of the county's 2017 Environmental Vision,[19] and its June 6, 2017 resolution in support of the Mayor's National Climate Action Agenda. The goal of a reduction of county **geographical** emissions of 20 percent below 2005 levels by 2020 and 80 percent below 2005 levels by 2050 is a shared goal with neighboring counties. Cool Counties also specifically calls for the achievement of a 10 percent reduction of GHG emissions every five years after 2010 through 2050. [20] The board's adoption of an operational energy strategy will contribute to a reduction in GHG emissions, which supports this goal.

The second element of Cool Counties calls for signatories to work with regional partners to reduce their community-wide GHG emissions through the development of regional plans establishing short, mid and long-term GHG reduction targets. Fairfax County has participated in regional efforts, led by the Metropolitan Washington Council of Governments (MWCOG), to inventory regional GHG emissions and to develop strategies to achieve GHG emissions reduction targets.

A component of this second element of Cool Counties calls for the development of efforts to reduce GHG emissions to 80 percent below 2005 levels by 2050. Fairfax County has participated in a regional Multi-Sector Working Group (MSWG) effort that has been coordinated by MWCOG. In reviewing this material and the recommendations provided by the workgroup[21] and an associated technical report,[22] a number of state and federal actions are recommended to support this target. Action by EQAC and the Board's Legislative Committee in the past year to support the enactment of state legislation removing barriers to customer-sited solar energy is an example of the types of measures that are recommended.

The third element of Cool Counties asks local governments to continue to urge Congress and the Administration to enact specific requirements and market-based limits and incentives, including a specific Corporate Average Fuel Economy standard. Fairfax County and MWCOG have supported such efforts, and MWCOG's aforementioned MSWG effort highlights how important such efforts are to the attainment of regional GHG emissions reduction targets.

For its analysis, MWCOG incorporated annual energy consumption data from utilities serving Metropolitan Washington, regional data from transportation planning activities, operational data from water and wastewater utilities, solid waste data from localities, and fuel use data from the federal Energy Information Administration. The data are used for tracking progress, climate planning, and the development of policies and programs at local and regional scales. MWCOG reports metrics for the 2020 Regional Climate and Energy Action Plan's progress on its Climate

[19] Fairfax County, *Environmental Vision,* June 2017, p. 28, *available at https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf*
[20] See www.fairfaxcounty.gov/environment/us-cool-counties-climate-stabilization-declaration (referenced July 31, 2017).
[21] See: www.mwcog.org/documents/2017/01/18/multi-sector-working-group-greenhouse-gas-emission-reducing-strategies-air-quality-climate-mitigation-greenhouse-gas-multi-sector-working-group/ (referenced July 31, 2017).
[22] See: www.mwcog.org/documents/2016/08/01/multi-sector-approach-to-reducing-greenhouse-gas-emissions-in-the-metropolitan-washington-region-final-technical-report/ (referenced July 31, 2017).

and Energy Dashboard at www.mwcog.org/environment/data-and-tools/climate-and-energy-progress-dashboard/. This MWCOG website summarizes a number of measures that are useful indicators of regional action to address climate change and potential climate change impacts, including:[23]

- Progress towards Metropolitan Washington's GHG goals
- Progress towards reducing energy consumption
- Progress towards increasing high performance buildings
- Progress towards increasing renewables as a percent of total energy consumption
- Progress towards increasing grid-connected renewables
- Progress towards reducing transportation sector GHG emissions
- Progress towards increasing electric vehicle ownership
- Progress towards reducing vehicle miles traveled
- Progress towards increasing growth rates in activity centers
- Projected increases in average annual temperature
- Projected increases in sea level rise

In order to provide for greater consistency in the analysis of GHG emissions, such emissions estimates have been developed through a coordinated effort with the MWCOG. Figure VI-2 shows that Fairfax County community-wide GHG emissions declined by over nine percent between 2005 and 2015.[24] In addition, Fairfax County GHG emissions have remained relatively consistent as a proportion of the region's overall emissions, averaging about 20 percent of the region's GHG emissions.

This figure also indicates that the region has made progress by reducing its GHG emissions by 10 percent since 2005. However, the climate goal for MWCOG is a 20 percent GHG reduction by 2020, so the region (including Fairfax County) will require greater emissions reductions to meet this goal. As the Director of MWCOG Environmental Programs stated in an interview following the release of the 2015 GHG inventory, *"we still have a lot of work to do in a short amount of time to meet that [2020] goal."*[25]

[23] Metropolitan Washington Council of Governments. 2018. Climate and Energy Progress Dashboard. See: www.mwcog.org/environment/data-and-tools/climate-and-energy-progress-dashboard/.
[24] MWCOG and Fairfax County, Fairfax County, Virginia Community-Wide GHG Inventory Summary Factsheet, 2005 to 2015 Data, *available at* www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-greenhouse-gas-emissions-factsheet-may-2018.pdf
[25] WAMU Interview, *Washington's Greenhouse Gas Emissions are Declining, But Not Quickly Enough*, July 27, 2018, *available at* https://wamu.org/story/18/07/27/washingtons-greenhouse-gas-emissions-declining-not-quickly-enough/

Figure VI-2. CO_2e Emissions (MM Tons) for Fairfax County, Northern Virginia, and the Metropolitan Washington Area

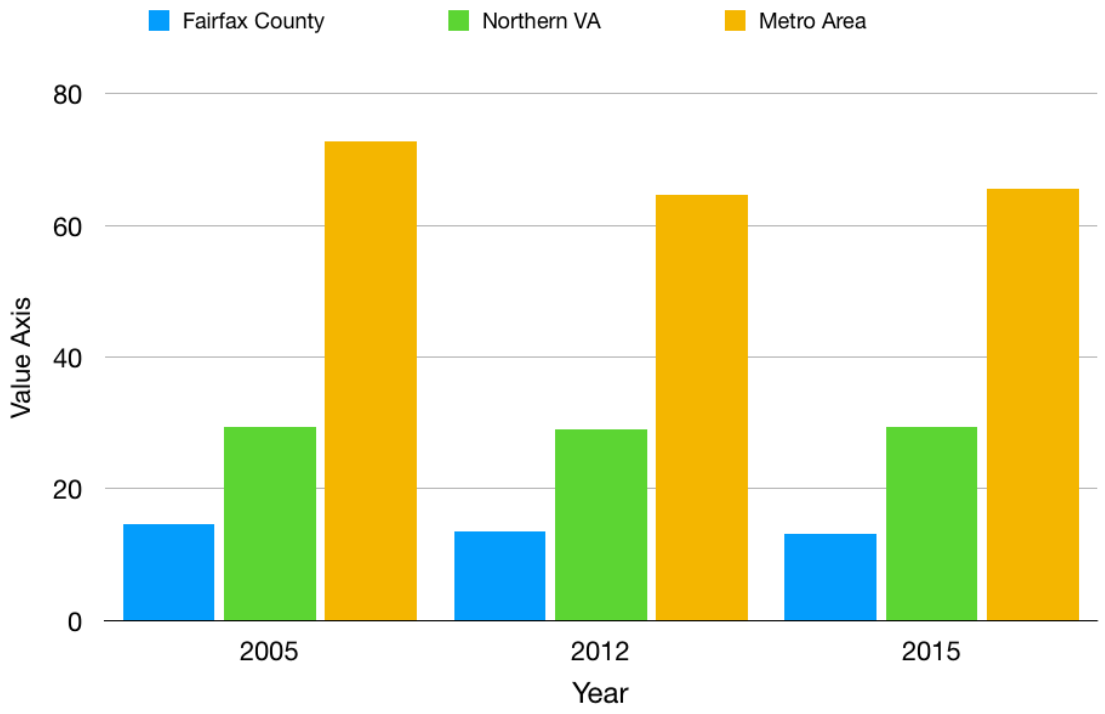
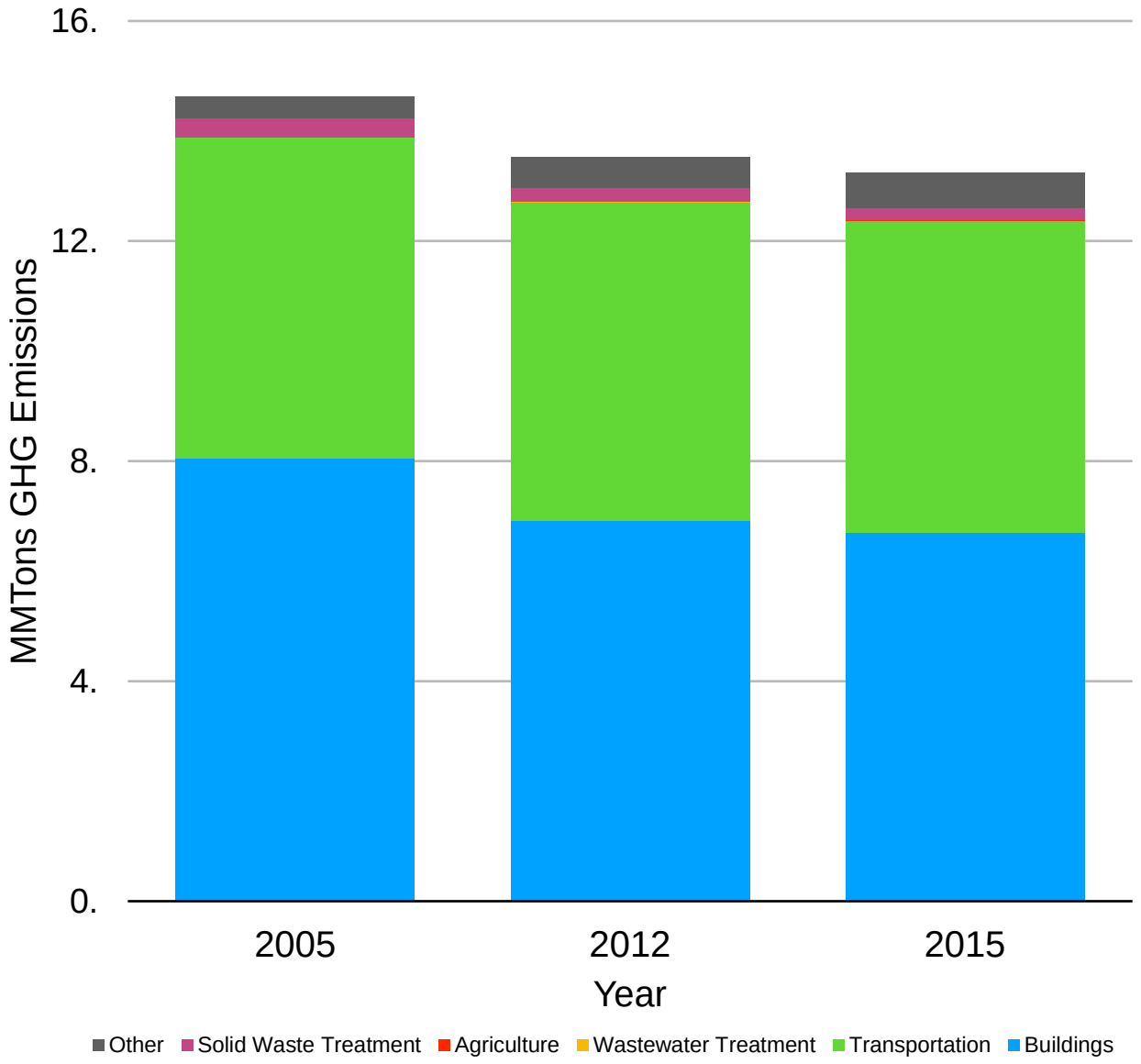


Figure VI-3[26] shows Fairfax County emissions by category. This figure shows that 2015 emissions associated the residential and commercial building sectors accounted for 51 percent of GHG emissions and that transportation and mobile sources accounted for 43 percent. It is important to note that GHG emissions associated with mobile sources have been reduced because of county actions described in the transportation chapter as well as federal vehicle emissions standards. Similarly, GHG emissions associated with electricity generation have been reduced because natural gas has become more affordable. Electric utilities in the region serving Fairfax County reduced their GHG emissions relative to energy production by almost 30 percent from 2006 to 2016,[27] which appears largely to be a result of a switch from coal to natural gas.

[26]Metropolitan Washington Council of Governments. 2018. Fairfax County, Virginia: Community-Wide GHG Inventory Summary Factsheet. www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/regional-greenhouse-gas-inventory-fact-sheet.pdf.

[27] From Fairfax County CO2 Data 2006-2017 spreadsheet—see conversion tab under Electricity, column E. Spreadsheet available at the following link: www.fairfaxcounty.gov/energy/energydata/download .

Figure VI-3. Fairfax County Wide GHG Emissions by Category



Fairfax County faces challenges in reducing GHG gas emissions, given that its population increased by 13 percent between 2005 and 2015. However, this is the same challenge faced by many communities, as the world needs sharp reductions in GHG emissions in the face of a rapidly increasing world population. Within the Metropolitan Washington region, the region's population also increased 16 percent between 2005 and 2015. At the same time, the region has

benefited from a reduction in GHG emissions resulting from a transition to cleaner fuel sources for the generation of electric power.[28]

GHG emissions from Fairfax County government (including schools) are important because county operations should provide a model for others to demonstrate that GHG emission reductions to meet the county's GHG commitments can be reached. Fairfax County government GHG emissions comprise about three percent of countywide GHG emissions.[29] About half of the emissions are attributable to general county operations and about half to the Fairfax County Public Schools (FCPS). Energy use for the FCPS is managed separately from the rest of the county government operations, and the programs to address GHG emissions in the two government entities have been different.

In 2018, FCPS and general county operations provided more data than in the past, which aided in providing greater insights into GHG emissions for county operations. As previously mentioned, the regional target for GHG emission reductions is a 20 percent reduction from 2005 to 2020 for all sources of GHG emissions. Since government operations are the only area of direct county government control in reducing GHG emissions, we sought to analyze the extent of progress towards meeting the 20 percent reduction. While we did not have information to compare all sources of GHG emission reductions for schools and county government operations, information for GHG emissions associated with electric and natural gas use was available. The FCPS reported a 38 percent reduction from 2008 to 2017 in electric use and direct combustion.[30] County government operations reported that GHG emissions associated with electrical use and combustion of natural gas declined by 20 percent from 2006 to 2017.[31]

Overall Fairfax County outperformed Northern Virginia in reducing GHG emissions, which remained essentially constant for Northern Virginia, as shown in Figure VI-2. The reductions in public school emissions are especially noteworthy as the schools are educating tomorrow's leaders. As such, the schools are not only serving as a model for the county - FCPS is also serving as a model to help shape the priorities of students.

Recognizing that growth is likely to continue and that residents and business will expect at least the same level of services, both FCPS and general government operations will likely find that continuing to achieve greater reductions in GHG emissions will become increasingly difficult. In order to continue to see GHG emissions reductions, funding or third-party financing options for the county's government operational energy strategy will be important.

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[28] Fairfax County Energy Website, *Fairfax County CO2 Data – 2006 to 2016, Conversion Factor Tab, available at* www.fairfaxcounty.gov/energy/energydata/download

[29] Fairfax County, *Cool Counties Website, available at* www.fairfaxcounty.gov/environment/cool-counties

[30] Fairfax County Public Schools, Greenhouse Gas Inventory for Calendar Year 2017, Figure 1 (data on direct combustion and indirect emissions from electricity use for 2008 and 2017), *available at* www.fcps.edu/node/31156.

[31] *Fairfax County CO_2 Data, 2006 and 2017, available at* www.fairfaxcounty.gov/energy/energydata/download The comparison between the FCPS and general county operations was assembled from different data sources and there are differences in the methodology used to develop these two separate estimates.

One of the challenges in interpreting the GHG inventory information for Fairfax County is that it has been prepared by the MWCOG with only summary county data provided to the public. Preparing the emission inventory under MWCOG's leadership was viewed as a significant step forward because the preparation of the inventory by a single entity would improve the consistency of developing the emissions inventory across local jurisdictions. However, the publicly available data in the inventory lacks the specificity necessary to analyze the data associated with different sources and to compare the emissions inventories across the different local governments in the greater Washington Metropolitan area.

Looking at Fairfax County data, available information does not provide sufficient information to compare county operations to FCPS because different years were used for the analyses performed. In order to assess the benefits of emission reduction efforts, it is useful to have detailed emissions information reported in a manner that is consistent.

The detailed breakdown of emissions information across the County is important to understand the benefits of steps to reduce GHG emissions. This information is important for the public so that they can see that County investments are contributing towards a worthwhile and important goal to help reduce Fairfax County's impacts on climate change.

It would also be helpful to see the emission profiles along the steps that are being taken in the local governmental organizations within the Washington Metropolitan Area. This analysis could be helpful to all jurisdictions in the Washington Metropolitan area.

As discussed later in this chapter, it would be helpful to develop a community-wide climate action plan for reducing GHG emissions, in concert with local residents, commercial entities, and other parties, to address energy consumption and GHG emissions in the private sector and meet GHG emission reduction goals. Such a plan would be important so that everyone could see their role in reducing GHG emissions to reduce adverse impacts of climate change in the future. In order to support this effort, MWCOG has developed a dashboard to track key metrics at a regional level. Similar efforts seem appropriate at the county level.

Various documents also report CO_2 equivalent pounds per square foot, which can be helpful when evaluating trends. However, it should be noted that GHG emissions reduction goals are generally stated as a percentage reduction in the total emissions over a fixed period of time.

Information on emissions for other activities in Fairfax County was not available. While there are significant business operations, the federal government also has a significant presence with Fort Belvoir and other government operations in Fairfax County. Virginia state operations also contribute to the overall GHG emissions footprint of the county.

UPDATE ON COUNTY ACTIONS

Organization and Staffing Resources for Climate and Energy Functions

One of the major areas of advancement by Fairfax County in the past year has involved actions to strengthen its organizational structure and resources to support energy and climate functions.

These actions included the establishment of the Office of Environmental and Energy Coordination on July 1, 2019 and the funding of several new staff positions. These actions are significant because they demonstrate a high-level commitment to energy management and climate action by the Board of Supervisors, the new County Executive (Bryan Hill), and the Chief Financial Officer, and such commitment is an essential element of success. However, it should be noted that these steps are in their early stages of implementation so that further monitoring will be needed to assess implementation. In addition, as discussed below, some subsidiary issues remain to be addressed.

The impetus for change came from the Office of the County Executive with significant support from EQAC. In late 2018 and early 2019, the office conducted an organizational review of its energy and environmental functions, and the major recommendation was the establishment of a new Office of Environmental and Energy Coordination (OEEC) within the Office of the County Executive.[32] EQAC contributed to this review with a November 27, 2018 white paper titled *"Organization and Resources for County Energy and Climate Functions."*[33]
The reorganization plan involves the combination of four existing staff positions with three additional staff members (two new positions and one unfilled existing position).[34] The Board of Supervisors approved funding for these positions as part of the county's FY 2020 budget in May 2019.[35]

The three major functions of the office were specified as:

- Policy evaluation, coordination and oversight;
- Coordinating internal agency operations on energy and environmental matters; and
- Leading community sustainability efforts.[36]

Moreover, in its action on the FY 2020 budget, the Board supplemented the general funding for the new OEEC with funding of $276,749 for two additional staff positions to coordinate the development and implementation of a Community-Wide Energy and Climate Action Plan (CECAP). The county moved quickly to hire two new employees to fill these positions.

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[32] Presentation of Joe Mondoro before Fairfax County Environmental Committee, Feb. 12, 2019, p. 3, hereinafter cited as *February 2019 CFO Briefing*, *available at* https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2019/feb12-environmental-environmental-energy-organization.pdf

[33] Memorandum from Stella Koch, EQAC Chair, to Board of Supervisors, transmitting EQAC "White Paper on Organizational Structure & Resources for Energy and Climate Functions in Fairfax County, November 27, 2018, (hereinafter cited as *EQAC White Paper*), *available at* https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resoultions%20and%20positions/2018/2018,%20november--eqac%20climate%20and%20energy%20organization%20and%20resources%20transmittal%20and%20paper.pdf

[34] *February 2019 CFO Briefing*, p. 3.

[35] Fairfax County Board of Supervisors, *FY 2020 Fairfax County Adopted Budget Plan (Overview)*, p. 23, *available at* https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2020/adopted/overview.pdf

[36] *February 2019 CFO Briefing*, pp. 4-5.

As the OEEC is implemented, EQAC strongly supports the incorporation of several energy management best practices highlighted in a Board Matter on *Fairfax Green Initiatives*, adopted by the Board of Supervisors on February 5, 2019.[37] Several of these energy management best practices as well as several additional ones were highlighted in EQAC's November 2018 white paper. These best practices are as follows:

- Delineating the duties and responsibilities of the senior managers and the members of the cross-organizational leadership team through an executive directive or county ordinance;[38]
- *"Ensur[ing] County leadership accountability for results and outcomes through SMART goals;"*[39]
- *"Includ[ing] energy management criteria in performance evaluations of departmental heads and senior executives;"*[40]
- Establishing and utilizing a cross-organizational working group comprised of mid-level managers as well as an oversight committee of departmental heads;[41] and
- Assuring necessary training.[42]

February 2019 Board Action on Fairfax Green Initiatives

One of the most significant policy actions on energy and climate approved by the Board of Supervisors in the past year was a Joint Board Matter on *Fairfax Green Initiatives*.[43] This Board Matter was sponsored by Supervisors Storck, Foust, and McKay and approved unanimously by the Board of Supervisors on February 5, 2019. It described 19 energy and climate-related actions for consideration and implementation by Board offices, three Board Committees, the Tree Commission, and the County Executive.[44]

The Board Matter already has had a positive impact in accelerating county action on climate and energy matters. For example, the *Fairfax Green Initiatives* called for the County Executive to develop proposed resources and a timeline to develop a Community-Wide Energy and Climate

[37] Joint Board Matter by Supervisors Storck, Foust, and McKay, *Fairfax Green Initiatives*, February 5, 2019, p. 3, item 6.c.i. (hereinafter cited as *Fairfax Green Initiatives*), *available at* https://www.fairfax-county.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-green-initiatives-joint-board-matter.pdf
[38] *EQAC White Paper*, pp. 9-10, 12.
[39] *Fairfax Green Initiatives*, p. 3, item 6.c.i.
[40] Id., item 6.c.ii. See also *EQAC White Paper*, p. 14.
[41] *EQAC White Paper*, pp. 10-11, 13-14.
[42] Id., p. 14.
[43] See Joint Board Matter by Supervisors Storck, Foust, and McKay, *Fairfax Green Initiatives*, February 5, 2019, (hereinafter cited as *Fairfax Green Initiatives*), *available at* https://www.fairfax-county.gov/mountvernon/sites/mountvernon/files/assets/documents/boardmatters/02-05-2019fi-nal.pdf?fbclid=IwAR1wx1EOA1o97vqR0DKeec9BL_-qgjMnbdKWtRoCpAIb3v-5Iah2s7UNWmU
[44] Memorandum from Bryan Hill, County Executive, to Board of Supervisors, on February 5, 2019 Joint Board Matter on Fairfax Green Initiatives: Implementation Matrix, June 14, 2019, *available at* https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-green-intiatives-implemention-memo.pdf

Action Plan (CECAP) on an accelerated timetable,[45] and this recommendation led directly to the funding of the two new staff positions for CECAP development discussed above. Other specific aspects of the Board Matter will be discussed later in this Chapter.

At the same time, the large majority of the action items listed in the Board Matter have not yet been completed, and timelines and responsible officials have not been established for many action items.[46] We recognize that the Board Matter requires the County Executive to report to the Board by September 2019 to ensure staff leadership accountability for the results and outcomes of the *Fairfax Green Initiatives* through SMART goals.[47] The acronym for SMART Goal Setting stands for **S**pecific**, M**easurable**, A**ttainable**, R**ealistic**,** and having a **T**ime-Frame for completion, and SMART goals are viewed as a management approach to describe goals in enough detail to help monitor progress toward achieving them.

EQAC commends the Board for requiring the establishment of SMART goals for the action items in its *Fairfax Green Initiatives*. We will be monitoring this process to assure that it provides strong accountability.

Energy and Climate Efforts Relating to County Operations

Summary
In the past year, the county has also made some notable progress in strengthening its energy and climate efforts relating to county operations. The Board of Supervisors approved substantial funding in 2019 to install high-efficiency Light Emitting Diode (LED) streetlights, install new electric vehicle (EV) charging facilities, and increase the energy efficiency of county buildings. Moreover, the county issued a landmark procurement for solar arrays on county facilities and schools that represents the largest procurement in Virginia's history by a locality for on-site solar energy. At the same time, substantial challenges remain, as discussed below, to meet the aggressive action items noted by the Board of Supervisors in the *Fairfax Green Initiatives*.

[45] Memorandum from Bryan Hill, County Executive, to Board of Supervisors, on February 5, 2019 Joint Board Matter on Fairfax Green Initiatives: Implementation Matrix, June 14, 2019, *available at* https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-green-intiatives-implemention-memo.pdf

[46] February 5, 2019 Joint Board Matter on Fairfax Green Initiatives: Implementation Matrix, June 14, 2019, p. 1, hereinafter cited as *Board Matter Implementation Matrix*, p. 1, *available at* https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-green-initiatives-implementation-matrix.pdf

[47] *Fairfax Green Initiatives*, p. 3, item 6.c.i.

SMART goals are viewed as a guideline to describe goals in enough detail to help monitor progress toward achieving them. The acronym for SMART Goal Setting stands for **S**pecific**, M**easurable**, A**ttainable**, R**ealistic**,** and having a **T**ime-Frame for completion.

LED Streetlight Conversion Initiative

In our 2018 Annual Report, we detailed the county's initiative to convert streetlights to high-efficiency LED fixtures.[48] Details about progress on this initiative are included in the latter pages of the land use chapter.

Landmark Initiative for Solar at County Facilities and Schools

On June 6, 2019, Fairfax County launched the largest procurement in Virginia history for solar at county facilities and schools. The solar procurement is in the form of a Request for Proposals (RFP) to solar developers, and Fairfax County Government issued the RFP on behalf of itself and three other entities: the Fairfax County Public Schools, the Fairfax County Park Authority, and the Fairfax County Redevelopment and Housing Authority.[49] The RFP identifies approximately 130 facilities as sites for potential Phase I projects and it provides a list of more than 100 Phase II facilities for evaluation by the successful bidder as potential additional projects.[50] The RFP covers opportunities for rooftop solar, ground-mounted solar, and solar canopies (e.g., parking lot canopies).[51] In addition, the RFP contains provisions that would allow other localities to "ride" the Fairfax County contract once it is awarded.[52]

Fairfax County hosted a bidder's conference on June 17th, and approximately 15 companies attended the conference, demonstrating substantial interest in the RFP. County officials have indicated that they expect to select the contractor by the Fall of 2019.

The solar developers responding to the RFP will be competing to provide services under a power purchase agreement (PPA).[53] Under this mechanism, the solar developer would design, finance, install, maintain, and decommission the solar arrays.[54] There are no upfront costs to Fairfax County, and the county will pay back the costs of installation and maintenance through savings on its electric bills over a 20 to 30-year period.

County Operational Energy Strategy

- *Introduction*
  The county has also made progress in implementing its July 2018 Operational Energy Strategy in the past year. This strategy addresses the approximately 1.5 percent of GHG emissions resulting from county operations (apart from county schools). The county

[48] Fairfax County Environmental Advisory Committee, *2018 Annual Report on the Environment*, pp. 122-24, hereinafter referenced as *EQAC 2018 Annual Report, available at* https://www.fairfax-county.gov/planning-development/sites/planning-development/files/assets/documents/eqac/annual%20reports/2018/annual%20report/6%20%20climate%20and%20energy.pdf
[49] Fairfax County Department of Procurement and Material Management, Request for Proposal No. 2000002845.
[50] Id., p. 1, Attachment C.
[51] Ibid.
[52] Id., p. 18, Attachment A ("Listing of Public Bodies).
[53] Id., p. 1.
[54] Ibid.

accelerated its renewable energy efforts with the Solar RFP discussed above, and it moved forward to fund electric vehicle charging stations and implement energy efficiency measures.

However, as noted below, substantial challenges remain in addressing energy in government operations. The Board of Supervisors recognized in their February 2019 Joint Board Matter the need to consider *"accelerating goals and targets for the Operational Energy Strategy."*[55] The Board Matter also recommended that the Environmental Committee discuss *"[s]etting a goal that by 2025, local generated energy (like solar) would offset County government energy usage."*[56] According to a June 14, 2019 report to the County Board, staff work on the first item is ongoing and the second item will be referred for consideration in the CECAP.[57]

- *Innovative Energy Solutions/Renewable Energy*
  The renewable energy target in the July 2018 Energy Strategy called for the implementation of *"a rooftop solar pilot project at the Springfield Warehouse."*[58] EQAC is pleased that the county has greatly exceeded this goal with the issuance of its June 2019 Solar RFP and that the county has utilized a budget-neutral funding approach for this RFP, as highlighted for consideration in our 2018 Annual Report.[59]

  Following the award of the solar contract, county staff should report to the Board information on the percentage of county electricity use that is projected to be provided by renewable energy under the contract. In increasing its renewable use further, EQAC supports the county's continuation of its aggressive efforts to amend Virginia law to facilitate the development of a large solar array on its Lorton Landfill. We encourage the county to evaluate other options necessary to increase its renewable energy use, including off-site power purchase agreements.

- *Electric Vehicles (EVs)*
  During the past year, the county took steps to develop the EV charging infrastructure referenced in its 2018 Energy Strategy. The County Operational Energy Strategy set forth a target of ensuring that by 2030 *"one or more Level 2 charging stations are installed at each major government facility."*[60] In May 2019, the County Board approved $750,000 in funding to design, build, and permit EV-ready charging stations for up to 10 county facilities with the capability to charge both county government and private vehicles.

  In addition, the county announced that that it planned to request up to $750,000 in additional funding in 2020 for further progress in building out its charging infrastructure.[61] Since

[55] *Fairfax Green Initiatives,* p. 2, item 4a.
[56] Id., p. 2, item 4.c.
[57] *Board Matter Implementation Matrix*, Attachment 2, items 4a. and 4c.
[58] *Fairfax County Operational Energy Strategy*, July 10, 2018, p. 10, hereinafter cited as *2018 Operational Energy Strategy, available at* https://www.fairfaxcounty.gov/energy/sites/energy/files/assets/documents/fairfax-county-operational-energy-strategy.pdf
[59] *EQAC 2018 Annual Report*, p. 126.
[60] *2018 Operational Energy Strategy,* p. 11.
[61] *Feb. 2019 Energy Initiatives Update,* pp. 8-9.

Fairfax County has approximately 20 major government facilities,[62] the current funding strategy would meet and accelerate the completion of the goal in the Operational Energy Strategy.

- *Energy Use and Efficiency*
  In the fall of 2018, the county approved $4.5 million in funding from general revenues to fund the first phase of a proposed 10-year energy efficiency plan. This funding is designed to support the goal in the Operational Energy Strategy to reduce energy use in buildings by two percent per year between 2019 and 2029.[63]

  In addition, the county has proposed funding another $4.5 million in energy efficiency projects in the FY 2019 carryover budget. The Board of Supervisors approved this funding on September 24, 2019.

  In addition, the *Fairfax Green Initiatives* required the county to evaluate the option of funding some or all of its energy efficiency projects through Energy Savings Performance Contracts (ESPCs). Specifically, the Board Matter directed the County Executive to report to the Environmental Committee no later than June 2019 on *"[a] process for contracting with an ESPC or recommend other such initiatives that produce a similar outcome and timeframe."*[64] Although the report deadline was not met, the Chair of the Board's Environmental Committee directed county staff to prepare a memorandum or a presentation on this topic at the October 2019 Environmental Committee meeting.[65]

- *Green Buildings*
  The June 2018 Operational Energy Strategy set forth an energy performance policy for county buildings. In this strategy, the county set forth the target of achieving "LEED Silver on all new facility construction, additions, and renovations with an occupied area greater than 10,000 square feet."[66] The LEED Silver target largely followed the county's previous green building policies.[67]

  In its February 2019 *Fairfax Green Initiatives,* the Board of Supervisors directed the County Executive to report to the Board no later than September 2019 on *"[s]trengthening Green Building Policies for County Facilities."*[68] EQAC strongly supports the Board's direction to strengthen the green building policies to improve energy performance for county facilities. In July 2019, in furtherance of this objective, EQAC provided a memo with background

[62] Interview with Kambiz Agazi, July 15, 2019.
[63] *EQAC 2018 Annual Report*, p. 125.
[64] *Fairfax Green Initiatives*, p. 1, item 1.b.
[65] Fairfax County Environmental Committee, June 18, 2019 Meeting, video (min. 4:57 to 7:30), *available at* video.fairfaxcounty.gov/player/clip/1420?view_id=9
[66] *2018 Operational Energy Strategy,* p. 8.
[67] However, it should be noted that the Green Building Council had increased the stringency of its efficiency requirements in the LEED rating system to some extent in the new version of LEED - version 4 - that the county had begun to implement in 2018.
[68] *Fairfax Green Initiatives*, p. 3, item 6.a.

information on green building policy options for consideration by the County Executive in preparing his report to the Board.[69]

- *Goods and Services*
  The July 2018 Operational Energy Strategy stated a specific target as follows:

  > *"By 2020, require that all major appliances, such as refrigerators and televisions, are ENERGY STAR-certified or equivalent, unless it can be shown that an energy-efficient option is not available. Continue to require that all electronic office equipment, such as computers, monitors and multifunction devices, purchased be ENERGY STAR-certified or equivalent, unless it can be shown that an energy-efficient option is not available."*[70]

  The County's Department of Procurement and Material Management (DPMM) is currently working with the County Executive to issue guidance that reinforces these policies.[71]
  In addition, the Energy Strategy contained a goal to *"encourage and increase the purchase of environmentally preferable products and services."*[72] In a June submission to EQAC, DPMM summarized a new Supply Chain Sustainability Program Pilot to support this goal, as follows:

  > *"Fairfax County's supply chain includes thousands of suppliers and spans across hundreds of sectors. The impact of the goods and services purchased extends beyond the energy consumed when plugged into an outlet or waste generated at County facilities.* ***The extraction of raw materials, manufacturing, transportation, etc, related to our purchasing decisions results in large indirect impacts, especially in the form of GHG emissions. The magnitude of these impacts is often larger than direct emissions from energy used in buildings and vehicles.*** *Thus, the suppliers we partner with matter. DPMM is piloting a Supply Chain Sustainability Program to conduct a baseline assessment, document the leaders vs laggards and then try to improve key segments of our supply chain. Success will be measured by the percentage of suppliers who have completed a 3rd party … assessment, and later, the improvement in sustainability metrics. The pilot program is scheduled for a launch in July 2019 with results being shared to County stakeholders in August or September." (emphasis added)*

- *Conclusion*
  In light of greenhouse gas reduction goals included in the County's Environmental Vision, the action item in the *Fairfax Green Initiatives* to accelerate the goals and targets in the Operational Energy Strategy is very important.

[69] This memo will be posted with other resolutions for 2019 on the EQAC web site.
[70] *2018 Operational Energy Strategy,* p. 12.
[71] Interview with Patricia Innocenti and Chris McGough, Department of Procurement and Material Management, July 23, 2019.
[72] Ibid.

GHG Emissions Inventory for County Operations

Our 2018 Annual Report recommended that the Board of Supervisors direct county staff to publish an Annual Greenhouse Gas Inventory Report for county operations.[73] In a March 26, 2019 response to the recommendation, county staff questioned the need for creating an annual inventory because their *"experience has been that the small incremental changes year-over-year do not justify the time needed to undertake the inventory."*[74] They expressed support for a *"limited emissions inventory every three to five years."*[75] Staff also agreed to consult with MWCOG about the potential for MWCOG to separately account for Fairfax County government operations in their next regional GHG Inventory (conducted every three years).

We believe it is important to track GHG emissions to evaluate progress that is or is not being made. In order to determine the benefits of different actions to reduce GHG emissions, a detailed emissions inventory is needed. This inventory is important so that we can not only measure progress toward meeting GHG reduction goals but so that we can also see what actions are having the greatest benefits. We understand that there are challenges in obtaining accurate transportation emissions and that the transportation component of the county operations may pose some reporting challenges on an annual basis.

We believe that an alternative combination of actions can go a long way in meeting the goal set forth in last year's report:

- Include a separate component for county operations in the GHG inventory planned in the coming year (as part of the county's new Community-Wide Energy and Climate Action Plan (CECAP)). The entire CECAP process began after the March 2019 response (noted above), and it is our understanding that county staff is supportive of this GHG inventory component for county operations.[76]
- Provide an annual report update on electricity and natural gas use and related GHG emissions. This information is already collected and made available to the public on the county Energy Data web pages, which are updated annually,[77] and the new Energy Dashboard, which is updated monthly.[78] However, the current public data is presented in spreadsheet format and does not contain any analysis (e.g, trend data) and the CO_2 data is only provided for limited years and is not reported by individual agency function (e.g. wastewater collection).
- Prepare a detailed public GHG inventory report for county operations (including transportation) at least every three years in concert with the MWCOG GHG inventory.

[73] *EQAC 2018 Annual Report*, p. 138.
[74] Letter from Joseph Mondoro, Chief Financial Officer, to EQAC, March 26, 2019, providing responses to Climate and Energy Recommendation #1 of 2018 EQAC Annual Report.
[75] Ibid.
[76] Interview with Kambiz Agazi, July 15, 2019.
[77] See https://www.fairfaxcounty.gov/energy/energydata/download
[78] See https://www.fairfaxcounty.gov/energy/energydata

Reducing GHG Emissions in the Private Sector

Introduction and Summary

Other significant initiatives by the Board began to address the 97 percent of GHG emissions in the county resulting from private sector activities – in buildings and transportation. EQAC particularly commends the Board's funding of key staff and contractor resources and initial steps to set forth a framework for the development of a CECAP. This action was one of the priority recommendations highlighted in our 2018 Annual Report.

In addition, the county moved forward toward the launch of a C-PACE program, with the enactment of a county C-PACE ordinance in March 2019 and the issuance of a Request for Proposal for a program administrator in July 2019. The county also received a designation as a SolSmart community in June 2019.

The February 2019 Board Matter also specified a number of actions for future consideration related to energy use in the private sector. These actions included:

- Potential changes in the county's Comprehensive Plan and zoning ordinances to incentivize and support more environmentally sustainable development;[79]
- Analysis of options for grant and cooperative agreement funding to support clean energy measures for all county residents (consistent with One Fairfax);[80]
- Analysis of options to assist residents in planting additional trees;[81] and
- Developing partnerships like the federal Department of Energy's Better Buildings Challenge.[82]

Strong leadership by the county to address climate change would be consistent with the aggressive actions initiated by leading businesses. For example, the Mars Corporation, based in McLean, has committed to the achievement of net-zero GHG emissions by 2040 in its direct operations (in more than 80 countries), and the company is already using or purchasing renewable electricity to address more than 50 percent of its total footprint, including 100 percent of its operations in the United States.[83]

Funding and Initial Steps to Develop Community-Wide Energy and Climate Action Plan (CECAP)

As noted above, the county took significant action by funding staff and contractor resources to develop the CECAP during the past year. In addition, the Board's Environmental Committee provided its support for a CECAP planning process at its June 18, 2019 meeting.

Public involvement in the CECAP planning process will include the following components:

- *Broad Community Involvement* – comprised of community-wide meetings across the county, surveys, and public comments.

[79] *Fairfax Green Initiatives*, p. 2, item 2.a.
[80] Id., p. 2, item 4.b.
[81] Id., p. 3, item 5.
[82] Id., p. 3, item 6.c.v.
[83] See https://www.mars.com/news-and-stories/articles/mars-takes-climate-action

- *Focus Groups* – comprised of approximately nine to ten subject matter experts and community leaders in the districts of each county Supervisor. The individual Supervisors will select these members, and the first meetings are expected in October.
- *Energy and Climate Task Force* – comprised of approximately 30 subject matter experts and a cross-section of community leaders, including the leaders of each of the Focus Groups. The first meeting is likely in the November/December timeframe.[84]

The county has projected that the process for the completion of the CECAP will take approximately 18 months.[85] In light of the urgency of the climate crisis, we recommend that the Board direct the County Executive to pursue several priority actions to reduce GHG emissions in the private sector in parallel with the CECAP development process. The suggested approach is consistent with the action taken by the county during the past two years in developing targeted initiatives, such as the C-PACE Program, the Solarize program, and the SolSmart designation discussed below. In addition, this approach is in sync with the *Fairfax Green Initiatives,* which directed the consideration of a number of targeted actions, as discussed above.

Other areas where targeted actions might be considered include the following:

- Launching a voluntary energy efficiency benchmarking program for commercial buildings. Such a program might be coordinated through the U.S. DOE Better Building Challenge noted in the *Fairfax Green Initiatives*. The benefits of voluntary benchmarking programs and examples of Virginia-based programs are highlighted in a paper prepared by a local consulting firm.[86]
- Developing an energy efficiency program for local residents modeled after the Solarize program and in partnership with the Northern Virginia Regional Commission. Such a program could facilitate energy savings actions by residents by simplifying the selection process for vendors and providing group discounts.

Commercial Property Assessed Clean Energy (C-PACE)

In last year's Annual Report, we highlighted the important work that the county had commenced to develop a Commercial Property Assessed Clean Energy (C-PACE) program. We noted that the county's work on C-PACE is extremely important because this program will greatly facilitate the financing of energy efficiency, renewable energy, and water savings measures in new and existing commercial buildings in the private sector and in buildings owned by non-profit organizations (e.g., religious congregations).[87]

[84] Presentation of Kambiz Agazi, *Community-Wide Energy and Climate Action Plan: Initiation Phase Update*, June 18, 2019, *available at* https://www.fairfaxcounty.gov/boardofsupervisors/board-supervisors-environmental-committee-meeting-june-18-2019 and video presentation linked to that web site; E-mail from Kathleen Daley to Debra Jacobson, June 24, 2019.
[85] *April 2019 CECAP Presentation,* p. 6.
[86] Energy-Shrink, *Benchmarking: What's Happening in Virginia,* 2018, *available at* https://energy-shrink.com/benchmarking-happening-virginia/
[87] *EQAC 2018 Annual Report*, p. 130.

In the past year, the county demonstrated strong progress in developing its C-PACE program. In March 2019, the Board approved an ordinance to authorize the establishment of a C-PACE program in Fairfax County,[88] and in July 2019, the county's procurement office issued a Request for Proposal for a program administrator.[89] Staff expect that the program will be launched in the county before the end of 2019.[90]

EQAC urges the county to place a major priority on strong marketing and effective outreach and education about C-PACE to commercial property owners as the program is implemented. Experience in other states has demonstrated that marketing and outreach is key to program success. To achieve this goal, staff in relevant county agencies (e.g., Department of Planning and Development, Economic Development, Administration) and county Supervisors should help to provide public education. For example, the Department of Planning and Development should provide C-PACE educational materials to property owners during the development process.

Solar in the Residential and Commercial Sectors

- *Solarize Fairfax Update* - Solarize Fairfax is a bulk purchasing program that provides discounts to participating homeowners and businesses. From the initiation of the program in 2017 until the middle of 2019, work through this program and its regional partners had resulted in the 156 contracts with Fairfax County residents[91] and the installation of more than 1 Megawatt of solar capacity.[92]
- *Achievement of SolSmart Designation* - In August 2019, Fairfax County also received a Gold designation from the national SolSmart program, a program funded by the U.S. Department of Energy. The County became the first local government in Virginia to reach SolSmart Gold status.[93]

[88] Fairfax County, Final Board Package, March 19, 2019, including copy of C-PACE ordinance, pp. 751-72, *available at* https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2019/board/march19-final-board-package.pdf
Fairfax County, Clerk's Board Summary Report of Actions of the Fairfax County Board of Supervisors, March 19, 2019, p. 44, *available at* https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2019/board/march19-board-summary.pdf;
[89] Department of Procurement and Materials Management, RFP No. 2000002866, *available at* https://www.fairfaxcounty.gov/solicitation/DownloadPDF.aspx?AttachmentID=f0a4f80c-c2ca-4df6-b25b-cc2ada188e81
[90] Kambiz Agazi, July 9, 2019.
[91] Fairfax County Public Affairs, *Solarize Fairfax County Results are In,* September 9, 2019, *available at* https://www.fairfaxcounty.gov/publicaffairs/solarize-fairfax-county-results-are
[92] E-mail from Jessica Lavender, Fairfax County Office of Environmental and Energy Coordination, to Debra Jacobson, July 11, 2019.
[93] Fairfax County Public Affairs, *Fairfax County Becomes the First Local Government in Virginia to Reach SolSmart Gold Status for Advancing Solar Energy Growth,* Aug. 20, 2019, *available at* https://www.fairfaxcounty.gov/publicaffairs/fairfax-county-becomes-first-local-government-virginia-reach-solsmart-gold-status-advancing-solar

To receive this SolSmart designation, the county had to establish processes to make it faster, easier, and less expensive to install a solar energy system by county residents and businesses. The county met these program requirements by:

- Streamlining permitting processes (e.g., same-day building permits for solar systems, no-fee permitting for residential and commercial systems); and
- Providing economic incentives.[94]

Increasing Climate Resilience and Adaptation

Background

EQAC's 2018 Annual Report includes a priority recommendation for *"the development and implementation of a climate resilience/adaptation plan, which would help to minimize the impacts of climate change."*[95] The stated objective of this plan is *"to reduce the adverse impacts of climate change (e.g., flooding, power outages) on local residents, businesses and critical infrastructure and to help reduce the long-term costs of extreme weather events and other climate change impacts."*[96] The rationale for this recommendation is contained in the Climate and Energy Chapter of the 2018 Annual Report.[97] We are pleased that the *Fairfax Green Initiatives* recognized the importance of this issue. This Board Matter stated that the Environmental Committee should discuss *"[i]dentify[ing] [a] timeframe for developing a County-specific Climate Resiliency and Adaptation Plan."*[98] In a detailed letter in March 2019 responding to the recommendations of the 2018 EQAC Annual Report, the county's Chief Financial Officer also recognized the benefits of a county-specific climate resiliency and adaptation plan. He emphasized that:

> *"County staff agree with EQAC's recommendation and believe a more holistic approach to developing a climate adaptation and resilience plan would prove beneficial. While agencies are currently working on adaptation and resiliency projects, the scope of these efforts largely remains confined to individual departments. In preparing this response there was recognition amongst staff that the development of a comprehensive plan would likely identify areas of weakness and missed opportunities and ultimately allow for better coordination and collaboration of disparate efforts in individual agencies."*[99]

The March 2019 letter from the CFO also set forth elements for consideration that provide a strong framework (with some refinements) for the development of a climate resiliency and adaptation plan.

[94] Ibid.
[95] *EQAC 2018 Annual Report*, pp. iii, 138.
[96] Ibid.
[97] Id., pp. 131-37 and data appendix.
[98] *Fairfax Green Initiatives*, p. 2, item 4.f.
[99] Letter from Joseph Mondoro, Chief Financial Officer, to EQAC, March 26, 2019, providing responses to Climate and Energy Recommendation #2 in 2018 EQAC Annual Report.

Path Forward

According to the county's Environmental and Energy Coordinator, the development of the climate resiliency and adaptation plan has been delayed, in part, because some of the contractor work for CECAP will provide baseline data (e.g., historic and projected weather data) necessary to provide a foundation for the development of a resilience plan.[100] In addition, a county resilience plan will build on work from the Coastal Storm Risk Management Study, which was just launched by the Corps of Engineers in 2019.[101] As described in more detail in our 2018 report, the Corps study will investigate flood risks in the vicinity of the region's tidal areas and identify potential solutions to protect critical infrastructure and communities in these areas.[102] MWCOG is coordinating this regional study, and it is partially funded by Fairfax County.

We acknowledge that it may be appropriate to provide some sequencing in the development of the county's energy and climate action plan and its separate resilience plan. However, in recognition of the urgent need to move forward, we have restated our recommendation from last year's report for the county to develop and implement a resilience/adaptation plan. We recommend that the Board of Supervisors move expeditiously to:

- Set a timeline for the development of the County-specific Climate Resiliency and Adaptation Plan, as highlighted in the February 2019 Joint Board Matter;[103]
- Direct the formation of a Steering Committee comprised of pertinent agencies to develop a detailed workplan and budget estimates, initiate plan development, and coordinate with regional and state partners; and
- Approve the necessary budgetary resources.

The CFO's March 2019 letter contains excellent examples of critical actions steps that could be part of a county-specific resiliency plan. Some examples include:

- Evaluation of the county's current efforts that relate to climate change adaptation and resiliency to identify areas of overlap and gaps in the current county strategies;
- Identification of critical facilities for additional infrastructure investment for continuity of operations during extreme weather events;
- Exploration of potential incentives to encourage private property owners and developers to implement resiliency measures;[104]
- Continuation of improved coordination with VDOT and FCDOT to incorporate stormwater solutions into transportation projects; and
- Consideration by the Board of potential additions to the Comprehensive Plan Amendment Work Program and Zoning Ordinance Amendment Work Program to require potential changes related to climate change.

[100] Kambiz Agazi, July 15, 2019.
[101] E-mail from MWCOG staff, July 12, 2019.
[102] *EQAC 2018 Annual Report*, p. 135.
[103] *Fairfax Green Initiatives*, p. 2, item 4.f.
[104] Such incentives would include the new stormwater and resilience financing provided for commercial buildings in the county's new C-PACE legislation.

Importance of State Action on Climate and Energy in Meeting County Goals

EQAC also notes that it is critical for the Board continue and intensify its advocacy efforts in the Virginia General Assembly to remove a variety of barriers in Virginia law that impede the ability of the county government, its residents, and its businesses to increase the use of energy efficiency and renewable energy, to achieve reductions in GHG emissions, and to capture related cost savings. In addition, Virginia needs to consider energy and climate policy approaches that have proven effective in other states.

Fairfax County faces two major types of state legal constraints in pursuing clean energy and climate action strategies. The impact of these impediments is that Fairfax County is forced to address climate change "with one hand tied behind its back." It does not have the tools that are available to many other municipal governments in other states to confront the climate crisis. Therefore, a major goal of the County Board of Supervisors should be to advocate for legislation to reduce these legal constraints and provide new authority to local governments.

The two areas of concern are as follows:

- Constraints related to the "Dillon Rule;" and
- Limitations of State energy law.

First, under the Dillon Rule, which is in effect in 39 states,[105] local governing bodies have only those powers that are expressly granted by the state legislature, those powers fairly or necessarily implied from expressly granted power, and those power which are essential and indispensable.[106] The Dillon Rule is not required in the Virginia Constitution or State law.[107] Instead, the Dillon Rule has "emerged over time in court decisions."[108]

In its 2019 Legislative Program, the Fairfax County Board highlighted the problems posed by the Dillon Rule, as follows:

> *"[A]s a Dillon Rule state, local governments in Virginia are significantly restricted in their authority, which impedes the ability of localities to react quickly and efficiently to emerging problems. In many instances, an overemphasis on statewide uniformity does not adequately consider the particular issues experienced in growing and urbanizing localities in Northern Virginia, limiting the ability of local governments to respond to community standards and priorities.… At a minimum, the state should empower localities to solve their own problems,*

[105] Brookings Institution, *Is Home Rule the Answer? Clarifying the Influence of Dillon's Rule on Growth Management,* Jan. 1, 2003, *available at* https://www.brookings.edu/research/is-home-rule-the-answer-clarifying-the-influence-of-dillons-rule-on-growth-management/ Of the 39 states that apply the Dillon Rule, 31 apply the rule to all municipalities and eight (such as California, Illinois, and Tennessee) appear to use the rule for only certain municipalities. Ten states do not adhere to the Dillon Rule at all.
[106] City of Virginia Beach v. Hay, 258 VA 217, 221, 518 S.E.2d 314,316 (1999).
[107] Robert deVoursney, *The Dillon Rule in Virginia: What's Broken? What Needs to be Fixed?,* University of Virginia Newsletter, July/Aug. 1992, p. 2, *available at* https://vig.cooper-center.org/sites/vig/files/Virginia_News_Letter_1992_Vol._68_No._7.pdf
[108] Ibid.

by providing increased authority or discretion for services that have no compelling priority or impact for the Commonwealth, thus eliminating the need to seek permission for ministerial matters from the [General Assembly] each year."[109]

We would like to highlight the fact that the climate crisis is one of these emerging problems where the limitations of the Dillon Rule significantly restrict the county's authority to pursue key policy initiatives to address the problem and reduce GHG emissions. For example, the state residential building energy code in Virginia has not adopted provisions of the most advanced building energy codes; at least a dozen states have required much higher levels of energy efficiency.[110] Yet, under current law, Fairfax County does not have authority to adopt a building energy code more stringent than the state standard.

Similarly, in light of the Dillon Rule, mandatory requirements for benchmarking the energy efficiency performance of commercial buildings do not appear to be allowable in Fairfax County without specific State authorizing legislation. In a major report in 2017, the Virginia Energy Efficiency Council (VAEEC) stressed that *"[b]enchmarking building energy data is a critical first step for a building owner or facilities manager to improve energy performance over time."*[111] To pursue this important energy saving approach, the VAEEC recommended new State legislation to grant *"localities the authority to enact mandatory benchmarking programs for commercial buildings…."*[112]

Second, Virginia energy law also creates a large number of impediments to development of energy efficiency and renewable energy and fails to include a significant number of policy approaches that have been used successfully in many states. For example, Virginia energy law creates a large number of barriers to the adoption of customer-sited renewable energy.

The so-called Solar Freedom legislation was introduced in the 2019 session of the Virginia General Assembly to remove eight specific barriers to customer-sited solar development.[113] Examples of the barriers that the legislation would have removed include the following:

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[109] Fairfax County, VA 2019 Legislative Program, p. 7, adopted December 4, 2018, *available at* https://www.fairfaxcounty.gov/boardofsupervisors/sites/legislation/files/assets/documents/pdf/2019/adopted-2019-ga-program-12-4-2018-a-1a.pdf

[110] U.S. Department of Energy, *Status of State Energy Code Adoption*, Dec. 2018, *available at* https://www.energycodes.gov/status-state-energy-code-adoption For example, wall and ceiling insulation requirements in VA's residential building code reflect the 2012 model International Energy Conservation Code (IECC) rather than the 2015 or 2018 IECC.

[111] Virginia Energy Efficiency Council, *Why Energy Efficiency is a Smart Investment for Virginia: Making the Business Case for Energy Efficiency*, 2017, p. 15, *available at* https://vaeec.org/wp-content/uploads/2017/05/VAEEC-2017-Report-FINAL.pdf

[112] Ibid.

[113] HB2329, *available at* https://lis.virginia.gov/cgi-bin/legp604.exe?ses=191&typ=bil&val=HB2329 and SB1456, *available at* https://lis.virginia.gov/cgi-bin/legp604.exe?ses=191&typ=bil&val=SB1456

- Limitation on all power purchase agreements in Virginia Dominion Energy territory to 50 MW of capacity. It is expected that this limit will be reached in the next year, threatening the growth of solar in Virginia.[114]
- Restriction on the owner of a multi-family residential building installing a solar facility on the building or surrounding property and selling the electricity to tenants.

To its credit, Fairfax County worked closely with a coalition to advocate for the Solar Freedom legislation in 2019. However, this legislation was defeated in the House and Senate Commerce and Labor Committees.

Some examples of highly effective state energy policies that are lacking in Virginia are:

- A mandatory Energy Efficiency Resource Standard, that requires electric utilities and natural gas distribution utilities to meet annual, long-term targets for reducing energy use;[115] and
- A mandatory Renewable Energy Portfolio Standard, that requires that an electric utility generate a certain percentage of its electricity from renewable energy sources.[116]

In conclusion, Fairfax County could greatly benefit in its efforts to expand clean energy and reduce GHG emissions by the enactment of a variety of state laws.

COMMENTS

1. **Greenhouse Gas Reductions**
   During the past year, the Board established a solid foundation for the development of a Community-Wide Energy and Climate Action Plan (CECAP) with funding of staff positions and contractor resources and with the approval of the framework for plan development. However, the county faces challenging work ahead to complete the plan and achieve major GHG reductions. In parallel with the process of developing the CECAP, it is important for the Office of Environmental and Energy Coordination to continue to pursue individual priority actions to reduce GHG emissions in the private sector.

2. **Advocacy Efforts in Virginia General Assembly**
   EQAC commends the county for its strong advocacy in support of Solar Freedom legislation in the 2019 session of the Virginia General Assembly. EQAC recommends that the Board continue and intensify its advocacy efforts in the Virginia General Assembly to remove a variety of barriers in Virginia law that impede the ability of the county government, its residents, and its businesses to increase the use of energy efficiency and renewable energy, to achieve reductions in GHG emissions, and to capture related costs savings. In addition,

[114] Letter from Tony Smith, President, Secure Futures, to Dave Eichenlaub, VA State Corporation Commission, June 24, 2019.
[115] Michael Gerrard and John Dernbach, *Legal Pathways to Deep Decarbonization in the United States*, Environmental Law Institute, p. 603, 2019. At least 23 states have enacted mandatory Energy Efficiency Resource Standards.
[116] Id., p. 602. Approximately 30 States have enacted mandatory Renewable Portfolio Standards.

Virginia needs to consider energy and climate policy approaches that have proven effective in other states.

3. **Energy Management Best Practices**
   As the County Executive implements the new Office of Environmental and Energy Coordination, EQAC urges the incorporation of key energy management best practices, as discussed in this chapter.

4. **Fairfax Green Initiatives**
   EQAC commends the Board for adoption of the February 2019 Joint Board Matter on *Fairfax Green Initiatives* and further commends the Board for requiring the establishment of SMART goals for the action items in this Board Matter.

5. **Green Building Policies**
   EQAC strongly supports the strengthening of Green Building Policies to improve the energy performance of county facilities. The Board's policy review should consider net energy zero buildings and other options to the current LEED standard used by the county.

6. **Solar Installations**
   EQAC commends the Board for the issuance of its Request for Proposal to install solar panels on county buildings and schools. This procurement represents the largest procurement in Virginia history for solar by a municipality.

7. **Supply Chain Sustainability Program Pilot**
   EQAC supports the Supply Chain Sustainability Program Pilot of the Department of Procurement and Materials Management and encourages its expansion.

8. **C-PACE Outreach**
   In implementing its new C-PACE program, EQAC supports efforts to place a priority on marketing, outreach, and education about C-PACE to commercial property owners.

RECOMMENDATIONS

1. **Community-Wide Energy and Climate Action Plan**
   EQAC recommends that Fairfax County continue its development of a Community-Wide Energy and Climate Action Plan to reduce GHG emissions in the private sector, which is the source of 97 percent of the county's GHG emissions. Development of this plan would be in accordance with the goals established by the 2017 Environmental Vision and regional (MWCOG) climate goals.

2. **Climate Adaptation/Resilience Plan**
   EQAC recommends that the Board of Supervisors direct the development and implementation of a climate adaptation/resilience plan, which would help to minimize the impacts of climate change. The objective of this adaptation/resilience plan would be to reduce the adverse impacts of climate change (e.g., flooding, power outages) on local

residents, businesses, and critical infrastructure and to help reduce the long-term costs of extreme weather event and other climate change impacts.

3. Emissions Inventory

In order to help the public to evaluate the benefits of specific actions to reduce greenhouse gas emissions, EQAC recommends that the Board ask county staff to provide an emissions inventory for the entire county, county operations, and FCPS so that detailed GHG emissions reports can be prepared by year. Moreover, EQAC asks that the Board request that the MWCOG climate inventory provide information by jurisdiction along with steps that are being taken to reduce GHG emissions.

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VII. AIR QUALITY

Board of Supervisors Environmental Vision:
"The county also will continue to support attainment of air quality through regional planning and action."
[Excerpt from the vision statement for the Climate and Energy core service area][1]

In addition to the above vision statement, the board's Environmental Vision document includes the following supporting objective: *"Ensure Fairfax County's cooperation in regional compliance with federal primary and secondary national air quality standards."*

INTRODUCTION

Fairfax County, as part of a federal-state-regional-local partnership, has worked for the last several decades to improve air quality. While air quality is a regional issue that is beyond the control of any one state or local government, governments at all levels play important roles in identifying measures that are needed to improve air quality and in implementing related strategies. In the metropolitan Washington, DC area, air quality planning efforts have been focused on regional strategies to bring the area into attainment with all federal air quality standards (the National Ambient Air Quality Standards, or NAAQS), and the Metropolitan Washington Council of Governments (MWCOG), through the Metropolitan Washington Air Quality Committee (MWAQC), has coordinated, and continues to coordinate, these efforts.

Looking back over the past two decades, there is much to celebrate in the area of air quality. The region has made tremendous progress in its air quality thanks to actions at the federal, state, and local government levels, including new regulations to reduce emissions from power plants, passenger vehicles, and heavy-duty diesel engines as well as programs to improve energy efficiency and renewable energy use. We still exceed the federal ozone standard on too many days, but the number of days each year that have exceeded the current eight-hour ozone standard has decreased markedly, and other measures of ozone concentrations follow a similar pattern. The region is also in attainment of the NAAQS for fine particulate matter, despite being identified as a non-attainment area as recently as 2009 and despite a strengthening of the annual standard for fine particulate matter since that time. However, there are ongoing threats to air quality that need to be monitored – for example, the anticipated relaxation of Corporate Average Fuel Economy (CAFE) standards for cars and light trucks (https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-proposed). Climate change presents another threat to the county's future air quality because rising temperatures speed up the formation of ground-level ozone and lead to more violations of the ozone standard.

The county's major responsibilities in the partnership involve participation and coordination with regional and state organizations on plans intended to reduce air pollution and improve air quality, as well as the implementation of local programs that help to minimize or eliminate air pollution. This air quality chapter focuses on: criteria pollutant air quality matters, such as ground-level

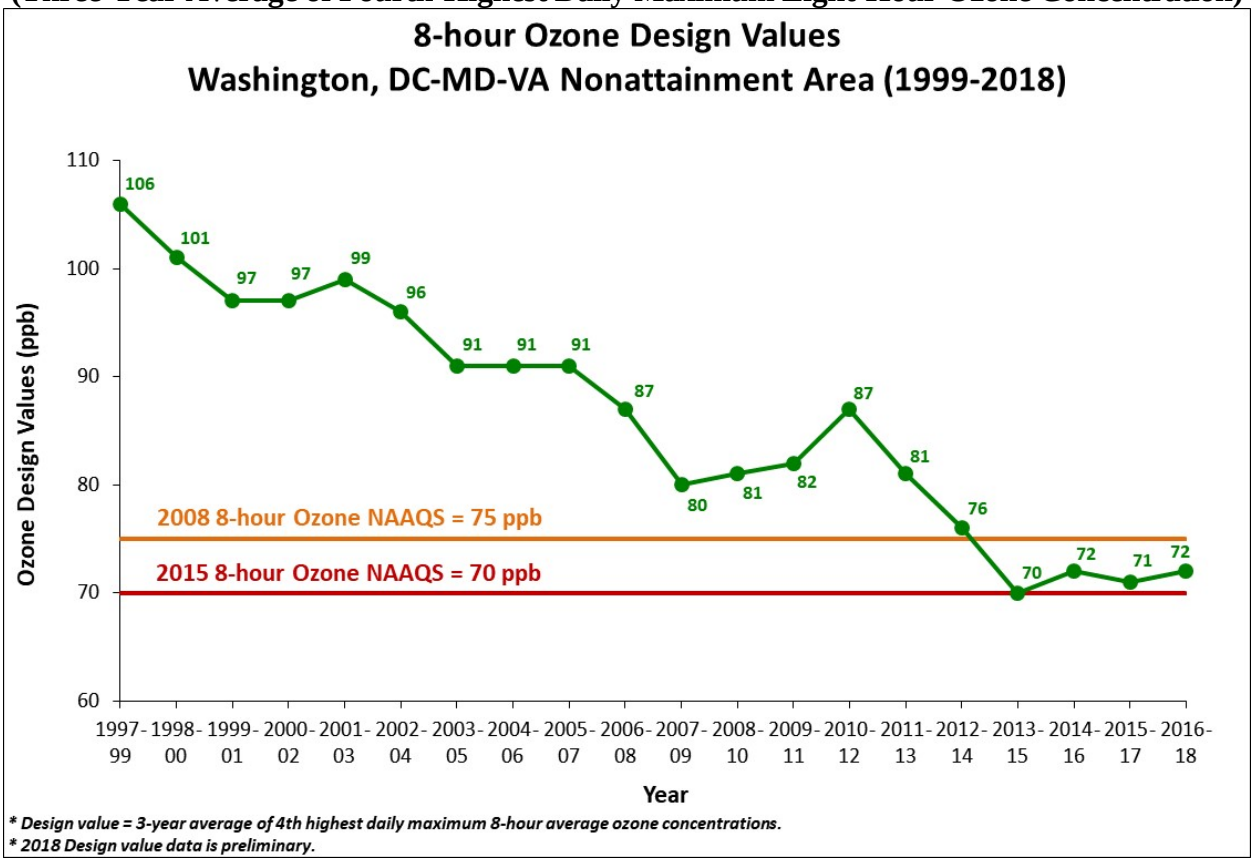
[1] 2017 Fairfax County Environmental Vision, Section 2 F, pg. 28, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

ozone, fine particulate matter, nitrogen dioxide, sulfur dioxide and lead; air quality monitoring; emissions from motor vehicles; and public agency responsibilities. The county also has activities related to climate and energy; however these are described in Chapter VI of this report rather than this chapter.

CURRENT STATUS OF AIR QUALITY IN FAIRFAX COUNTY

NAAQS have been established for major criteria pollutants as described below, including ground-level ozone and fine particulate matter. Fairfax County relies on data provided by MWCOG to assess the status of the Washington, DC metropolitan area, including Fairfax County, relative to these standards. For example, Figure VII-1 shows the eight-hour ozone design value in the metropolitan area over the period from 1999 to 2018. The eight-hour ozone design value is the three-year average of the fourth-highest daily maximum eight-hour ozone concentration in the metropolitan area and is used to assess compliance with the NAAQS. The supporting Data Appendix provides additional data for ozone and fine particulate ($PM_{2.5}$) over a multiple-year period of monitoring for the metropolitan area.

Figure VII-1. Ozone Design Value in Relation to 2008 & 2015 Eight-Hour Ozone Standards (Three-Year Average of Fourth-Highest Daily Maximum Eight-Hour Ozone Concentration)



Source: Metropolitan Washington Council of Governments.
Note: 2018 data are preliminary and may change.

Ground-Level Ozone

Ground-level ozone, colloquially called "smog," can cause breathing problems for sensitive persons, especially those with asthma.

On May 21, 2012, the U.S. Environmental Protection Agency (EPA) published final designations for areas under the 2008 ozone NAAQS, which is set at 75 ppb. In July 2012, the Washington region was designated as a "marginal" nonattainment area for the 2008 ozone standard of 75 ppb. The region has been progressively improving ozone air quality, so state air agencies of the District of Columbia, Maryland, and Virginia requested that EPA extend the attainment date by one year. EPA granted the request in April 2016.

EPA published a formal determination of attainment with the 2008 ozone NAAQS for the Washington DC-MD-VA area on November 14, 2017 (82FR52651). This publication noted the improvement in air quality achieved by the area and concluded that the area attained the 2008 ozone NAAQS based on 2013-2015 air quality data. The Commonwealth of Virginia submitted a final 2008 ozone NAAQS redesignation request and maintenance plan for the Washington DC-MD-VA marginal nonattainment area on January 3, 2018. EPA approved these submissions and redesignated the area to attainment/maintenance for the 2008 ozone NAAQS on April 15, 2019 (84FR15108).

On October 26, 2015, EPA published a more stringent standard, lowering the ozone standard to 70 ppb. Based on the 2014-2016 ozone data, Virginia recommended to EPA that the Northern Virginia area, including Fairfax County, be designated as a marginal nonattainment area for the 2015 ozone NAAQS. On June 4, 2018, EPA published designations and classifications for the 2015 ozone NAAQS (83FR 25776). EPA designated the Northern Virginia area a marginal nonattainment area for the 2015 ozone NAAQS, effective August 3, 2018. The region is required to conduct an emissions inventory. State governments and localities may need to implement new measures to reduce ozone pollution if the region does not attain the 2015 standard by August 3, 2021.

Monitors in the metropolitan region recorded data on nine days during the 2018 ozone season when ozone values were greater than the 70 ppb standard (2015 standard). Eight of these days were all noted as "Code Orange" (unhealthy for sensitive groups). One day was "Code Red" (unhealthy), and none were "Code Purple" (Very Unhealthy).

Fine Particulate Matter

Data show that the region continues to comply with both the annual (12 $\mu g/m^3$) and daily (35 $\mu g/m^3$) standards for fine particulate matter ($PM_{2.5}$). Based on data for 2015 – 2017, the annual design value for $PM_{2.5}$ was 9.2 $\mu g/m^3$ (relative to the 12 $\mu g/m^3$ standard) and the 24-hour (daily) design value was 21 $\mu g/m^3$ (relative to the 35 $\mu g/m^3$ standard). Additional improvements are expected due to additional retirements of older electrical generating units and other changes that reduce the emissions of sulfur dioxide (SO_2), a precursor to $PM_{2.5}$.

Since the Washington region is in attainment of the $PM_{2.5}$ standards, it is no longer required to perform transportation conformity analyses for any $PM_{2.5}$ standard.

Nitrogen Dioxide—NO_2

On February 9, 2010, EPA published a revised NAAQS for nitrogen dioxide (NO_2), strengthening the health-based standard to 0.10 ppm over an hour. The standard required monitoring to occur near roads, in areas with high community-wide NO_2 concentrations, and in low income or minority at-risk communities. All of Virginia, including Fairfax County, and the entire DC-MD-VA area are designated "unclassifiable/attainment" for the 2010 NO_2 NAAQS (for Fairfax County, this is due to a lack of three years of certified data). This designation may change when three years of certified data are available from near-road sites. Fairfax County has one near-road monitoring station (in Springfield); data collection began at that site in April 2016. To date, the site has not monitored any exceedances of the 2010 NO_2 NAAQS.

Sulfur Dioxide--SO_2

On June 22, 2010, EPA published a revised NAAQS for sulfur dioxide (SO_2) by establishing a new one-hour standard of 0.075 ppm (75 FR 35520). All monitoring data for Virginia demonstrate compliance with this standard. EPA published the 2010 SO_2 NAAQS Data Requirements Rule on August 21, 2015 (80 FR 51052). Under this rule, states must model or monitor air quality around sources that emit 2,000 tons per year or more of SO_2. No such facilities are located in Fairfax County. EPA published final designations for most Virginia jurisdictions on January 9, 2018 (83FR1166). This publication listed Fairfax County as Attainment/Unclassifiable for this standard.

Lead--Pb

On November 12, 2008, EPA published a revision to the NAAQS for lead and associated monitoring requirements (73 FR 66964). This rule set the standard at 0.15 $\mu g/m^3$. All areas in Virginia are designated as attainment or unclassifiable for the 2008 Lead NAAQS (76 FR 72097).

REVISIONS TO STANDARDS

EQAC is not aware of any ongoing or completed activities by EPA in 2018 to update or revise NAAQS for major criteria pollutants. However, regulatory actions related to these NAAQS may have impacts on Fairfax County.

Cross State Air Pollution Rule Update

On September 7, 2016, EPA finalized an update to the Cross State Air Pollution Rule (CSAPR) to address the 2008 ozone NAAQS. Beginning May 2017, the CSAPR update reduced summertime nitrogen oxides (NO_X) from electric generating units in 22 eastern states. There may be indirect benefits to Fairfax County from these reductions in summertime NO_X, even though the county has no affected electric generating units.

Reasonably Available Control Technology

The Clean Air Act establishes that all major stationary sources of volatile organic compounds (VOC) and NO_X located in the Ozone Transport Region, which includes Fairfax County, must install Reasonably Available Control Technology (RACT) to support each promulgated ozone standard. EPA published final rules supporting this requirement for the 2008 ozone standard on March 6, 2015 (80 FR 12264). The Virginia Department of Environmental Quality (VDEQ)

has notified subject facilities and is working on reviewing RACT analyses. There are two major stationary sources requiring RACT reviews that are located in Fairfax County: Fort Belvoir and Covanta Fairfax. Based on the Covanta submittal, VDEQ determined that additional controls are needed at the Covanta facility in order to satisfy RACT requirements. VDEQ issued a permit dated February 8, 2019, that reduced the NO_X limitations on the units at the facility from 205 parts per million (ppm) to 90 ppm on an annual average and 110 ppm on a 24-hour average. To meet these limitations, the facility is installing NO_X controls on a schedule such that two units must be controlled by the end of 2019, an additional unit must be controlled by the end of the 4th quarter 2020, and the fourth unit must be controlled by the end of the 4th quarter 2021. NO_X emissions from this facility should decrease by approximately 50% from previous levels once controls are installed on all four units.

AIR QUALITY MONITORING

Fairfax County does not have an air quality monitoring program; it works with the Metropolitan Washington Council of Governments (MWCOG) to assess air quality in the region. VDEQ has responsibility for air quality monitoring in Fairfax County in addition to air quality facility inspections. It provides current air quality and forecast data for Northern Virginia and other regions at http://vadeq.tx.sutron.com/cgi-bin/air_quality_forecast.pl.

The Franconia site in Lee District Park is the only Fairfax County site that meets regulatory requirements for determining ozone exceedances.

EMISSIONS FROM MOTOR VEHICLES

Overview

One of the key issues related to ozone nonattainment and other air quality concerns is the use of motorized vehicles and their emissions. There is extensive use of motor vehicles in Fairfax County, including a significant number that do not pass the required emissions testing. The Transportation chapter of this report includes information about daily vehicle miles traveled and characteristics of commuting by Fairfax County residents.

VDEQ operates a motor vehicle inspection and maintenance (IM) program in Northern Virginia. This program requires that vehicles subject to inspection pass an emissions test every two years in order to register or re-register with the Virginia Department of Motor Vehicles. In 2018, 836,387 initial emissions inspections were performed in Northern Virginia, with an overall fail rate of 2.4 percent. Vehicles registered in Fairfax County represent approximately 43 percent of the IM fleet in the area. Vehicle owners have the option of visiting an emissions inspection station or using VDEQ's RapidPass program, which allows up to 30 percent of the IM fleet's cleanest vehicles to receive a clean screen by driving through on-road remote sensing devices. RapidPass allows vehicle owners to redeem clean screens online in lieu of submitting their vehicles for a traditional station emissions inspection. In calendar year 2018, the RapidPass identified 229,831 eligible RapidPass candidates within the IM area and 71,317 clean screen notices were sent to vehicles registered in Fairfax County. Of those, approximately 58 percent of owners opted to redeem them.

In addition to RapidPass, DEQ uses on-road remote sensing devices to identify vehicles with very high exhaust emissions in excess of standards. All 1968 and newer gasoline-powered vehicles registered in the IM area are subject to this high emitter program, even if they are not subject to the biennial emissions inspection requirement. Owners of these high emitting vehicles are sent a Notice of Violation (NOV) and must have their vehicle inspected by an emissions inspection station within 30 days of receipt of the NOV. Owners must repair these vehicles or receive a waiver from VDEQ if repair costs exceed the waiver threshold. In 2018, VDEQ issued 896 high emitter NOVs, of which 325 were issued to vehicles registered in Fairfax County.

VDEQ began implementing an evaporative emissions advisory program in 2018, which also uses on-road remote sensing devices to identify vehicles with very high evaporative emissions and sends owners of these vehicles an advisory notice. Evaporative emissions include hydrocarbons released separate of tailpipe exhaust emissions and may indicate the presence of a liquid or vapor fuel leak. These types of fuel leaks not only adversely affect air quality but may also pose a safety or fire hazard. Unlike high emitter NOVs, these advisory notices do not require the vehicle owner to submit the vehicle for inspection; they simply advise the owner of the potential evaporative emissions leak and recommend they have the vehicle examined. Since this is an advisory-only program, any Virginia-registered vehicle that travels through a remote sensing location and is identified as having very high evaporative emissions may receive a notice. There were 93 advisory notices sent in 2018.

Alternatives to Use of Motor Vehicles

The Fairfax County Board of Supervisors has directed the Fairfax County Department of Transportation (FCDOT) to lead the effort to improve bicycle and pedestrian safety and mobility, including constructing bicycle and pedestrian improvements in high-priority areas of Fairfax County. These efforts are described in the Transportation chapter (Chapter II) of this report.

Volkswagen Settlement Agreement

The Volkswagen Corporation (VW) established a $2.925 billion environmental mitigation trust as part of settlement agreements with the U.S. Justice Department. States and Tribes may use funds from the Trust to implement certain mitigation actions intended to fully mitigate the excess NO_X emitted by over 500,000 VW diesel vehicles in violation of federal emission standards. Virginia's allocation from the Trust is $93.6 million. VDEQ is managing the implementation of the Trust through a beneficiary mitigation plan. The overall goal of this Plan is to mitigate approximately 2,095 short tons of excess lifetime NO_X emitted by more than 16,000 offending VW diesel vehicles registered in Virginia. This will be accomplished by investing in technologies that provide cost-effective, near-term emissions benefits (e.g., low NO_X) coupled with investments in zero emission technologies to accelerate deployment of light-duty vehicles, buses, trucks, and equipment that may cost more in the near-term but provide long-term emissions benefits. To date, Virginia has allocated 15 percent for light duty electric vehicle charging infrastructure and 15 percent for public all-electric transit buses.

AGENCY/PARTNERSHIP EFFORTS

Metropolitan Washington Air Quality Committee (MWAQC)

Although compliance with National Ambient Air Quality Standards and resulting air quality management responsibilities is a function of federal law, in Fairfax County and other major metropolitan areas in Virginia, these responsibilities have been split between the Commonwealth of Virginia and the regional lead planning organization as defined by Section 174 of the Clean Air Act. MWAQC was established to work cooperatively with state air agencies to conduct interstate air quality attainment and maintenance planning for the Metropolitan Washington region. Three members of the Fairfax County Board of Supervisors currently serve on the committee. Kambiz Agazi, Environmental & Energy Coordinator for Fairfax County, and staff from the Fairfax Health and Transportation departments also attend MWAQC meetings for Fairfax County.

Members of MWAQC and all lead planning organizations are appointed by the governors of affected jurisdictions to represent areas included in air quality planning requirements. MWAQC works with state departments of transportation and transit providers in identifying transportation needs and priorities. More information about MWAQC, including its bylaws, is available at: www.mwcog.org/committees/metropolitan-washington-air-quality-committee/.

MWAQC Subcommittee System

MWAQC operates through a subcommittee system. Subcommittees include:

- *The Air & Climate Public Advisory Committee (ACPAC)* - This special joint subcommittee advises MWCOG's Metropolitan Washington Air Quality Committee (MWAQC) and Climate, Energy and Environment Policy Committee (CEEPC) on air quality, climate, and energy issues and initiatives. ACPAC provides a forum for members to provide input to local elected officials and staff on environmental policy issues and stay informed of local and regional progress.
- *Attainment Subcommittee* - This subcommittee considers evidence for the case that the Washington nonattainment area can attain the eight-hour ozone standard.
- *Emissions Inventory Subcommittee* - This subcommittee oversees the development of emissions inventories for air quality plans.
- *Control Measures Workgroup* - This workgroup was established to research emission-reducing control measures and develop a plan of control measures for the region to implement in an effort to reach attainment for ozone.
- *Transportation Conformity Subcommittee* - This subcommittee reviews Air Quality Conformity Determinations prepared by the Transportation Planning Board (the federally designated metropolitan planning organization for Metropolitan Washington) 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).

Special Project: *"What We Can Do to Improve Air Quality in the Washington Region"*

MWAQC has been working on a project to analyze measures that could be implemented or expanded in the region, especially local actions to improve air quality and reach a goal of no

unhealthy air days, since 2017. Many of the actions identified, such as energy efficiency, renewable energy, and electric vehicle adoption, also reduce greenhouse gas emissions or provide other societal benefits. The list of measures and associated cost and benefits estimates were presented at May and July 2018 MWAQC meetings and are summarized in a report entitled *"What We Can Do to Improve Air Quality in the Washington Region"* published in July 2018. Subsequent to this, two webinars were held in December 2018 and February 2019 to discuss a number of measures and their possible implementation by local governments in the region. The effort will be continued through 2020.

MWAQC Activities

MWAQC staff participates in the Mid-Atlantic Regional Air Management Association (MARAMA) to follow their development of emissions inventories. MARAMA also evaluated various ozone NAAQS attainment scenarios using a regional photochemical model for the ozone NAAQS. Staff also kept track of various emissions control measures and rules being developed by the Ozone Transport Commission as part of the implementation of the 2015 ozone standard.

In 2018, MWAQC commented on the transportation conformity analysis (Visualize 2045). Conformity was tested against the two tier (Tier 1 & Tier 2) mobile budgets in the region's maintenance SIP for the 2008 ozone standard. The conformity analysis showed current and future mobile emissions lower than the Tier 1 maximum allowable VOC and NO_X mobile budgets except for 2025 and 2030 where they were higher. Tier 2 mobile budgets (with higher allowable VOC and NO_X mobile budgets) were used to demonstrate conformity for those two years.

MWAQC commented on a number of proposed federal rule changes such as SAFE Vehicle Rule for CAFE and Tailpipe Carbon Dioxide Emissions Standards for Model Year 2021-2026 Light-Duty Vehicles, Strengthening Transparency in Regulatory Science, Affordable Clean Energy (ACE) Rule, and the rule to Revise Supplemental Cost Finding for Mercury and Air Toxics Standards (MATS).

MWAQC FY 2020 Work Program

For FY 2020, MWAQC will continue to work to meet the 2015 ozone NAAQS. Support will be provided to local members to implement air quality initiatives to help meet the 2015 ozone standard and beyond to improve the air to protect public health. In FY 2020 MWAQC Core Program objectives include:

- Development of the base year inventory for 2015 ozone NAAQS.
- Work with local members to implement initiatives to reduce air pollution.
- Review and comment on transportation conformity assessments for ozone.
- Communicate to regional leaders and the public on actions needed to improve air quality.
- Continue working on the "What We Can Do" effort to identify measures and provide technical help in the possible implementation of such measures by local governments to help improve the air quality in the region.
- Manage a Diesel Idle Reduction Campaign and Driver Recognition Program for the metropolitan Washington region's truck and motor coach drivers to raise awareness of idle reduction and encourages compliance with idling laws.

Transportation Planning Board

The Transportation Planning Board (TPB), which also is part of MWCOG, serves as the designated metropolitan planning organization for the Metropolitan Washington region and is responsible for regional transportation planning and air quality conformity analysis. The TPB makes transportation investment decisions for the metropolitan area and, by default, for the individual regions encompassed within MWAQC. Fairfax County currently has four members of the Board of Supervisors serving on TPB. TPB and MWAQC work together on air quality and transportation issues.

Clean Air Partners

Clean Air Partners is a is a nonprofit 501(c)(3) partnership chartered by MWCOG and the Baltimore Metropolitan Council that educates the greater metropolitan Baltimore-Washington region about the health risks associated with poor air quality and the impacts everyday actions have on the environment. For 20 years, Clean Air Partners has been dedicated to empowering individuals and organizations to take simple actions to protect public health, improve air quality, and reduce greenhouse gas emissions. Additional information is available at: www.cleanairpartners.net/.

COMMENTS

1. **Environmental Quality Measures and Economic Success**
   EQAC commends Fairfax County for using data about air quality as a proxy for a general indicator of environmental quality in the county as part of its outreach materials about economic success. This measure is based on the percent of days in a calendar year when the air quality was reported as being either moderate or good, and the county reported a score of at or above 98 percent over the past four years (www.fairfaxcounty.gov/economic-success/air-quality). EQAC supports the county's efforts to integrate environmental quality measures into the county's outreach materials about economic success, and encourages it to explore additional environmental measures to include in that effort.

2. **County Support for Air Quality**
   EQAC appreciates that the county continues to support participation in and attendance at Metropolitan Washington Council of Governments' Air Quality Committee meetings and meetings of MWAQC's Technical Advisory Committee and subcommittees. In addition, EQAC appreciates that county staff: collaborates with other local, regional and national air quality organizations, such as Clean Air Partners; provides support to address board matters related to air quality and the environment; provides for interagency coordination on efforts to reduce air pollution; performs legislative reviews; and encourages county residents and others to take voluntary actions to improve air quality.

3. **Funding for Non-Motorized Transportation**
   EQAC supports the efforts of Fairfax County, the Virginia Department of Transportation, and the Virginia Commonwealth Transportation Board to provide funding to programs that further the availability and use of non-motorized transportation alternatives for Fairfax

County. This includes the efforts by FCDOT to improve bicycle and pedestrian safety and mobility, including constructing bicycle and pedestrian improvements in Fairfax County.

RECOMMENDATIONS

None.

REFERENCES

MWCOG e-mail to Joe Gorney, EQAC. July 2, 2019.
VDEQ e-mail from Doris McLeod to Joe Gorney, EQAC. June 6, 2019.

VIII. WILDLIFE MANAGEMENT

Board of Supervisors Environmental Vision:
"Actively manage urban ecological stressors such as overabundant white-tailed deer, non-native invasive vegetation, forest pests, urban stormwater flows, soil compaction and erosion, and others."[1]
[Excerpt from the vision statement for the Parks and Ecological Resources core service area]

INTRODUCTION

The Fairfax County Sustainability Initiatives[2] document provides good context about the need for active management of the county's ecological resources:

> *"Until a few decades ago, land management consisted of benign neglect, with areas left alone under the assumption that they were self-sustaining. Land management professionals now understand that there are tremendous pressures on remaining natural areas, that their conditions are declining and that active management is necessary to restore their health.*
>
> *Today, natural resources are considered natural capital.… Natural capital is not self-sustaining; instead, deliberate care and investment are required to enhance, protect and preserve it."*

As with other natural capital, such as land, water, and vegetation, wildlife must also be actively managed to varying degrees to achieve and maintain sustainable population levels within a suburban landscape, which generally presents less suitable habitat that is more fragmented, has fewer natural predators for certain species, and has increased chances of negative human-wildlife interactions. Within the county, the two species that present the most significant challenges to attaining this sustainable balance are white-tailed deer and Canada geese, with uncontrolled deer populations by far posing the greatest risk. While both species are native to our region, the anthropogenic changes within a suburban landscape like Fairfax County result in a situation where each has the potential to cause significant negative impacts on the county's ecological resources and negatively impact public health and safety as well.

The Fairfax County Park Authority (FCPA) has a progressive, stepwise Wildlife Conflict Policy (Policy 202[3]) used to guide actions in addressing human-wildlife conflicts. EQAC commends the Fairfax County Police Department (FCPD) for continuing to fund and staff the Deer Management Program and the Canada Geese Management Program.

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[1] 2017 Fairfax County Environmental Vision, Section 2 E, pg. 24, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf
[2] 2017 Fairfax County Sustainability Initiatives, pg. 67, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/sustainability-initiatives-report-fy2018.pdf
[3] Fairfax County Park Authority Policy Manual www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/administrative/park-policy-manual.pdf

This chapter focuses on wildlife management efforts for these two most challenging species (deer and geese), but also covers other mammals, including feral cats, and includes a section on wildlife borne diseases in the county.

WHITE-TAILED DEER

Overview/Environmental Impact

The high population of white-tailed deer in Fairfax County adversely affects public safety, public health, and the ecological sustainability of the county's natural resources. Increased habitat modification, loss of natural habitat, reduced hunting pressures, and a loss of natural large predators contribute to this 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, such as determining the optimum "cultural carrying capacity" (the number of deer a region can support while avoiding unacceptable levels of human-wildlife conflict) and means to control populations, when needed. The sport hunting community, recreational nature lovers, residential property owners, wildlife biologists/managers, environmental preservationists, and animal rights/welfare groups have widely differing viewpoints on these issues. However, most residents recognize the need to take action due to the numerous and severe impacts of overabundant deer.

The Fairfax County Board of Supervisors is ultimately responsible for determining the county's policy on deer management and should work with staff and stakeholders to create and implement a safe, effective, and humane deer management program.

Data Collection

The population of deer that a healthy eastern forest ecosystem can support without damage to the native plant community and other animal species that these plants support is estimated to be between 10 and 25 deer per square mile.[4,5] With populations at this level, the overall health of the herd and the ability for the forests and general habitat to regenerate will be in balance with herbivory pressure from deer and the risk of deer-vehicle collisions, and the destruction of property will be lowered. Prior to the implementation of the county's management program, the Virginia Department of Game and Inland Fisheries (VDGIF) estimated deer density levels ranging from 90-419 deer per square mile throughout Fairfax County parks. FCPD and FCPA have used camera surveys and aerial infrared surveys to estimate deer density in selected county parks. Deer density varies among parks with many sites in Fairfax County currently estimated at a minimum of 40 - 100 deer per square mile.[6]

[4] Virginia Deer Management Plan 2015-2024, Virginia Department of Game and Inland Fisheries www.dgif.virginia.gov/wildlife/deer/management-plan/

[5] Deer Can Be Too Many, Too Few, or Just Enough for Health Forests, US Forest Service Northern Research Station, Research Review No. 16 www.fs.fed.us/nrs/news/review/review-vol16.pdf

[6] FCPD, Wildlife Management Specialist Office Website, Deer Management Frequently Asked Questions www.fairfaxcounty.gov/wildlife/deer-management-frequently-asked-questions

Monitoring data are imperative to guide deer management decisions and inform whether current management efforts have sufficiently reduced the deer population to a more sustainable level, for which reduced safety hazards and ecosystem recovery goals can be realized. Unfortunately, conducting countywide deer population estimates or vegetation browse impact surveys is not feasible, as staff and funding limitations, coupled with private property access issues, make the collection of statistically valid data impractical. However, surveys of smaller areas, such as the individual parks included in the Deer Management Program, are possible.

Field studies continue to be conducted by FCPA and the Wildlife Management Specialist Office to estimate the density of white-tailed deer and assess the impact of deer on native plant communities on park properties. These data can be used by biologists to better inform future deer management activities. EQAC strongly encourages the continued pursuit of building rich data sets to establish an archive of evidence documenting the impact of deer and the results of the Deer Management Program.

Data collected within parks in the Deer Management Program, and from other sources, include the following:

- Browse Impact Surveys - 523 permanent plots established
  - 2015: 16 parks (166 unique plots)
  - 2016: 15 parks (148 unique plots)
  - 2017: 21 parks (176 unique plots)
  - 2018: 24 parks (186 unique plots)
  - 2019: 14 parks (114 unique plots)
  - White-tailed deer browse impact data have been published to the county's enterprise geographic information system (GIS) database. Public access to this data is anticipated at a later date.

- Deer Density Camera Surveys
  - 2015: 13 parks (26 camera stations)
  - 2016: 33 parks (48 camera stations)
  - 2017: 21 parks (45 camera stations)
  - 2018: 22 parks (40 camera stations)
  - 2019: 21 parks (28 camera stations)

- Aerial infrared (FLIR) surveys with fixed-wing aircraft
  - 21 parks were surveyed in winter 2013-2014

- Deer-Vehicle Collision Data
  - Police records and Virginia Department of Transportation (VDOT) work orders (see Table A-VIII-1 and Figure A-VIII-1 in the Data Appendix for details)

Game camera surveys and/or aerial infrared/forward-looking infrared (FLIR) surveys with fixed-wing aircraft, which are used for population estimates, have been conducted in approximately 80 percent of the parks included in the Deer Management Program from 2013-2019. FCPD and FCPA have consistently collected deer population and browse impact data since 2015 and are

planning to continue and expand survey efforts to collect data on parks undergoing deer management on a five-year rotational schedule, dependent on staffing and available resources. In fact, all of the browse impact data collected in 2019 represented re-surveys of previously monitored plots, providing the opportunity to begin to develop trend analyses to: evaluate the effectiveness of the program strategies; determine if and when impacts have been sufficiently mitigated; and determine if management efforts for white-tailed deer can be transitioned from reduction efforts to maintenance efforts on these park lands.

Staff plan to expand efforts to collect herd health data using deer check stations on select dates for an archery program, managed hunts, and nighttime sharpshooting operations. Data collected will include: estimated deer age based on jawbones, dressed scale weights, antler measurements, hoof examination (sloughing/splitting as an indicator of Hemorrhagic Disease), and lactation status. Diagnostic testing for Chronic Wasting Disease (CWD) may also be incorporated on a subsample of deer harvested in the Deer Management Program (see section on CWD). Wildlife staff will coordinate with personnel from the Health Department's Disease Carrying Insects Program to collect ticks from harvested deer when possible (dependent on scheduling and staff availability).

Management Methods

DGIF is responsible for the regulation and enforcement of wildlife-related laws and restrictions on wildlife management or research in the Commonwealth of Virginia, including which management methods are legally allowed within Fairfax County's Deer Management Program. Each season, the county evaluates how best to expand and improve its deer management efforts through the use of all available population control tools.

At this time, non-lethal fertility control methods for white-tailed deer (described below) are not approved as management methods in the commonwealth by VDGIF. Experimental techniques may be permitted under a scientific collection permit by VDGIF if the project represents *bona fide* scientific research. VDGIF continues to monitor and evaluate ongoing research that may inform future decisions about non-lethal methods. As non-lethal methods become viable, they will be evaluated for possible inclusion in the Fairfax County Deer Management Program to diversify the county's management methods.

Lethal methods *(currently approved for deer management in Virginia)*

- Archery Program - Harvesting of deer using qualified bow hunters selected via public group hunt lottery
- Sharpshooting - Harvesting of deer using specially-trained Fairfax County Police Department officers
- Public Managed Hunts - Harvesting of deer using qualified hunters selected via a public hunt lottery

Non-lethal methods *(not currently approved for deer management in Virginia)*

- Surgical Sterilization - Stopping reproduction in female deer via tubal ligation (tying the fallopian tubes) or ovariectomy (removing the ovaries)
- Immunocontraception - Application of vaccines that prevent pregnancy by stimulating production of antibodies that bind with proteins or hormones essential for reproduction

FY 2019 Fairfax County Deer Management Program

The Fairfax County Deer Management Program is operated on public lands (primarily county and regional parks) and is implemented by FCPD in collaboration with FCPA and NOVA Parks. During the FY 2019 season, deer herd reduction was sustained through the incorporation of three management methods: archery hunts, managed firearms hunts, and sharpshooting. Deer herd reduction activities in FY 2019 yielded 954 deer harvested for all parks, as compared to the FY 2018 season, during which reduction activities removed 1,091 deer.

Archery Program

Archery hunting has proven to be the most effective method for use in suburban parks that remain open to the public. It is also a cost-effective method, relying on numerous volunteer archers who have demonstrated skill through qualifications and a criminal background check.[7] Archery is a quiet and short-range method, with most deer being taken within less than 60 feet. VDGIF identified Fairfax County as an area for deer population reduction based on the abundant status of deer herds within the county. Thus, VDGIF has set liberal regulations to assist population control efforts, including no daily or season bag limits and an extended eight-month deer season. VDGIF has authorized an early archery season on lands within Fairfax County, a northern Virginia Late Antlerless-only archery season, and an Urban Archery season, which includes Fairfax County. Qualified bowhunters may hunt from the first Saturday in September through the last Sunday in April in Fairfax County.

The Deer Management Program datasets have been published to the county's enterprise GIS database, and the Deer Management Program hunt areas data layer is also available online to the general public.[8] In FY 2019, 89 percent of the deer (854 deer) harvested in the Deer Management Program were taken by archery, with the remainder being harvested by managed firearms hunts and sharpshooting. In FY 2019, 578 volunteer archers contributed 42,735 hours to the Deer Management Program for an average of 74 hours per volunteer. The county's FY 2019 archery program was organized as 18 hunt clusters, which included 99 parks and county-owned properties. Further details can be found in the Data Appendix.

As noted above, the county's Deer Management Program is only operated on FCPA properties and other select parks or open space. Given that these public lands constitute less than 20 percent of the total acreage within the county, it is acknowledged that the coordination of hunting on both public and private lands will be necessary to effectively reduce overall deer densities to more sustainable levels and to minimize instances of negative human-deer interactions. Please refer to the Deer Management on Private and Other Public Lands section for additional information on this subject.

Public Managed Hunts

Since FY 2006, managed hunts have been conducted in the Sully Woodlands area, including Elklick Preserve, Halifax District Park (formerly Elklick), Mountain Road Park, Rock Hill

[7] www.fairfaxcounty.gov/wildlife/individual-archer-standards

[8] http://fairfaxcountygis.maps.arcgis.com/apps/webappviewer/index.html?id=409cc24c643d453387f752ce6e06bcad

District Park and Richard W. Jones Park (Pleasant Valley Golf Course). While managed shotgun hunts can be efficient, they do incur higher costs than archery in terms of staff time for planning, operations, and on-site public safety officers. Due to higher costs incurred by this method, lower harvests for several seasons, and weather-related events that impacted scheduled managed hunts, these hunts were curtailed in FY 2017 and FY 2018 and the majority of park property was transitioned to archery. During FY 2019, staff used a combination approach with archery as the primary management method along with three managed hunts to assist in population reduction efforts for Sully Woodlands. The managed hunts yielded 36 deer harvested, accounting for approximately 4 percent of the total FY 2019 program harvest. Changes that were implemented to the program last year include the use of slugs only (no buckshot or muzzle-loading) and no lead shot (only non-toxic ammunition will be permitted) for the managed hunts.

Sharpshooting

Night-time sharpshooting operations conducted by the Fairfax County Police Department were held at five parks and accounted for approximately seven percent (69 deer) of the harvest in FY 2019. Further details can be found in the Data Appendix. Sharpshooting is especially important for deer population control on public lands where other methods, such as archery and managed shotgun hunting, are determined to be inappropriate due to park operations and/or environmental features that make implementation difficult (i.e., open fields, extensive trails that restrict hunting acreage, limited forest cover, recreational complexes, botanical gardens).

All venison from sharpshooting operations is donated to provide food for individuals, including donations to Hunters for the Hungry, a non-profit organization providing food for the needy through local food banks.

Non-lethal Methods

There are no non-lethal deer population control measures approved for general use within Virginia at this time. Nonetheless, Fairfax County continues to keep abreast of the latest information on this topic. For example, in July 2017, three Fairfax County Police Department Wildlife Management staff attended the first two days of the 8th International Conference[9] on Wildlife Fertility Control hosted in Washington, DC by the Humane Society of the United States and Bobstiber Institute for Wildlife Fertility Control.

Environmental Protection Agency (EPA) approval of Zonastat-D

In July 2017, EPA approved the registration of the *porcine zona pellucida* (PZP) vaccine, Zonastat-D, for contraception of female deer. Although this product has been federally registered, state approval of deer management options and the use of drugs in vertebrate wildlife is still required, and VDGIF has not yet approved this drug. It is registered as a restricted use pesticide and is only authorized for remote dart delivery; application includes an initial priming dose followed by a booster at least two weeks later and an annual booster dose thereafter. Further details about the challenges of using immunocontraception for deer management are provided in the Data Appendix section "Further Explanation of Non-Lethal Methods."

City of Fairfax Deer Sterilization Research Study

[9] www.regonline.com/builder/site/default.aspx?EventID=1895243

In 2014, the City of Fairfax initiated a five-year experimental research effort to surgically sterilize deer within the city limits. The estimated cost of sterilizing one doe under this project was $1,000, but in the first year of the program the city incurred an additional cost of $436 per deer sterilized due to pay for police overtime to support the effort. At the completion of the Fairfax City research study, White Buffalo, Inc. had sterilized 52 female deer. There were 15 female deer mortalities recorded since the start of the project. Ten deer were killed in deer-vehicle collisions, four were shot by hunters just outside of the city in the county, and one died of unknown causes. Ten female deer also could not be located, nor were camera images obtained, indicating that they dispersed or were dead and not locatable.

As noted above, Fairfax County has and should continue to stay abreast of scientific advances in non-lethal methods of deer management so that the program continues to apply best practices in the future. However, at this time, alternatives to lethal techniques are not practical or cost effective for free-ranging deer population management, particularly at the county landscape scale. In fact, a statement issued in August 2014 by DGIF noted that:

> *"In many instances, non-lethal alternatives to hunting or sharpshooting have been proposed as a means to control deer populations. Research has shown that non-lethal methods are limited in applicability, prohibitively expensive, logistically impractical, and technically infeasible."*[10]

Chronic Wasting Disease

Chronic Wasting Disease (CWD) is an emerging, contagious neurological disease affecting white-tailed deer, mule deer, moose, and elk. The disease was first confirmed in white-tailed deer in Virginia in Frederick County in 2009. A CWD Containment Area was established by VDGIF that includes Shenandoah, Warren, Frederick, and Clark Counties.

Surveillance for CWD in Virginia is being conducted by the VDGIF within the established Containment Area and by samples collected from taxidermists statewide. During the past hunting season, the VDGIF received 1,600 samples submitted by participating taxidermists and also tested over 1,550 deer harvested from Frederick, Clarke, Warren, and Shenandoah counties. As of April 2019, a total of 68 deer have tested positive in Virginia since 2009.

Among the new deer that tested positive, the VDGIF recently confirmed CWD in a male deer legally harvested in Culpeper County in November 2018. At the time this deer was harvested, the hunter did not notice any outward signs of disease and the buck appeared to be in good condition. While CWD has been documented in northwest Virginia for over nine years, this deer was harvested more than 40 miles from the nearest CWD-positive deer in Frederick or Shenandoah counties.

In 2019, after the detection of CWD in Culpeper County and the subsequent need to create a second CWD response/management area in Virginia, the Department elected to utilize the term CWD Disease Management Area (DMA) instead of CWD Containment Area to delineate affected counties. VDGIF will conduct preliminary disease surveillance in Culpeper and

[10] www.pwconserve.org/wildlife/mammals/deer/DGIF_Lethal%20vs%20Non-lethal%20deer%20management%20Statement-%20Official.pdf

surrounding counties during Spring/Summer 2019 to make preliminary assessments about the occurrence of the disease. The VDGIF is in the process of determining the most appropriate measures moving forward for Culpeper and surrounding counties, which may include the delineation of a new DMA, carcass movement restrictions, feeding restrictions, and enhanced surveillance for CWD. The borders of the new CWD DMA has not yet been established by the VDGIF but will be released to the public in advance of the 2019 fall hunting season[11].

Through correspondence between the Fairfax County Wildlife Management Specialist and the VDGIF, it *does not appear* that the new DMA will likely impact deer management operations in Fairfax County for the upcoming season. Although CWD testing of harvested deer is not required by the VDGIF in Fairfax County at this time, county wildlife staff are investigating training staff to collect samples from deer harvested under the Fairfax County Deer Management Program during the 2019-2020 season. Currently, CWD testing services for deer harvested outside a DMA are available through the Virginia Department of Agriculture and Consumer Services (VDACS), but submission of deer for testing is at the discretion of each hunter and hunters who choose to have deer tested must transport the deer to a VDACS laboratory and cover the cost of sampling (currently $35/deer). The Fairfax County Wildlife Management Specialist is continuing to communicate with the VDGIF to determine if any additional actions need to be taken in Fairfax County relative to this disease in the future.

Public Education

An educated public that has an understanding of the population dynamics of deer, the concept of carrying capacity, the different management options available, and the various values of the community in addressing ongoing management is essential to the successful implementation of a deer management program. While the county's Deer Management Program website[12] is a good resource for the public, as time and resources allow, the Wildlife Management Specialist's office also provides proactive outreach, which is a critical component of education. The county should continue to hold public information meetings in advance of deer management season in an effort to ensure that accurate information is disseminated, and that the public has an opportunity to ask questions and voice concerns. Three such meetings were held in August 2019 in advance of the 2019-2020 season. Collaboration with impacted residents can improve the success of the Deer Management Program.

In FY 2018, the FCPD Wildlife Management Office received approval to conduct a follow-up public survey to help determine community needs and expectations related to deer management and for assessing the status of human-deer conflicts and damages experienced by residents in Fairfax County. A similar survey was completed in 2011.[13] Data from this survey will be an integral part of developing a revised Deer Management Plan. The Wildlife Management Office plans to model the survey on a previous Cultural Carrying Capacity survey about white-tailed deer in Virginia developed by the VDGIF and Virginia Tech University. Using this survey will allow for comparison of deer management in Fairfax County to other jurisdictions in Virginia.

[11] https://www.dgif.virginia.gov/wildlife/diseases/cwd/tracking-cwd-in-virginia/
[12] www.fairfaxcounty.gov/wildlife/deer-management-program
[13] www.fairfaxcounty.gov/wildlife/sites/wildlife/files/assets/documents/pdf/deer%20management/fy-2011-deer-management-survey-results.pdf

The completion of this survey is dependent on staff availability and the schedule of the vendor that is ultimately selected to perform the survey, but is expected to be completed in FY 2020.

As noted above, the county's Deer Management Program website provides significant information for the public, including pages covering topics such as problems created by the overabundance of deer, methods of population management available and utilized in Fairfax County, and suggestions on conflict mitigation approaches. The website also contains links to additional resources on the subject of deer management, along with other wildlife related topics, as well as an extensive bibliography of literature on deer management, particularly in urban environments.

In addition, the county has also produced rack pamphlets on deer management issues, as well as other wildlife topics, which are available at various public buildings and events. Several informational videos discussing wildlife management issues have also been produced for Channel 16, the Fairfax County Government Television Channel. A list of some of these wildlife management outreach efforts, with web links, is provided in the Data Appendix.

Deer Management on Private and Other Public Land

As noted, the county's deer management efforts are generally limited to county and regional parks, which constitute less than 20 percent of the land within the county. Furthermore, while the relaxed hunting restrictions set by VDGIF to encourage deer population control in Fairfax County also apply to private landowners, hunt clubs, etc., hunting is only feasible on a small percentage of private land within the county. Firearms may only be discharged on parcels that exceed 20 acres in size and that are located within the limited Appendix J hunting area, which generally covers the Great Falls area and the western border of the county from Chantilly, and south through Clifton, Occoquan, and Mason Neck.[14] This area comprises less than 30 percent of the county. Regulations governing archery hunting are less restrictive. There is no minimum parcel size for example, but homeowner's association rules and negative community perception about the safety of archery and hunting in general, drastically limit the amount of deer hunting that occurs within the county outside of the Deer Management Program. VDGIF reported that a total of 1,660 deer were harvested within Fairfax County in 2018 on public and private lands, which is inclusive of the 1,091 deer removed through the efforts of the county deer management program. Deer kill data for the current year is preliminary and does not include deer killed during the late urban archery or special late antlerless only deer seasons. This number is reduced compared to recent years and is likely due, in part, to the heavy rains and/or high winds that were experienced during the hunting season. Harvests have been relatively consistent over the last several years, averaging 2,014 deer per year since 2010.[15]

Due to staffing limitations, the county does not currently assist with the coordination of hunting on private property, but there are many private archery groups and clubs operating in the region that property owners may seek assistance from to connect with qualified bow hunters to hunt deer where the use of firearms is prohibited. More information on this topic can be found in the Data Appendix under "Public Agency Responsibility" and "Private and Other Public Landowners' Roles."

[14] www.fairfaxcounty.gov/wildlife/population-control-options-private-property
[15] www.dgif.virginia.gov/wildlife/deer/harvest/?county=Fairfax

CANADA GEESE

Overview/Environmental Impact

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. Problems caused by geese include:

- Being 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 (see the Data Appendix for more information on Hunting Creeks, as an example).
- Fouling of public areas, including boardwalks, parks, and open grassy areas (e.g., golf courses and parks).
- Altering ecology of marshlands, where they feed on sprouting plants so voraciously that some once-plentiful botanical species have all but disappeared (e.g., wild rice).

Addressing these problems inevitably requires reducing the goose population, but this is complicated, because geese are protected by federal migratory waterfowl laws.

Management Methods

Population management methods that use immediate population reduction are severely limited due to stringent federal regulations against killing geese once they are hatched (see the Data Appendix for more information in the "Federal Limitations on Remedial Action" section).

The two primary management methods used in Fairfax County are:

Addling (population stabilization)

The term "addling" is commonly used to refer to any process by which an egg ceases to be viable. Three egg treatment techniques are authorized by the U.S. Fish and Wildlife Service (USFWS) Depredation Order: shaking; puncturing; and oiling (coating the surface of the shell with 100 percent food-grade corn oil to prevent oxygen intake). Geese will continue to attempt to incubate treated eggs, but they will fail to hatch, thus limiting population growth. There is no federal permit required to conduct egg addling, but each landowner (resident, tenant, homeowner's association, management company, etc.) must register yearly with the USFWS and report the location and number of nests that were addled in that year.[16]

Nuisance abatement (population exclusion)

This approach involves making an area unsuitable for habitation, such as using trained Border Collies to move geese away from areas where they constitute a nuisance. However, a major

[16] https://epermits.fws.gov/eRCGR/

negative aspect of this method is the impact on adjacent properties.

Additional options for minimizing geese populations include:

Landscaping modifications
This approach involves discouraging geese from congregating near ponds by installing bushy plantings, reeds and tall grasses, strategically placed around a pond to provide perceived hiding places for predators.

Repellents
Commercial, nontoxic chemical repellents are available which discourage geese from eating grass. The disadvantage to this approach is the necessity for frequent reapplications as grass is mowed. Installation of physical barriers such as fencing and railings around water-bodies can also be effective at deterring geese.

Prohibition of Feeding
Feeding geese encourages them to become resident and to congregate in areas where a "free lunch" is provided, exacerbating the very nuisance that one is attempting to reduce.

Special foraging areas
Setting aside an area where a small population of geese can be resident without creating an undue nuisance can be an option. However, adequate consideration must be given to the water pollution and other waste problems that would be created.

Immunocontraception
Immunocontraception for geese is inherently fraught with even greater limitations and disadvantages than is this technique with respect to deer populations. Therefore, it is not a subject of serious consideration for Fairfax County.

Combinations of several of the above approaches can be 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 addling is added to this for the few nests that are established, significant reductions in usage of this area in following years can be achieved.

Management Implementation
Goose management programs continue to be implemented at a number of locations in Fairfax County. Each year, county staff conducts outreach to recruit and train local volunteers on goose management strategies. The egg addling program is highly cost-effective since, once trained, volunteers can perform goose management activities, which should lessen the workload of county staff. Volunteer involvement has varied by year and the level of outreach provided for training is dependent on staffing. Some landowners and property managers at locations that were previously covered under the county permit have applied for individual registrations and conduct egg addling on their own properties according to USFWS protocol. This ability has greatly expanded the number of properties where egg addling is conducted throughout Fairfax County; however, many landowners, homeowner associations, etc. still do not take the initiative to

implement goose management on their properties. Staff with the Wildlife Management Specialist Office conducts addling on government properties, but also still covers multiple locations on private property, with landowner consent, under the county registration with the USFWS. FCPA also conducts egg addling on county parklands under a separate registration.
All of these programs have demonstrated reasonable degrees of success in stabilizing populations. In some cases, populations have declined over time due to efforts to discourage geese from further attempts to nest in areas where control measures have been pursued. See the Data Appendix for details regarding goose management locations, and the number of eggs and nests addled each year.

FY 2019 Canada Geese Management

FCPD and FCPA support efforts to control resident Canada goose populations by participating in humane egg oiling programs and educating the public about resident Canada geese. In 2019, 106 nests containing 485 eggs were oiled on county parkland at the following parks:

- Burke Lake (86 nests, 400 eggs)
- Huntley Meadows (5 nests, 24 eggs)
- Jefferson Golf Course (2 nests, 8 eggs)
- Lake Fairfax (3 nests, 12 eggs)
- Laurel Hill Golf Course (3 nests, 12 eggs)
- Pinecrest Golf Course (4 nests, 19 eggs)
- Twin Lakes Golf Course (3 nests, 10 eggs)

In 2019, 143 nests containing 599 eggs were oiled on properties under the countywide registration held by the Wildlife Management Specialist office, including: VDOT properties; the county's Public Safety and Transportation Operations Center; Fair Oaks Mall; Fairfax Corner Shopping Center; Fair Oaks District Police Station; Crosspointe Lake; Pinewood Lake; Manchester Lakes; Burke Centre Conservancy ponds; Penderbrook Golf Course; and various stormwater management ponds.

In addition to egg oiling, FCPA has granted permission in prior years to Wingfield Properties, LLC, the private company managing Pleasant Valley Golf Club, to hunt adult geese on that golf course in accordance with Virginia game regulations and the Fairfax County code. If undertaken at other golf courses in future years, U.S. Department of Agriculture Wildlife Services staff would be contracted and would round the geese up and take them to a poultry processing plant. Any such efforts would be as a last resort and done in conjunction with egg oiling, exclusion, harassment, and habitat modification efforts.

FERAL CATS

Overview/Environmental Impact

Feral cats pose a particularly challenging management situation. While these domesticated animals are not meant to live outdoors and pose a significant threat to wildlife and potentially to humans, there is a lack of consensus among concerned stakeholders as to the best approach to address the issue. Concerns related to the existence of feral cats include:

- Threats to Wildlife - Domesticated cats kill significant numbers of wildlife, especially birds and small mammals.
- Threats to Human Health - The Centers for Disease Control and Prevention (CDC) notes that feral cat populations can harbor many zoonotic diseases (those that can be passed from animals to humans), including rabies and toxoplasmosis, which is a leading cause of death from foodborne illnesses in the United States.[17]
- Negative Health Consequences and Cruelty to the Animals – Feral cats are subjected to harsh weather, injury, and/or death from cars and/or wildlife, hunger, and disease.

Management Methods

Fairfax County operates a Trap-Neuter-Return (TNR) program through the Animal Shelter for feral cats. TNR involves volunteers who trap feral cats and bring them to a veterinary clinic, where they are spayed or neutered, given a checkup, vaccinated against rabies and distemper, and later released at the original point of capture. Information on the Animal Shelter website suggests that cats that have gone through the TNR program can continue to live out the rest of their lives, but will not be a threat to the spread of diseases and will not continue to add to the feral cat population.

The website also purports that feral cat populations subjected to TNR will naturally decline over time as reproductive rates are decreased. The Animal Shelter reports that 7,937 cats have been through the TNR program during the 10 years (2010 to 2018) that the program has been in operation and cites a decline in the number of stray cats and kittens surrendered to the shelter during the same timeframe as proof of the success of the program. However, scientifically valid population monitoring data, which the county does not currently collect, would be necessary to support this anecdotal conclusion, and to determine if the TNR approach is having any effect on decreasing the overall number of feral cats within the county.

One concern about the TNR approach is that it does not address the significant impact that feral cats have on birds and other native wildlife. In a 2013 study[18] that compiled and analyzed the results of dozens of previous published scientific articles on the subject, the authors concluded that free-roaming cats kill between 1.3 and 4.0 billion birds per year in the contiguous United States, and that approximately 69 percent of this mortality is caused by un-owned cats. This study further found that cats kill an estimated 6.3 to 22.3 billion mammals per year in the contiguous United States, with un-owned cats accounting for approximately 89 percent of these mortalities.

In addition, several peer-reviewed and published scientific studies focused on the subject of feral cats have called into question the efficacy of TNR-type programs, particularly when applied across a large geographic area.[19] [20] [21] One such study, which analyzed the results of two county-wide TNR programs, found minimal or no effect on feral cat populations, which continued to

[17] https://stacks.cdc.gov/view/cdc/43106/cdc 43106 DS1.pdf?
[18] www.nature.com/articles/ncomms2380
[19] www.ncbi.nlm.nih.gov/pmc/articles/PMC5120395/
[20] www.avma.org/News/Journals/Collections/Documents/javma_227_11_1775.pdf
[21] www.ncbi.nlm.nih.gov/pubmed/19245489

grow. The study found that the efforts of the TNR program were greatly outpaced by the fecundity of the non-neutered cats within the population, concluding that 71 to 94 percent of the cats within the colony would have had to be neutered to stabilize or bring about a decline in population.[22]

The food set out by volunteers that care for feral cat populations has the potential to encourage abandonment of additional unwanted cats and attract free-roaming owned cats, which may be attacked or contract diseases from the feral individuals. Food being left at these locations is also likely to attract other wildlife, increasing the chances of negative cat-wildlife interactions, including injuries, diseases, or death. Notably, this practice is in direct conflict with guidance from the Wildlife Management Specialist's office, which advises against intentionally or unintentionally feeding wildlife to avoid human-wildlife conflicts.[23]

OTHER MAMMALS

Coyote

Coyotes are a well-established, though often secretive, resident of Fairfax County. Coyotes serve a beneficial ecological service in control of other nuisance species such as deer (e.g. fawns, injured deer), geese, and rodents. Occasionally, coyotes will opportunistically attack small domestic pets due to similarity in size to the coyote's natural prey. Most negative interactions occur when coyotes are attracted by improperly stored garbage and outdoor pet feed dishes around human habitations or when coyotes have been fed by people and become habituated to being around humans. The only action required at this time is monitoring the spread of the coyote population and any adverse incidents that may occur. Coyote awareness tips can be found online at https://www.fairfaxcounty.gov/wildlife/coyote and https://issuu.com/fcpa/docs/resourcessp07.

Beaver

Beavers are mainly a consideration in areas with larger bodies of water due to their impacts on park natural resources and infrastructure, such as stormwater management ponds. Whenever possible, beavers are tolerated on parkland. Exclusion methods can be employed to protect vegetation and property from damage. Harassment and population control methods will be considered in rare circumstances where tolerance and exclusion methods are infeasible.

Fox

Many homeowners have noted the presence or wandering of foxes on their properties. Fox provide a beneficial ecological service in control of nuisance species such as rodents and do not typically pose a threat to residents or outdoor pets. Fox can be affected by mange, a skin disease, and are often mistaken to have rabies due to their sickly appearance or abnormal behavior.[24] Information pertaining to foxes can be found online at www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/stewardship%20brochures/foxcard.pdf, https://fcpdnews.wordpress.com/2016/10/14/you-mangy-fox-isnt-just-a-

[22] www.avma.org/News/Journals/Collections/Documents/javma_227_11_1775.pdf
[23] www.fairfaxcounty.gov/wildlife/wildlife-management

saying-its-a-skin-condition-caused-by-mites/, and
https://www.youtube.com/watch?v=EbpmRBFHpZM

Raccoon

Raccoons, frequently observed in and around trash cans and bird feeders, are primarily a nocturnal animal. Residents are encouraged to limit or remove access to outside food sources to minimize negative interactions. Raccoon information and safety tips can be found online at https://fcpdnews.wordpress.com/2015/06/10/fairfax-county-wildlife-biologist-shares-raccoon-information-safety-tips/.

Bear

While optimal bear habitat continues to be west of Fairfax County, bear sightings typically occur in the county each year. If a bear is sighted, keep a respectful distance and report the sighting to the VDIF. Keep trash cans secured and food sources removed, including birdfeeders, when bears have been seen in the area. More information on bears can be found online at www.fairfaxcounty.gov/news2/bear-aware-season-bear-sightings/ and https://www.youtube.com/watch?v=7RGwpPk5dUY.

WILDLIFE BORNE DISEASES OF CONCERN IN FAIRFAX COUNTY

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.

West Nile Virus

The natural West Nile virus (WNV) transmission cycle is between certain types of mosquitoes and certain types of birds. In general, *Culex* mosquitoes and passerine birds have been implicated as those involved in this cycle. Incidental infections of humans and other animals also occur. Clinical illness and death related to WNV infection is seen in humans and other animals, including horses and some types of birds like crows, blue jays, hawks, and owls. WNV is mostly transmitted to people by the bite of an infected mosquito.

WNV spread quickly throughout the continental U.S. since the first reported case in New York in 1999. The Centers for Disease Control and Prevention (CDC) figures show a rapid increase in reported cases across the U.S. in the early 2000s, although these numbers have somewhat stabilized in the ensuing years.[24] There is almost certainly major underreporting of incidence, since most of those infected apparently have no symptoms or mild symptoms that do not require a visit to the doctor. Even for those infected and seeing a physician, a report of West Nile would not be made without the proper testing. If someone thinks he/she has WNV, he/she should consult his/her physician or medical provider.

Adults over the age of 60 or people with certain medical conditions are at greatest risk for the more severe form of WNV infection. Encephalitis and meningitis (inflammation of the brain or surrounding tissue) are among the serious neurological illnesses that are associated with WNV

[24] www.cdc.gov/westnile/statsmaps/cumMapsData.html

infection and these are seen in about one percent of those infected. Some people may never fully recover from the neurological illness. About 10 percent of neurological infections due to WNV are fatal. There is no vaccine for humans or antiviral treatment available.
There are several steps that can be taken to reduce risk of WNV through the avoidance and/or control of mosquitoes. These steps include:

- Avoidance - If possible, avoid peak mosquito activity times (typically dusk and dawn) or areas where mosquito numbers may be high.
- Minimize Standing Water That Can Serve as a Breeding Ground for Mosquitos (e.g. pots, wheelbarrows, toys) - Ponds can be stocked with the small fish Gambusia that feed on mosquito larvae. Water in bird baths should be changed every two to three days. Standing water (e.g. bird baths, rain barrels) can also be treated with a larvicide containing *Bacillus thuringiensis* var. *israelensis* (Bti) such as Mosquito Dunks, available to consumers at a variety of retail outlets.
- Use of Insect Repellants - There are four EPA-registered mosquito repellent active ingredients that are recommended by the CDC: DEET (N,N-diethyl-meta-toluamide), picaridin, oil of lemon eucalyptus, and IR3535. In addition, treatment of outdoor clothing with Permithrin prior to time spent outdoors is also effective.
- Dress to Prevent Mosquito Bites - wear long, loose-fitting clothing.

Tick-Borne Illnesses
Lyme disease, transmitted via the bite of an infected *Ixodes scapularis* (commonly known as a deer tick or blacklegged tick) is the most commonly-reported vector-borne disease in Fairfax County. However, there are several other tick-borne illnesses to be aware of as well, such as Rocky Mountain Spotted Fever and Ehrlichiosis, both transmitted via an infected *Amblyomma americanum* (commonly known as a lone star tick). The most current information regarding tick-borne illnesses and the tick species that carry them can be found online here: www.fairfaxcounty.gov/health/fightthebite/tick-diseases.

There are preventative measures that can be taken to reduce the risk of tick-borne illnesses:

- The same repellents recommended for mosquitoes (see West Nile virus above) are also highly effective for ticks. See the discussion of insect repellents in the West Nile Virus section above.
- When engaged in activities that might result in exposure to 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.
- Tick check and shower - Do a full-body tick check after returning from potentially tick-infested areas. Use a hand-held or full-length mirror or have someone help you check parts of your body that are hard to see.

Reported cases of Lyme disease in Fairfax County have steadily increased in recent years, from an average of 26 cases in the five-year period from 2000 – 2004 to an average of 218 cases over the five-year period from 2013 – 2017. The Climate and Energy chapter of this report cites an April 2018 Natural Resources Defense Council report, *Climate Change and Health in Virginia Issue Brief*, which discusses how climate change is a likely contributing factor to the increased

incidence of mosquito and tick-borne illnesses across the state. The Data Appendix for this chapter includes a graph of reported Lyme disease cases in Fairfax County for the period of 2000 to 2016.

Rabies

Rabies is a viral disease that affects the nervous system and may have a post-infection latent period from one week to many years. During the latent period, between the time of an animal bite and the onset of overt symptoms in the animal that was bitten, the virus is propagated along nerves 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. Rabies is transmitted to humans and other mammals through the saliva or central nervous system tissue of an infected animal almost always in the overtly symptomatic stage, which usually only lasts about a week.

In Fairfax County, the main reservoirs for rabies are raccoons, skunks, foxes, and bats. Occasionally, beavers and groundhogs are diagnosed with rabies. Dogs and cats may act as secondary transmitters of the disease after having contracted rabies from wildlife, which is why it is so important to vaccinate your pets. While rabid cats have been identified each year since 2010, the last rabid dog identified in the county was in 2011.

The most important measure for preventing rabies is to avoid being bitten by or coming in 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, erratic wandering or circling, staggering gait, disorientation, repeated high-pitch vocalization, unprovoked aggression, and/or self-mutilation, contact Fairfax County Animal Protection Police at 703-691-2131 without delay.

Fecal Coliform and Related Pathogens[25]

Coliform bacteria (some caused by fecal pollution) in the county's surface water resources (e.g., streams, ponds) can itself be a potential pathogen, but can also indicate the presence of other waterborne pathogens. Bacteria from human sources may indicate the presence of human viruses, while bacteria from wildlife and domestic animals may indicate the presence of the parasites *Giardia* or *Cryptosporidia*. While EPA indicates that coliforms themselves are not a health threat, they can be used to indicate whether other potentially harmful bacteria may be present.[26] Understanding the source(s) of bacteria in a water body can inform remediation actions and which steps to be taken to prevent further bacterial contamination.

These pathogens primarily affect humans when contaminated water is ingested or used in recreation (e.g. wading, swimming). To avoid diseases caused by fecal coliform bacteria and related pathogens, do not drink water from sources for which the pollution status is unknown and avoid wading or swimming in water that is known to be, or suspected of being, polluted.

[25] www3.epa.gov/npdes/pubs/bacsortk.pdf
[26] www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

COMMENTS

1. **Deer Archery Program**
   EQAC commends the county for continuing and expanding the archery program. Archery is particularly cost-effective, relying on hundreds of qualified volunteers who contribute thousands of hunt hours to the program at a nominal cost. EQAC supports the use of other management methods, such as sharpshooting and managed hunts, when archery isn't a viable option.

2. **Data Collection for Deer Management**
   EQAC encourages FCPA and FCPD to continue to collect and integrate data into discussions about wildlife management. While estimates of population sizes and goals for deer reduction may be challenging to define, both the magnitude of the problem being addressed and the effectiveness of the applied solutions can be better understood and communicated with data. Being able to present a strong base of information will be a benefit in bringing along stakeholders in the effort to grow various management programs, both in staffing and funding. As the county ultimately seeks to update its current Deer Management Plan or a Comprehensive Wildlife Management Plan, data will be a key component in supporting proposed recommendations.

3. **Goose Management Limitations**
   While the programs currently in place to address the problem of goose overpopulation are good, they would benefit from being replicated much more widely in additional areas of the county. Moreover, additional public information campaigns and community outreach efforts are needed to actively involve a larger number of individuals and community organizations in population control programs. The office of the county Wildlife Management Specialist is not adequately staffed to conduct and/or supervise these critical functions. Due to the current scarcity of staff resources, the Goose Management Program is below an acceptable level of activity. This staffing limitation is very unfortunate, since geese are a major contributor to the pollution of streams and water bodies that are sources of drinking water and that are used for recreational purposes. Further, the county is facing increased restrictions in the Total Maximum Daily Loads of pollutants that may be present in our surface waters (see the Water chapter of this report).

RECOMMENDATION

1. **Hiring of Full-Time Wildlife Assistant**
   EQAC recommends that the Board of Supervisors direct the County Executive to assess the need and feasibility of funding or otherwise increasing staff capacity in the Fairfax County Police Department or other county agency for the hiring of a full-time wildlife assistant. At its current staffing and funding levels, the Fairfax County Deer Management Program is sustaining its impact year to year, but is unable to grow in order to better address the needs of the county. The Canada Geese Management Program is operating at a low capacity due to limited staffing for outreach and the training of volunteers. Over the past several years, turnover of the part-time wildlife assistant position(s) have been extremely high, resulting in

the training of new hires, which takes a significant amount of time away from growing the management programs. With a full-time position, additional data analysis (e.g. of VDOT deer-collision data) could be completed, additional education and outreach of the county wildlife programs could be implemented, and program services could be expanded to include inventory and population monitoring of additional wildlife taxa (i.e., bats, birds, reptiles, amphibians, coyotes).

REFERENCES

- Fairfax County Police Department: Emails and data from Katherine Edwards, Fairfax County Wildlife Management Specialist, Ph.D., Certified Wildlife Biologist®, June 2019.
- Fairfax County Park Authority: Data provided from Kristen Sinclair, Ecologist III, Inventory and Planning Program Manager, June 2019.
- www.fairfaxcounty.gov/wildlife/deer-management-program.
- www.fairfaxcounty.gov/wildlife/geese-management-program.

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IX. TECHNOLOGY TO UNDERSTAND THE COUNTY

Board of Supervisors Environmental Vision:
The Environmental Vision does not directly address information technology in the core service area vision statements. However, the need and utility for information technology is recognized within many of the supporting objective statements.[1]

INTRODUCTION

Technology is critical to understanding Fairfax County's large and complex environment. Among the most critical technologies is a Geographic Information System (GIS), which uses a geographic data model to combine mapping and data management functions. GIS is a major focus of this chapter of the Annual Report on the Environment.

Reflecting its high-tech economy, Fairfax County was an early adopter of GIS and today is one of the nation's leading counties in applying GIS to its business processes. The substantial returns on this investment are documented in the county's Information Technology plan (https://www.fairfaxcounty.gov/informationtechnology/it-plan), and numerous interactive mapping applications are offered to the public (https://www.fairfaxcounty.gov/maps/interactive-map-gallery). Enterprise GIS is managed by Geographic Information Systems and Mapping Services, which is a Division of Fairfax County's Department of Information Technology (DIT). It is tasked with developing, maintaining, coordinating, and distributing GIS/mapping data and technology to Fairfax County government agencies and residents.

Many of the county's earliest GIS applications naturally dealt with land use and transportation, where the advantages of GIS are so powerful and obvious. However, GIS also has great application to other environmental areas, including water resources, ecology, wildlife, and all forms of pollution and environmental health hazards. In this chapter, we hope to help readers better understand the critical role GIS plays in managing Fairfax County's data and assisting decision makers. Already, it is difficult to imagine agencies supporting the Annual Report on the Environment without GIS, and this contribution of GIS will only grow in the future.

More recently, the county has also been using a wider range of remotely-sensed data (multi-spectral satellite data and LiDAR (light detection and ranging), and has been finding them of significant assistance in the county's environmental stewardship.

Mobile GIS use and integration into agency field operations is growing significantly. It is being used to help track invasive species, maintain parks, and assist in mosquito abatement field work. Later in this chapter, an innovative and highly efficient use of mobile GIS to speed mosquito control is highlighted.

[1] https://www.fairfaxcounty.gov/living/environment/environmental-vision-2017.pdf

DATA

Information is the foundation of the county's GIS. It is the data from which maps are created, analyses made (e.g., stormwater runoff calculations, invasive plants and pests locations and trends, larvicide application rate calculations, development patterns and impacts, encroachments identified) and most crucially, decisions made and actions taken. For timely, informed decisions to be made, the data must be current, correct, and granular enough to understand its significance. The county now has a large and growing amount of data relevant to environmental impact determination and decision making. Maintaining the county's investment in the data is essential to managing its environmental quality.

The data fall broadly into four categories: planimetric; topographic; imagery (raster); and related special data (e.g., property parcels and associated data).

Planimetric Data

Planimetric data provide information on the built and topographic features such as roads, buildings, and water bodies that are visible and identifiable on aerial photographs, which can be compiled into map features through photogrammetric or surveying procedures. In 2013, the county completed a four-year effort to update the planimetric data in the county's GIS. A new round of planimetric updates is underway using 2017 aerial imagery procured in conjunction with the Commonwealth. The first quadrant of data (northwest) has been delivered to the GIS Division for quality checks and the vendor is proceeded with the second quadrant updates as of June 2019. Each quadrant will be made available to staff and the public as it clears quality control.

Surface (Topographic) Data

Surface (topographic) data provide elevations of the county's surface. These are essential data for stormwater analyses and dam inundation area determinations. In 2018, the Department of Public Works and Environmental Services (DPWES), the GIS Division of the Department of Information Technology and the U.S. Department of the Interior entered into a one-time funding agreement to capture quality level one LiDAR data of Fairfax County and its immediate neighbors to the east in 2019. The County of Arlington, the City of Alexandria, and the City of Fairfax have all agreed to be contributors to the project as well, funding the square mileage that covers their jurisdictions. This is the second LiDAR capture of Fairfax County, and will complement the county's current production LiDAR layer consisting of data from partial captures in 2012 and 2014. With multiple datasets, the county can detect changes between the capture dates. Discussions are taking place to continue LiDAR capture in the future as frequently as every two years.

Imagery Data

Imagery data are pictures of the earth that come from fixed wing aircraft or satellites. The imagery is also used in creating three-dimensional images and incorporating them into the planning process. Aerial imagery is available for 2017 and many earlier years, as far back as 1937. All can be browsed on the internet using the Historical Imagery Viewer in the county's interactive map gallery https://www.fairfaxcounty.gov/maps/interactive-map-gallery.

Special Data Sets

Special data sets on natural resources and land information also are important to some of the county's environmental stewardship responsibilities. Planned and desired data include: rare tree/plant species; restored ecosystems; vegetation community classification; and historic imagery.

Much of the data are already publicly available, mostly at no charge, through the county's GIS Open Data section website: https://www.fairfaxcounty.gov/maps/gis-data. The data can be downloaded in multiple formats, are available as services, and can be directly viewed online.

APPLICATIONS AND TOOLS

Fairfax County has four main categories of GIS applications and tools: desktop GIS software; broad based Web GIS software; targeted Web GIS applications; and mobile GIS. Each has an important role in providing the capabilities necessary to support county staff and the public in viewing, querying, analyzing, and displaying geographic information relative to Fairfax County. All are used in environmental management programs in the county.

Desktop GIS Software

This is powerful, high-end GIS software that requires significant training or a background in GIS. Because of its flexibility and powerful capabilities, usage of desktop GIS is particularly high in departments with environmental or regulatory responsibilities.

Broad-Based Web GIS Software

One of the essential components of a complete GIS system is GIS client software that provide users a mid-level of functionality to perform analysis, queries, and other operations that are beyond the scope of a simple targeted Web application, but that don't require the sophistication of high end desktop GIS software. The Geographic Exploration and Mapping (GEM) application, for example, is a powerful Web-based tool for county staff that brings together in a single application much of the GIS data in the previous section for viewing, analysis, and reporting. In the summer of 2019, JADE, a public version of the GEM, became available. JADE has much of the same functionality of the GEM allowing the public to make custom maps with GIS data and create property specific reports on the environmental factors affecting a site and other information.

Targeted Web GIS Applications

By far the biggest increase in applications over the last several years has come in this category. Targeted Web applications attempt to help the user solve specific GIS questions related to a specific business area with a minimum of complexity. Most of these applications are available on the county's public website in its interactive map gallery: https://www.fairfaxcounty.gov/maps/interactive-map-gallery.

Mobile GIS

To support field data collection, the county has embraced and made significant advances in the use of mobile GIS in recent years. The new tools have brought down the costs of field data collection. Today, mobile GIS use is increasing, as agencies incorporate mobile devices into their

business processes and Enterprise GIS implements on-line portals. Agencies work closely with DIT Enterprise GIS to leverage existing investments and standardize county approaches to avoid duplication of effort and promote the use of best practices. DIT hosts feature services, manages licensing, and provides database design support where required.

GIS technology is also increasingly an integral part of other major county systems. The county is undergoing an initiative to replace the land development system and GIS will be a key piece of the new system. The number of people using high end GIS software is likely to stay the same, although there is a possibility that some of those users could be served by the GEM application, as new versions are released. The number of users accessing middle tier GIS applications will certainly increase and both the usage and number of targeted Web applications will continue to increase. The ArcGIS Online framework from Esri is continuing to expand in capabilities. The same can be said for the GEM's GeoCortex application framework that the county uses.

Based on the trend in software development, some of the targeted Web applications will likely expand in functionality yet still remain intuitive to even those who have no training.

SELECT AGENCY PROFILES

As GIS usage in the county government matures, we are seeing some division of responsibilities. The Geographic Information Systems and Mapping Services Branch still manages the GIS software and the county's extensive GIS data holdings. Other county agencies are beginning to train their own personnel to develop GIS applications in their particular areas of responsibility. Some applications worthy of note are listed below.

The Department of Public Works and Environmental Services (DPWES)

DPWES has used a plethora of mobile GIS solutions, with new and improved ones on their road map. In particular, DPWES has configured applications to assess hard infrastructure, such as the asphalt trail inspection and wastewater collection applications. They have configured monitoring and assessment apps for natural resources, such as the stream physical assessment and dry weather screening applications. DPWES has configured emergency response applications such as those for snow collection monitoring. As an organization, DPWES is constantly evaluating the usefulness and applicability of mobile GIS applications, how they relate to other enterprise systems, and how they align to business requirements and department objectives.

The Fairfax County Park Authority (FCPA)

FCPA continues to use mobile GIS technology to perform multiple habitat inventory, management and restoration activities. This includes collecting inventory data on invasive plant species, deer herbivory and a comprehensive natural vegetation community inventory. This same technology is also used to direct contractors to perform invasive plant treatments in a more efficient and precise manner using clearly defined treatment boundaries. All habitat restoration activities are tracked via mobile GIS tools to aid in meeting desired restoration goals and outcomes. In the next year, mobile GIS tools will be utilized to verify the potential vernal pools dataset to aid in the creation of a comprehensive inventory of all known active vernal pools on Park Authority property.

The Disease Carrying Insects Program (DCIP)

Since 2018, DCIP (a part of the Health Department) has utilized GIS based mobile data collection for larval mosquito inspections, control, and identification. This has greatly improved the process, eliminating paper maps and records and allowing staff to review previous information about a site while in the field. Future DCIP activities with GIS based mobile data collection will likely include adult mosquito trapping, control, and identification activities including mosquito-borne disease response activities. Additionally, Onsite Sewage and Water (OS&W, Health Department) is currently working with the GIS Division to develop a field data collection application to map and verify well locations throughout the County.

PUBLIC ACCESS TO GIS DATA AND APPLICATIONS

Public access to Fairfax County applications and data, including GIS and GIS data, has been a priority for the Department of Information Technology. The county website was completely redesigned in 2018, and agencies continue to work on new on-line services and content. Access to GIS data and other environmental data is being pushed on three fronts:

- Publicly available GIS applications;
- The GIS Open Data initiative; and
- The website platform.

All of these options provide pathways to GIS and environmental data easily and with contextual or metadata information.

The GIS Division now hosts 14 different thematic interactive mapping applications with environmental focuses or utility created by the division or its partner agencies. These applications present specific themes to the public and are all associated with conveying information useful to applicants involved in the various building and land use application processes. These unique tools available to the public not only provide access to the data but a way to use it that reduces barriers to access and does not require GIS skills.

As part of its efforts to make GIS and environmental data conveniently available to the public, the Department of Information Technology has established a GIS Open Data Site. This site hosts over 170 key GIS layers for download. A section has been devoted specifically to the environmental oriented layers to make the discovery process as easy as possible: https://www.fairfaxcounty.gov/maps/open-geospatial-data.

The county website platform is home to a significant amount of non-GIS environmental data. The county website redesign presents a modern interface with an increased capacity for environmental agencies to convey data important to residents and the business community. Critical business areas from the Department of Public Works, Land Development Services, the Department of Planning and Development, and the Park Authority can post their information and make it readily accessible to residents and the business community through a powerful search engine that prioritizes results based on relevance.

This past summer, Fairfax County released “Jade,” a new interactive map application, available on any device, with over 170 layers to view, combine and analyze

(https://www.fairfaxcounty.gov/GeoApps/Jade/Index.html?configBase=https://www.fairfaxcounty.gov/GeoApps/Geocortex/Essentials/REST/sites/Jade/viewers/Jade/virtualdirectory/Resources/Config/Default). Jade was designed to provide the public with never-before released map layers, reports, exclusive aerial imagery, and analytical tools to explore County data and business processes. Detailed property reports describing legal and environmental conditions are especially useful for land development activities. To meet this need, Jade users will be able to create reports for every property in Fairfax County, including:

- A general parcel report that uses the most current County data to display information on a property's description, zoning, structures, ownership, and tax/assessments.
- A separate environmental parcel report that includes information on watersheds, floodplains, resource protection areas, and soil details.

DIT will continue to support county agencies with the capacity and ability to publish interactive maps to inform the public. Likewise, DIT will continue its support and build out of the GIS Open Data Site and encourage its partner agencies to continue the dissemination of as much environmental data as possible through this medium. DIT is examining other more general open data venues for any county information that should be more easily accessible, including environmental data.

FUTURE TRENDS

As the county grows in population and increases in development density, the stress on the environment will increase. Protection and preservation of the increasingly urban environment will present growing management challenges to county agencies. A rapid change in development areas and gradual growth in traditional residential areas, will mean that GIS and related data important to environmental stewardship will more quickly be outdated and require refreshing. Data resolution may have to increase as well to successfully model and analyze increasingly dense county development. DPWES is already increasing the resolution of LiDAR in the upcoming acquisition from two measurement points per square meter to eight points. New analytical tools may need to be developed to monitor impacts. And since budget challenges are not expected to abate, agencies will need to identify more efficient and effective ways to fulfill their missions at the same time.

Looking ahead, GIS use is expected to continue to expand into more business areas and processes. More agencies and more public users realize the value and importance of GIS. GIS is already playing an increasingly important role in environmental management as shown in the sections above. More detailed modeling will need to be done, more detailed data will need to be collected, maintained, and acquired, and more analytical tools will need to be developed for field and office usage. GIS is also providing cost savings to agencies that will continue to accrue and expand as new applications are created.

As the county seeks to replace its various business systems it is seeking to leverage GIS to the greatest extent possible in the replacement systems. These geo-enabled systems will combine normal business information with GIS interfaces or backend processes. GIS will be increasingly "baked in" to business systems and thus a critical part of these systems and not a side system. For example, as the county looks at replacements for the Land Development System in particular

(see below) and other systems like those for asset management, GIS capabilities are now part of the requirements.

GIS data and tools should be considered part of the county's environmental infrastructure, similar to our stormwater facilities, park facilities, and others. Just as the traditional infrastructure needs to be maintained and refreshed regularly, the data about the environment and the infrastructure need to be refreshed and sometimes expanded in order for the county to effectively carry out its environmental stewardship responsibilities. Without sufficiently current and accurate data, agencies will not be able to make informed decisions as necessary or carry out the most effective actions.

OTHER COUNTY IT SYSTEMS

The project to design, configure, and implement the Planning and Land Use System (PLUS) is underway. PLUS will create a single system of record for land development. Accela, Inc., the system integrator, and county staff have completed the design and initial configuration for approximately 70 percent of land use records. The need for a third party product to complete electronic plan review tasks has been identified. This product may assist with quantifying development (e.g., uses, gross floor area, and number of residential units). Without a product for this purpose, staff would need to transfer building level information from the site plan to the database.

County staff will work with the system implementer to design a solution that demonstrates how data capture at the building level can be quantified and reported, as system design activities continue this year.

COMMENTS

1. **Increasing Use of GIS Applications**
   Fairfax County already is a leader in GIS data, applications, and systems, and this leadership continues to pay off in more efficient operations by county agencies and in better decisions concerning the environment. Use of GIS by county agencies and the public continues to increase. This burgeoning usage, with its associated benefits, will require continued investment in desktop and Web-based GIS software as well as specialized applications, particularly for mobile GIS research and data collection.

   Protecting the county's environmental quality will increasingly be a collaborative effort between county staff and the community. Enabling this will involve sharing data and Web-based tools. Fairfax County makes a growing amount of data available to the public, as well as applications to use the data. The county could benefit by making more tools available to the public. Looking ahead, internal tools such as the impervious area calculator and watershed delineation tool could be very helpful to the public, particularly engineering and planning firms.

To expand the program and capabilities, additional software licenses and hardware will be required to support the volume of usage for mobile collection, geo-enabled systems, and application deployments. To make mobile data collection and GIS use a reality for county business, agencies may need to expand their deployment of mobile technologies, devices, and wireless services. The entire cost for field data collection is predicated on the extent of the adoption of GIS by agencies in their business processes, which will determine the expansion of software, end-user hardware and electronic data storage costs, as well as the implementation of high-availability architecture. At this point, it is difficult to determine a specific cost for FY 2020. However, once an agency's needs are known, additional server and/or license requirements can be identified to handle the growth. DIT will work to address funding requirements through future quarterly review or annual budget processes.

It is important that Fairfax County continue to support the increased use of GIS throughout county agencies and with the public. The county already is realizing significant benefits from GIS, and increased usage is likely to continue this trend.

2. Investment in Data

Fairfax County already has significant holdings of GIS data, but continued investment is needed to keep up with population and economic growth. For timely informed decisions to be made, data must be current, correct, and granular enough to understand their significance.

For the longer term, in order to continue a regular LiDAR capture program, DIT and its partner agencies will need to identify funding for the capture years. Each capture costs approximately $220,000. Sustaining growth in mobile GIS usage will also have cost implications in the long term. Additional reliable infrastructure will need to be procured and existing infrastructure refreshed. Depending on the needs, costs will vary, but will be significant.

3. Public Access

The new website design significantly increases the ability of the public to access GIS data and applications, and it is very likely that use by the public will grow significantly in the future. Given significant public interest in the nature and amount of county growth, the availability of current, accurate, and accessible data will play a key role in future public debates and interactions on development and transportation issues. Towards this end, it is important that Jade and PLUS have clean, well-functioning interfaces to facilitate public access.

The capacity to continue to create and host more environmental specific mapping applications is dependent on continued funding for GIS growth. Additional funding in future years will be required to facilitate expansion, and DIT will seek this funding through the annual budget process. This will be coupled with a continuous review of the most cost effective ways to deliver these applications.

4. Continued PLUS Development

At any given time there should be accurate information about existing land development, as well as the development that can be expected in the next five to 20 years. The PLUS system will be critical to assessing activity within the development pipeline.

RECOMMENDATIONS

1. Expanding GIS Data and Applications

EQAC recommends that the county pursue regular acquisition of both LiDAR and Multi-spectral data based on their value to environmental stewardship. EQAC also recommends the continued capture of orthographic and oblique imagery, as well as the continued funding for planimetric updates. Additionally, environmental agencies should continue to increase the utilization of field data collection through the use of mobile GIS tools.

2. Access to Data

EQAC recommends that the county continue its efforts to ensure convenient public access to GIS and other environmental data.

3. Supporting Infrastructure

In order to support the growing needs of agencies and the public for GIS capabilities, the county should ensure that a robust GIS architecture is put in place to support current business needs, public outreach with GIS, and future growth. As more geo-enabled systems are brought on, county business processes and environmental protection efforts will be increasingly reliant on a highly available GIS system.

ACKNOWLEDGEMENTS

The bulk of this section was prepared by the Geographic Information Systems and Mapping Services Branch in coordination with EQAC. We thank the staff for its excellent work in preparing this chapter.

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APPENDIX A

SUMMARY OF ENVIRONMENTAL BILLS OF INTEREST 2019 VIRGINIA GENERAL ASSEMBLY

INTRODUCTION

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 2019.

The major substantive provisions of each measure are listed as summaries prepared by Virginia legislative staff - no edits or other revisions from EQAC have been provided. The appropriate bill number and main patron are noted so that one can obtain further information, if needed. A researcher should refer to the enrolled bill and the appropriate chapter in the 2019 Legislative Information System Cumulative Index on the internet (https://index.lis.virginia.gov/?ses=24) for detailed information on legislation.

These summaries reflect actions of the regular session of the 2019 General Assembly through adjournment *sine die* on February 23, 2019. The legislation listed below has passed both the House of Delegates and the Senate and has been signed by the Governor.

BILL SUMMARIES

HB 1613 - Penalty for wanton waste.

Changes from a Class 3 misdemeanor to a Class 2 misdemeanor the penalty for violating a regulation prohibiting wanton waste, or the allowing of a killed or crippled game animal or nonmigratory game bird to be wasted without making a reasonable effort to retrieve the animal. (Patron – Edmunds II)

HB 1614/SB 1248 - Local Stormwater Management Fund.

Authorizes a locality by ordinance to create a local Stormwater Management Fund consisting of appropriated local moneys for the purpose of granting funds to an owner of private property or a common interest community for stormwater management and erosion prevention on previously developed lands. (Patron – Cole)

HB 1625 - Animal care; adequate shelter.

Provides that the definition of "adequate shelter" includes the provision of shelter that, during hot weather, is shaded and does not readily conduct heat and, during cold weather, has a windbreak at its entrance and provides sufficient bedding material. (Patron – Orrock, Sr.)

HB 1626 - Animal fighting; confiscation of tethered cocks.

Provides that an animal control officer shall confiscate a tethered cock if such cock has been, is, or is intended to be used in animal fighting. (Patron – Orrock. Sr.)

HB 1637 - Special license plates; PROTECT SEA LIFE.
Authorizes the issuance of revenue-sharing special license plates for supporters of the Virginia Aquarium bearing the legend PROTECT SEA LIFE. (Patron – Knight)

HB 1696 - Killing of nuisance species from an automobile.
Authorizes killing a nuisance species on private property by the owner of such property or his designee from a stationary automobile or other stationary vehicle. (Patron – Fariss)

HB 1709 - Special license plates; VIRGINIA STATE PARKS.
Authorizes the issuance of revenue-sharing special license plates for supporters of Virginia State Parks bearing the legend VIRGINIA STATE PARKS. (Patron – Bulova)

HB 1715 - Dams; wetland vegetation.
Exempts wetland vegetation growing on certain regulated impounding structures from the requirement that all vegetation be removed from such dams. The bill exempts vegetation associated with a wetland mitigation bank or in-lieu fee site that has regulatory approval and is the subject of a recorded, permanent instrument protecting the vegetation from removal. The bill allows the Department of Conservation and Recreation to require the dam owner to remove trees by flush cutting unless the Department determines on the basis of site-specific information that the grubbing of roots is necessary to protect the integrity of the dam. (Patron – Bulova)

HB 1779 - Riparian planting ground assignment eligibility.
Authorizes the Commissioner of the Marine Resources Commission to assign to a land owner who is eligible to apply for riparian planting grounds only a planting ground that the Commissioner, in his discretion, deems appropriate to encompass as much as one-half acre of ground. The bill authorizes the Commissioner to consider assigning an area that the owner designates within his riparian waters and provides that the assignment shall not extend farther than the nearest edge of the channel or the middle of the body of water, whichever is the shorter distance. The bill removes a provision stating that the fee for such assignment shall be $1.50. (Patron – Bloxom, Jr.)

HB 1816 - Land preservation tax credit; allowable time to claim credit.
Extends the amount of time a taxpayer is allowed to claim the land preservation tax credit to either (i) December 31 of the second year following the calendar year of the eligible conveyance if the conveyance was made on or after January 1, 2020 or (ii) December 31 of the third year following the calendar year of the eligible conveyance if the conveyance was made before January 1, 2020. Under current law, the credit must be claimed by December 31 of the first year following the calendar year of the conveyance. (Patron – Fariss)

HB 1822 - Virginia Water Quality Improvement Fund; grant for wastewater conveyance facility; estimates of future funding requests; Stormwater Local Assistance Fund.
Authorizes the Director of the Department of Environmental Quality (the Department) to authorize grants from the Virginia Water Quality Improvement Fund (the Fund) for the installation of certain wastewater conveyance infrastructure. Any such infrastructure shall (i) divert wastewater from one publicly owned treatment works that is eligible for grant funding to another such eligible treatment works; (ii) divert wastewater to a receiving treatment works that

is capable of achieving compliance with its nutrient reduction or ammonia control discharge requirements and that results in a net reduction in total phosphorus, total nitrogen, or nitrogen-containing ammonia discharges; and (iii) result in no more expense to the Fund than would otherwise be incurred to install eligible nutrient removal technology or other treatment technology at the treatment works from which the wastewater will be diverted.

The bill also directs the Department to consult with stakeholders annually to estimate the amount of grant funding that local governments will request during the upcoming year from (a) the Fund and (b) the Stormwater Local Assistance Fund and to submit those estimates to the Governor as part of a biennial funding report and an annual progress report that are required by current law. The bill contains technical amendments. (Patron – Bulova)

HB 1874/SB 1604 - Cruelty to animals; serious bodily injury; penalty.
Provides that any person who tortures, willfully inflicts inhumane injury or pain not connected with bona fide scientific or medical experimentation, or cruelly and unnecessarily beats, maims, or mutilates any dog or cat that is a companion animal whether belonging to him or another and as a direct result causes serious bodily injury to such dog or cat is guilty of a Class 6 felony. Current law requires that the animal die for the person to be guilty of the felony. (Patron – Ransone)

HB 1934 - Electric vehicle charging stations; operation by certain state agencies.
Authorizes the Department of General Services, Department of Motor Vehicles, and Department of Transportation to locate and operate a retail fee-based electric vehicle charging station on property the agency controls if the electric vehicle charging services are offered at prevailing market rates, as defined in the bill. The bill exempts such agencies from being considered a public utility solely because of the sale of electric vehicle charging service or the ownership or operation of an electric vehicle charging station and further exempts such service from constituting the retail sale of electricity. Currently, such provisions are applicable only to the Department of Conservation and Recreation when operating a retail fee-based electric vehicle charging station on property of any existing state park or similar recreational facility the Department of Conservation and Recreation controls. (Patron – Bulova)

HB 2008/SB 1348 - Department of Education; energy career cluster.
Requires the Department of Education, in consultation with representatives from pertinent industries such as renewable energy, natural gas, nuclear energy, coal, and oil, to establish an energy career cluster. The bill requires the Department of Education to base the knowledge and skill sets contained in such energy career cluster on the energy industry competency and credential models developed by the Center for Energy Workforce Development in partnership with the U.S. Department of Labor. The bill further requires the Department of Education to report to the Chairmen of the House Committee on Education and the Senate Committee on Education and Health no later than December 1, 2019, on its progress toward establishing such energy career cluster. (Patron – Garrett)

HB 2009 - Virginia Land Conservation Foundation; project proposals.
Directs the Virginia Land Conservation Foundation to conduct a grant round each year to identify and rank projects for the subsequent fiscal year. The bill requires the Foundation to assume an amount of funding of the grant program as provided in the general appropriation act. The bill requires the Foundation to provide rankings to the House Committee on Appropriations and the Senate Committee on Finance by December 15 of each year. (Patron – Krizek)

HB 2019 - Residential real property; required disclosures; stormwater management facilities.
Provides that the owner of residential real property under the Virginia Residential Property Disclosure Act must include in the residential property disclosure statement provided to a potential purchaser of residential property a statement that the owner makes no representations with respect to the existence or recordation of any maintenance agreement for any stormwater detention facilities on the property, and that advises the potential purchaser to take whatever due diligence steps they deem necessary to determine the presence of any such facilities or agreements, such as contacting his settlement provider, consulting the locality in which the property is located, or reviewing any survey of the property that may have been conducted. The bill also requires the Common Interest Community Board to include notice that regular annual or special assessments paid by the owner to the association may be used for the construction or maintenance of stormwater management facilities in the form that accompanies association disclosure packets that are required to be provided to all prospective purchasers of lots located within a development that is subject to the Virginia Property Owners' Association Act and resale certificates provided to purchasers of units located in a condominium that is subject to the Condominium Act. (Patron – Murphy)

HB 2047 - Oyster-planting grounds; municipal dredging projects; compensation.
Extends the duration of an exception, for municipal dredging, to the right of a person to lease oyster-planting grounds, and establishes a procedure for determining compensation to such a leaseholder when his grounds are disturbed by such a dredging project.

The bill extends from 2019 to 2035 the sunset date for an exception to the leaseholder's right that allows certain municipal dredging projects to take place in the Lynnhaven River. The bill provides that when such a dredging project is proposed for leased grounds that are subject to beneficial use as oyster-planting grounds, the Commissioner of Marine Resources (the Commissioner) shall review the project to ensure that it avoids affecting such grounds to the maximum extent practicable and, if the project meets such standard, the Commissioner shall notify any leaseholder within the footprint of the proposed navigation channel, requesting a response within 60 days.

The bill then requires the locality to compensate the lessee for the use of the ground by coming to a voluntary agreement or entering into mediation if no agreement is made in 90 days. If the lessee refuses mediation or cannot come to an agreement with the locality within nine months of the offer of mediation, a court of competent jurisdiction shall determine and order fair compensation to the lessee. Finally, the Commission shall hold a hearing on the proposed project. If the compensation has been determined and the project has been approved by the

Commission, the Commissioner shall issue the permit for the project. The bill contains technical amendments. (Patron – Stolle)

HB 2292 - Electric utilities; energy efficiency programs.
Provides that any determination by the State Corporation Commission that an energy efficiency program is not in the public interest shall include with its final order the work product and analysis conducted by the staff of the Commission in making that determination. The measure requires that if the Commission reduces the proposed budget for a program or portfolio of programs, its final order shall include an analysis of the impact such budget reduction has upon the cost-effectiveness of such program or portfolio of programs. An order by the Commission (i) finding that a program or portfolio of programs is not in the public interest or (ii) reducing the proposed budget for any program or portfolio of programs shall adhere to existing protocols for extraordinarily sensitive information. The measure provides that any utility petitioning the Commission for approval of one or more rate adjustment clauses for energy efficiency programs shall include a proposed budget for the design, implementation, and operation of the energy efficiency programs. The bill requires that any rate adjustment clause approved for an energy efficiency program remain in effect until the utility exhausts the approved budget for the energy efficiency program. (Patron – Sullivan)

HB 2293/SB 1605 - Electric utilities; stakeholder process for energy efficiency programs.
Requires the independent monitor chosen to facilitate the energy efficiency stakeholder process established for the purpose of providing input and feedback on the development of electric utilities' energy efficiency programs to convene meetings of the participants not less frequently than twice each calendar year between July 1, 2019, and July 1, 2028. The measure also requires the independent monitor's report on the status of the stakeholder process to address (i) the objectives established by the stakeholder group during this process related to programs to be proposed, (ii) recommendations related to programs to be proposed that result from the stakeholder process, and (iii) the status of those recommendations. Current law requires that an annual report be submitted by the utility and does not require that it include such information on the stakeholder process. (Patron – Sullivan)

HB 2322 - Department of Health; plan for oversight and enforcement; requirements governing onsite sewage treatment systems.
Directs the Department of Health to develop a plan for the oversight and enforcement by the Department of requirements related to the inspection and pump-out of onsite sewage treatment systems that do not require a Virginia Pollutant Discharge Elimination System permit established pursuant to the Chesapeake Bay Preservation Act and are located in counties eligible for participation in the Rural Coastal Virginia Community Enhancement Authority. The bill requires the Department to present such plan to the Chairmen of the House Committee on Health, Welfare and Institutions and the Senate Committee on Education and Health prior to implementing the plan. (Patron – Hodges)

HB 2341 - Forester title.
Authorizes a person who has met the educational criteria for Certified Forester, as reviewed and officially recognized in writing by the Society of American Foresters (the Society), to use the title of "forester" in connection with any practice of forestry. Current law limits such use of the

title to a person who holds a baccalaureate or higher degree from an institution of higher education, having completed a degree program that is accredited by the Society and meets the Society's minimum education criteria in certain fields of study. The bill provides that no person shall be appointed by the Governor to serve as State Forester unless he meets certain requirements as set out in the bill. The bill contains technical amendments. (Patron – Edmunds II)

HB 2358/SB 1414 - Potomac Aquifer recharge monitoring; advisory board; laboratory established; SWIFT Project.
Creates an advisory board and a laboratory to monitor the effects of the Sustainable Water Infrastructure for Tomorrow (SWIFT) Project being undertaken by the Hampton Roads Sanitation District (HRSD).

The bill establishes a 10-member advisory board called the Potomac Aquifer Recharge Oversight Committee (the Committee), directing it to ensure that the SWIFT Project is monitored independently. The bill provides that the Committee shall consist of the State Health Commissioner, the Director of the Department of Environmental Quality, the Executive Director of the Hampton Roads Planning District Commission, the two Co-Directors of the Laboratory, the Director of the Occoquan Watershed Monitoring Laboratory, two Virginia citizens appointed by the Governor, and two nonvoting members. The Committee is required by the bill to meet at least quarterly during the initial three years of its existence. The bill also authorizes the Committee to appoint a science and technical advisory council and directs the Committee to request funding from HRSD for the first three years of monitoring of the recharge of the aquifer.

The bill also creates the Potomac Aquifer Recharge Monitoring Laboratory (the Laboratory) at a location to be selected in the Hampton Roads region, placing it under the co-direction of one Old Dominion University faculty member and one Virginia Tech faculty member. The bill provides that the Laboratory shall monitor the impact of the SWIFT Project on the Potomac Aquifer, manage testing data, and conduct water sampling and analysis.

The bill authorizes both the Commissioner of the Department of Health and the State Water Control Board to issue emergency orders to halt injection or make any change to any facility of the SWIFT Project. (Patron – Jones)

HB 2365 – Special assessment for land preservation; optional limit on annual increase in assessed value.
Authorizes localities that require use value assessment and taxation to provide by ordinance that the annual increase in the assessed value of eligible property shall not exceed a specified dollar amount per acre. (Patron – Knight)

HB 2403 - Impacts to wetlands; permit requirements for compensation.
Requires the State Water Control Board to evaluate Virginia Water Protection Permits mitigation options for impacts to wetlands on a case-by-case basis with consideration for which option is practicable and ecologically and environmentally preferable, including, in terms of replacement of acreage and functions, which option has the greatest likelihood of success and avoidance of temporal loss of acreage and function. (Patron – Hodges)

HB 2482 - Land preservation tax credits; operation of facility on donated land; agreements between the Commonwealth and a third party related to donated land.
Provides that if Virginia or one of its political subdivisions operates a facility on land donated for a land preservation tax credit, including charging fees for the use of such facility, such operation of a facility shall not disqualify the donation from eligibility for the credit, so long as any fees are used for conservation or preservation purposes. The bill provides that if Virginia or one of its political subdivisions contracts with a third party to manage a facility on donated land, such agreement shall not disqualify the donation from eligibility for the credit, so long as such agreement is for conservation or preservation purposes. (Patron – Hodges)

HB 2547 - Electric utilities; net energy metering.
Establishes requirements for net energy metering by electric cooperatives effective upon the earlier of July 1, 2019, or the effective date of implementing regulations by the State Corporation Commission. Instances where the new net energy metering program's requirements differ from those of the existing program include (i) the cap on the capacity of generating facilities, which will initially be two percent of system peak for residential customers, two percent of system peak for not-for-profit and nonjurisdictional customers, and one percent of system peak for other nonresidential customers; (ii) authorizing an electric cooperative to raise these caps up to a cumulative total of seven percent of its system peak; (iii) legalizing third-party partial requirements power purchase agreements for those retail customers and nonjurisdictional customers of an electric cooperative that are exempt from federal income taxation; and (iv) establishing registration requirements for third-party partial requirements power purchase agreements, including a self-certification system under which a provider is required to affirm certain information to Commission staff, under penalty of revocation of its registration. The measure authorizes the board of directors of an electric cooperative to adjust its rates, terms, conditions, and rate schedules governing net energy metering and prohibits a cooperative after the date of such an adjustment from collecting stand-by charges. The measure authorizes an electric cooperative to adopt a new rate schedule or rider containing demand charges based upon a net energy metering customer's noncoincident peak demand and provides for alternative caps on its net energy metering program. The measure authorizes a cooperative's fixed monthly charge covering the fixed costs of owning and operating its electric distribution system as an alternative to volumetric charges associated with demand and to rebalance among any of the fixed monthly charge, distribution demand, and distribution energy charges. The measure authorizes an investor-owned utility participating in the pilot program for community solar development to move the Commission to make its pilot program permanent. The measure also requires Dominion Power to (a) convene a stakeholder process, using an independent facilitator, to make recommendations to the utility concerning issues related to the implementation of advanced metering technology and related investments in customer information systems; (b) submit to the Commission for approval retail rate schedules designed to offer time-varying pricing; and (c) submit to the Commission for approval an incentive program for the installation of solar equipment for customers served under time-varying retail rate schedules that have advanced-metering technology equipment. (Patron – Hugo)

HB 2553/SB 1680 - Mass transit providers; loss of certain operating funds.
Provides that any mass transit provider that incurs a loss in operating funds as a direct result of the performance-based allocation process set forth in Chapter 854 of the Acts of Assembly of

2018 may be eligible for supplemental operating funds in fiscal year 2020. The maximum amount of supplemental operating funds shall not exceed $3 million from the nongeneral fund amounts available to the Department of Rail and Public Transportation. (Patron – Thomas, Jr.)

HB 2555/SB 1165 - Local gas severance tax; sunset date.
Extends the sunset date from January 1, 2020, to January 1, 2022, for the local gas severance tax that is dedicated to (i) the local Coal and Gas Road Improvement Fund, (ii) the Virginia Coalfield Economic Development Fund, and (iii) water, sewer, and natural gas systems and lines. (Patron – Pillion)

HB 2621/SB 1091 - Site plan approval; decommissioning certified solar energy equipment, facilities, or devices.
Requires a locality, as part of the local legislative approval process or as a condition of approval of a site plan, to require an owner, lessee, or developer of real property to enter into a written agreement to decommission solar energy equipment, facilities, or devices upon certain terms and conditions, including right of entry by the locality and financial assurance. (Patron – Ingram)

HB 2637 - Loans and grants for agricultural best management practices; riparian buffers.
Authorizes the State Water Control Board to issue loans and grants from the Virginia Water Facilities Revolving Fund for the construction, renovation, improvement, or equipping of facilities or structures to implement agricultural best management practices to prevent pollution of state waters. Current law authorizes the Board to only issue loans for the construction of such facilities. The bill includes among the types of facilities or structures for which a loan or grant may be issued riparian buffers planted in trees and maintained in accordance with the terms and conditions of the loan or grant. (Patron – Webert)

HB 2741 - Clean Energy Advisory Board; low-to-moderate income solar loan and rebate pilot program and fund.
Establishes the Clean Energy Advisory Board (the Board) as an advisory board in the executive branch of government for the purpose of establishing a pilot program for disbursing loans or rebates for the installation of solar energy infrastructure in low-income and moderate-income households. The bill provides that the Board shall have a total membership of 15 members, consisting of 14 nonlegislative citizen members and the Director of the Department of Mines, Minerals and Energy, who shall serve ex officio. The bill establishes the Low-to-Moderate Income Solar Loan and Rebate Fund to be used to fund loans or rebate payments to electric customers who complete solar installations or energy efficiency improvements. The bill provides that the pilot program is open to any Virginia resident whose household income is at or below 80 percent of the state median income or regional median income, whichever is greater. The bill establishes application requirements and procedures for the review and approval or denial of applications. The bill requires that each applicant document the installation of energy efficiency services to demonstrate that such services lower home energy consumption by at least 12 percent prior to the submission of an application. The bill has an expiration date of July 1, 2022. (Patron – Aird)

HB 2689 - Livestock definition; alpaca.
Adds animals of the genus Vicugna, which includes alpacas, to the definition of "livestock" in the Domestic Animals law. Under current law, the definition includes animals of the genus Lama, which includes llamas but does not include alpacas. (Patron – Pogge)

HB 2705 - Historic rehabilitation tax credit.
Provides that the $5 million per year limit on the amount of historic rehabilitation tax credit that may be claimed by each taxpayer, which currently expires on January 1, 2019, shall apply to all future taxable years. (Patron – Bloxom, Jr.)

HB 2731 - Lyme disease; disclosure of information to patients.
Requires every laboratory reporting the results of a test for Lyme disease ordered by a health care provider in an office-based setting to include, together with the results of such test provided to the health care provider, a notice stating that the results of Lyme disease tests may vary and may produce results that are inaccurate and that a patient may not be able to rely on a positive or negative result from such test. Such notice shall also include a statement that health care providers are encouraged to discuss Lyme disease test results with the patient for whom the test was ordered. The bill also provides that a laboratory that complies with the provisions of the bill shall be immune from civil liability absent gross negligence or willful misconduct. (Patron – Edmunds II)

HB 2733 - Personal property tax; exemption for agricultural vehicles.
Provides that, for purposes of the optional local personal property tax exemptions for motor vehicles, trucks, and tractors, the exemption shall apply if the vehicle is used primarily for agricultural purposes. Under current law, the exemption applies only if the vehicle is used exclusively for agricultural purposes.

The bill also provides that, for purposes of the optional local personal property tax exemption for farm vehicles, such exemption shall apply to equipment used by a nursery for the production of horticultural products and to any farm tractor. (Patron – Webert)

HB 2783 - Living shorelines; loans to businesses.
Authorizes a local government that has a funding program that provides low-interest loans or other incentives for the establishment of living shorelines to provide such incentives to businesses. The bill includes bed-and-breakfast operations, campgrounds, restaurants, and businesses that use working waterfronts among the eligible businesses, and it requires such a business to be located within a locality that is in the Rural Coastal Virginia Community Enhancement Authority in order to be eligible for loan funding. Current law authorizes the provision of such incentives only to individual residents of the Commonwealth. (Patron – Hodges)

HB 2786/SB 1355 - Coal combustion residuals impoundment; closure.
Requires the owner or operator of any coal combustion residuals (CCR) unit, defined in the bill to include a coal ash pond or landfill, within the Chesapeake Bay watershed at Bremo Power Station, Chesapeake Energy Center, Chesterfield Power Station, and Possum Point Power Station to close such CCR unit by removing all of the CCR for (i) recycling, known as encapsulated

beneficial use, or (ii) deposition in a permitted and lined landfill that meets certain federal standards. The measure requires that any owner or operator beneficially reuse no less than 6.8 million cubic yards in aggregate of such removed CCR from no fewer than two of the sites. Such a closure project shall be completed within 15 years of its initiation and shall be accompanied by an offer by the owner or operator to provide connection to a municipal water supply for every residence within one-half mile, or if such connection is not feasible, the owner or operator shall offer to provide water testing for any such residence.

The bill provides that if the owner or operator moves CCR off-site, it shall develop a transportation plan in consultation with any county, city, or town in which the CCR units are located and any county, city, or town within two miles of the CCR units, for any truck transportation that minimizes the effects on adjacent property owners and surrounding communities. The bill requires the owner or operator of a CCR unit to accept and review on an ongoing basis sufficiently detailed proposals to beneficially reuse any CCR that are not already subject to a removal contract. The bill requires that any entity conducting the closure work (i) identify options for utilizing local workers, (ii) consult with the Commonwealth's Chief Workforce Development Officer on opportunities to advance the Commonwealth's workforce goals, and (iii) give priority to the hiring of local workers.

The bill requires the CCR unit owner or operator to submit two biennial reports beginning October 1, 2022, and continuing until closure of all of its CCR units is complete. One report describes closure plans, progress, a detailed accounting of the amounts of CCR that have been beneficially reused and the amount of CCR that have been landfilled, the utilization of transportation options, water monitoring results, and other aspects of the closure process; the other report contains the beneficial reuse proposals that the owner or operator has received and its analysis of such proposals.

The measure provides that all costs associated with closure of a CCR unit shall be recoverable through a rate adjustment clause authorized by the State Corporation Commission (the Commission) provided that (i) when determining the reasonableness of such costs the Commission shall not consider closure in place of the CCR unit as an option and (ii) the annual revenue requirement recoverable through a rate adjustment clause shall not exceed $225 million on a Virginia jurisdictional basis for the Commonwealth in any 12-month period, provided that any under-recovery amount of revenue requirements incurred in excess of $225 million in a given 12-month period shall be deferred and recovered through the rate adjustment clause over up to three succeeding 12-month periods. The bill provides that costs may begin accruing on July 1, 2019, but no approved rate adjustment clause charges shall be included in customer bills until July 1, 2021; any such costs shall be allocated to all customers of the utility in the Commonwealth as a non-bypassable charge, irrespective of the generation supplier of any such customer; and any such costs that are allocated to the utility's system customers outside of the Commonwealth that are not actually recovered from such customers shall be included for cost recovery from jurisdictional customers in the Commonwealth through the rate adjustment clause. The measure prohibits cost recovery for any fines or civil penalties resulting from violations of federal or state law. (Patron – Ingram)

HB 2789 - Direct the establishment of energy conservation measures providing incentives for the development of electric energy delivered from sunlight.

Requires Dominion Power and Appalachian Power Company to a seek approval for a three-year program of energy conservation measures providing incentives to low income, elderly and disabled individuals in an amount not to exceed $25 million in the aggregate for the installation of measures that reduce residential heating and cooling costs and enhance the health and safety of residents. The measure also requires the utilities to develop a program of energy conservation measures providing incentives, open to low income, elderly and disabled individuals who also participate in the above-described incentive program, in an amount not to exceed $25 million in the aggregate, for the installation of equipment to develop electric energy derived from sunlight. The measure provides that the utilities may provide such incentives directly to customers or to organizations that assist low income, elderly and disabled individuals. The measure directs that in developing such incentive programs, each utility shall give consideration to low income, elderly and disabled persons residing in housing that a redevelopment and housing authority owns or controls. (Patron – O'Quinn)

HB 2792/SB 1779 - Electric utilities; municipal net energy metering.

Directs the State Corporation Commission to establish a pilot program that affords the opportunity for any locality to participate in net energy metering if it is a retail customer of a certain type of investor-owned electric utility. In order to qualify for the program, the locality is required to own and operate a renewable generating facility with a generating capacity of not more than two megawatts that is located on the municipality's premises and is intended primarily to offset all or part of the locality's own electricity requirements. Under the pilot program, a municipal customer-generator that generates electricity in amounts that exceed the amount of electricity consumed by the municipal customer-generator, determined annually, to credit one or more of the municipality's target metered accounts in order that the generation energy charges on the electric bills of the target's metered accounts are reduced by the amount of excess generation kilowatt hours apportioned to the metered account multiplied by the applicable generation energy rate of the target's accounts. In Appalachian Power's service territory, metered accounts of the public school division of a locality may be target accounts. The amount of generating capacity of all generating facilities that are the subject of a pilot program are limited to (i) five megawatts if Appalachian Power is the pilot program utility, though the utility may increase the amount to up to 10 megawatts or (ii) 25 megawatts if Dominion Power is the pilot program utility. Such aggregated capacities of the generation facilities that are the subject of a pilot program constitute a portion of the existing limit of the utility's adjusted Virginia peak-load forecast of the previous year that is available to municipal customer-generators, eligible customer-generators, eligible agricultural customer-generators, and small agricultural generators in the utility's service area. The duration of the pilot program is six years. (Patron –Tran)

HB 2811 - Tax-exempt pollution control facilities; certifying authority; Virginia Department of Health.

Adds to the duties of the Virginia Department of Health the duty of serving as a state certifying authority in determining conformity with state requirements for certain tax-exempt water pollution control projects. Under current law, the State Water Control Board is the only state certifying authority for water pollution projects. The bill contains an emergency clause. (Patron – Webert)

SB 1152 - Chesapeake Bay Restoration Fund Advisory Committee; member terms.
Increases from two to four the number of consecutive four-year terms a nonlegislative citizen member is allowed to serve on the Chesapeake Bay Restoration Fund Advisory Committee (the Committee), which oversees the distribution of funds raised by the sale of Friend of the Chesapeake license plates. The bill provides that the two citizen members of the Committee who are appointed by the Senate Committee on Rules, both of whose terms expire on July 1, 2019, shall have their terms extended until July 1, 2020, and July 1, 2021, respectively. One of the two members appointed by the Speaker of the House of Delegates shall have the expiration of his term extended from July 1, 2019, until July 1, 2022. Such extensions shall not constitute a term in determining each member's eligibility for reappointment under the limit of four consecutive terms provided by the bill. (Patron – DeSteph)

SB 1176 - State Corporation Commission; natural gas utilities; investigative reports.
Requires the State Corporation Commission, within 30 days following receipt of a written request, to make available for public inspection a report regarding the finalized enforcement action or investigation regarding the death or personal injury necessitating inpatient hospitalization of any person or damage to property exceeding $50,000 resulting from a leak or other incident involving the intrastate facilities of a natural gas utility operator. The measure prohibits such a report from revealing infrastructure information regarding certain buildings, structures, or facilities; risk assessment information not provided to the public by the utility operator; certain security plans and measures; confidential or sensitive information; proprietary information; and information that would jeopardize the safety or security of any person, governmental facility, building, or structure, or private commercial office, residential, or retail building. (Patron – McPike)

SB 1271 - Oil and gas wells; bonding requirements; application notice.
Authorizes a person who applies for a hearing in front of the Virginia Gas and Oil Board to provide required notice of such application to certain gas or oil owners, coal owners, mineral owners, or gas storage field operators by commercial delivery service. Current law provides for delivery only by certified mail. The bill changes the blanket bond amounts that the Director of the Department of Mines, Minerals and Energy may require for an application for permits for gas or oil operations and authorizes additional bonds for any well proposed to be drilled in the Tidewater region. (Patron – Stuart)

SB 1346 – Electric cooperatives; rates.
Authorizes any electric cooperative to (i) if it does not hold a membership interest in a utility aggregation cooperative, petition the Commission for approval of one or more rate adjustment clauses for the timely and current recovery from customers of the costs of generation facilities, modifications to generation facilities, or pumped hydroelectricity generation and storage facilities or (ii) adopt any other cooperative's voluntary rate, voluntary program, or voluntary tariff. (Patron – Newman)

SB 1400 - C-PACE loans; stormwater management; residential dwellings and condominiums.
Authorizes any locality, by ordinance, to authorize contracts to provide loans for the initial acquisition and installation of stormwater management improvements with free and willing property owners of both existing properties and new construction. Current law authorizes such contracts only for clean energy improvements. (Patron – Petersen)

SB 1413 - Oyster planting grounds; lease assignments.
Authorizes the Commissioner of Marine Resources (the Commissioner) to decide which area within a riparian owner's waters shall be assigned for planting oysters and removes the $1.50 fee of such assignment. Under current law, such decision is made by the riparian owner. The bill changes various provisions related to oyster-planting grounds, including (i) increasing the application fee for an assignment of general or riparian oyster-planting grounds, (ii) authorizing the Commissioner to consider the public benefits and impacts of shellfish aquaculture or whether a transfer or renewal of an oyster-planting lease is in the public interest when determining whether to allow such transfer or renewal of an assignment, (iii) directing the Marine Resources Commission to adopt regulations related to license renewal fees, and (iv) increasing the application fee for a transfer of an oyster-planting lease. The bill contains an emergency clause. (Patron – Mason)

SB 1427 - Water and sewerage companies; cost allocation and rate design.
Requires the State Corporation Commission (SCC) to consider certain factors in making determinations regarding water and sewerage company rate applications or proposals allocating the revenue requirement to classes of customers. The measure (i) excludes certain previously-addressed revenue allocations and (ii) requires that rate applications submitted to the SCC that would allocate the revenue requirement to more than one class of customers shall be supported by a class cost-of-service study. The measure applies to any water or sewerage company with fewer than 10,000 customer accounts. (Patron – Obenshain)

SB 1462 - Comprehensive animal care; enforceable under Virginia Consumer Protection Act.
Subjects provisions related to misrepresentation of animals' conditions to enforcement under the Virginia Consumer Protection Act (§ 59.1-196 et seq.). The bill also increases from one year to two years following the date of sale the period of time for which a pet dealer is required to maintain a copy of the pet dealer's animal history certificate that is signed by the consumer. (Patron – McPike)

SB 1468 - Northern Virginia Transportation Authority; analysis of projects.
Shifts responsibility from the Department of Transportation to the Northern Virginia Transportation Authority for the evaluation and rating of significant transportation projects in and near Planning District 8. The bill also adds administrative and operating expenses to those expenses that can be paid by the Northern Virginia Transportation Authority Fund. Current law provides that administrative expenses be allocated to the component counties and cities of the Authority. (Patron – Black)

SB 1559 - C-PACE loans; resiliency improvements.
Authorizes any locality, by ordinance, to authorize contracts to provide loans for the initial acquisition and installation of resiliency improvements, including improvements for the mitigation of flooding or the impacts of flooding or stormwater management improvements with a preference for natural or nature-based features and living shorelines with free and willing property owners of both existing properties and new construction. Current law authorizes such contracts only for clean energy improvements. Such ordinance shall include (i) a minimum and maximum aggregate dollar amount that may be financed with respect to a property and (ii) if a locality or other public body is originating the loan, a maximum aggregate dollar amount that may be financed with respect to loans originated by the locality or other public body. (Patron – Lewis, Jr.)

SB 1588 - Partial exemption from real property taxes for flood mitigation efforts.
Codifies an amendment to Article X, Section 6 of the Constitution of Virginia that was adopted by the voters on November 6, 2018, which enables a locality to provide by ordinance a partial exemption from real property taxes for flooding abatement, mitigation, or resiliency efforts for improved real estate that is subject to recurrent flooding. The bill provides that exemptions may only be granted for qualifying flood improvements. Qualifying flood improvements are defined in the bill as improvements that do not increase the size of any impervious area and are made to qualifying structures or to land. Qualifying structures are defined as structures that were completed prior to July 1, 2018, or were completed more than 10 years prior to the completion of the improvements. For improvements made to land, the improvements must be made primarily for the benefit of one or more qualifying structures. No exemption shall be granted for any improvements made prior to July 1, 2018.

The locality is granted the authority to (i) establish flood protection standards that qualifying flood improvements must meet in order to be eligible for the exemption; (ii) determine the amount of the exemption; (iii) set income or property value limitations on eligibility; (iv) provide that the exemption shall only last for a certain number of years; (v) determine, based upon flood risk, areas of the locality where the exemption may be claimed; and (vi) establish preferred actions for qualifying for the exemption, including living shorelines. (Patron – Lewis, Jr.)

SB 1662 - Electric utilities; energy efficiency programs.
Provides that any determination by the State Corporation Commission that an energy efficiency program is not in the public interest shall include with its final order the work product and analysis conducted by the staff of the Commission in making that determination. The measure provides that any utility petitioning the Commission for approval of one or more rate adjustment clauses for energy efficiency programs shall include a proposed budget for the design, implementation, and operation of the energy efficiency programs. The bill requires that any rate adjustment clause approved for an energy efficiency program remain in effect until the utility exhausts the approved budget for the energy efficiency program. (Patron – Wagner)

SB 1756 - Virginia Condominium Act; Virginia Property Owners' Association Act; stormwater facilities; transfer of control of management, maintenance, repair, or replacement.

Requires a declarant to deliver to the president of the unit owners' association or his designated agent, or in the case of a property-owners' association, the board of directors or their designee, an inventory and description of stormwater facilities located on their premises. The bill requires the delivery of final site plans and applicable recorded easements and agreements regarding the inventory and description of stormwater management facilities located on common elements of a condominium or property owners' association property so that such associations are aware of the requirements for the maintenance, repair, or replacement of the stormwater facilities. (Patron – Surovell)

SB 1769 - Electric utilities; net energy metering.

Establishes requirements for net energy metering by electric cooperatives effective upon the earlier of July 1, 2019, or the effective date of implementing regulations by the State Corporation Commission. Instances where the new net energy metering program's requirements differ from those of the existing program include (i) the cap on the capacity of generating facilities, which will initially be two percent of system peak for residential customers, two percent of system peak for not-for-profit and nonjurisdictional customers, and one percent of system peak for other nonresidential customers; (ii) authorizing an electric cooperative to raise these caps up to a cumulative total of seven percent of its system peak; (iii) legalizing third-party partial requirements power purchase agreements for those retail customers and nonjurisdictional customers of an electric cooperative that are exempt from federal income taxation; and (iv) establishing registration requirements for third-party partial requirements power purchase agreements, including a self-certification system under which a provider is required to affirm certain information to Commission staff, under penalty of revocation of its registration. The measure authorizes the board of directors of an electric cooperative to adjust its rates, terms, conditions, and rate schedules governing net energy metering and prohibits a cooperative after the date of such an adjustment from collecting stand-by charges. The measure authorizes an electric cooperative to adopt a new rate schedule or rider containing demand charges based upon a net energy metering customer's noncoincident peak demand and provides for alternative caps on its net energy metering program. The measure authorizes a cooperative's fixed monthly charge covering the fixed costs of owning and operating its electric distribution system as an alternative to volumetric charges associated with demand and to rebalance among any of the fixed monthly charge, distribution demand, and distribution energy charges. The measure authorizes an investor-owned utility participating in the pilot program for community solar development to move the Commission to make its pilot program permanent. The measure also requires Dominion Power to (a) convene a stakeholder process, using an independent facilitator, to make recommendations to the utility concerning issues related to the implementation of advanced metering technology and related investments in customer information systems; (b) submit to the Commission for approval retail rate schedules designed to offer time-varying pricing; and (c) submit to the Commission for approval an incentive program for the installation of solar equipment for customers served under time-varying retail rate schedules that have advanced-metering technology equipment. (Patron – Sturtevant, Jr.)

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APPENDIX B

SPOTLIGHT ON FAIRFAX COUNTY PUBLIC SCHOOLS

OVERVIEW

Fairfax County Public Schools (FCPS) is the 10th largest school system in the United States, serving more than 189,000 students with over 220 facilities comprising 198 schools, 11 centers, and other support buildings. This spotlight identifies relevant components of the updated Fairfax County Environmental Vision (adopted in June 2017) and describes recent efforts to address those components. The Vision includes FCPS in the following four sections: (1) Transportation; (2) Waste; (3) Climate and Energy; and (4) Environmental Stewardship.

FCPS highlights "resource stewardship" as one of the goals of its strategic plan ("Ignite"); this is in addition to goals covering student success, caring culture, and premier workforce. FCPS addresses such stewardship activities through policies and regulations. This Spotlight describes recent achievements by FCPS and upcoming plans for climate and energy; stormwater management; potable water; Get2Green; and transportation. As available, it identifies specific schools and facilities where achievements have taken place. In addition, it discusses activities related to a recent law related to testing for lead in potable water at schools.

FCPS has multiple departments and offices that have activities relevant to environmental topics. These include Facilities and Transportation Services; Food and Nutrition Services; Instructional Services; Office of Design and Construction; Office of Facilities Management; and Office of Safety and Security.

In the past year, FCPS has continued its efforts to prioritize systems and practices that maximize energy efficiency and provide for a cost-effective transition to clean and renewable alternatives to fossil fuels. With new projects, FCPS invests nearly one-third of every project dollar into increasing energy efficiency and sustainability efforts such as geo-thermal, rain water cisterns, LED lighting upgrades, variable refrigerant flow mechanical systems, water source heat pumps, bio-filters, solar hot water heaters, highly reflective roofing, and pervious pavers. One of the notable accomplishments was updating a public website with school-by-school energy and recycling data. Additional information about this is at http://get2green.fcps.edu/. FCPS is working closely with the Fairfax County Board of Supervisors Environmental Committee to develop an Energy Action Plan in support of the county's Environmental Vision.

OUTREACH

County Agencies

FCPS works closely on storm water management projects with the Department of Public Works and Environmental Services (DPWES). In April 2019, Fairfax County's Joint Environmental Task Force (JET) was jointly created by the Fairfax County Board of Supervisors and the FCPS

Board. The JET's mission is to *"join the political and administrative capabilities of the county and the school system to proactively address climate change and environmental sustainability"*[1].

Other Authorities or Actors

FCPS works with the Metropolitan Washington Council of Government through their Regional Climate and Energy Action Plan and the U.S. Department of Energy through their Better Buildings Challenge.

Community

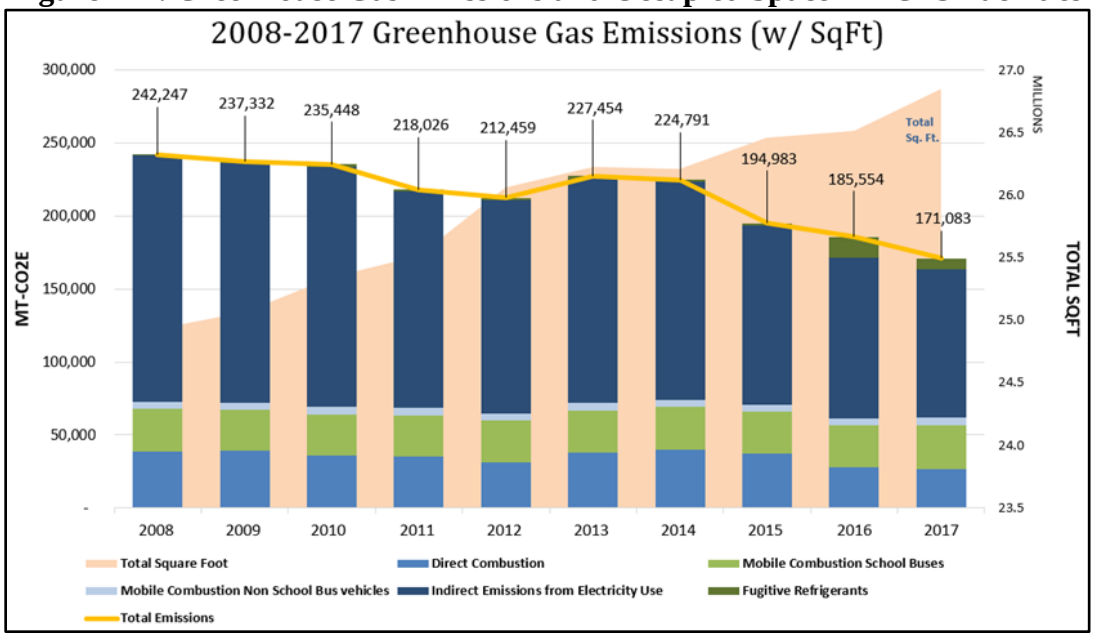
Get2Green provides a newsletter and maintains an active social media presence on Twitter. The newsletter has more than 4,000 subscribers and 500 Twitter followers.

CLIMATE AND ENERGY

This year, FCPS is conditioning over 27 million square feet of occupied space for education, support, and administration functions. FCPS' efforts in environmental sustainability have yielded the following results in energy efficiency and greenhouse gas (GHG) reductions:

- Reduced Energy Use: FCPS has most recently achieved an annual reduction of 14 percent in total energy use division-wide compared to 2014.
- Savings from Energy Use Reductions: A cumulative cost savings of more than $23 million has resulted from the reduced energy consumption since 2013.
- A Significant Reduction in Greenhouse Gas Emissions (as shown in Figure A-1): FCPS has reduced GHG equivalent emissions (CO_2e) by more than 71,000 metric tons of CO_2e from 2008 to 2017 (a 29 percent reduction over a nine-year period).

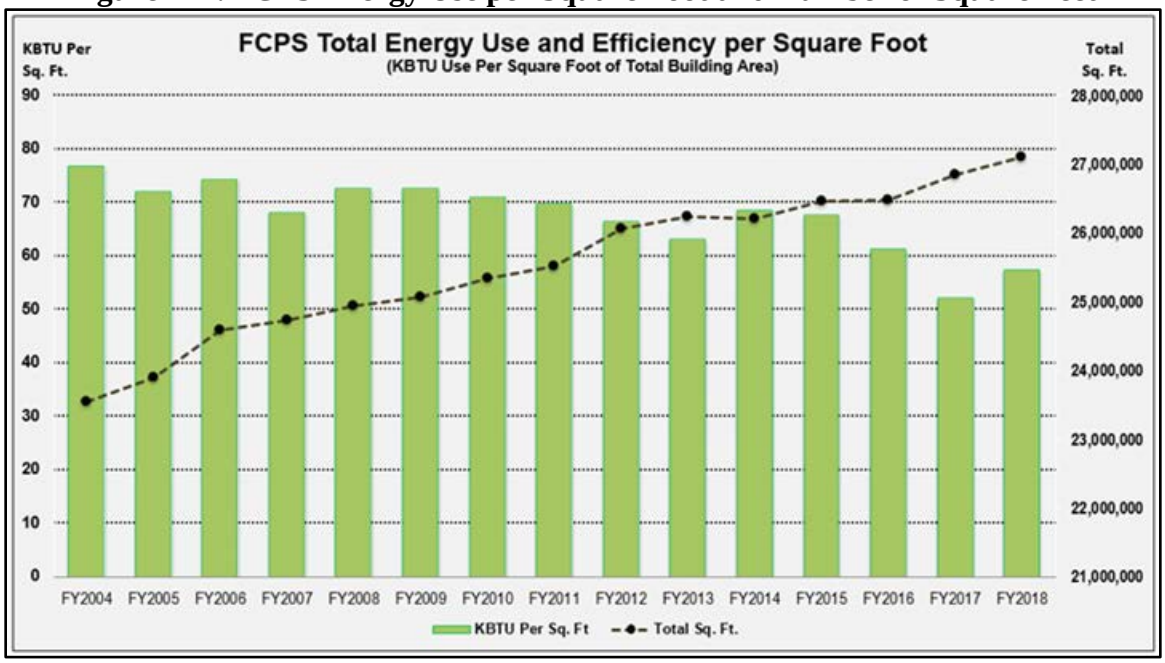
Figure A-1. Greenhouse Gas Emissions and Occupied Space in FCPS Facilities



[1] The JET had its first meeting on September 3, 2019. https://www.fairfaxcounty.gov/publicaffairs/fairfax-countys-joint-environmental-task-force-hold-first-meeting-sept-3

Consumption of electricity and natural gas in 2018 was 1.47 billion kBtu, compared to 1.73 billion in 2005, a 15 percent reduction. The energy use per square foot during FY 2018 was 57 kBtu, compared to 77 kBtu in FY 2004, a 26 percent reduction (see Figure A-2). These energy reductions (total and per square foot) have been achieved despite the addition of school building space to accommodate increasing student membership. Growth in student membership was more than 25,000 between 2008 and 2018 and FCPS added almost 2.2 million square feet of education space to accommodate that growth.

Figure A-2. FCPS Energy Use per Square Foot and Number of Square Feet



FSPS' accomplishments with energy and sustainability were recognized by the U.S. Department of Energy:

- The Largest Number of ENERGY STAR® Certified School Buildings among U.S. School Districts: In 2018, a total of 173 FCPS buildings earned ENERGY STAR certification awards from the U.S. Department of Energy. This is 87 percent of all FCPS schools, and is an increase of 27 buildings compared to 2015.
- National Recognition for Energy Efficiency: FCPS earned the ENERGY STAR partner of the year award in 2017, 2018, and 2019. The award is given by the U.S. Department of Energy in recognition of superior energy and sustainability performance and practices.

As required by School Board Policy 8542 (Environmental Stewardship), FCPS has prepared an annual GHG Inventory report (reports for years 2013 through 2017 are available at https://www.fcps.edu/about-fcps/performance-and-accountability/energy-management-program/greenhouse-gas-inventory). Policy makers use GHG inventories to track emission trends, develop strategies and policies, and assess progress. Operations managers use GHG inventories to evaluate a program's impact and to prioritize projects. Scientists use GHG inventories as inputs to atmospheric and economic models.

School renovations and new construction are designed to the Virginia Collaborative for High Performance Schools (VA-CHPS) design certification standard. This results in energy-efficient, comfortable, environmentally responsible, and healthy learning centers. Core criteria of VA-CHPS reflect three major priorities: improving health and student performance, reducing operating costs, and decreasing environmental impact. VA-CHPS standards integrate state priorities, local climate and codes, and other regional variations specific to Virginia.

Currently, there are 12 schools undergoing major renovations or new construction, and all are being built to achieve the VA-CHPS standards: Annandale Terrace Elementary School (ES), Belle View ES; Clearview ES, Herndon High School (HS), Hollin Meadows ES, Mt. Vernon Woods ES, Northwest County ES, Oakton HS, Rocky Run Middle School (MS), Waynewood ES, White Oaks ES, and West Springfield HS. Additionally, there are 12 FCPS schools in the planning phases for future major renovations/construction and VA-CHPS standards are in the construction design specifications for those projects.

Energy assessments have been provided over the past five years by energy specialists from Cenergistic, Inc. FCPS partnered with Cenergistic to provide energy management, conservation, and educational services division wide. Cenergistic is different from typical performance contractors in that it is focused on organizational and behavioral changes to conserve energy with a goal to save money. FCPS has reduced anticipated energy costs by more than $22 million through this conservation program. The Cenergistic contract ended in July 2019, at which time FCPS will use their in-house energy management section to maintain the level of savings by continuing the work performed by Cenergistic.

FCPS spends about $36,000,000 annually on its electric, oil, gas, and water utilities. The Office of Facilities Management is tasked with keeping this bill as low as possible through development and implementation of conservation programs. The energy management section has been installing and operating central control and monitoring systems (CCMS) in FCPS buildings since 1978. These systems range in sophistication from automated start/stop programming to web-integrated Direct Digital Control (DDC) with operator interface graphic software. These systems have a life span of approximately 17 years and are replaced on a rotating cycle when funding permits. The energy management section currently operates about 240 computerized Energy Management Systems. In addition, the energy management section provides in-house training sessions to school-based custodians, school-based operating engineers, and Heating, Ventilation, and Air Conditioning (HVAC) maintenance technicians.

Each year FCPS monitors more than ten thousand utility bills at 239 locations using EnergyCAP, a third party accounting software. Engineers evaluate energy consumption data, looking for and correcting anomalies in usage and billing errors. Facilities are audited regularly to identify potential improvements in energy use, developing and implementing energy saving projects. Data is gathered from a variety of sources including utility bill databases, metering data, building benchmarking, control system historical trends, interviews with building staff, and field observations. Projects are prioritized based on their potential financial payback and those with the best payback are implemented.

To contribute to enhancing the pace of energy related improvements at existing FCPS schools and other facilities, the Office of Facilities Management is in the process of planning Energy Savings Performance Contracts (ESPCs) that will enable completion of urgently needed energy improvement projects that have been unfunded due to budget constraints, such as replacing inefficient HVAC equipment still in use beyond its useful life (such as chillers and boilers), old inefficient structural components (single pane, metal framed windows with no thermal breaks), and inefficient and poor quality fluorescent and High Intensity Discharge (HID) lighting. ESPCs will enable FCPS to accelerate replacement of these items with more efficient replacements such as LED lighting, condensing boilers, high efficiency chillers, insulated windows, and shell air sealing. The money to pay for this will come from energy cost savings achieved by those improvements, and those savings will be guaranteed to FCPS by the energy savings contractors for the projects (see Climate and Energy chapter for additional information about ESPCs).

FCPS recently amended its Capital Improvement Program (CIP) to expand the commitment to renewable energy resources and continues to assess the viability of renewable energy for future projects, addressing each on a case by case basis. In 2019, FCPS joined Fairfax County in its development of the Solar Power Purchase Agreement (PPA) Request for Proposal (RFP) from companies providing solar PPAs. FCPS' Office of Facilities Management maintained close contact with county staff throughout the RFP development process. As of this writing, the Solar PPA has been issued by the county and the procurement process is proceeding with PPA contractors. There are 198 FCPS schools included in the facilities list of potential buildings (see Climate and Energy chapter for additional information about Solar PPA).

STORMWATER MANAGEMENT

A substantial percentage of the cost of a construction project goes towards stormwater management. Throughout 2018, FCPS continued working with the Fairfax County DPWES to identify opportunities to enhance stormwater management efforts and partner with the Fairfax County Stormwater Planning Division (SWPD) to address stormwater management over and above FCPS requirements when appropriate opportunities are present through a bond project. These include: evaluation of opportunities for SWPD to construct stormwater management facilities on school properties which are not part of the CIP; and education and outreach opportunities in the FCPS science curriculum (see the FCPS Get2Green Program section of the report below). FCPS meets requirements of Fairfax County's Municipal Separate Storm Sewer System (MS4) permit (see the Water Chapter for additional information about MS4).

Another part of this effort includes placing visible signage in advance of stormwater management activities installed on school property that would include a description of the improvement. Such signage helps students and others at the schools to increase their appreciation of the efforts and can be a useful educational tool.

The reforestation of areas on school sites help mitigate stormwater runoff by absorbing water. Drought resistant trees and plants native to this region are used because they are suited to this climate and generally do not require irrigation after establishment. The trees absorb carbon dioxide and assist with improved air quality around the schools. 1,430 trees and 3,564 shrubs were planted by FCPS in the past year. With few exceptions, only native and non-toxic fruit

bearing vegetation was planted. No invasive species were planted, and in most cases existing invasive species are removed using procedures prescribed by Fairfax County's Urban Forest Management Department.

POTABLE WATER QUALITY

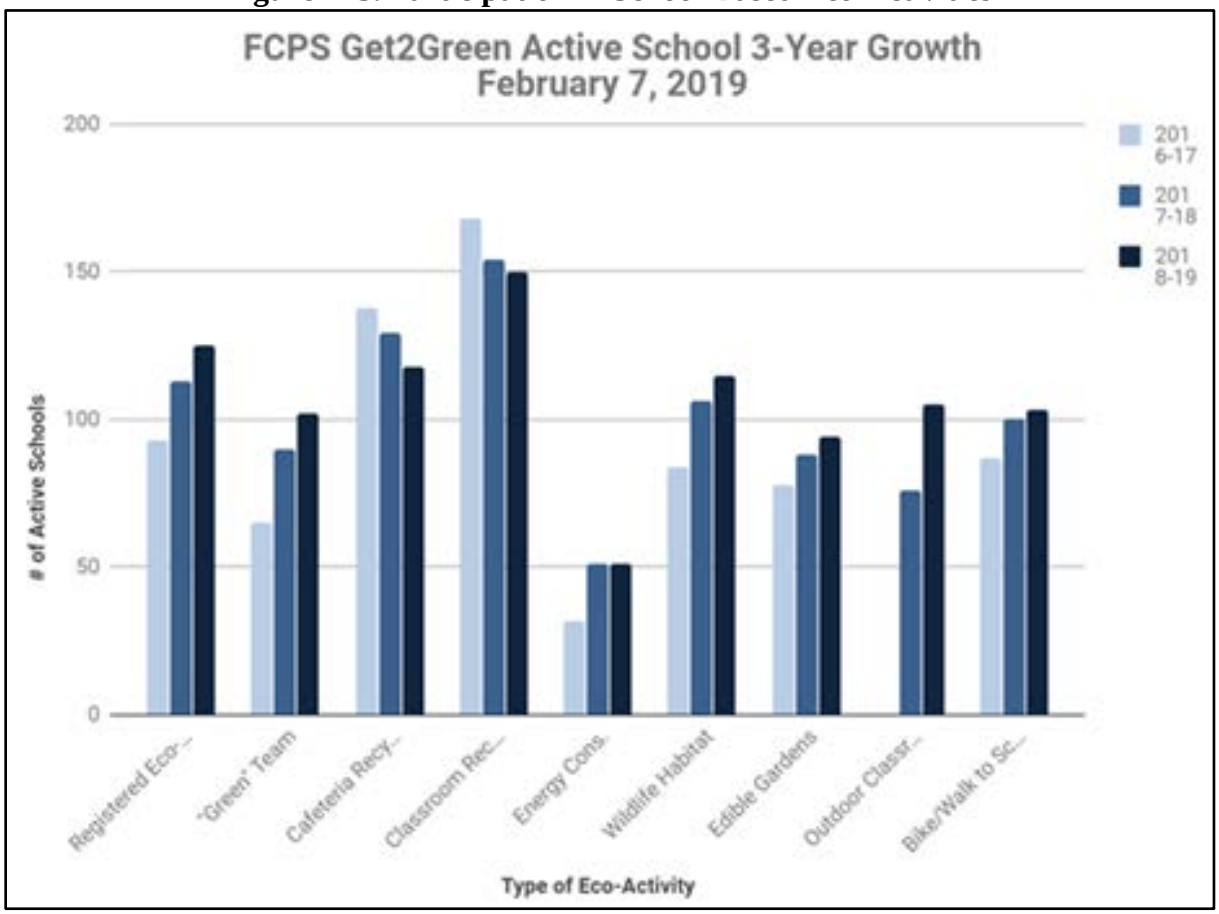
The Office of Safety and Security developed a water testing plan during SY 2017/2018 as required per §22.1-135.1 (formerly SB 1359). The plan is scheduled to commence in SY 2019/2020, with completion anticipated in SY 2023/2024 (a 5-year project). FCPS did not provide input about how residents can learn more about the scope of the water testing activities (e.g., availability of the testing plan). FCPS noted that the Office of Safety and Security will address individual water issues as they arise.

GET2GREEN PROGRAM

Get2Green is the award-winning interdepartmental environmental stewardship program for FCPS. Get2Green is supported by staff in Instructional Services, Facilities and Transportation Services, and Food and Nutrition Services who collaborate to expand student access to environmental education in sustainable learning environments.

At the end of 2018, FCPS had 125 registered Eco-Schools through the National Wildlife Federation's Eco-Schools USA program. Fifteen of these schools have achieved Green Flag status, the highest honor in that program. The Green Flag schools are: Belvedere ES, Centreville ES, Chesterbrook ES, Churchill Road ES, Daniels Run ES, Flint Hill ES, Franklin Sherman ES, Frost MS, Haycock ES, Lake Anne ES, Lanier MS, Longfellow MS, Marshall HS, Rachel Carson MS, and Rocky Run MS. During the 2018-2019 school year, Lanier MS, Centreville ES, and Flint Hill ES earned permanent Green Flag status for their sustained excellence in student-driven environmental stewardship. These are the only schools in the United States to achieve this level of recognition. Figure A-3 shows how participation in school-based eco-activities has grown each year for the past three years.

Figure A-3. Participation in School-Based Eco-Activities



The Get2Green website launched in 2016 and features information, resources, and guidelines for students and staff to engage in environmental stewardship. The site has been continually updated and expanded since launching. Energy and recycling dashboards are main features of the website and showcase data for each school. The site has downloadable data for student and community member use. Continuing improvements in the functionality have been completed, including an overhauling of the Recycling tab in late 2018 to reflect changes in recycling guidelines for FCPS facilities. In Spring 2019, a new energy dashboard was launched that is connected to EnergyCAP, which updates utility use data automatically as it is received instead of updating it manually. Individuals are able to look up electric, natural gas, water, and GHG data for each FCPS facility. Data download features were enhanced to include monthly electricity (kWh) and natural gas (therm) data for all facilities. (Previously, only total kBtu data, or total energy use, was available for users to download.) Also, the listing of the sizes of buildings in square feet measurements was added. Future plans include an update to the Energy tab to better connect to the new dashboard in 2019. A new Climate tab will also be added. Both tabs will help facilitate instructional connections to the dashboard and aid schools in addressing energy and climate topics with students.

The Get2Green program hosted a Reduce, Reuse, and Recycle Challenge in Spring 2019 to support schools in adapting to the new recycling guidelines. Get2Green supported the rollout of the new recycling guidelines with posters, and web information regarding the changes to

recycling in FCPS stemming from broader shifts in the global recycling industry. All schools were invited to participate in the Audit, Budget, and Action Plan activities, supported by using the FCPS Get2Green website dashboard data for their school. Sixteen schools participated and were awarded a total of approximately $27,000 in infrastructure (such as bins, dollies, and posters) to improve the recycling program at their schools. Many schools developed sustainable education plans for their staff and students.

Get2Green received a grant from the Community Foundation for Northern Virginia to expand equitable access to outdoor and environmental education in underserved communities throughout FCPS. The grant funding supported the installation of 11 new garden and habitat spaces in the 2018-2019 school year, with a few additional spaces scheduled for Fall 2019.

In an effort to enhance engagement in Get2Green programs and environmental education for students, Get2Green hosted its second annual Earth Week in April 2019. Teachers and students were invited to play EARTH Bingo and complete an activity for each themed day. Classes that completed a board earned Get2Green stickers for all of the students and one school won a visit from NWF mascot Ranger Rick. Get2Green continued to work with the Fairfax Food Council to expand edible garden programs in schools and train FCPS employees on school garden procedures.

TRANSPORTATION

The Office of Transportation Services' primary responsibility is providing the safe and efficient transportation of all eligible students to and from schools and school activities each day. To accomplish this task, a team of dedicated routing, safety, and administrative specialists, combined with a host of drivers and attendants, work together to maintain a high level of service for all of their clients.

Nationally, 10 - 14 percent of car trips during morning rush hour are for school travel. Based on a survey of FCPS students, approximately 19 percent of FCPS students get to school using active transportation (walking and bicycling); 53 percent arrive by school bus; and 26 percent are driven in the family vehicle. Safe Routes to School (SRTS) is an approach that promotes more active transportation to school on the part of students through infrastructure improvements, enforcement, tools, safety education, and incentives. It reduces GHG emissions through reducing car trips. Originally started as a federally funded program, SRTS is now an active movement in schools in every state. In Virginia, the grant program is administered by the Virginia Department of Transportation (VDOT).

Twenty-six FCPS schools have their own fleet of bikes in addition to two travelling fleets of bikes that visit both elementary schools and middle schools. In 2019, Bike to School Day featured students from 95 FCPS schools who took to their bikes and scooters or put on their walking shoes to get to school. Over half of the FCPS middle schools participated, which is an all-time high. Several schools ran bike trains picking up students throughout the neighborhood. International Walk to School Day held in October 2018 featured 111 FCPS schools participating. Schools also have done Student Travel Tallies in the Fall.

APPENDIX C

ENVIRONMENTAL STEWARDSHIP/VOLUNTEER OPPORTUNITIES IN FAIRFAX COUNTY

Board of Supervisors Environmental Vision:
"An informed community works together with Fairfax County and its partners to care for and responsibly manage our treasured natural resources. In partnership, Fairfax County will continue to coordinate and promote education and outreach programs that encourage personal stewardship and promote initiatives at a countywide level."[1]

INTRODUCTION

Environmental quality is a team effort. We need partnerships with government, commercial, and volunteer organizations to strive to improve our environment as is described throughout this annual report. There are a number of organizations focused on stewardship efforts and best practices supporting government and non-government resources and broader environmental needs. This section is provided to highlight a group of governmental and non-governmental opportunities that individuals or organizations might consider supporting with their time and focus. Many of these organizations rely on volunteer resources to be effective, and greater participation may allow the organizations to expand the scope of their current work. EQAC does not assert that these are the only organizations making a valuable contribution to our environment. Some government organizations are listed if they either organize environmental activities or provide a good source for members of the community who want to contribute their time to improving environmental quality.

1. ALICE FERGUSON FOUNDATION

http://fergusonfoundation.org/

The Alice Ferguson Foundation's flagship volunteer opportunity is their annual Potomac River Watershed Cleanup held throughout the Washington, DC Metropolitan area each April (www.potomaccleanup.org).

2. CLEAN AIR PARTNERS

www.cleanairpartners.net/

Clean Air Partners strives to improve public health and the environment by working with businesses, organizations, and individuals throughout the region to raise awareness and reduce air pollution through voluntary actions. While some of the Metropolitan Washington area's ozone problem originates outside 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

[1] 2017 Fairfax County Environmental Vision, Section 2 G, pg. 31, www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf

of our air. Their "Get Involved" section of the Clean Air Partners website offers many opportunities for taking action.

3. CLEAN FAIRFAX

www.cleanfairfax.org/volunteer-opportunities/

Clean Fairfax is a local nonprofit that encourages environmental stewardship and sustainability in Fairfax County through education, programming, and community engagement. Working in close collaboration with county agencies, Clean Fairfax aims to reduce littering and to encourage recycling, reusing, and reducing consumption through community clean-ups and sustainable business consultations. Clean Fairfax can help you organize a successful clean up in the Spring or Fall where they supply all the necessary tools (gloves, trash bags, recycling bags, vests, and safety tips, as well as assistance in large scale pickups by connecting residents with the county's trash pickup program). Clean Fairfax also organizes and leads the Earth Day/Arbor Day event called SpringFest Fairfax (www.springfestfairfax.org), in partnership with the Department of Public Works and Environmental Services (DPWES) and the Fairfax County Park Authority (FCPA).

4. EARTH SANHGA

www.earthsangha.org/volunteer

Earth Sangha is a non-profit public charity which operates a volunteer-based program to propagate local native plants, restore native plant communities, and control invasive alien plants. Volunteer opportunities exist at Earth Sangha's Wild Plant Nursery (the region's most comprehensive effort to propagate native plants directly from local forests and meadows) as well as through other ecological restoration events (e.g., invasive plant removals or native plantings).

5. ENERGY ACTION FAIRFAX

www.fairfaxcounty.gov/energy/energyactionfairfax/

Energy Action Fairfax develops and implements outreach initiatives across Fairfax County to help residents, businesses, and county employees save energy and money. Residential outreach is done through events, presentations, a quarterly newsletter, and a website. Energy Action Fairfax also coordinates special initiatives such as the Thermal Camera Loan Program, LED Exchanges, and Solarize Fairfax County. Business outreach is done through the Green Business Partners program, which offers recognition to county businesses with sustainable practices and which offers resources for businesses looking to become more sustainable. Employee outreach is done through Fairfax Employees for Environmental Excellence, which hosts awareness events and an internal county webpage. Energy Action Fairfax can be reached at energyactionfairfax@fairfaxcounty.gov.

6. FAIRFAX COUNTY DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES (DPWES)

www.fairfaxcounty.gov/dpwes/stormwater/

There are numerous opportunities throughout the year to participate in stream cleanups, storm drain labeling, volunteer water quality monitoring, and tree planting projects. DPWES-Stormwater Management provides links to information about these popular volunteer programs on its website. For a list of common household hazardous materials and how to dispose of them, go to www.fairfaxcounty.gov/publicworks/recycling-trash/household-hazardous-waste.

7. FAIRFAX COUNTY PARK AUTHORITY

www.fairfaxcounty.gov/parks/volunteer/
https://www.fairfaxcounty.gov/parks/park-volunteer-team
The Fairfax County Park Authority (FCPA) offers a number of opportunities for volunteers via the above websites. Information about its programs is available from the "Programs and Activities" menu on this website. Opportunities include, but are not limited to, engaging in programming, leading walks and tours, writing fliers or brochures, answering the phone when a resident calls with an environmental question, and/or hands-on resource management, cleanup events, habitat restoration events, being a park volunteer team lead, and wildlife monitoring (e.g. birds, amphibians). Monetary donations to the Fairfax County parks can be accepted through the nonprofit Fairfax County Park Foundation (www.fairfaxparkfoundation.org).

8. FAIRFAX COUNTY RESTORATION PROJECT

http://www.fcrpp3.org/
The Fairfax County Restoration Project (FCRP) strengthens the relationship between people and nature through community action. FCRP connects, creates, and promotes efforts to restore ecosystem functions in Fairfax County through collaboration with public, private, and volunteer organizations.

9. FAIRFAX RELEAF

www.fairfaxreleaf.org
Volunteers plant and preserve trees, improve community appearance, and restore habitat on public and commons lands in Northern Virginia.

10. NATIONAL PARK SERVICE

www.nps.gov/getinvolved/volunteer.htm
The National Park Service has many ways you can help care for your national parks, from one-time to reoccurring volunteer opportunities for youth, families, groups, and individuals.

11. NATURE CONSERVANCY, THE

www.nature.org/en-us/get-involved/how-to-help/volunteer-and-attend-events/
Opportunities local to Fairfax County may vary, but more broadly volunteers can participate in projects ranging from visitor outreach to monitoring preserves.

12. NORTHERN VIRGINIA CLEAN WATER PARTNERS

https://www.novaregion.org/408/Clean-Water-Partners
https://www.onlyrain.org/
Northern Virginia Clean Water Partners is a group of 19 Northern Virginia local governments, school systems, independent water and sanitary sewer authorities, and local businesses that are concerned with local water quality. Examples of the activities of this group include its Regional Stormwater Education Initiative, along with other outreach to reduce pollution that reaches local creeks and rivers.

13. NORTHERN VIRGINIA CONSERVATION TRUST
http://nvct.org/get-involved/volunteer/
NVCT holds numerous volunteer events each year focused on restoring habitats in Northern Virginia, including invasive plant removals, tree plantings, trash removals, and much more.

14. NORTHERN VIRGINIA REGIONAL PARK AUTHORITY (NOVA PARKS)
www.novaparks.com/event-category/community-volunteers
For the environmentally-conscious park enthusiast, we recommend contacting NOVA Parks (the Northern Virginia Regional Park Authority). Environmental stewardship opportunities for volunteers, including shoreline, trash, and trail clean-ups and invasive plant removals, are available at Meadowlark Botanical Gardens, Potomac Overlook Regional Park, Upton Hill Regional Park, Pohick Bay Regional Park, and various other parks on occasion. NOVA Parks has implemented a program that allows youths to access its fee-based park facilities through volunteer service. It has a wide variety of community partnerships in place that encourage groups to take advantage of the regional parks for environmental and historic education and service projects.

15. NORTHERN VIRGINIA SOIL AND WATER CONSERVATION DISTRICT
www.fairfaxcounty.gov/nvswcd/
The Northern Virginia Soil and Water Conservation District (NVSWCD) supports numerous opportunities throughout the year to participate in stream cleanups and restorations, storm drain labeling, rain barrel workshops, native seedling sales, volunteer water quality monitoring, and tree planting projects. NVSWCD is also a good resource for homeowners on problems with ponds, eroding streams, drainage, problem soils, and other natural resource concerns. The Conservation Assistance Program may be able offer financial assistance for energy or watershed conservation projects on private land.

16. PLANT NOVA NATIVES
www.plantnovanatives.org/work-with-us
Plant NOVA Natives is a joint marketing campaign of non-profit, governmental, and private groups, which encourages residents, as well as public and commercial entities, in Northern Virginia to install native plants as the first step toward creating wildlife habitat and functioning ecosystems on their own properties. The organization has volunteer opportunities to support its mission internally as well as performing direct outreach in the community.

17. POTOMAC CONSERVANCY
http://potomac.org/
Get involved in the Potomac Conservancy's mission to establish a foundation of healthy, sustainable, and connected communities through ensuring access to clean water. Opportunities include seed collection and tree plantings as well as river cleanups and restorations.

18. RESTON ASSOCIATION
www.reston.org/AboutRestonAssociation/VolunteerOpportunities/VolunteerOpportunitiesOverview/tabid/435/Default.aspx
Volunteer opportunities in this homeowner's association of 60,000 residents include seasonal cleanups, stream monitoring, wildlife counts, and bird box monitoring.

19. VIRGINIA MASTER NATURALIST PROGRAM, FAIRFAX CHAPTER

https://fairfaxmasternaturalists.org/

The Virginia Master Naturalist Program is a statewide corps of volunteers providing education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities. Interested Virginians become Master Naturalists through training and volunteer service.

20. VIRGINIA OUTDOORS FOUNDATION

www.virginiaoutdoorsfoundation.org/volunteer/

Be part of the most successful land conservation program in Virginia. Help fulfill Virginia Outdoors Foundation's mission to preserve open spaces for future generations by becoming a volunteer. With eight offices across the Commonwealth, volunteer opportunities include conservation easement monitoring, field assistance, office assistance, courthouse research, land management assistance, exhibit staffing/event assistance, and communications assistance.

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APPENDIX D

HOW TO REPORT ENVIRONMENTAL CRIMES OR CONCERNS IN FAIRFAX COUNTY

TTY 711 for all phone numbers

Type of Incident	Phone Number
RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT - ACTIVE RELEASE, DANGEROUS, OR UNKNOWN If the dumping of any substance into a stream, into a manhole, into a storm drain, 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
RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT - 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 should be reported to the Fairfax County Fire and Rescue Department's Fire and 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.	703-246-4386 (working hours) 703-691-2131 (after hours)
RELEASE OF ANY MATERIAL INTO THE ENVIRONMENT Any release of materials into the environment, whether hazardous or not, should be reported to the Northern Regional Office of the Virginia Department of Environmental Quality at the above number. If the release is an active one, call 911.	703-583-3800 OR 911
ILLEGAL DUMPING While any of a number of county and/or state agencies may ultimately have authority over dump sites, depending on circumstances, the Department of Code Compliance is an intake center for complaints (call or visit www.fairfaxcounty.gov/code).	703-324-1300
LAND CLEARING; TREE REMOVAL; DUMPING OF FILL To report the suspected illegal removal of trees, clearing of land, digging or dumping of fill dirt, contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300

Type of Incident	Phone Number
SOIL EROSION To report soil erosion from private properties or construction sites, call the Hotline of the Site Development and Inspection Division of Land Development Services or visit https://www.fairfaxcounty.gov/landdevelopment/site-development to submit a complaint online.	703-324-7470
GENERATION OF DUST FROM CONSTRUCTION, GRADING, OR LAND CLEARING Contact the Virginia Department of Environmental Quality, Northern Regional Office.	703-583-3800
TRASH/DEBRIS ON CONSTRUCTION SITES Call the Hotline of the Site Development and Inspection Division of Land Development Services or visit https://www.fairfaxcounty.gov/landdevelopment/site-development to submit a complaint online.	703-324-7470
CONSTRUCTION NOISE To report construction noise outside between 9 p.m. and 7 a.m. on Sunday through Thursday, or between 9 p.m. and 9 a.m. on Fridays, Saturdays, and the day before federal holidays, contact the following: • If the construction activity is occurring at the time of the complaint, call the Fairfax County Police non-emergency number. • Otherwise, if the construction activity is ongoing or recurring, call the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	 703-691-2131 703-324-1300
NOISE IN A RESIDENTIAL AREA To make a complaint about noise from animals, amplified sound, vehicles, or people, contact the following: • If the noise is currently occurring during non-business hours in a residential area, call the Fairfax County Police non-emergency number. • Otherwise, if the noise is ongoing or recurring, call the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	 703-691-2131 703-324-1300
TRASH COLLECTION BETWEEN 9:00 P.M. AND 6:00 A.M. Call the Department of Public Works and Environmental Services. If possible, provide descriptive information about the truck, such as name of company, color, truck number, and license plate number.	703-324-5230
OTHER SOLID WASTE COMPLAINTS ASSOCIATED WITH WASTE COLLECTORS/HAULERS Call the Department of Public Works and Environmental Services. If possible, provide descriptive information about the truck, such as name of company, color, truck number, and license plate number.	703-324-5230
ACCUMULATION OF SOLID WASTE WITHIN BUILDINGS (E.G., TRASH CHUTES IN DISREPAIR) To report a complaint, contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300

Type of Incident	Phone Number
SIGNS ON ROADS AND MEDIANS If a sign on a road or median poses a safety hazard, you may contact the Virginia Department of Transportation at this phone number or through https://my.vdot.virginia.gov/. Fairfax County performs monthly collections of illegal roadway signs on certain designated roads. More information can be found at www.fairfaxcounty.gov/code/signs.	1-800-367-7623 (1-800-FOR-ROAD)
SIGNS ON PRIVATE PROPERTY There are restrictions for signs on private property. To report a complaint, contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300
POORLY MAINTAINED HOMES OR OTHER BLIGHTED PROPERTIES To report problems including broken windows and gutters, junk or debris in yards, and tall uncut grass, contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300
ABANDONED VEHICLES (FIVE OR FEWER) Contact the Fairfax County Police Department's Traffic Division Impound Section; e-mail: FCPDJunkVehicle@fairfaxcounty.gov.	703-280-0716
ABANDONED VEHICLES (SIX OR MORE) Contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300
OUTDOOR LIGHTING CONCERNS To report problems with glare, overlighting, or other issues, contact the Department of Code Compliance, or visit www.fairfaxcounty.gov/code.	703-324-1300
AIR POLLUTANTS Air pollutants are emitted by stationary sources, such as power plants, gasoline service stations, and dry cleaners, as well as by mobile and area sources, such as from automobiles, trucks, and other highway activities. This phone number is for the Virginia Department of Environmental Quality Northern Regional Office.	703-583-3800 After hours, call 1-800-468-8892
NO RECYCLING IN SCHOOLS Section IX of the Fairfax County School Board's Policy 8541 states that *"Schools and centers will have mandatory recycling programs for paper products, cans, and bottles. Construction waste materials will be separated and recycled."* To report schools that are not recycling in accordance with this policy, contact the Fairfax County Public Schools Office of Facilities Management, Plant Operations Section. More information is available at: https://www.fcps.edu/node/27868.	703-764-2459

Type of Incident	Phone Number
BUSINESS OR RESIDENTIAL RECYCLING To report a suspected violation of recycling requirements (whether residential or business), contact the Department of Public Works and Environmental Services - Solid Waste at the phone number provided or through the Solid Waste Feedback Form at https://www.fairfaxcounty.gov/publicworks/recycling-trash/solid-waste-feedback-form.	703-324-5230
HEALTH HAZARDS For information and guidance on a suspected environmental hazard that may pose a public health risk, call the Health Department's Division of Environmental Health. These hazards include unburied dead animals; rat infestations, and mosquito breeding sites.	703-246-2201
MEDICAL WASTE Improper storage or disposal of medical waste should be reported to the Virginia Department of Environmental Quality. This phone number is for the Northern Regional Office.	703-583-3800 After hours, call 1-800-468-8892
WILDLIFE/ANIMAL CONTROL ISSUES Contact the Police Department's non-emergency dispatch number.	703-691-2131