

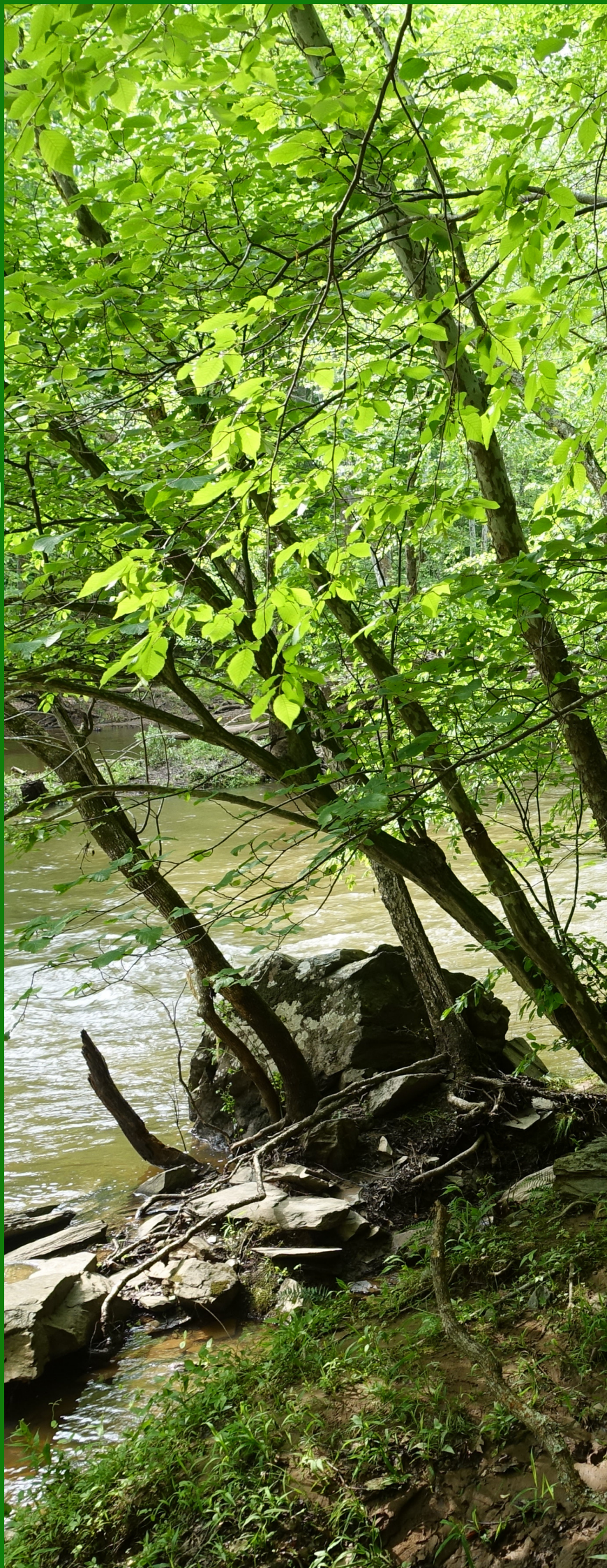
# 2018 Annual Report on the Environment

## Environmental Quality Advisory Council



**A Fairfax County, Virginia  
Publication**

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The cover photo was taken at  
Hemlock Overlook Regional Park

Cover design and photo by  
Krystyna Hesser, Student Member,  
Environmental Quality Advisory Council.

## IN MEMORY OF FRANK CRANDALL



Frank Crandall served as the Dranesville District representative on EQAC from January 1999 until his death in February 2018. For many years, he prepared the Wildlife Management chapter and Light Pollution section of this report. He also provided invaluable guidance to EQAC on a range of other issues, from airport noise to riparian buffer protection and restoration.

In addition to his service on EQAC, Frank was the long-time Chairman of the McLean Citizens Association's Environment, Parks and Recreation Committee, an appointee to the county's Chesapeake Bay Preservation Ordinance Exception Review Committee, an appointee to the county's Airports Advisory Committee and a member of numerous formal and informal *ad hoc* advisory groups. He worked closely with county officials to inform and improve numerous environmental programs, practices, policies and requirements.

In May 2018, EQAC partnered with the McLean Citizens Association to honor Frank's memory through the planting of a Scarlet Oak tree and a Red Buckeye tree in Lewinsville Park, in McLean.

Frank was a dogged and passionate advocate for the environment and was an indomitable presence on EQAC throughout his lengthy tenure on the council. He will be missed.





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ANNUAL REPORT  
on the  
**ENVIRONMENT**  
2018



Fairfax County, Virginia  
**Environmental Quality Advisory Council**  
November 2018

Printed on FSC-certified paper with recycled content

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A companion Data Appendix is available on-line at  
[www.fairfaxcounty.gov/eqac](http://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 2018. These are presented in the same order as they appear in the report and do not reflect an order of importance to EQAC:

- **Water.** Our two recommendations this year are both priorities:
  - There is a need for continued efforts to adequately fund and implement the county's ongoing stormwater program, which includes dam maintenance, infrastructure replacement, water resource monitoring and management, watershed restoration and educational stewardship programs. An increase in the Stormwater Service District rate in FY 2020 of at least on-quarter penny (from a rate of 3.25 cents per \$100 assessed real estate value to 3.50 cents per \$100) is recommended.
  - The county's policies and ordinances that protect stream valley lands and other environmental assets should remain unchanged or be enhanced when possible.
- **Recycling and Waste Management.** There are significant new market developments, particularly a major reduction in demand by China for recycled materials, that are impacting the county's waste recycling program. Although these developments are beyond the control of Fairfax County, they impact the environmental benefits and cost of the program. EQAC recognizes that the Board of Supervisors' Environmental Committee recently received a briefing on this matter, and we recommend that the board continue to engage in these issues in the coming year. One of our Waste Management recommendations is that the county should conduct a study through which changes to the county's program can be identified with the goal of increasing recycling viability, local market opportunities and economic and environmental effectiveness. Most importantly, this study should identify changes to Virginia law that may be needed to provide options for higher recycling rates to address the changed recycling market. Our other Waste Management recommendations are also priorities:
  - Review of the county's Environmentally-Preferable Purchasing Policy.
  - Support for changes to Virginia law to provide for a local option for a disposable bag litter abatement program and statewide container redemption fee (bottle bill) to reduce litter and increase recycling.
- **Climate and Energy.** Both of our recommendations in the Climate and Energy chapter are priorities this year.
  - A community-wide climate and energy action plan to reduce greenhouse gas emissions in the private sector, which is the source of 97 percent of the county's greenhouse gas emissions.
  - Development and implementation of a climate adaptation/resilience plan, which would help to minimize the impacts of climate change.

In addition, we acknowledge that the Board of Supervisors, for several years, has allocated funds for implementation of environmental projects through the county's **Environmental Improvement Program (EIP)**. Projects that have been funded through the EIP have supported multiple core service areas from the board's Environmental Vision and many of the subject areas within our report. Because the EIP funding process cuts across multiple program areas, it is not the subject of any one particular chapter in our report, and we have not made recommendations relating to it. However, this is an important environmental program funding source, and we note that the funding levels for it have remained constant over the past several years. We thank the Board of Supervisors for its past commitments to EIP funding and encourage the board to establish a mechanism through which there would be significant increases in EIP funding from year to year.



# INTRODUCTION

The Environmental Quality Advisory Council is pleased to present to the Board of Supervisors its 2018 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 that has characterized our past reports. 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](http://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](http://www.fairfaxcounty.gov/environment/sustainability-initiatives)).

The Data Appendix also 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](http://www.fairfaxcounty.gov/environment/sustainability-initiatives)).
- Identification of recipients of Environmental Excellence Awards ([www.fairfaxcounty.gov/environment/environmental-excellence-awards](http://www.fairfaxcounty.gov/environment/environmental-excellence-awards)).

This report focuses on activities affecting the environment in 2017; however, in some cases, key activities from 2018 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 truly thank Noel Kaplan of the Environment and Development Review Branch, Department of Planning and Zoning. Noel provides county staff support to EQAC. Noel sets up and tapes every EQAC meeting, follows up on actions generated from the meetings and coordinates the inputs and publication of the Annual Report. Although the members of EQAC write the Annual Report, it is Noel who makes publication of the document possible. 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 simply 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 have 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 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 Zoning  
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 Environmental Coordinator  
Fairfax County Facilities Management Department  
Fairfax County Fire and Rescue Department  
Fairfax County Health Department  
Fairfax County Land Development Services  
Fairfax County Office of Community Revitalization  
Fairfax County Park Authority  
Fairfax County Police Department  
Fairfax County Police Department, Division of Animal Services  
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  
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 action within the county. We also appreciate ECC's coordination of the staff responses to the recommendations within EQAC's 2017 *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.”<sup>1</sup>

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 strive 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.

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<sup>1</sup> 2017 Fairfax County Environmental Vision, Section 2 G, pg. 32,  
[www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf)



# **SUMMARY OF EQAC ACTIVITIES: NOVEMBER 2017 THROUGH OCTOBER 2018**

Between November 1, 2017 and October 31, 2018, EQAC held 12 meetings, including one public hearing and two joint meetings with the Fairfax County Environmental Coordinating Committee. In addition, meetings of *ad hoc* EQAC committees were held during the course of the year. During this period, EQAC issued 11 resolutions and positions (see the list below, with details provided in Appendix D of the Data Appendix). On November 21, 2017, EQAC presented its 2017 Annual Report on the Environment to the Board of Supervisors. On October 23, 2018, EQAC presented the 2018 Environmental Excellence Awards (see [www.fairfaxcounty.gov/environment/environmental-excellence-awards](http://www.fairfaxcounty.gov/environment/environmental-excellence-awards)).

## **Key agenda items from EQAC's meetings were as follows:**

November 8, 2017:

- Briefing on the FY 2019 Fairfax County budget process.
- Briefing on the modernization of the Planning Land Use System (PLUS).
- Review of future meeting agenda items.

December 13, 2017:

- Briefing from the Virginia Department of Environmental Quality on the development of a Salt Management Strategy.
- Briefing from DPWES-Urban Forest Management on the draft revision of the Fairfax County Tree Action Plan.
- 2017 Annual Report on the Environment—Review of the November 21 presentation to the Board of Supervisors.
- Follow-up discussion regarding EQAC's October vote addressing the use of dredge material for the Dyke Marsh restoration project—review of draft correspondence.
- Establishment of a nominating committee for EQAC officers for CY 2018.
- Discussion of the scope of a future agenda item regarding water quality issues in Accotink Creek.
- Preparation for the January 10, 2018 public hearing.

January 10, 2018:

- Annual public hearing.
- Election of officers for 2018.
- EQAC review of the draft Fairfax County Tree Action Plan 2018.
- Identification of future meeting agenda items.

February 14, 2018:

- Debriefing on the 2017 Annual Report on the Environment.
- Follow-up to the January 10, 2018 public hearing, including approval of the public hearing summary.
- Agenda items for the March 14, 2018 joint meeting with the Environmental Coordinating Committee.
- Review of student member application materials.

March 14, 2018:

- Joint meeting with the county staff Environmental Coordinating Committee.
  - FY 2019 Advertised Budget Plan.
  - Draft Fairfax County Operations Energy Strategy.
  - Updates to the county's energy Web page.
  - Update on energy outreach initiatives.
- Development of an EQAC position on the FY 2019 Advertised Budget Plan.
- Process for EQAC review of the draft Fairfax County Operations Energy Strategy.
- Agenda items for future EQAC meetings.

April 11, 2018:

- Draft Fairfax County Operations Energy Strategy—additional information regarding Strategy targets, and discussion.
- Finalization of an EQAC position on the FY 2019 Advertised Budget Plan.
- 2018 Annual Report on the Environment kickoff.
- Appointment of a student member selection committee.
- Discussion of the May 9 agenda item regarding the county's Strategic Plan to Facilitate the Economic Success of Fairfax County.
- Minimum rear yard coverage limits for residential properties.

May 9, 2018:

- Briefing on the county's Strategic Plan to Facilitate the Economic Success of Fairfax County.
- Discussions relating to the C-PACE (Commercial Property Assessed Clean Energy) concept.
- Finalization of EQAC comments on the Draft Fairfax County Operations Energy Strategy.
- Establishment of an Environmental Excellence Awards committee.

June 13, 2018:

- Briefing on the county's Deer Management Program.
- Discussion of conceptual ideas for legislative proposals for the 2019 General Assembly session.
- Discussion of possible changes to federal CAFE standards.
- Recommendations from the student member selection committee.
- Discussion of the 2018 Annual Report on the Environment.
- Preparation for the July 11 joint meeting with the Fairfax County Park Authority Board.
- Discussion of future agenda items.

July 11, 2018:

- Joint meeting with the Fairfax County Park Authority Board.
  - FY18 update on the Natural Resources Management Plan (NRMP) and FY19 NRMP work plan initiatives.
  - Update on the Park Authority's Master and Strategic Plans.
- Consideration/discussion of development of EQAC legislative proposals for the 2019 General Assembly.
- 2018 Annual Report on the Environment.
- Update on the Board of Supervisors' discussion on the Fairfax County Operational Energy Strategy.
- Report from the Environmental Excellence Awards Committee.

August 8, 2018:

- Briefing on the activities of the Environmental Health Division of the Fairfax County Health Department.
- EQAC discussion of a Comprehensive Plan Amendment proposal for 8800 Richmond Highway.
- Consideration/discussion of development of additional EQAC legislative proposals for the 2019 General Assembly.
- Discussion of distribution of EQAC positions and EQAC member representations.
- 2018 Annual Report on the Environment.
- Preparation for the September 12 joint meeting with the Environmental Coordinating Committee.

September 12, 2018:

- Joint meeting with the Environmental Coordinating Committee.
  - Conversation with Joe Mondoro, Chief Financial Officer.
    - County organizational structure as it relates to energy, climate and other environmental efforts.
    - Strategic Plan effort.
  - Discussion of the development and presentation of recommendations within EQAC Annual Reports on the Environment and the process through which county staff responds to these recommendations.
    - Discussion about the recommendation response process.
    - Discussion of EQAC's recommendation for a full-time wildlife assistant and the broader scope of funding recommendations.
  - Funding for Environmental Improvement Program projects.
- 2018 Annual Report on the Environment.

October 10, 2018:

- Stormwater program updates.
  - Watershed plan implementation and allocation of revenues from the Stormwater Service District.
  - Stormwater outreach and education.
- Partnership for a Healthier Fairfax: Community Health Improvement Plan revision.
- 2018 Annual Report on the Environment.
- EQAC discussion of follow-up correspondence regarding a Comprehensive Plan Amendment proposal for 8800 Richmond Highway.

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](http://www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/minutes).

**EQAC resolutions and positions were as follows:**

December 13, 2017: EQAC memorandum to the Board of Supervisors supporting the use of dredge material for the Dyke Marsh restoration project.

January 10, 2018: EQAC comments to staff on the draft revision of the Tree Action Plan.

April 11, 2018: Testimony on the FY 2019 Fairfax County budget.

April 11, 2018: EQAC position regarding a proposed Zoning Ordinance Amendment addressing minimum required rear yard coverage limitations.

May 9, 2018: EQAC comments on the draft Fairfax County Operations Energy Strategy.

May 9, 2018: EQAC support for a commercial PACE program.

July 11, 2018: Legislative proposal regarding disposable bags.

July 11, 2018: Legislative position supporting Freedom for Solar Legislation

August 8, 2018: EQAC position on proposed Plan Amendment PA 2018-IV-MV2.

August 8, 2018: EQAC's recommended edits—County Legislative Program, Environment section.

October 10, 2018: Follow-up correspondence regarding proposed Plan Amendment PA 2018-IV-MV2.

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

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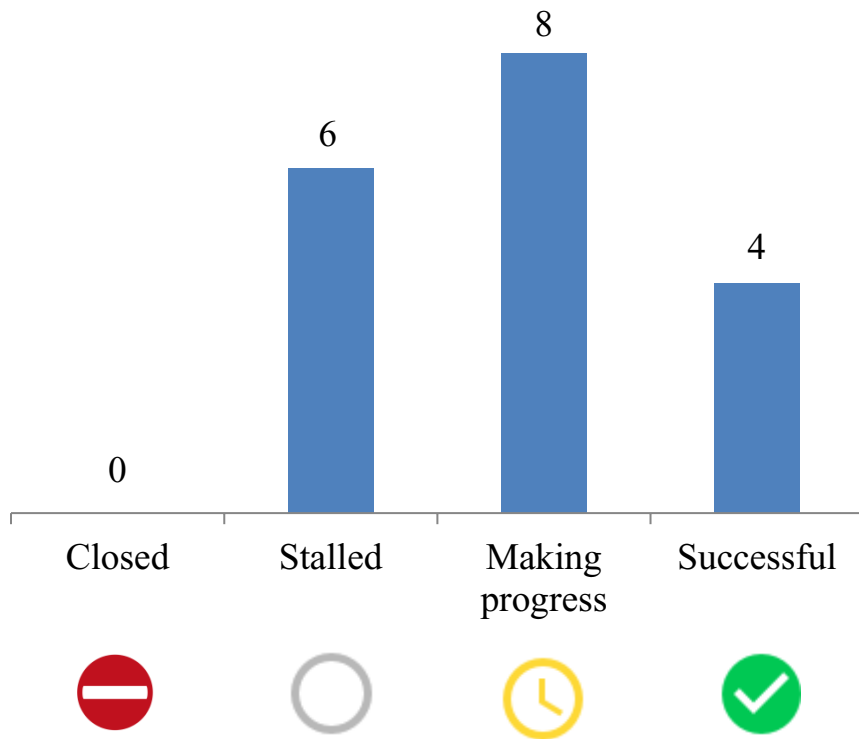
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**A companion Data Appendix providing more detailed information is available online at [www.fairfaxcounty.gov/eqac/report2018](http://www.fairfaxcounty.gov/eqac/report2018)**

## SCORECARD

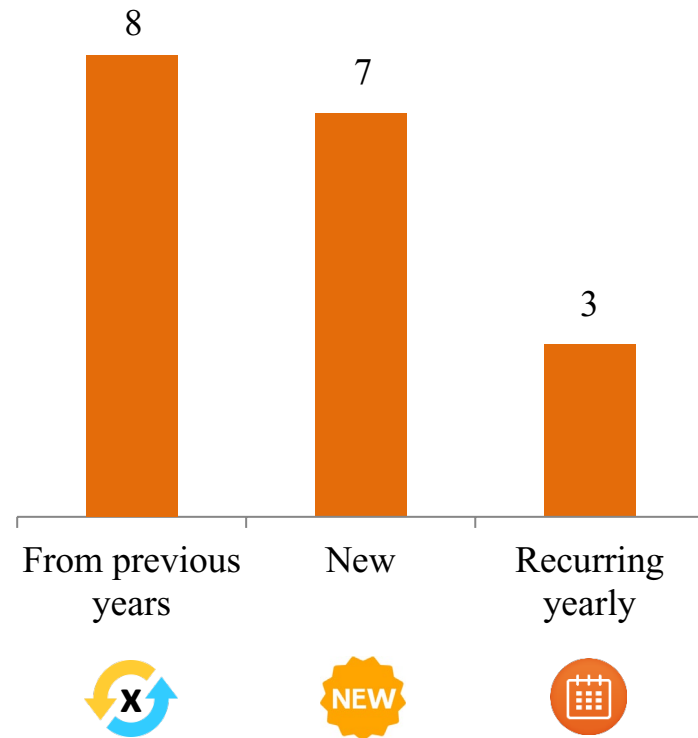
### Progress Report on 2017 Recommendations

**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.





## I. LAND USE



	Land Use: Five Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	<p><b><u>Holistic Comprehensive Planning Process</u></b> EQAC has been an advocate for holistic planning processes and supported the Fairfax Forward process. EQAC recommends that changes to the process:</p> <ol style="list-style-type: none"> <li>1. Prioritize large study areas that encompass multiple projects.</li> <li>2. Include a robust screening process to make sure the most appropriate projects are considered outside of a work project area.</li> <li>3. Incorporate technology to augment decision-making. Examples include realistic visualization, GIS artifacts, development information from diverse county systems and accurate models of project impacts.</li> <li>4. Continue to develop Policy Plan amendments that result in better environmental outcomes. A goal should be to address environmental issues comprehensively rather than on a piecemeal basis through site-specific Plan amendments.</li> </ol> <p>EQAC also recommends that pilot projects be developed in cooperation with the development community to combine information and technology from different sources to improve the understanding of the project for the Plan review committees.</p>	<p>Staff continues to implement the Comprehensive Plan Amendment Work Program to schedule activity center, neighborhood and countywide policy plan amendments that involve large areas or countywide needs, in addition to Board-authorized amendments and Site-Specific Plan Amendment nominations.</p> <p>A Policy Plan Amendment was adopted in 2017 that concerns the repurposing of older office buildings in the county and includes a recommendation for improvements to be made to energy efficiency and other green building practices, noise mitigation and stormwater management facilities when an older office building is being repurposed. Staff continues to regard activity center studies as a holistic approach to analyze and make recommendations on environmental opportunities and impacts. Stormwater management strategies that relate to specific targets for rainwater runoff quantity and quality controls and recommendations for the use of low impact development techniques are included in all large area studies.</p>	<p>Making progress</p>  <p>EQAC is following the adoption of the Site Specific Plan Amendment process and the effect that this process has on the Comprehensive Plan Amendment Work Program. We continue to advocate for large comprehensive study areas and the robust screening process as this provides holistic and comprehensive protection to the environment.</p> <p>We would like to see combination of both programs reduce the need for and number of board-directed amendments.</p> <p>The repurposing of older office buildings is a positive Policy Plan amendment. This will standardize good practices across the county.</p>

	Land Use: Five Recommendations	Action taken by Agency or Department	Status / EQAC Comments
2	<p><b><u>Land Development Applications and Information</u></b></p> <p>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 gap-fit 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.</p> <p>EQAC recommends that new PLUS system be funded to include the gap-fit requirements and associated database migrations.</p> <p>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 activity centers also be tracked at the building level vs. the parcel level, 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.</p>	<p>The project to design, configure and implement the Planning Land Use System (PLUS) has begun.</p> <p>This complex IT systems replacement project will take several years to design and implement with go-live of core system expected in FY 2020.</p> <p>Implementation of extended capabilities is expected in 2021 (i.e. tracking building level development, comprehensive plan and proffer management).</p>	<p>Making progress</p>   <p>EQAC continues to support this effort and will continue this recommendation until the system is fully implemented.</p>



	<b>Land Use: Five Recommendations</b>	<b>Action taken by Agency or Department</b>	<b>Status / EQAC Comments</b>
3	<p><b><u>Environmental focus on Comprehensive Plan review committees</u></b></p> <p>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. Note: this recommendation replaces prior recommendations to develop strong countywide urban design guidelines that would then be customized per each mixed use center.</p>	<p>The Board of Supervisors creates community task forces for planning studies and appoints members to represent a variety of stakeholder perspectives. There are many factors that are involved in the selection of the task force members. By virtue of presenting this recommendation in the Annual Report, EQAC has highlighted to the board the sensitivity of this concern.</p>	<p>Making progress</p>  <p>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.</p>
4	<p><b><u>Light Pollution—Outdoor Lighting Ordinance</u></b></p> <p>The Outdoor Lighting Ordinance is in need of updating. EQAC recommends a lighting work group be reconstituted to consider needed amendments, including those mentioned in the adopted 2017 Priority 1 Zoning Ordinance Amendment Work Program, Item 12.</p>	<p>The requested work group met on May 1, 2018 to re-start the process of updating the ordinance.</p>	<p>Making progress.</p>  <p>The group needs to continue meeting and not lose momentum.</p>

	Land Use:		
5	<p><b><u>Light Pollution—Streetlights in County Activity Centers</u></b></p> <p>The county should accept the staff recommendation to conduct a study of alternatives to using Virginia Dominion Energy for streetlights in county activity centers, with the objectives of reducing energy use, lowering costs and improving the lighting quality of streetlights.</p>	<p>The county led the effort to create a new regional agreement for converting existing streetlights to energy-efficient LEDs. The agreement makes streetlight upgrades and replacement more cost effective and reduces the yearly cost to operate LED streetlights. The current high-pressure sodium vapor (HPSV) lights in use in FY17 consumed 40 million kilowatt-hours of electricity. Converting these lights to LED would save 68 percent in energy use with corresponding greenhouse gas reduction while providing more attractive and pleasing light.</p> <p>The county has also hired a consultant to consider the best ways to utilize streetlights in the future and create a budget for making the transition.</p>	<p>Successful</p>   <p>The streetlight agreement negotiated with Virginia Dominion Power meets all the goals of this recommendation.</p> <p>EQAC commends the county staff for negotiating an excellent agreement.</p>

## II. TRANSPORTATION



	Transportation: One Recommendation	Action taken by Agency or Department	Status / EQAC Comments
1	<p>Continue to expand on the network of bicycle infrastructure envisioned in the bicycle master plan via county, state and privately financed projects.</p> <p>Ë Seek to maintain or increase the rate of on-road bike infrastructure construction; over the past three years, an average of 10 miles a year have been added.</p> <p>Ë Please provide data on the use of Capital Bikeshare.</p> <p>Ë An east-west trail connection serving the western part of the county provides an important travel and recreation option. A safe, contiguous bicycle trail should remain part of the I-66 Outside the Beltway project.</p>	<p>Ï FCDOT and VDOT partnered to add 60 lane miles of on-road bike facilities in 2017, including 19 lane-miles of bike lanes and two miles of buffered bike lanes.</p> <p>Ï Capital Bikeshare data are now included in FCDOT's status report.</p> <p>Ï The plan for Transform 66 Outside the Beltway includes shared use paths or bike trails separated from traffic by either a fence or sound wall and connected to bridge crossings.</p>	<p>Successful</p> <p> </p> <p>The council encourages continued construction of on-road bike lanes and continued tracking of bike share.</p> <p>FCDOT and VDOT have done a commendable job of implementing bicycle facilities identified through the Bicycle Master Plan.</p> <p>Capital Bikeshare data suggest a 200 percent increase in use in the comparison provided.</p>



### III. WATER

	Water: One Recommendation	Action taken by Agency or Department	Status / EQAC Comments
1	<p>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.</p> <p><b>EQAC recommends that the Stormwater Service District rate be increased in FY 2018 by at least one-quarter penny, from a rate of 3.00 cents per \$100 assessed real estate value to 3.25 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.</b> 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.</p>	<p>The Service District rate was increased for FY 2019 to 3.25 cents per \$100 assessed real estate value.</p>	<p>Successful</p> <div>   </div> <p>Continued increases in the Service District rate support increased capacity for more watershed improvement programs and a more realistic infrastructure replacement timeline.</p>





## IV. WASTE MANAGEMENT

	Waste Management: Four Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	Improve recycling. This recommendation has been in place for multiple years. The county has instituted programs to increase recycling. We encourage this effort and recommend the county initiate a formal study to obtain practical recommendations on how to increase the recycling rate. This study should include specific goals for the different categories of recyclable material, numerical recycling targets and a schedule.	<p>The county received responses to its Request for Expressions of Interest that included means of increasing recycling.</p> <p>Staff has also been trying to adjust to the market changes that have decreased recycling and recycling revenue.</p>	<p>Stalled</p>  <p>Fundamental changes to the recycling program are needed to implement the county's recycling and waste reduction vision. Staff cannot do this with the tools it has.</p>
2	Collect and report data on the various types of materials collected, how they're recycled and the environmental benefit of each material. Develop a practical means of estimating the actual recycling rate and the ultimate beneficial use of each category of recycled material. This may require future requests for proposals (RFPs) and contracts with materials recovery facilities (MRFs) and others to provide the information needed, or a sampling/survey program may be used.	<p>Although the staff indicated that this cannot be addressed, staff did indicate to EQAC that the diversion rate (materials counted as recycled but actually not recycled) is anecdotally reported at about 30 percent.</p> <p>Afternote: With China expected to stop receiving any solid waste in 2020, the diversion rate can be expected to rise.</p>	<p>Stalled</p>  <p>Without good data on actual recycling rates, the county does not know if the cost of this program is justified by environmental benefit. Means must be found to estimate actual beneficial recycling or the program must be re-assessed.</p>



	<b>Waste Management: Four Recommendations</b>	<b>Action taken by Agency or Department</b>	<b>Status / EQAC Comments</b>
3	Investigate how to encourage county contractors, as well as other trash disposal and recyclables processing facilities, to manage materials according to their best environmental use. This may require changes to future contracts.	Staff indicated that the county has an Environmentally Preferable Purchasing Policy (EPPP) and has issued solicitations that include scoring for “greenest” end use. SWMP's latest recyclables processing solicitation called for a better end use for glass than landfilling, and evaluation of the competitive responses included scoring for selection of the "greenest" end use. The policy has also been applied to e-waste disposal procurement.	<p>Making progress</p>  <p>The EPPP is an internal policy that is not available to vendors or the public. It is applied on an ad-hoc basis at the discretion of DPSM and the soliciting department. The interdepartmental subcommittee has not met in many years.</p>
4	EQAC continues to recommend a statewide container redemption fee to reduce litter and in increase the recovery of containers in a form that can be recycled.	County staff indicated that this recommendation would need to be examined for efficacy, cost and ease of administration.	<p>Stalled</p>  <p>This recommendation requires board action.</p>

## V. PARKS AND ECOLOGICAL RESOURCES

	Parks and Ecological Resources: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	<p>EQAC recommends that the Board of Supervisors fund \$263,000 for the remaining budget required for Fairfax County Park Authority's natural resource mapping efforts. The data collected from this project will set the direction for all other activities in the Park Authority. In addition to the project being identified as the Natural Resource Management and Protection Branch's highest priority, the project will directly and indirectly help achieve tree and forest related objectives and themes in the Board of Supervisors' Environmental Vision that include Transportation; Water; Parks and Ecological Resources; Climate and Energy; and Environmental Stewardship.</p> <p>At the current funding rate, the project will be completed in approximately 8.5 years. With the information derived from the inventory and mapping project expected to be useful for 15 to 20 years, the sooner the project can be completed, the higher the return on investment will be from the effort.</p>	<p>Similar to last year, the Park Authority allocated an additional 14 percent of monopole funding to this project (to date, approximately 41 percent of the total funding has been allocated from Park Authority monopole funding). Approximately 10 percent of Park Authority property has been mapped as a part of this project, with a projected completion date taking eight additional years at this funding level.</p> <p>The mapping effort is already yielding useful information. For example, the 10 percent of parkland recently mapped has yielded about 80 new occurrences of rare plant species and communities. This information is already being used to inform natural resource management within the Park Authority and is shared with appropriate state agencies. The Park Authority expects similar results as it continues to map more area.</p> <p>The information derived from the inventory and mapping project is expected to be useful for 15 to 20 years. At the end of the project deliverables' useful life, the Park Authority would recommend re-inventory and update of the data and information.</p>	<p>Stalled</p>  <p>EQAC commends the Park Authority for finding funding sources to support a subset of activities called for in the Natural Resource Management Plan.</p> <p>However, the monopole funds are not adequate to complete the natural resource mapping efforts. Given the projected timeline for completion at the current funding rate (~eight years) versus useful life of the data (15-20 years), the sooner this project is fully funded, the longer the information will be able to be used, thus raising the return on investment for this information.</p>

	<b>Parks and Ecological Resources: Two Recommendations</b>	<b>Action taken by Agency or Department</b>	<b>Status / EQAC Comments</b>
2	<p>EQAC recommends that the Board of Supervisors approve the Park Authority's FY 2019 request for an additional merit Ecologist III position and funding for the position of \$93,000 per year. Hiring for this position directly supports the board's Environmental Vision by ensuring the fourth of four program areas in the Natural Resource Management Plan, Fostering Stewardship and Expanding Natural Capital, is appropriately staffed.</p> <p>Creating this position would meet growing customer needs for citizen science projects and programs that inform county decision-making, 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 and furthering natural resource-based education within the agency. By approving and funding this position, progress would be made towards the implementation of Phase 1 of the Fairfax County Park Authority's Natural Resource Management Plan (NRMP). Furthermore, the return on investment of this new position is quite high: at full performance, the position is estimated to maintain a return on investment between 160 percent and 680 percent in the form of increased volunteer hours.</p>	<p>Without funding, no further action has been taken by the Park Authority at this time.</p> <p>If dedicated recurring funding cannot identified, the Park Authority will investigate auxiliary sources of funding.</p>	<p>Stalled</p>  <p>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.</p>


## VI. CLIMATE AND ENERGY

	Climate and Energy: One Recommendation	Action taken by Agency or Department	Status / EQAC Comments
1	Fairfax County should promote an update to the regional emissions inventory that would allow for comparisons among the different governments, which would help show what is being done in the different jurisdictions and highlight successes.	Fairfax County staff requested a report on the status of the Greenhouse Gas Inventory on November 15, 2017. The GHG inventory was in progress and has been completed.	Successful   Information from MWCOG and county staff on the GHG inventory has been received and is reflected in the 2018 Annual Report.



## VII. AIR QUALITY

There were no recommendations in the 2017 Annual Report





## VIII. WILDLIFE MANAGEMENT

	Wildlife Management: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	EQAC recommends that the Board of Supervisors fund the Fairfax County Police Department in the funding, authorization, and hiring of a full-time wildlife assistant position. This position has been requested in the FY2019 budget for the Police Department. 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 three 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 done and program services could be expanded to include inventory and population monitoring of additional wildlife taxa (i.e., bats, birds, reptiles, amphibians, coyotes).	Funding to hire a full-time wildlife assistant was not authorized in the FY 2019 FCPD budget. Current staff in the Wildlife Management Office, consisting of one full-time wildlife management specialist and a varying number of part-time assistants, have worked diligently to maintain previous levels of impact in managing deer and goose populations. However, staff indicates that the expansion of these efforts, as well as the implementation of various data collection and analysis initiatives, and public education and outreach efforts are substantially limited under the current staffing situation. The FCPD Wildlife Management office has continued to share resources and work collaboratively with FCPA on cross-departmental initiatives, particularly the deer and goose management programs.	<p>Stalled</p>  <p>EQAC continues to recommend that the Board of Supervisors fund the Fairfax County Police Department or other county agency for the hiring of a full-time wildlife assistant.</p>



	<b>Wildlife Management: Two Recommendations</b>	<b>Action taken by Agency or Department</b>	<b>Status / EQAC Comments</b>
2	<p>EQAC recommends the Board of Supervisors fund, in the amount anticipated to be less than \$15,000, a follow-up public survey to provide data needed to understand the cultural carrying capacity of deer in Fairfax County. EQAC recommends this survey include context and information regarding safety issues with deer strikes as well as the severe ecological damage caused by deer to our forest regrowth and threat from invasive species due to deer browse of native vegetation. Gathering input is critical for determining 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. Data from the survey would be an integral part of developing a revised Deer Management Plan. Fairfax County's Wildlife Biologist recommends using a previous Cultural Carrying Capacity survey about white-tailed deer in Virginia developed by the Department of Game and Inland Fisheries and Virginia Tech. Using this survey would allow for comparison of deer management in Fairfax County to other jurisdictions in Virginia and could be tailored to include additional questions specific to Fairfax County to better inform Deer Management Program strategies. Initial cost for the survey will depend on the number of mailings and specific contractor/vendor pricing.</p>	<p>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. 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 Department of Game and Inland Fisheries and Virginia Tech. Using this survey will allow for comparison of deer management in Fairfax County to other jurisdictions in Virginia. 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 FY19.</p>	<p>Making progress</p>   <p>EQAC is pleased that approval was granted to conduct this survey and that planning and coordination efforts have been initiated by the Wildlife Management Office. It is worth noting that the timing of the survey, as well as the implementation of other data collection and analysis efforts and education and public outreach initiatives have been significantly hampered by the staffing limitations in the Wildlife Management Office. This issue is addressed in the first Wildlife Management recommendation above.</p>

## IX. TECHNOLOGY TO UNDERSTAND THE COUNTY

	Technology: Two Recommendations	Action taken by Agency or Department	Status / EQAC Comments
1	<p><b><u>Expanding GIS Data and Applications</u></b></p> <p>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.</p>	<p>Planimetric and topographic updates have begun. Planning has begun on acquiring the 2018 dataset that has four times the current point density. Some county agencies have added their own GIS personnel to expedite field data and applications. The Fairfax County Health Department, in particular, has made effective use of GIS field data.</p>	<p>Making progress</p>   <p>EQAC supports the more widespread use of GIS specialists within the workforce.</p>
2	<p><b><u>Access to Data</u></b></p> <p>EQAC recommends that the county continue its efforts to ensure convenient public access to GIS and other environmental data.</p>	<p>Although many GIS data sets are online, work on a public face for the Geographic Exploration and Mapping (GEM) application continues.</p>	<p>Making progress</p>   <p>EQAC urges completion of the public face for GEM.</p>

# **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.”<sup>1</sup>

### **Background**

Fairfax County covers approximately 395 square miles with over 1.1 million residents and 400,000 households. As the population has grown and the county has transitioned towards a more urban environment, the Comprehensive Plan and the decision-making processes for changing 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. These changes allowed the county to continue to grow and prosper within a finite environmental footprint.

The Board of Supervisors’ 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.

Revitalization and redevelopment are complex endeavors requiring coordination across the community and significant public and private investment. The county has been making these investments consistently and thoughtfully following the Fairfax County Comprehensive Plan.

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<sup>1</sup> 2017 Fairfax County Environmental Vision, Section 2 A, pg. 6,  
[www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf)

The Plan is a forward-looking document that shows how the county expects to grow and where new growth should occur. It is a living document that is continuously reviewed and amended to reflect changes in the built environment and county values and priorities. Accompanying the Comprehensive Plan is the Concept Map for Future Development that EQAC has long included in our Annual Report. The concept map is a picture of where the county currently is, where change, investment, and growth is planned and how the land and environment will change in the future.

When the concept map was initially created in 1990, the focus was developing Tysons as the Urban core of the county and establishing growth around Metrorail stations that provided multi-modal transportation options. With Metro through Tysons complete, the urban core is being realized with massive construction, an effective public/private partnership guiding the community and new residents moving into the urban core. The results of the planning have been dramatic. In 2017, the Metropolitan Washington Council of Governments (COG) reported that Northern Virginia accounted for more than half of all new construction in the region, with 7.9 million square feet of commercial space. The office sector held the greatest share of commercial construction, creating 32 percent of the region's new space. Across the region, 4.8 million square feet of office space – 83 percent of which was sited within a half-mile of a Metro station - is the most since 2014 but still less than half of the pre-recession peak.<sup>2</sup>

With much of the concept map in place at Tysons and under construction along Metrorail's Silver Line, it is EQAC's view that the Concept for Future Development map in the Comprehensive Plan has largely been realized; EQAC therefore sees a need to consider, with a strategic perspective, long-term conceptual planning goals, which may necessitate changes to the concept map and related Comprehensive Plan goals, objectives and policies. Staff is planning for a new State of the Plan review in the near term. As part of that review, it is important to bring the environmental vision and community priorities into the forefront of the future Concept Map.

Prior editions of this report combined Land Use and Transportation into a single chapter that highlighted the interdependence of land use and transportation. With the county reaching build-out and transitioning to revitalization, along with the new Board of Supervisors' Environmental Vision, EQAC has decided to separate the topics into individual chapters. The focus of this chapter will be on caring for the environment throughout the planning process, long-term development considerations and tools to engage people in the process.

### **Comprehensive Plan and Development Potential**

The Fairfax County Comprehensive Plan is a forward-looking document that shows how the county expects to grow and where new growth should occur. It is a living document and is continuously reviewed and amended to reflect changes in the built environment and county

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<sup>2</sup> COG report to EQAC 2018

values and priorities. While the amount of undeveloped land available across the county has decreased, the **Plan potential** has been increasing.

The potential is the number of units that can be built in the county according to the current Plan. When the county was approaching build-out, there was 6.1 percent vacant space available. New amendments typically consider larger and taller buildings that redevelop and allow continued growth in the same footprint. In the residential sense, this means more multi-family complexes. In the nonresidential space, it means higher office buildings with multiple uses.

The growth in 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.<sup>3</sup> 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 vibrant mixed use neighborhoods are Merrifield, Springfield Town Center and Reston Station.

Tysons, the Fairfax County downtown, is a national example of increasing plan potential while protecting the environment. Tysons has four Metrorail stations in an urban core. When Metro was being constructed, the county developed an urban plan 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 Metro began service in Tysons has already increased the number of residents to approximately 21,000. The new developments conform to environmental policies that reduce stormwater runoff volumes, reduce the average energy used per resident and add open space for outdoor recreation. By locating residential, commercial and retail within walking distance and close proximity to Metro, the average vehicle miles traveled by each resident can be significantly reduced. The Tysons Progress Report includes preliminary studies to assess transportation efficiency in a mixed use urban core.<sup>4</sup>

### **The Comprehensive Plan and Concept Map**

The Comprehensive Plan<sup>5</sup> and the Zoning Ordinance<sup>6</sup> are the primary documents that guide decisions and specify legal requirements for developing projects 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.

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<sup>3</sup> [www.fairfaxcounty.gov/demographics/fairfax-county-general-overview](http://www.fairfaxcounty.gov/demographics/fairfax-county-general-overview)

<sup>4</sup> [www.fairfaxcounty.gov/tysons/annual-report](http://www.fairfaxcounty.gov/tysons/annual-report)

<sup>5</sup> [www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan](http://www.fairfaxcounty.gov/planning-zoning/fairfax-county-comprehensive-plan)

<sup>6</sup> [www.fairfaxcounty.gov/planning-zoning/zoning-ordinance](http://www.fairfaxcounty.gov/planning-zoning/zoning-ordinance)

The current edition of the Comprehensive Plan consists of several components. The **Policy Plan** outlines the objectives, policies and guidelines to guide planning and development review considerations toward implementing county goals. The Policy Plan functional sections and website links are:

<a href="#">Land Use</a>	<a href="#">Transportation</a>	<a href="#">Housing</a>
<a href="#">Environment</a>	<a href="#">Economic Development</a>	<a href="#">Heritage Resources</a>
<a href="#">Public Facilities</a>	<a href="#">Human Services</a>	<a href="#">Parks and Recreation</a>
<a href="#">Revitalization</a>	<a href="#">Visual and Performing Arts</a>	<a href="#">Chesapeake Bay Supplement</a>

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 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.

The Concept for Future Development map and Land Classification System were first published in 1990 and were revised in 2012; they continue to be revised with new amendments. Since 1990, significant elements of the concept have been or are being implemented. While amendments track updates to the Plan, the concept is closer to built reality than a conceptual vision of the future.

### **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. These themes are:

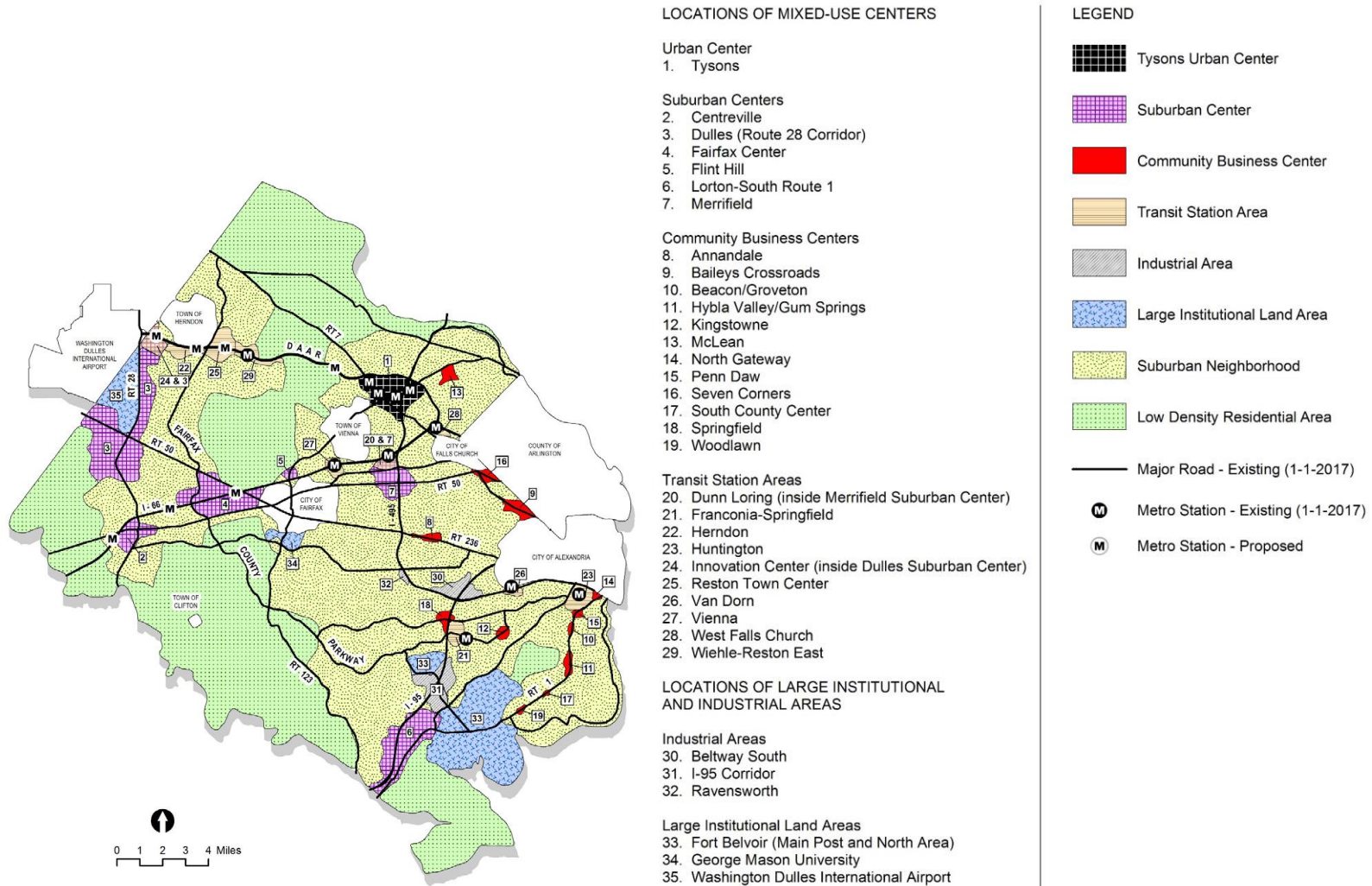
1. *Encouragement of Intensity and Land Use Flexibility in Mixed Use Centers.*
2. *Protection of Low Density Residential Neighborhoods.*
3. *Avoid Re-Planning Industrial Areas.*
4. *Expansion of Medical Facilities.*
5. *Revision of Policy Plan Regarding Acquisition of Land for Public Parks.*
6. *Environmental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

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

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.



## CONCEPT FOR FUTURE DEVELOPMENT MAP



**Figure I-1: Concept for Future Development**

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**

The Concept Map identifies 30 mixed-use areas, categorized as:

- Tysons Urban Center.
- Suburban Centers.
- Community Business Centers.
- Transit Station Areas.

These areas have the most potential to change the environmental performance of the county and are the most important places to grow sustainably. As Tysons is becoming a new city, other places in the county have growth concerns. Three recent reports/studies are illustrative of the environmental concerns and need to align environmental priorities into a future strategic concept map:

1. 2017 Reston Annual State of the Environment Report:<sup>7</sup> The Reston association environmental advisory committee called out future development pressures and is advocating a Biophilic city<sup>8</sup> 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.”*

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<sup>7</sup> 2017 Reston Annual State of the Environment Report (RASER)

<sup>8</sup> <http://biophiliccities.org/about/>



2. The McLean CBC Study<sup>9</sup> to revitalize an established Community Business Center 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 is asking a series of important questions about open space that illustrate the importance of the environment to all CBCs:

## OPEN SPACE TYPES



Figure I-2. McLean Open Space Types

- Which photo overall do you think best represents the open space type that you would be likely to use in the CBC?
- Which characteristics of the open space type do you like and why?
- Which characteristics of the open space type do you dislike and why?
- What open space types do you think are most appropriate for the CBC and why?
- 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)?
- 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.

<sup>9</sup> <https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/mcleancbcstudy/mcleancbc-frameworkplan-openhouse.pdf>

3. Neighborhoods such as Annandale, Baileys Crossroads and the Richmond Highway Corridor<sup>10</sup> that relied primarily on automobile transportation and 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 get 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 to revitalization. The decision by Arlington County to cancel the Columbia Pike Streetcar makes revitalization and reinvestment through Baileys and into Annandale more difficult.

Reston recognizes that development needs to be done in 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 needs to expand 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 to 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-model opportunities.
- A healthier environment, with tree preservation and native species landscaping, walkability, open space and urban agriculture.
- Energy-efficient buildings conforming with green building standards.
- Efficient water management with better stormwater management practices and less impervious surface.

### **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 19<sup>th</sup> and a 20<sup>th</sup> goal were added later). From 1991 through 2013, updates to the Plan were vetted through an Area Plans Review (APR) process with public participation in each district. The review process would cycle every five years to consider developer or community projects and incorporate them into the Plan.

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<sup>10</sup> <https://www.fairfaxcounty.gov/planning-zoning/embark-richmond-highway/about>

By 2013, it was realized that APR 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 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 APR.
- 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 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 APR and align resources on 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 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 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 introduces 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 thorough review. Together these processes should cover most of the development types, and reduce the need for special board-authorized projects.

Between July 2013 and May 2018, 78 Plan amendments have been approved or rescinded, with 19 amendments adopted in FY2018. Currently, there are 33 Plan amendments under review, including 11 areawide Plan amendments (mixed-use center studies), five Policy Plan amendments (countywide amendments) and 17 minor/site-specific 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\\_2013\\_work\\_program.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/sspa/workprogram/adopted_2013_work_program.pdf)

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 process, and four have been added to the

work program (two were since combined as one study), in 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](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/compplanamend/sspa/staff_report_final.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.

### **Tysons Urban Center Planning History**

Tysons is the only urban center identified in the Comprehensive Plan; it has the highest planned development intensities in the county and the highest concentration of work and residential utilization. Tysons underwent an extensive review from 2005-2010 to prepare for the extension into the area of Metrorail, and the associated changes and opportunities that Metro provided to create a true multi-modal new urban environment. The scale of transformation planned for Tysons required new and creative approaches. The Board of Supervisors convened a task force that represented a wide swath of stakeholders. It included developers, landholders and residents, as well as advocates for neighboring communities, distant communities, affordable housing, the arts, the environment, transportation, biking, accessibility and others. The task force worked together with assistance from county staff, a world-recognized urban design firm, experts in transportation and modeling and advisors on communications. Technology was incorporated throughout the process with models and digital mockups that showed massing and expected growth projections.

The combination of many stakeholders working together over a long period led to good urban policies that are applicable across all mixed-use centers. Since the Tysons task force, the Office of Community Revitalization (OCR) and Department of Planning and Zoning have brought together many different study groups to recommend area-focused policy and planning decisions. EQAC feels it is important to make sure there are environmental representatives on these boards to align with the Board of Supervisors' environmental vision.

### **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 (ZOAWP).

The county's Zoning Ordinance has been in its current form for over 40 years.<sup>11</sup> In March 2017, the county started work on the Zoning Ordinance Modernization, or "zMod," initiative. The first phase focuses on three key areas:

1. Prioritizing key zoning ordinance amendments for updates.
2. Reformatting and restructuring the ordinance to make it more user friendly, such as including more charts, tables and links.
3. Improving the county's overall process for how the zoning ordinance is updated.

Zoning Ordinance amendments can have significant impact on the environment. One that is currently underway revises Planned Development Housing (PDH)<sup>12</sup> 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,<sup>13</sup> 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

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<sup>11</sup> [www.fairfaxcounty.gov/planning-zoning/zmod](http://www.fairfaxcounty.gov/planning-zoning/zmod)

<sup>12</sup> [www.fairfaxcounty.gov/planning-zoning/zoning-ordinance/work-program](http://www.fairfaxcounty.gov/planning-zoning/zoning-ordinance/work-program)

<sup>13</sup> <https://www.fairfaxcounty.gov/environment/green-buildings>

buildings and 14 have been certified as LEED Silver buildings. Two buildings have received Green Globe certifications from the Green Building Initiative's environmental assessment and rating system for commercial buildings. In addition, there are 22 projects in the design, construction or post-construction phase that have the goal of achieving LEED Silver certification, and one project, the Huntington Levee, has been submitted for certification to achieve a bronze-level rating under the Institute for Sustainable Infrastructure Envision rating system.

In December 2007, the Board of Supervisors adopted an amendment to the Policy Plan that established a green building policy within the Comprehensive Plan. The policy included broad support for green building practices and established linkages between the incorporation of green building/energy conservation practices and the attainment of planned uses and densities/intensities of development. In growth centers, commitments for green building practices sufficient to attain LEED certification or equivalent were recommended for certain nonresidential and multi-story multifamily residential proposals. ENERGY STAR® Qualified Homes designations were recommended for any other residential development proposed at the high end of the Plan density range. In July 2014, the Board of Supervisors adopted a green building policy amendment to the Comprehensive Plan<sup>14</sup> 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. 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 for Neighborhood development covers five topics:

- Smart location and linkage: to encourage development within and near existing communities and public transit infrastructure.
- Neighborhood pattern and design: to promote transportation efficiency and promote walking by providing safe, appealing and comfortable street environments.

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<sup>14</sup> Provided to EQAC 2014 by Department of Planning and Zoning—Planning Division

- Green infrastructure and buildings: to encourage the design, construction and retrofit of buildings that utilize green building practices.
- Innovation and Design Process: to encourage exemplary performance above the requirements and innovative performance in green building, smart growth or new urbanism.
- Regional Priority: to encourage strategies that address geographically specific environmental, social equity and public health priorities.

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. These concepts should be references for evaluating the State of the Plan and projecting a future concept map.

### **Office of Community Revitalization**

The Fairfax County Office of Community Revitalization (OCR) facilitates strategic redevelopment and investment opportunities in older commercial mixed-use centers and across the county. OCR was established in 2007 in response to the importance and priority the Fairfax County Board of Supervisors has placed on ensuring the long term viability of its older commercial areas, including, but not limited to, the county's seven designated revitalization districts/areas.<sup>15</sup> In general, recent revitalization plans support compact, walkable, mixed use centers, which reduce the need for automobiles, increase access to transit and support other modes of transportation like bicycling and walking. Revitalization projects span the county, from McLean to Springfield and the Richmond Highway corridor.

### **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 totally new and modern Outdoor Lighting Ordinance in 2003. An online brochure ([www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning/lightingbrochure.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning/lightingbrochure.pdf)) provides an excellent explanation of these rules.

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 LED lights and sensors. In 2010, staff coordinated with

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<sup>15</sup> <http://www.fcrcv.org/about.htm>

a work group consisting of representatives from the International Dark Skies 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 placed on the back burner. The lighting work group was reconstituted, and met on May 1, 2018 to re-start the process of updating the ordinance.

### 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 the staff of a member of the Board of Supervisors. The causes of the complaints have usually been 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 warning that there is a violation and how it may be remedied. A written notice of violation or civil action can be used if needed. Beyond the general glare standards, the county frequently is able to negotiate or impose additional "before-the-fact" restrictions through proffers or development conditions when rezoning, special permit and special exception processes come into play.

### Streetlights

On behalf of Fairfax County, Dominion Energy Virginia (Dominion) owns, operates and maintains nearly 58,000 streetlights in 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 streetlights to LED fixtures. (The Climate and Energy chapter of this report, Chapter VI, provides more details.) 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 3000K and 4000K color temperatures for most fixtures, 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.

Staff in the county's Department of Public Works and Environmental Services is currently analyzing its new LED outdoor lighting options. Because streetlights in some areas of Fairfax County were installed decades ago, staff is not simply planning to replace an existing streetlight with what might be considered a comparable LED. Instead, staff is evaluating whether the level of lighting is appropriate for current roadway characteristics and usage, and whether it satisfies both community interests and current standards, including those established by the Illuminating Engineering Society (IES). Preliminary proposals indicate that, even with lighting upgrades, the use of LED technology should allow the county to reduce its monthly streetlight costs while dropping the electricity use associated with street lighting – and corresponding carbon emissions – by more than a third. A staff proposal should be presented to the board in FY 2019.



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**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 will need increased affordable options as the economy rebounds.
- b. Identify vacant offices and homes in locales with good transit options and coordinate with the real estate industry to aid in marketing those properties, thereby supporting new tenants with quality of life perquisites, improved commuting options and better residential/commercial or mixed use utilization.
- c. Coordinate with agencies and businesses to inform prospective/new workers of opportunities for desirable commutes and local housing amenities.

**2. Strategic Plan Update**

The last State of the Plan covered 2000-2010. Since that report, the county has seen significant growth and changes in process and technology. The current Concept for Future Development map has been very successful--with a significant number of the proposed Metrorail stops completed or under construction, it has largely been realized. There may, therefore, be benefit in looking beyond this achievement to longer-term conceptual considerations. 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 recognizes that there is a need for discussion of these ideas with county staff, and EQAC intends to pursue such discussion in the future; EQAC may have more specific recommendations relating to this concern in future Annual Reports on the Environment.

**3. Social Media Innovation**

EQAC commends the county for embracing new technology and leveraging the Web to share and interact with the public. We recommend that the county continue to integrate social media into the planning process and outreach efforts. This allows community participation through Internet technologies and is more cost effective and far reaching than traditional media and outreach. The Route 7 Corridor Transit Study included a crowd sourcing map and

online polls. The crowd source map was the most frequently used source of input for the project with over 300 comments:

<http://www.novatransit.org/uploads/studiesarchive/2017Envision%20RT7%20Report.pdf>

## **Recommendations**

### **1. Holistic Comprehensive Planning Process**

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.

### **2. Land Development Applications and Information**

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.

### **3. Environmental focus on Comprehensive Plan review committees**

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.

#### **4. Light Pollution—Outdoor Lighting Ordinance**

EQAC recommends the lighting work group, reconstituted in 2018, continue working towards the goal of updating the 2003 Outdoor Lighting Ordinance.

## 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.”<sup>1</sup>

Transportation intersects with several policy areas including air quality, climate and energy, noise, stormwater and quality of life. The focus of this chapter is how these areas are impacted by the existing transportation system and solutions under consideration. The vision for transportation focuses on meeting demand for services while reducing environmental impacts rather than the health of a set of natural resources.

Since the 2017 Annual Report on the Environment was published, the policy framework and environmental focus areas remain largely unchanged, but there has significant change in the past year, including a significant investment in transit, progress on several projects affecting major travel corridors and possible changes to federal regulation of vehicle fuel efficiency and vehicle emissions.

### **Authority**

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

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

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 and the county's Economic Success Strategic Plan.

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.<sup>2</sup> Fairfax County and the Washington, D.C. 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.<sup>3</sup> Consequently, the region continues to attract new workers and experience population growth, which drives the demand for transportation system capacity.

### **Travel Choices**

Two key elements of the vision for transportation - reducing dependence on single occupant vehicle use and increasing transit use - are concerned with the travel choices residents and visitors make. Understanding current and past conditions sets the stage for evaluating progress toward these vision elements. Means of travel to work data from the U.S. Census Bureau's American Community Survey<sup>4</sup> provide some insight into recent patterns.

There has not been significant change in the travel means selected by Fairfax County residents since 2017 report or in the past decade. There have been slight declines in driving alone and carpooling and slight increases in public transit and working at home that fall within the margin of error.

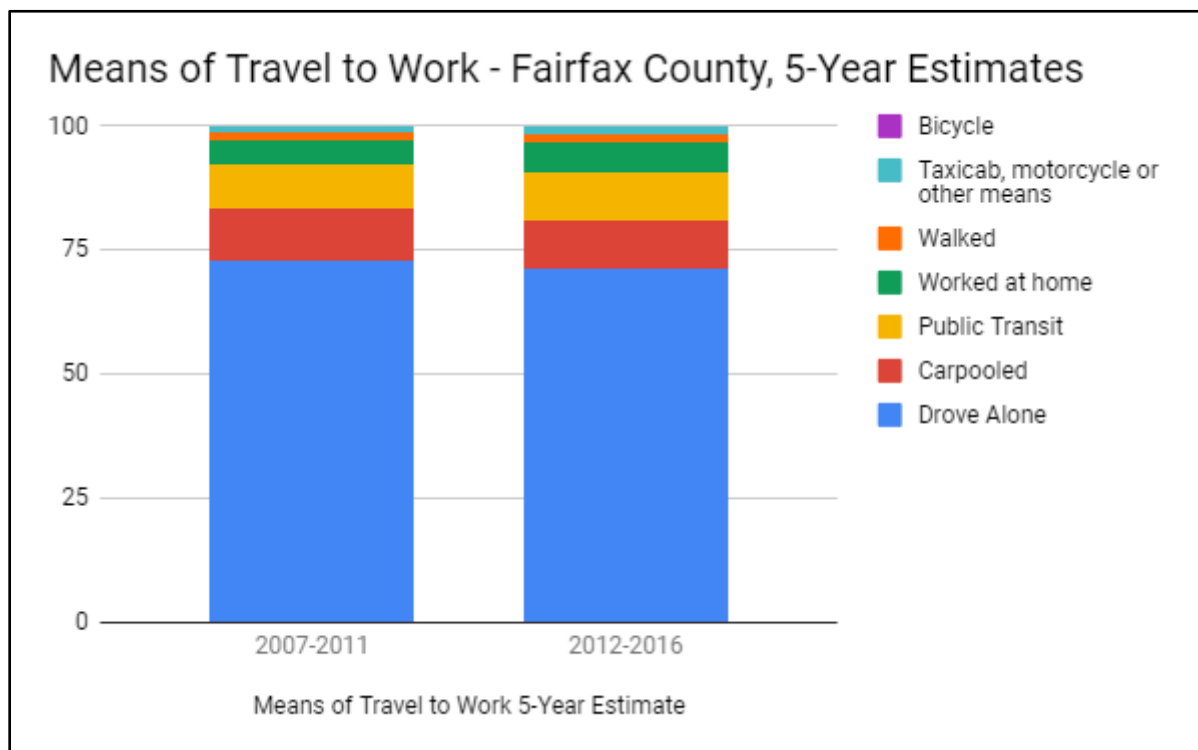
Beyond the means of travel, travel distance also serves as a proxy measure for the level of activity generating environmental impacts to air quality and climate emissions. The Virginia Department of Transportation estimates daily vehicle miles traveled annually; vehicle miles traveled increased slightly from more than 26.8 million trips in 2016 to 27.1 million trips in 2017, a one percent increase.<sup>5</sup>

<sup>2</sup> 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/](http://www.brookings.edu/research/traffic-why-its-getting-worse-what-government-can-do/)

<sup>3</sup> Economic Indicators 2000-2018, Fairfax County Department of Management and Budget, [www.fairfaxcounty.gov/budget/economic-indicators](http://www.fairfaxcounty.gov/budget/economic-indicators)

<sup>4</sup> American Community Survey, U.S. Census Bureau. Commuting Characteristics by Sex, 2007-2011, 2012-2016 U.S. Census Bureau [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_S0801&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_S0801&prodType=table)

<sup>5</sup> 'Daily Vehicle Miles Traveled by Physical Jurisdiction', VDOT. 2016 data: [www.virginiadot.org/info/resources/Traffic\\_2016/VMTRReport\\_1200\\_2016.pdf](http://www.virginiadot.org/info/resources/Traffic_2016/VMTRReport_1200_2016.pdf), 2017 data: [www.virginiadot.org/info/resources/Traffic\\_2017/VMTRReport\\_1200\\_2017.pdf](http://www.virginiadot.org/info/resources/Traffic_2017/VMTRReport_1200_2017.pdf)

**Figure II-1.**

Note: Annual percent of means of travel does not total to 100 percent due to rounding and margin of error in survey data.

Source: U.S. Census Bureau's American Community Survey

### **Traffic Congestion**

While trip share is important to evaluate the vision, trip efficiency is critical for users and for outcomes for the environment. A measure that partially documents efficiency is traffic congestion: longer trip times and slower travel speeds attributed to increased use. There is a significant amount of traffic congestion in Fairfax County and the Washington D.C. metro region. In a study of traffic congestion in 500 cities around the world, Washington D.C. ranked the 18th worst for congestion and the sixth worst in the United States.<sup>6</sup> The same study estimates that a Washington, D.C. area driver commuting 240 days a year - the equivalent of five days per week for 52 weeks, with two weeks off for sickness or vacation annually - would spend about 63 hours or 2.63 days per year in congestion in peak commuting periods.<sup>7</sup> The average travel time to work for county residents is about 32 minutes.<sup>8</sup>

<sup>6</sup> INRIX Traffic Scorecard 2017 - Washington D.C., <http://inrix.com/scorecard-city/?city=Washington%3B%20DC&index=13>. Note: INRIX is used to develop the Texas Transportation Institute Urban Mobility Scorecard

<sup>7</sup> INRIX Global Traffic Scorecard 2017 - <http://inrix.com/scorecard/#>

<sup>8</sup> Commuting Characteristics by Sex, 2012-2016 American Community Survey, U.S. Census Bureau [https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_S0801&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_S0801&prodType=table)

In addition to carrying a huge economic and quality-of-life cost, traffic congestion increases the hours of vehicle emissions, impacting air quality and climate change. However, congestion is due in part to road design and to adjacent land use planning. In some circumstances, a reduced level of service is desirable for roadways since it allows other users to share adjacent facilities more safely; e.g. converting a travel lane to a dedicated bus lane.

### **Washington Metropolitan Area Transit Authority (WMATA)**

Metrorail is the largest transit service in Fairfax County and the region and provides more trips than other transit options combined. Fairfax County is served by four rail lines: Orange, Blue, Yellow and Silver. The second phase of Silver Line construction will extend service beyond the current terminus at Reston-Wiehle East to Dulles International Airport (IAD) and into Loudoun County. Substantial completion of contracted construction is expected by August 2019;<sup>9</sup> after substantial completion, the new segment will be tested and transferred to WMATA for operation.

Existing rail service has experienced challenges in recent years due to long-delayed maintenance and reinvestment. Issues with both tracks and railcars resulted in regular service disruptions and, in 2015, a passenger died after a train filled with smoke in a tunnel. To address these issues and restore the system to a state of good repair, WMATA launched an extensive overhaul of the rail system, SafeTrack, which was recently completed.

The impact of both the service failures and reduced level of service for repairs is evident in ridership numbers: Metrorail trips originating in Fairfax County declined 9.2 percent from FY 2016 to FY 2017, with trips decreasing from 26.0 million trips to 23.7 million trips.<sup>10</sup> This decline is attributable to reliability concerns, service disruptions from SafeTrack and continuing low fuel prices, which make personal automobile travel more cost effective.

WMATA also operates a regional bus service, Metrobus, in Fairfax County. In FY 2017, Metrobus operated 60 bus routes in Fairfax County and served 6.9 million trips, an 8.4 percent decline in trips provided from FY 2016.<sup>11</sup> Riders often transfer between rail and bus service and the decline is attributable to the decrease in rail use as well as low fuel prices.

Fortunately, the lack of reinvestment which necessitated a repair program like SafeTrack has been addressed. In March 2018, the District of Columbia, Maryland and Virginia reached a historic agreement to provide dedicated funding for WMATA for the first time. Access to dedicated funding allows WMATA to develop and implement a long-term plan to reinvest and maintain transit infrastructure without having to secure financing piecemeal from WMATA compact members. This funding comes at a critical time, since it creates an opportunity for

<sup>9</sup> Canale, Mark. *Dulles Corridor Metrorail Project: Silver Line Phase 2 Implementation*. May 8, 2018. [www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20\(general\)/board%20transportation%20committee/item%207%20-%20btc%20dulles%20rail%20update\\_final.pdf](http://www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20(general)/board%20transportation%20committee/item%207%20-%20btc%20dulles%20rail%20update_final.pdf)

<sup>10</sup> 'Fund 30000, Metro Operations & Construction, Department of Transportation FY 2019 Advertised Budget Plan: Performance Measures' [www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/30000.pdf](http://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/30000.pdf)

<sup>11</sup> IBID

WMATA to capitalize on the investment made through SafeTrack and to avoid falling back into the pattern of insufficient maintenance that required major service disruptions to address.

As the trip data suggest, there is significant ground to make up in terms of lost ridership. Regaining rider confidence requires the provision of consistent, reliable and quality service. Efforts are already underway to improve peak service and place value on customers, such as WMATA's Rush Hour Promise program, which promotes reliability and accountability by providing credits to riders who experience delays of fifteen minutes or more for their rush hour trips.<sup>12</sup> These efforts should help to restore confidence.

One further development of note is that WMATA has recently announced a multi-year project to reconstruct 20 rail station platforms, including Franconia-Springfield and Huntington in 2019 and Vienna, Dunn Loring and West Falls Church in 2020 or 2021.<sup>13</sup> This is the first major project to benefit from dedicated funding and will provide much-needed reconstruction of outdoor platforms. However, the work will require further service disruptions on all lines serving Fairfax County.

### **Virginia Metro Funding**

To provide dedicated funding, over \$100 million in annual transportation revenue was reprogrammed - a majority of these funds were previously allocated by House Bill 2313 to the Northern Virginia Transportation Authority (NVTa) and its member jurisdictions. Under the new allocation methodology, annual revenues of \$75 million previously available to NVTa to invest in regionally significant projects has been committed to WMATA and, similarly, \$27 million in annual revenue is diverted from local sources. NVTa funds are distributed based on population and Fairfax County has approximately half the region's population. Consequently, the impact of the change is estimated at \$45 to \$50 million in annual revenue which the county would have been entitled to allocate under HB 2313.<sup>14</sup> While there is no denying that Metro is a tremendously significant transportation investment, there are many other substantial needs in the region as well. NVTa has funded a number of transit projects as well as intersection improvements, highways and other priorities. Going forward, there are now fewer resources available to improve compatible transit, or fund bicycle and pedestrian improvements.

### **Fairfax Connector Bus**

Fairfax Connector served 86 routes and transported 8.6 million passengers in FY 2017, which represents a 3.9 percent decline from FY 2016.<sup>15</sup> Rider satisfaction, measured in complaints per 100,000 passengers, exceeded targets. However, similar to ridership on Metrobus, the decline in connecting Metrorail service, combined with cheap fuel for personal vehicles, negatively impacted ridership.

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<sup>12</sup> Rush Hour Promise, [www.wmata.com/fares/smartrip/rush-hour-promise.cfm](http://www.wmata.com/fares/smartrip/rush-hour-promise.cfm)

<sup>13</sup> [www.wmata.com/about/news/Platform-Reconstruction.cfm](http://www.wmata.com/about/news/Platform-Reconstruction.cfm)

<sup>14</sup> Fairfax County Department of Transportation Response to EQAC, received June 22, 2018.

<sup>15</sup> Fund 4000, County Transit Systems, FY 2019 Adopted Budget Plan Performance Measures ([www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/40000.pdf](http://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/40000.pdf))



Fairfax Connector continues to explore ways to improve service convenience and marketing to attract and retain riders. The Fairfax County Department of Transportation (FCDOT) has partnered with Fairfax County Public Schools (FCPS) to offer the Free Student Bus Pass program, which, as the name suggests, allows high schools to issue bus passes to students. The program has been in place less than three years and has served over 800,000 trips for students; students now make up seven percent of Fairfax Connector riders.<sup>16</sup> Further improvements, including conversion to SmarTrip cards and a pilot with Metrobus, are planned. This program introduces students to bus ridership at the same time they are eligible to drive personal vehicles and provides service which FCPS or families would otherwise need to fill.

To help riders find service, FCDOT has launched Fairfax Connector Bus Tracker, which provides real time information on bus locations and estimated arrival times.<sup>17</sup> Fairfax Connector was recently added to Google Maps, opening route and arrival time information to an array of new users.<sup>18</sup>

With the launch of Phase 1 of the Silver Line, bus routes which previously served the corridor between Reston and Falls Church were realigned to connect one or more major employment centers with one or more rail stations. In anticipation of Phase 2, a similar realignment will be undertaken for Reston, Herndon and Dulles area service to optimize connections with Metrorail and enhance transit access for area residents.<sup>19</sup>

### **Virginia Railway Express (VRE)**

VRE provides service on two commuter rail lines, connecting Fredericksburg and Manassas to Union Station in Washington, D.C., with multiple stops in Fairfax County. Unlike WMATA and Fairfax Connector, VRE is a commuter service, operating during peak periods on weekdays. VRE ridership was the only exception to the trend of declining transit ridership in FY 2017, with ridership increasing approximately 9.3 percent, from 954,804 annual boardings in FY 2016 to 1,024,080 annual boardings in FY 2017.<sup>20</sup> The ridership gains likely came in part from Metrorail riders seeking alternatives during track closures. EQAC will monitor whether there is a shift back following the completion of Metrorail repairs.

### **TDM Program**

The Transportation Demand Management (TDM) program is a policy tool which supports the goal of reducing single occupant vehicle (SOV) dependence. Through the land use entitlement process, commitments are obtained from developers to provide employees or tenants with

<sup>16</sup> Free Student Bus Pass Program Update, FCOT, May 8, 2018.

[www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20\(general\)/board%20transportation%20committee/item%205%20-%20student%20bus%20pass%20smartrip%20metrobus%20pilot%20ppt%20may%208.pdf](http://www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20(general)/board%20transportation%20committee/item%205%20-%20student%20bus%20pass%20smartrip%20metrobus%20pilot%20ppt%20may%208.pdf)

<sup>17</sup> [www.fairfaxcounty.gov/connector/bustracker](http://www.fairfaxcounty.gov/connector/bustracker)

<sup>18</sup> FCDOT response to EQAC, June 22, 2018

<sup>19</sup> IBID

<sup>20</sup> Fund 4000, County Transit Systems, FY 2019 Adopted Budget Plan Performance Measures

([www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/40000.pdf](http://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/pm/40000.pdf))

alternatives to single occupant vehicle travel or to otherwise incentivize the use of such alternatives. Through transit incentives and car or van pools, TDM reduces SOV use. The number of employers participating in TDM increased from 538 in 2017 to 580 in 2018, and 287 participating employers have implemented programs which significantly reduce SOV travel, up from 272 in 2017.<sup>21</sup> Due to the targeted nature, however, TDM can only be set up when a property comes through the land use entitlement process - properties that are not seeking a zoning change would only enter a TDM plan voluntarily.

### **Bicycle and Pedestrian Programs**

FCDOT staff advances the county's bicycle and pedestrian programs in direct coordination with other agencies. The bicycle coordinator works with the Virginia Department of Transportation (VDOT) annual paving program based on the Bicycle Master Plan in the county's Comprehensive Plan. During the 2017 paving cycle, approximately 60 lane-miles of bike lanes were added.<sup>22</sup> Since road striping work is a necessary part of repaving, this is a very cost effective way to expand safe cycling options. During the 2018 paving cycle, work to add or upgrade bike facilities on 40 roads is planned.<sup>23</sup>

In keeping with the Bicycle Master Plan, bicycle and pedestrian facilities have also been incorporated into a number of major projects that were either recently completed or are currently under construction, including: a shared use path incorporated into the new Route 7 bridge over the Dulles Toll Road; on-street bike lanes and lighted sidewalks on the Jones Branch Connector; and a shared use path on the new Backlick Road bridge over the CSX railroad line.<sup>24</sup>

2017 was also the first full year of Capital Bikeshare operating in Fairfax County in Tysons and Reston; 11,618 trips were served over the course of the year--an average of 31.8 trips per day. Usage has grown considerably since its initial debut in October 2016; usage from October through December 2017 was over three times higher than usage in October through December 2016.<sup>25</sup>

### **Noise**

Noise impacts from air and ground transportation sources as well as infrastructure construction are concerns for residents and for the local environment. Noise from ground transportation facilities is reviewed during the design process under the National Environmental Policy Act (NEPA) and designs must mitigate impacts rising above allowable levels. Noise management standards set a minimum and may not fully satisfy the concerns of residents. Where possible, it is often desirable to provide additional mitigation. Some recent example include sound wall retrofits along the Dulles Toll Road and sound wall design for the 495 and 95 Express lanes.

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<sup>21</sup> FCDOT response to EQAC, June 29, 2018

<sup>22</sup> VDOT response to EQAC, September 10, 2018

<sup>23</sup> Fairfax County Department of Transportation Status Report, February 2018

([www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20projects,%20studies%20and%20plans/fctsr20180320.pdf](http://www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/transportation%20projects,%20studies%20and%20plans/fctsr20180320.pdf))

<sup>24</sup> VDOT response to EQAC, July 2, 2018

<sup>25</sup> FCDOT response to EQAC, June 29, 2018

Appropriate noise mitigation will be a point of interest as the I-66 Express Lanes go through design-build construction.

Fairfax County is fortunate to have two major airports, Reagan National Airport (DCA) and Dulles International Airport (IAD) near and within/adjacent to the county, respectively. These airports offer businesses and residents an array of flight connections. However, this proximity also results in noise impacts on neighborhoods under flight paths. Mitigating aircraft noise with barriers is difficult, so it is managed at the source - aircraft - and through local land use planning to limit residential development in flight corridors.

Recent noise issues are associated with the implementation of NextGen technology, which provides for more sophisticated tracking and guidance, thereby allowing the flight paths authorized by the Federal Aviation Administration (FAA) to be condensed to improve efficiency. With the same volume of air traffic following a narrower band of flight paths, the noise impacts for affected properties have increased; most of the affected properties are in established neighborhoods where land use decisions were made years before the implementation of NextGen. In addition, improvements in aircraft engine efficiency allow larger craft to utilize the shorter runways.

Aircraft noise standards are set by the FAA and FAA instituted a stricter noise standard for aircraft with a maximum certified takeoff weight greater than more than 55,000 kg.<sup>26</sup> The Airport Noise and Capacity Act of 1990 limits U.S. airports from imposing new noise-based operational restrictions on stage 3 aircraft, including limits on hours of operation, number of aircraft or noise level.<sup>27</sup> A similar higher standard will be applied to smaller aircraft beginning in 2020<sup>28</sup> and FAA continues to study aircraft noise impacts. DCA has particularly tight flight corridors due the airspace restrictions over the White House, the U.S. Naval Observatory and the National Mall.

In response to concerns raised by citizens and elected leaders about heightened noise at DCA, MWAA convened a regional group composed of residents from the District of Columbia, Maryland and Virginia, MWAA, FAA and airlines operating out of DCA to develop alternative flight paths for FAA consideration. This group has three members from Fairfax County and continues to work on refinements to the flight paths to limit impacts on residents. Additionally, MWAA has launched a noise complaint portal and dashboard to capture residents' complaints and to provide transparency about the types of complaints received, the quantity of complaints and complaint locations.<sup>29</sup> The data gathered through the portal assists in enforcement of noise violations against airlines and provides documentation that can be used in ongoing work on flight paths.

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<sup>26</sup> Federal Aviation Administration Response to EQAC, May 7, 2018

<sup>27</sup> DCA Reagan National - Aircraft Noise Information, MWAA, [www.flyreagan.com/dca/dca-reagan-national-aircraft-noise-information](http://www.flyreagan.com/dca/dca-reagan-national-aircraft-noise-information)

<sup>28</sup> Federal Aviation Administration Response to EQAC, May 7, 2018

<sup>29</sup> Reagan National Community Complaint Dashboard, MWAA, [www.flyreagan.com/dca/dca-reagan-national-complaint-dashboard](http://www.flyreagan.com/dca/dca-reagan-national-complaint-dashboard)

## **Air Quality**

Since vehicles and vehicle emissions regularly cross jurisdictional boundaries, air quality standards are applied to regions. The Metropolitan Washington Air Quality Committee (MWAQC) coordinates regional air quality planning activities. Air quality from transportation sources is regulated through the National Capital Region Transportation Planning Board (TPB) through the Financially Constrained Long Range Plan (CLRP), which evaluates whether planned transportation projects conform with the Clean Air Act and the National Ambient Air Quality Standards.<sup>30</sup> The 2017 update to the CLRP conforms to these standards.<sup>31</sup> For more information on air quality, please see Chapter VII of this report.

## **Climate Impact**

According to the Metropolitan Washington Council of Governments (MWCOC), 43 percent of energy consumption in Fairfax County in 2015 came from transportation or mobile sources.<sup>32</sup> Total emissions from the transportation sector have remained relatively unchanged between 2005 and 2015; however, the population has grown 13 percent over the same interval, so the emissions per capita have fallen. MWCOC attributes the per capita decline to improved fuel efficiency.<sup>33</sup> This finding is consistent with a 2010 study the National Capital Transportation Planning Board (TPB) conducted to research what it would take to attain the MWCOC emissions reduction goals for the transportation sector; the study concluded that federal regulation through the federal Corporate Average Fuel Economy (CAFE) standard is critical to attaining the region's emissions goals.<sup>34</sup>

These data support the predicted benefits of more stringent CAFE standards, which is notable because the U.S. Environmental Protection Agency (EPA) has announced that EPA and the National Highway Traffic Safety Administration (NHTSA) intend to revise greenhouse gas emissions (GHG) emissions standards and CAFE standards.<sup>35</sup> EPA is still in the process of developing a draft rule for comment; the impact of an alternative to the existing rule that was put in place in January 2017 is therefore not yet known.

## **Transportation Technology**

The Board of Supervisors received a presentation at the May 2018 Transportation Committee meeting from the Transportation Advisory Council (TAC) regarding new technologies that will shape the future of transportation. Many of these solutions are already in place in Fairfax County

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<sup>30</sup> Metropolitan Washington Air Quality Advisory Council (MWAQC) response to EQAC, May 2018.

<sup>31</sup> IBID

<sup>32</sup> Fairfax County Community-Wide Greenhouse Gas Inventory Summary Fact Sheet, MWCOC, [www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-greenhouse-gas-emissions-factsheet-may-2018.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-greenhouse-gas-emissions-factsheet-may-2018.pdf)

<sup>33</sup> IBID.

<sup>34</sup> *What Would It Take Scenario Study*, TPB, 2010. [www.mwcog.org/transportation/planning-areas/land-use-coordination/scenario-planning/wwit/](http://www.mwcog.org/transportation/planning-areas/land-use-coordination/scenario-planning/wwit/)

<sup>35</sup> EPA Administrator Pruitt: GHG Emissions Standards for Cars and Light Trucks Should Be Revised, April 1, 2018, [www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be](http://www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be)

in some form; driverless or autonomous vehicles have been tested on local roads and are under study by Virginia Tech. Similarly, real-time traffic monitoring and dynamic traffic management technology are the core technologies that make the 495, 95, and 66 Express Lanes possible and functional, and many travelers utilize wayfinding software like Google Maps or Waze to optimize their trips and account for road closures and incidents. Ride-hailing apps like Lyft and Uber provide on-demand transportation. Through a proffer commitment from the MITRE Corporation, the county has already studied opportunities and challenges associated with electric vehicle charging infrastructure.

Individually, these technologies represent improvements in convenience or time-savings, but the potential synergy among them has far greater potential. The consumer demand concepts behind ride-hailing software could be combined with dynamic management of available roadway capacity to optimize available resources across requested trips; rather than steering individual trips as Waze and Google Maps do, there is an opportunity to reconfigure signalization and speed limits in real time through the Internet of Things to serve the community's needs more efficiently.

Additionally, there is a growing universe of transit and travel data which can be compared and analyzed with other data sets to gain new insights into customer needs. Route planning can integrate additional data to consider factors like neighborhood-level socioeconomic information to develop services targeted to address gaps in transportation access. Utilizing data this way would support the equity in decision making envisioned in the One Fairfax policy.

From the standpoint of the environment, optimizing existing resources has several clear benefits. Better managing existing capacity reduces demand for new capacity and limits further water quality impacts of adding impervious surface. Similarly, more efficient trips means less fuel consumed and less climate and air impacts.

As the TAC outlined, Fairfax County is uniquely positioned to harness these emerging technologies due to the strength of the local information technology sector and policy and consulting services coupled with the demand and market opportunity that exist for transportation solutions. Other jurisdictions have, however, already made significant strides in these areas. A policy framework to foster this activity, ensure compatibility of solutions across the region and build consensus with state and regional partners is required to be prepared for these technologies to succeed in Fairfax County.

### **Project Updates**

The 2017 Annual Report focused largely on major projects that affect several magisterial districts or major travel corridors and the introduction of additional capacity and/or transit service to major corridors, including Phase 2 of the Dulles Rail Project, Transform 66 and Embark Richmond Highway.

### I-66 Express Lanes

I-66 Express Lanes Inside the Beltway project opened High Occupancy Toll (HOT) service in December 2017, allowing vehicles with a single occupant to pay a toll to use the lanes during peak periods in exchange for a guaranteed trip time. Similarly, vehicles with two or more occupants can use the lanes toll-free. Unlike other HOT facilities, I-66 Inside the Beltway is publicly owned rather than operated under a concession and toll revenue is invested in the I-66 corridor. This includes re-investment in I-66 infrastructure, investment in parallel facilities, investment in future widening and investment in new transit service. Funds are administered by the Northern Virginia Transportation Commission and, in 2017, 10 projects were awarded a total of \$9.8 million.<sup>36</sup> Utilizing these funds, the Fairfax County Department of Transportation has launched a new Fairfax Connector route, 699, which now serves an average of 248 riders on weekdays.<sup>37</sup>

It is difficult to assess the environmental benefit or impact of this project roughly six months into operation. While allowing single occupant vehicles on a formerly HOV restricted facility appears to undercut priorities to reduce vehicles on the road, VDOT has indicated that the new tolling gantries serve to reduce HOV violations through improved enforcement.<sup>38</sup> Data for the first week of operation published by VDOT show that between 30 and 45 percent of vehicles had two or more occupants.<sup>39</sup> This bears further monitoring since the data available only reflect one week of activity for the first week of operation, so it may not be indicative of regular travel patterns. There has also been significant discussion over tolling impacts from users and elected leaders, as initial toll prices approached \$40 for a single trip eastbound during morning peak hours.<sup>40</sup> This is a public facility and tolling structures could change by legislative action.

I-66 Express Lanes Outside the Beltway project is now under construction, with construction expected to last through 2022.<sup>41</sup> This project will add 22.5 miles of new two-lane HOT lanes in each direction alongside three general purpose lanes between the Beltway and University Boulevard in Gainesville, with dynamic tolling for non-HOV 3 vehicles similar to existing Express Lanes. In addition to added roadway capacity, I-66 Outside the Beltway includes support for new and expanded bus service in the corridor, with support coming from toll revenues. The project also includes 11 miles of new bike and pedestrian trails separated from the highway by either a sound wall or a fence.

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<sup>36</sup> CommuterChoice I66 Inside the Beltway, Project Overview, NVTC.

[www.novatransit.org/i66commuterchoice/2017-funded-projects/](http://www.novatransit.org/i66commuterchoice/2017-funded-projects/)

<sup>37</sup> FCDOT response to EQAC, received June 22, 2018

<sup>38</sup> 'Frequently Asked Questions: Background and Benefits' Transform I66 Inside the Beltway

<http://inside.transform66.org/faqs/default.asp>

<sup>39</sup> 'First Week Update: 66 Express Lanes Inside the Beltway', VDOT.

[http://inside.transform66.org/documents/121217\\_-\\_first\\_week\\_updatecp.pdf](http://inside.transform66.org/documents/121217_-_first_week_updatecp.pdf)

<sup>40</sup> IBID

<sup>41</sup> 'What is the current project schedule', Transform I-66, <http://outside.transform66.org/faqs/default.asp>

### Embark Richmond Highway

Since EQAC issued its 2017 Annual Report on the Environment, notable progress has also been made on Embark Richmond Highway. On March 20, 2018, the Board of Supervisors adopted a revision to the land use plan for a 7.5 mile corridor of Richmond Highway in the Lee and Mount Vernon Districts between Huntington and Fort Belvoir.<sup>42</sup> Equally critical, NVTA's FY 2018-2023 Six Year Program, adopted on June 14, 2018, includes \$389 million for Richmond Highway improvements in Fairfax County, including \$250 million for the Phase 1 and Phase 2 of planned Bus Rapid Transit (BRT). VDOT is partnering with the county to administer a related road widening project between Jeff Todd Way and Napper Drive. The new width will include bicycle and pedestrian accommodations as well as space in the median for BRT.<sup>43</sup>

The north end of the corridor is anchored by the current terminus of the Metrorail Yellow Line and the southern end connects to Fort Belvoir, a growing employment center in need of improved transit access. The plan addresses safety, walkability and level of service through a combination of improved sidewalks, integrated street trees, dedicated bike lanes and bus rapid transit operating in a dedicated space and the funding secured allows this project to continue to make significant progress in the coming years. Additionally, Richmond Highway is a built-out corridor, so this project will offer an example and learning opportunity for retrofitting transit and walkability solutions into other corridors.

### Comments

1. The council commends the Board of Supervisors, county leadership and staff, as well as leaders throughout the region for providing dedicated funding for WMATA. From an environmental standpoint, sustaining Metro's core services provides a direct alternative to single occupant vehicle travel and supports compatible bus, bike and pedestrian facilities.
2. The council commends MWAA for launching the new dashboard and complaint portals. Creating these tools and using the data generated by residents will help move the conversation about flight paths and noise forward.
3. The potential for disruption in the primary east-west travel corridor caused by concurrence of outdoor Metro station reconstruction on the Orange Line 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. Further, the timing of the station reconstruction is concerning since it will once again disrupt Metro riders' travel patterns in Fairfax County on the Orange, Blue, and Yellow Lines and undermining perceptions of improved reliability and convenience after SafeTrack.

<sup>42</sup> 'Embark Richmond Highway Plan Approved; Brings Bus Rapid Transit, Development', Fairfax County NewsCenter, [www.fairfaxcounty.gov/news2/embark-richmond-highway-plan-to-bring-major-transportation-improvements/](http://www.fairfaxcounty.gov/news2/embark-richmond-highway-plan-to-bring-major-transportation-improvements/)

<sup>43</sup> VDOT Response to EQAC, July 2, 2018



4. Transit ridership data suggest that SafeTrack significantly impacted ridership both on Metro rail and bus systems that connect to rail service. This represents a concern for both the environment and the region's transportation network; the trips formerly served by Metro are still occurring but are being served by other travel modes. Efforts to re-attract riders are critical. As ridership is influenced both by service quality and reliability, as well as cost and time comparisons with other travel modes, Metro and Fairfax Connector need to be prepared for opportunities like rising fuel prices to reintroduce service.

### **Recommendations**

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.
2. Continue investment in transit, bicycle and pedestrian projects where possible in support of the Bicycle Master Plan and the Transit Development Plan.
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.



### **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.”<sup>1</sup>

#### **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 system. This is the lens through which water is viewed in this chapter of the Annual Report on the Environment.

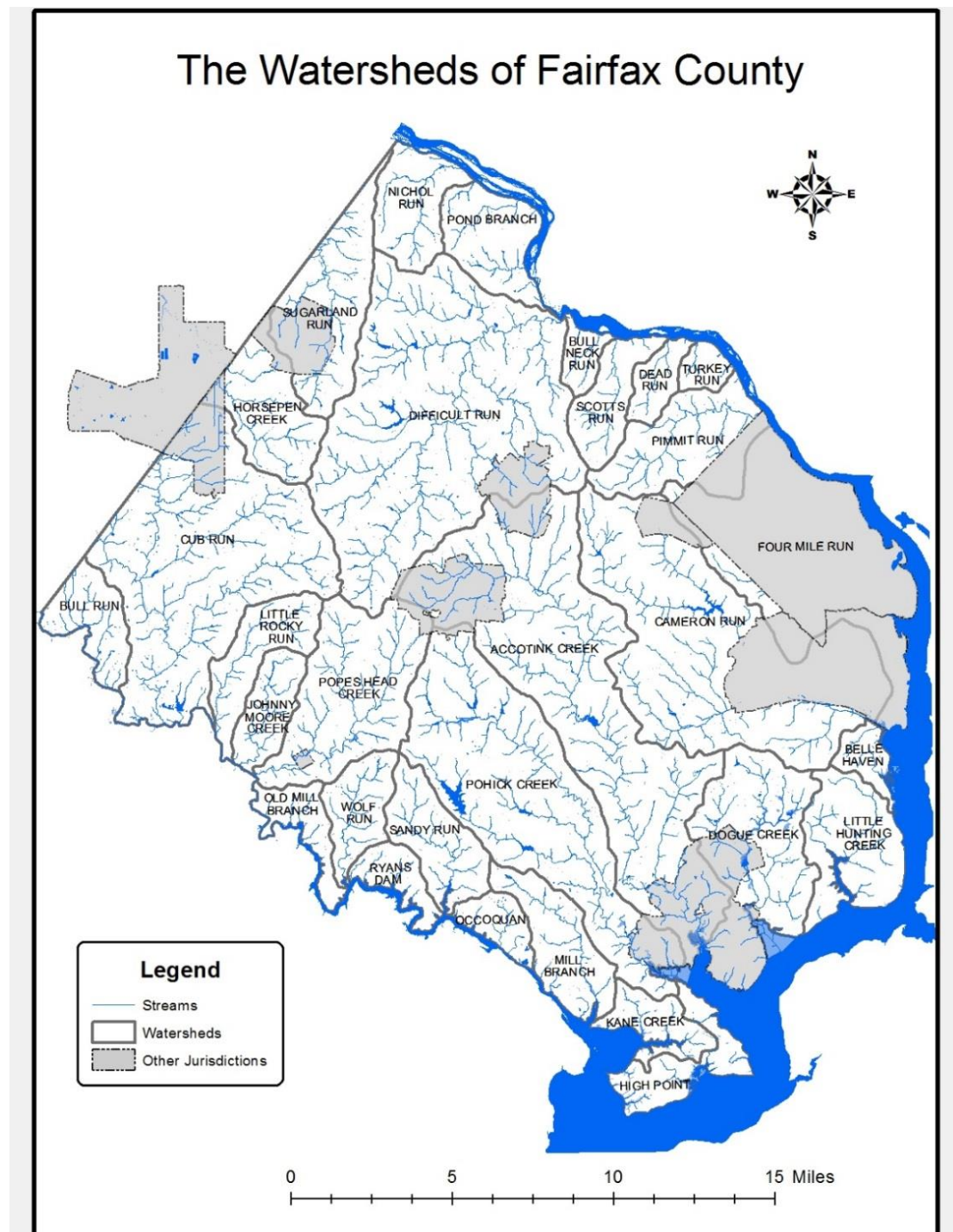
The concept of “one water” is illustrated in how our streams fit into the larger water ecosystem. The largest watershed in the county is Difficult Run (58 square miles), with ten smaller streams that drain into its main stream. Difficult Run, in turn, drains into the Potomac River. The Potomac River 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

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

Columbia. All of Fairfax County ultimately drains to the Potomac River, which drains to Chesapeake Bay.

**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** -- The collection in closed systems of sewage from homes and business; we then treat the raw sewage in facilities to remove pollutants to 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, our 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 depth 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 14,481 single family residences and businesses that are 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 Supply**

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 Airport. As of 2014, both the City of Fairfax and Falls Church systems were incorporated into Fairfax Water's system.

Fairfax Water provided 62,170 billion gallons of drinking water in 2017. These surface waters must be treated prior to use.

<b>Table III-1 Fairfax Water -- Water Supply Sources, 2017</b>	
<u>Sources</u>	<u>Gallons (in billions)</u>
Occoquan Reservoir (Griffith)	22.614
Potomac (Corbalis)	34.071
Purchased	5.39
Untreated	.0095
<b>TOTAL</b>	<b>62,170</b>

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 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](http://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 61 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 93 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, D.C.

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](http://www.fairfaxwater.org/water-quality).

Included in this report are details of the following contaminants:

**Disinfection By-Products**

In 2017, Fairfax Water monitored surface source water and finished drinking water for 60 volatile organic compounds (VOCs). No volatile organic compounds 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 volatile organic compounds 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 2017 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 2017 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](http://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 us to determine whether the organisms are dead or if they are capable of causing disease.

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

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 <i>Cryptosporidium</i> Concentration (Oocysts/Liter)
Potomac River	0.000
Occoquan Reservoir	0.007

Source: Fairfax Water

Additionally, the Washington Aqueduct was required to perform separate *Cryptosporidium* monitoring of the Potomac River in 2017. *Cryptosporidium* oocysts were detected in six samples collected at the Little Falls and/or Great Falls intakes in January, February, May and October 2017, with concentrations ranging from 0.093 to 0.279 oocysts/L. Based upon the plant-specific criteria, no additional treatment measures were required at the Washington Aqueduct water treatment plants.

#### 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 look at which compounds can 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 database of information. 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](http://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](http://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 2017, Fairfax Water collected over 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.

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

### **Protecting Drinking Water Sources**

#### Potomac River Water Quality Monitoring

The Metropolitan Washington Council of Governments (COG) coordinates with state and local government officials, scientists from local universities and other experts from around the region who collect and analyze water quality monitoring data from local waters. COG, 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," held in winter 2017 (meeting materials can be downloaded at

[https://www.chesapeakebay.net/channel\\_files/25553/sav\\_syn\\_summary\\_nov\\_2017b.pdf](https://www.chesapeakebay.net/channel_files/25553/sav_syn_summary_nov_2017b.pdf)), 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 estuary. COG contracts with the Occoquan Watershed Monitoring Laboratory 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, COG 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 COG's Regional Water Fund work program for fiscal 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](http://www.fairfaxwater.org/swap).

Fairfax Water developed an information system, completed in 2016, that catalogs storage facilities, pipelines, roads, rail crossings and other potential sources of contaminants sources 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 expensive option. To address this issue throughout the Northern Virginia region, Virginia Department of Environmental Quality (DEQ) has gathered a Stakeholder Advisory Committee (SAC) to work towards development of a Salt Management Strategy, (SaMS) through implementation of best management practices (BMPs) like training and certification programs, and improved salt application equipment and practices. Fairfax Water is an active participant in the SAC. More information on the initiative is available at: [www.deq.virginia.gov/SaMS.aspx](http://www.deq.virginia.gov/SaMS.aspx).

### 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, [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](#).  
[www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterWithdrawalPermittingandCompliance/GroundwaterWithdrawalPermitsFees.aspx](http://www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterWithdrawalPermittingandCompliance/GroundwaterWithdrawalPermitsFees.aspx)

All certified water well system providers must register with the Department of Environmental Quality 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. The concern exists, though, that there are other uranium occurrences in Virginia and that past uranium mining lease agreements were 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 was 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/resolutions%20and%20positions/2013/2013%20august--legislative%20proposal--uranium%20mining--reiteration%20of%202012%20proposal.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resolutions%20and%20positions/2013/2013%20august--legislative%20proposal--uranium%20mining--reiteration%20of%202012%20proposal.pdf)

### 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 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 (WMA) (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.

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."*

[www.nature.org/media/maryland/finalpogobrochure\\_back\\_low\\_rez.pdf](http://www.nature.org/media/maryland/finalpogobrochure_back_low_rez.pdf)

While the Potomac River has flows that average above 7,000 million gallons per day (mgd), flows well below that have also been observed, usually in late summer and early fall. The lowest recorded flow in this region was 388 mgd at Little Falls in September during the drought of 1966. This is an adjusted figure that does not include the withdrawal allocation of 290 mgd (e.g., with that adjustment, the flow was actually 98 mgd). The average daily water withdrawals from the Potomac River as of 2017 were about 350 mgd.

In 1978, the three major metropolitan water utilities (including Fairfax Water), along with the federal government, signed the Low Flow Allocation Agreement (LFAA), which created a protocol for allocation of water from the Potomac during periods of low flow.

In 1982, the WMA water suppliers and the Interstate Commission on the Potomac River Basin (ICPRB) signed the Water Supply Coordination Agreement (WSCA). The purpose of the agreement is to maintain adequate flow in the river so that water supply and flow-by needs are met and to reduce the risk of requiring allocations as defined in the LFAA. All parties agree to optimally utilize the off-Potomac Occoquan and Patuxent Reservoirs to meet water supply demands. The Cooperative Water Supply on the Potomac (CO-OP) section of ICPRB was established by the WSCA to perform necessary modeling, forecasting and coordination of drought activity.

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 of the region's major utilities; no additional releases from upstream reservoirs to augment water supplies have been necessary. Based on the current outlook, there is a low probability of requiring releases in the near future. 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," [www.potomacriver.org/focus-areas/water-resources-and-drinking-water/cooperative-water-supply-operations-on-the-potomac/](http://www.potomacriver.org/focus-areas/water-resources-and-drinking-water/cooperative-water-supply-operations-on-the-potomac/).

The current environmental flow recommendations are 300 mgd downstream of Great Falls and 100 mgd downstream of Little Falls. In 2002, the Maryland Department of Natural Resources revisited this issue of the flow level necessary to support aquatic habitat in the Potomac River and was unable to replicate the methodology used to create the present low flow requirements in the agreement. Droughts that occurred in 1999 and 2002 called attention to the concern that these flow regimes, derived by the 1981 study (which was conducted during a period without extreme low flows), needed to be revisited in light of new scientific methods and low-flow information.

On April 8, 2003, the Maryland Power Plant Research Program and the Interstate Commission on the Potomac River Basin sponsored a one-day workshop with a panel of nationally recognized

experts on habitat assessment to investigate and develop methods to evaluate the environmental flow-by requirements. Their conclusion of the present low-flow agreement is that: “Existing biological data and understanding are inadequate to support a specific, quantitative environmental flow-by.”

The final Large River Flow Needs Report from 2010 is now available at:

[www.potomacriver.org/wp-content/uploads/2015/02/ICPRB10-3.pdf](http://www.potomacriver.org/wp-content/uploads/2015/02/ICPRB10-3.pdf)

The Metropolitan Washington Council of Governments (MWCOC) manages the region’s drinking water drought response. In response to the droughts of 1998 and 1999, COG developed a task force to coordinate regional responses during droughts and to discuss the availability of drinking water supplies. The resulting Regional Water Supply and Drought Awareness Plan consists of two components: (1) a year-round plan emphasizing wise water use and conservation; and (2) a water supply and drought awareness and response plan. The Interstate Commission on the Potomac River Basin handles the administration of the coordinated drought response for water withdrawals from the Potomac River. Additionally, ICPRB’s Cooperative Water Supply Operations Section works with COG and the Drought Coordination Committee to assist in providing accurate and timely information to residents during low-flow conditions.

The Regional Water Supply and Drought Awareness Plan includes four conditions of water supply:

1. Normal, focusing on a year-round program emphasizing "Wise Water Use."
2. Watch, where the Potomac River basin is in a drought of level D1 as defined by the National Oceanographic and Atmospheric Administration.
3. Warning, when combined storage in Jennings Randolph and Little Seneca reservoirs is at less than 60 percent of capacity, triggering voluntary water use restrictions.
4. Emergency, when the probability of meeting water supply demands during the following 30 days is 50 percent or less, triggering mandatory water use restrictions.

Additionally, in coordination with Fairfax Water and the other water utilities in the Washington area, a Water Emergency Response Plan provides communication and coordination guidance to area water utilities, local governments, and agencies in the event of a drinking water related emergency.

In spring 2018, COG held a drought monitoring workshop with regional experts to discuss drought planning and various tools used to monitor drought conditions. Materials from the workshop can be downloaded from COG’s website –

<https://www.mwcog.org/events/2018/3/19/drought-monitoring-in-the-cog-region/>.

### **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 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](http://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 is currently under way; it is providing an evaluation of potential structural and operational alternatives available to the utilities for the years 2040 and 2085 that will 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](http://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 drought periods.

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. 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. Lifting the 1982 Ban on Uranium Mining could potentially threaten the Occoquan water supply.
3. 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 in order to assure adequate protection for Potomac River ecosystems and adequate planning for future water withdrawals.
4. 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 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 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 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](http://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**

The NMCPCP, located in Lorton, is a 67 million gallons per day 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 million gallons a day, has undergone three capacity and process upgrades to meet more stringent water quality standards. After treatment, the wastewater is discharged into Pohick Creek, a tributary of Gunston Cove and the Potomac River. The 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](http://www.youtube.com/watch?v=UdddK1YcFK8)

Treated wastewater of 13,297 million gallons, at a daily average of 36.43 million gallons, was discharged to Pohick Creek during CY 2017 (a reduction of 1.3 percent from CY 2016). The Noman Cole Plant continues to more than meet the performance standards for the limits of parameters monitored. The facility's performance in 2017 is summarized in Table III-2.

During CY 2017, 4,478 wet tons of ash, generated from incineration of byproducts from wastewater treatment process at NMCPCP, were disposed at the I-95 landfill. During CY 2017, NMCPCP supplied 28.79 million gallons of reuse water, a reduction of 93.3 percent from CY 2016 to customers in Fairfax County.

<b>Table III-2 NMCCP Permit Requirements and 2017 Performance Averages</b>		
<b>Parameter</b>	<b>Limit</b>	<b>Performance</b>
Flow	67 mgd	36.43 mgd
CBOD <sub>5</sub>	5 mg/l	< 2 mg/l
Suspended Solids	6 mg/l	0.65 mg/l
Total Phosphorus	0.18 mg/l	0.08mg/l
Chlorine Residual	0.008 mg/l	< QL**
Dissolved Oxygen	6.0 mg/l (minimum)	7.7 mg/l
pH	6.0-9.0 (range)	7.1
<i>E. coli</i> Bacteria	126/100 N/MCL*	1 N/MCL*
Ammonia Nitrogen	1.0 – 2.2 mg/l (seasonal)	< QL
Total Nitrogen (Annual)	3 mg/l	2.5mg/L

\*Geometric mean

\*\* Quantification Levels

Source: Department of Public Works and Environmental Services

The improved water quality of Gunston Cove (which receives effluent from NMCCP), 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 452 miles of sewer lines were cleaned in FY 2017. Greater efforts in sewer inspection and cleaning activities result in decreasing 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 was below the 25<sup>th</sup> 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 CCTV (closed circuit television) 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 181 miles of sewer lines were inspected in FY 2017.

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 2017, 127,565 linear feet of eight-inch through 15-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 3G communication technology system.

#### 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.

Approximately 1.3 million gallons per day (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.

Currently, four categorical and nine non-categorical SIUs are permitted to discharge to the county sanitary sewer system. The categorical SIUs are all classified as metal finishing businesses. Their permitted discharge flow rates are relatively low, varying from 3,000 to 78,000 gallons per day. Enforcement of applicable local limits ensures low discharge loadings of heavy metals to the wastewater treatment plants. The county's non-categorical permitted users include two landfills, a waste-to-energy facility, a newspaper printing business, a hospital, two federal facilities, a water treatment facility and a large medical testing facility. The waste-to-energy facility, operated by Covanta Fairfax, Inc., has the highest industrial flow (275,000 gpd permit limit).

When violations are detected, a variety of enforcement options are available, including issuance of verbal notice of violations (NOV) and written NOVs, with escalating actions, if needed, leading up to show cause hearings, administrative orders, cease discharge orders and termination of sewer service. Over the past three years, a total of 18 verbal NOVs and 16 written NOVs were issued to SIUs. Written NOVs were also issued to septage haulers delivering waste to county facilities. In the past ten years, one SIU was found to be in significant noncompliance and was issued administration and cease discharge orders. The county reached a negotiated settlement with this SIU.

The county recognizes industrial users for consistent compliance with pretreatment regulations. In 2009, Covanta Fairfax, Inc. and the George Bush Center for Intelligence received the Virginia Water Environment Association's platinum award for 100 percent compliance over a period of more than five years. Covanta Fairfax, Inc. again received VWEA's platinum award in 2014.

### **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 21,664 homes and businesses are served by onsite sewage disposal systems in Fairfax County. 1,144 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 2017, 184 New Sewage Disposal Permits were issued to single family residences. There were 159 new sewage disposal systems installed. 101 (64 percent) were alternative type systems and 58 (36 percent) were conventional systems. There were 607 septage disposal repair permits issued, ranging from total system replacement to minor repairs such as pump replacement. There were 3,557 septic tank pump outs.

There are 21 properties that are utilizing pump and haul as a result of a failing onsite sewage disposal system. There are also an additional nine properties that do not have an approved onsite sewage disposal system that are utilizing pump and haul. The Health Department is working with each owner to evaluate if the properties can be served by a replacement conventional or alternative on-site sewage disposal system, or be connected to available public sewer.

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 sector and government sector are essential to prevent a high failure rate of these more complex systems.

### **Closing Colvin Run Septage Receiving Facility**

Wastewater from the approximately 110 square miles of the county not included in the ASSA is treated onsite by 21,599 septic systems. These onsite systems are estimated to produce from five to six million gallons of wastewater per day. The Fairfax County Health Department provides lifecycle regulatory oversight for these systems as well as for the handling and transport of onsite system waste (septage). The county's Wastewater Management Program (WMP) provides regulatory oversight for the disposal and treatment of septage from these systems.

The County Code restricts disposal of septage waste to that which is produced within its jurisdictional boundary and at designated locations within the collection system; one at the southern end of the county at the NMCCP in Lorton, and a prior second one at the northern end of the county near Colvin Run Mill Park in Great Falls. These facilities received approximately 1.4 million gallons per month of hauled waste, largely from individual septic tank systems (as part of maintenance or repairs), from portable toilets and from the county's 3,200 plus food service establishments, whose grease traps require routine pump-outs. About half of these

individual septic tank systems in the county, many portable toilets and about half of the more than 3,200 food service establishments are located in the northern part of the county.

In April 2017, Fairfax County permanently closed its northern Septage Receiving Facility at Colvin Run, which was closed temporarily in June 2016 to facilitate the construction upgrade of the nearby county Difficult Run Pump Station. The decision to close this facility permanently was based, in part, on the facility's obsolete infrastructure, which posed unacceptable health and environmental risks, the facility's location in a flood plain and its proximity to homes and recreational areas. Fairfax County performed an extensive study to identify suitable locations in the northern portion of the county for a replacement facility, but no economically viable location was identified. Therefore, Fairfax County will not pursue construction of a replacement facility. When the facility was initially closed in June 2016, Fairfax County advised septage haulers to deliver septage to alternate receiving facilities, including the NMCPCP Septage Receiving Facility and inter-jurisdictional facilities at the Blue Plains AWTP and Upper Occoquan Service Authority's Regional Water Reclamation Plant (UOSA-RWRP) in Centreville, Virginia. Hauler waste manifests show that the majority of the septage collected in the northern part of the county is being disposed of at the UOSA-RWRP and the Blue Plains AWTP. Both of these facilities are closer geographically to northern Fairfax County than the NMCPCP Septage Receiving Facility.

### **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 located 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.

Last year's report included samples only from the first half of calendar year 2016, as contractual negotiations took a long time to resolve. OWML continued to collect and preserve the samples while the contract was negotiated, but did not have the funding to do the analyses until such time



as the contract was signed. Therefore, this report includes samples from the second half of calendar year 2016, and all of calendar year 2017.

The results from the 18-month period mentioned above indicate that the “health” of the water in the watershed continues to be excellent with respect to SOC. No SOC was detected at any level of concern in either water, sediment or fish samples. Phthalates were detected with the greatest frequency, but at level well below the level of concern. The usual other chemical compounds detected periodically were atrazine and dual (metolachlor), but below the levels of quantitation. (The level of quantitation is that concentration which can be reliably analyzed for. The limit of detection is often the lowest concentration that can be detected, but it may have a large error associated with it.)

Overall, this is excellent news for the watershed, and the programs that are in place to control the usage and migration of SOC in the watershed.

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](http://www.owml.vt.edu)), and stakeholders can continue to access near-real-time field data at various stream sites.

This program budget has remained flat-funded for almost 10 years now. With the budget constraints, it is impossible to look to adding emerging contaminants (such as EDCs--endocrine disrupting compounds) 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.

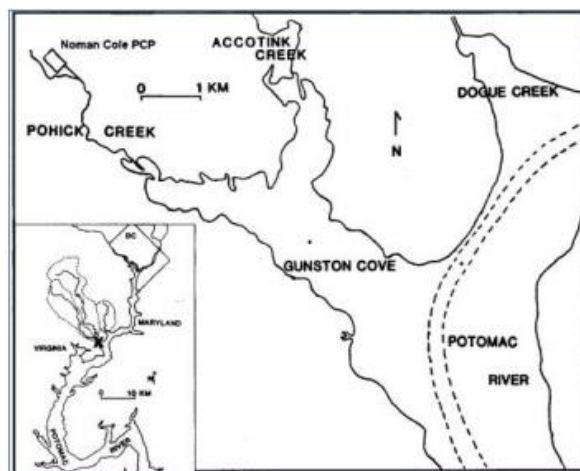
#### DPWES Wastewater Management Public Education and Outreach Efforts

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 Standard 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 rails, Facebook, Twitter and Slide Share, but also during one-on-one engagement with residents and governmental representatives as well as stakeholders who support the Wastewater Management Program. See the Water section of the Data Appendix for a list of 2017 initiatives.

### Gunston Cove Aquatic Monitoring Program

The strong and effective wastewater management efforts county and the robust monitoring program, demonstrates how 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. The onset of larger areas of SAV coverage 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/#.W893XsuWxaR> [you may need to copy and paste the link.] 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 years reinforced the major trends reported in recent years which provide documentation of major improvements in the Cove's water quality and biological resources. Dissolved oxygen values were well above saturation for most of the year in Gunston Cove indicating strong growth of phytoplankton diatoms (i.e., freely suspended aquatic flora that produce oxygen) in the spring and submersed aquatic vegetation (SAV) in the summer. Water clarity (as indicated by Secchi Disk readings to the right) was good for most of the year and was outstanding in the late summer-early fall attaining a new record of almost 2 meters in the Cove.*

*Nitrogen (N) and phosphorus (P) levels continued to show a general decline and values of N in particular were generally lower in the Cove than in the river. Un-ionized ammonia nitrogen values continue to be low and represent no threat to aquatic life. Phytoplankton algae populations (which can cause nuisance algal blooms, hypoxia, and a decline of fisheries) in Gunston Cove have shown a clear pattern of decline. Accompanying this decline have been more normal levels of pH and higher dissolved oxygen, and increased water clarity. The zooplankton assemblage in Gunston Cove is dynamic and shows a diversity of organisms that are important to ecosystem recovery. The introduced bivalve *Corbicula* constituted the majority of bivalve catch, but several specimens of native Unionid river mussels were also found. The benthos (i.e., fauna found in bottom sediments) of the study area is exhibiting a clear improvement over the early years of the study. Study results indicate that with increased water clarity, the coverage of SAV in the Cove has been extensive over the last decade and remained strong in 2016. The rebound of SAV contributes to enhanced water quality, and provides increased habitat value for a more diverse fish community and aquatic organisms.*

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](http://www.mdpi.com/2073-4441/9/6/421).

### **Comments**

1. 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. Public education and monitoring of the new alternate septic systems performance is necessary.
3. 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. This Occoquan Watershed Monitoring Lab budget has remained flat-funded for almost 10 years now. With these budget constraints, it is impossible for the lab to look to adding emerging contaminants (such as EDCs--endocrine disrupting compounds) 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 robust discussion in the coming year.

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## **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, our bridges, roads and buildings from damage from flooding and increased stream volumes.

Unlike drinking water and wastewater treatment processes, it is an emerging science with changing understandings and solutions. [www.youtube.com/watch?v=PiLQyFy7Pg](http://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, the Potomac and Occoquan, 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 down a storm drain goes directly to the nearest 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 and it 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 the 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 some 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](http://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. This countywide stream assessment can be obtained by going to [www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program](http://www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program).

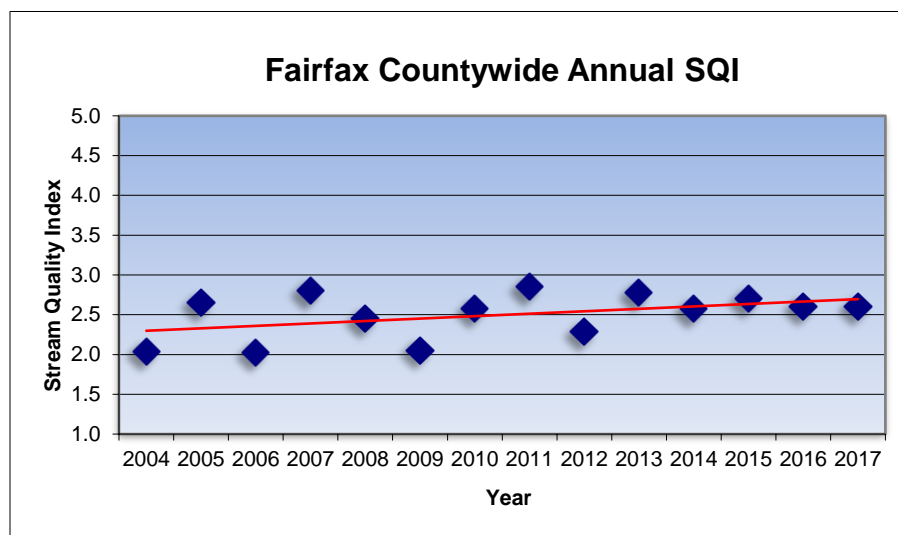
**The Stream Quality Assessment Program** – borne from the 2001 Stream Protection Strategy Baseline, has been assessing conditions in the streams of Fairfax County annually. This comprehensive monitoring program uses a statistically valid methodology called probabilistic monitoring to annually evaluate 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 (over 15 percent since 2004).

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 (Figure III-4).

The hope is to see statistically significant 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. In 2017 as in past years, roughly three quarters of the county's streams are shown to be in fair, poor or very poor biological condition. More information on the Stream Quality Assessment Program can be found online at [www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program](http://www.fairfaxcounty.gov/publicworks/stormwater/stream-quality-assessment-program).

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

**Figure III-4: Trends in the Countywide Stream Quality Index**

Source: Department of Public Works and Environmental Services, September 2018

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 11th 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](http://www.usgs.gov/centers/va-wv-water/science/fairfax-county-water-resources-monitoring-network?qt-science_center_objects=0#qt-science_center_objects).

#### Northern Virginia Soil and Water Conservation District Volunteer Monitoring

During the last fiscal year, 12 certified site leaders monitored 28 sites, three to four times. In addition, 11 trainings and 12 school and scout education events took place engaging approximately 127 volunteers. The Reston Association (RA) monitors another 12 sites in the Difficult Run watershed.

#### 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 have been uploaded to the Virginia SOS online database,



which provides DEQ with data on a regular basis. So far in 2018 (as of the date of preparation of this report), RA has had 22 events with 125 volunteers collecting data at eleven monitoring sites in Reston.

### **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, the homeowners association for the planned community of Reston, has an active watershed and lake management program. Four lakes, Audubon, Anne, Thoreau and Newport, as well as two ponds, Bright and Butler, are monitored. Dissolved oxygen, dissolved oxygen saturation, temperature, pH, conductivity, total phosphorus, Secchi depth transparency, chlorophyll a, phytoplankton and zooplankton are monitored. *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:

[www.reston.org/ParksRecreationEvents/NatureEnvironmentalResources/LakesWatersheds/LakeReport/tabid/945/Default.aspx](http://www.reston.org/ParksRecreationEvents/NatureEnvironmentalResources/LakesWatersheds/LakeReport/tabid/945/Default.aspx).

### **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, TMDLs have been established for streams and embayments in the county. Impairments identified include: bacteria (fecal coliform and/or *E. coli*); sediment (benthics); 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 TMDL Action Plans the county submitted to Virginia DEQ 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 fuller 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](http://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 (TN and TP) and sediment goals (TSS) is through stream restorations (see Table III-3).

## **Watershed Projects**

### **Stream Restorations**

In fiscal year 2018, the county completed five stream restoration and eight outfall stabilization projects. These projects restored approximately 2.67 miles of stream channel using natural channel design principles. The county often leverages resources and obtains grant funding from Department of Environmental Quality through the Stormwater Local Assistance Fund (SLAF) for these projects.

<b>Table III-3: Watershed Management Plan Projects and Stormwater Update Completed Facilities FY 2010-2017</b>				
<b>Practices</b>	<b>Number Installed</b>	<b>Capital Cost (Dollars per pound per year)</b>		
		<b>Total Nitrogen (TN)</b>	<b>Total Phosphorus (TP)</b>	<b>Total Suspended Sediment (TSS)</b>
Stream Restoration	28	\$2,900	\$18,900	\$63
Pond Retrofits	50	\$5,000	\$89,000	\$38
Infiltration Swales and Trenches	11	\$8,100	\$106,000	\$153
Dry Swales	8	\$9,400	\$117,000	\$173
Bioretention (Rain Gardens)	26	\$17,000	\$161,000	\$220
Pervious Pavement	24	\$44,000	\$379,000	\$462

Source: Department of Public Works and Environmental Services

- Turkey Run at Truro Subdivision—restoration of ~3,850 linear feet.
- Flatlick Branch, Phase II—restoration of ~4,600 linear feet.
- Accotink Tributary at Oakford Drive—restoration of ~1,538 linear feet.
- Colvin Run at Lake Fairfax Park, Phase I—restoration of ~ 2,200 linear feet.
- Turkeycock Run at Mason District Park—restoration of ~1,600 linear feet.
- Robinson Parcel 19 Outfall Improvements—restoration of ~300 linear feet.
- Babson Court Outfall—restoration of ~324 linear feet.
- Lazy Creek Court Channel Restoration—restoration of ~ 159 linear feet.
- Tyson’s Galleria Outfall—restoration of ~199 linear feet.
- Crestmont Circle Channel Restoration – restoration of ~145 linear feet.
- Harvest Green Court Channel Restoration – restoration of ~407 linear feet.
- Stone Mill Court Channel Restoration – restoration of ~262 linear feet.
- Launcelot Channel Restoration – restoration of ~90 linear feet.

### Reston Association Stream Restoration Efforts

Stream construction projects are complete at Brown’s Chapel Park, Vantage Hill, Lake Anne West (near Waterview Cluster), Lake Anne East (near Inlet Cluster) and Buttermilk.

Engineering design plans and efforts are under way for the remaining miles of stream restoration. For more information on the stream restoration project in Reston, visit

<https://www.wetlands.com/nvsrb/>

### **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 flood waters exceeded the Federal Emergency Management Agency’s 100-year floodplain elevation by approximately three feet. 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 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 is scheduled for completion in spring 2019. Additional information can be accessed through the County website at: <https://www.fairfaxcounty.gov/publicworks/huntington-levee>.

### **Stormwater Management Facilities and Infrastructure**

The county's stormwater management facility inventory is valued at more than \$0.5 billion. The Maintenance and Stormwater Management Division (MSMD) of DPWES inspects and maintains all county-owned and operated stormwater management (SWM) facilities and best management practice (BMP) facilities and infrastructure. MSMD inspects and oversees all private facilities regardless of whether they have a private maintenance agreement in place or not.

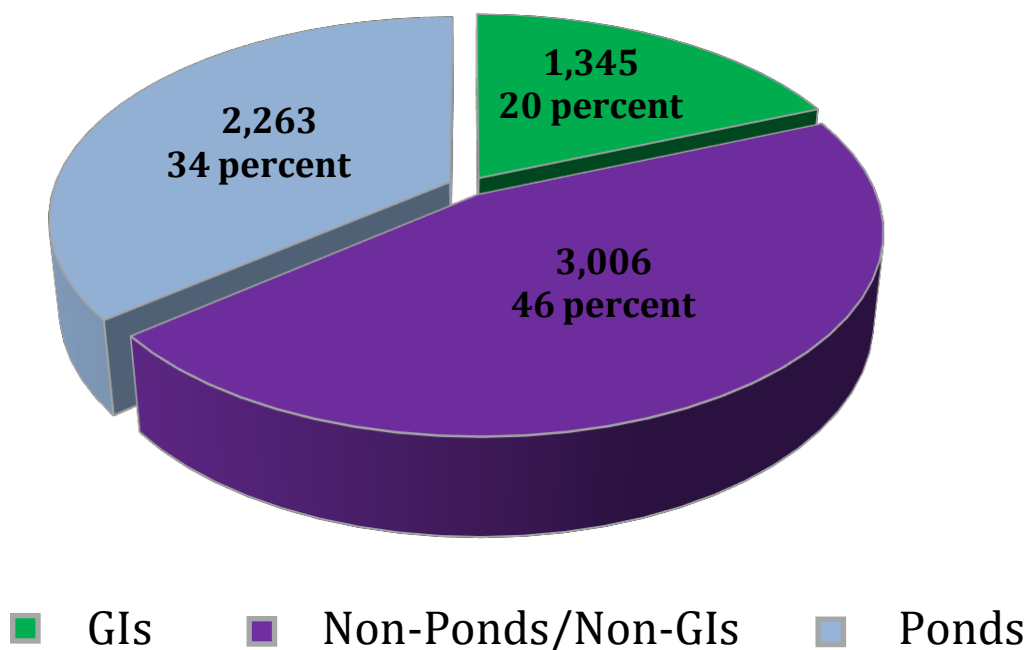
As depicted in Figure III-5, the current number of stormwater management facilities in Fairfax County's inventory is 6,614. Much of the inventory consists of manufactured (proprietary) devices, infiltration trenches, underground and rooftop detention facilities and sand filters. Approximately one-third of the inventory is comprised of wet and dry ponds and the remaining 20 percent of the inventory consists of green infrastructure (GI) practices. GIs include bioretention gardens, swales, tree filters, permeable pavement and green roofs.

Of the 6,614 facilities in the inventory, 2,159 are county-maintained and 4,455 are privately maintained. Figure III-6 shows the breakdown of county-maintained facilities by type 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, 2018, 202 stormwater management facilities were added to the inventory in FY17 and 399 facilities were added in FY18. Compared with the number of facilities added in FY17, the total number of GIs and Non-Ponds/Non-GIs added to the inventory in FY18 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 construction, lower construction costs and lack of space to construct ponds.

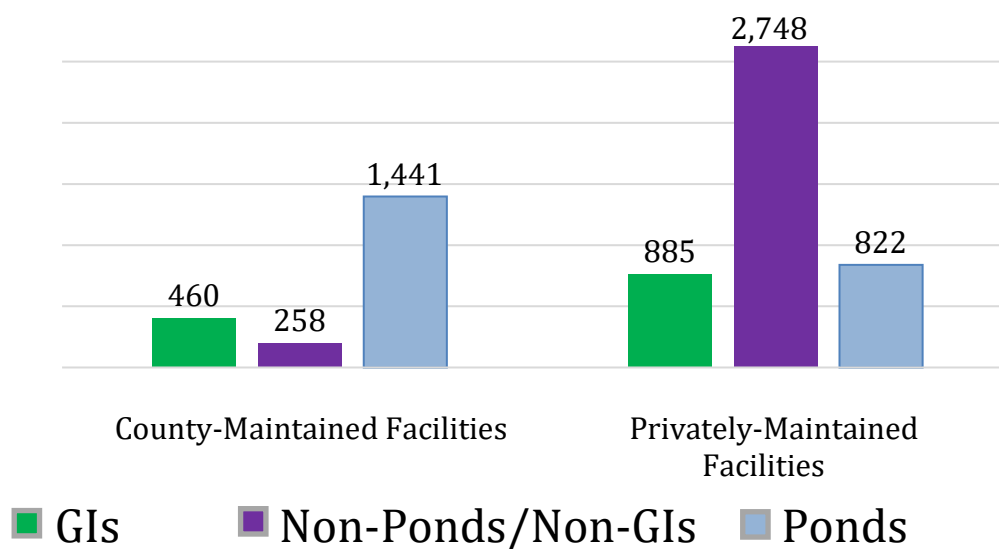
In FY 2018 (July 1, 2017 – June 30, 2018), 1,077 of the 2,159 county-maintained stormwater management facilities were inspected (50 percent) and 954 of the 4,455 privately-maintained stormwater management facilities were inspected (21 percent). These inspection rates are consistent with the MS4 (Municipal Separate Storm Sewer System) 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, 2018**  
**Facility Inventory by Type**

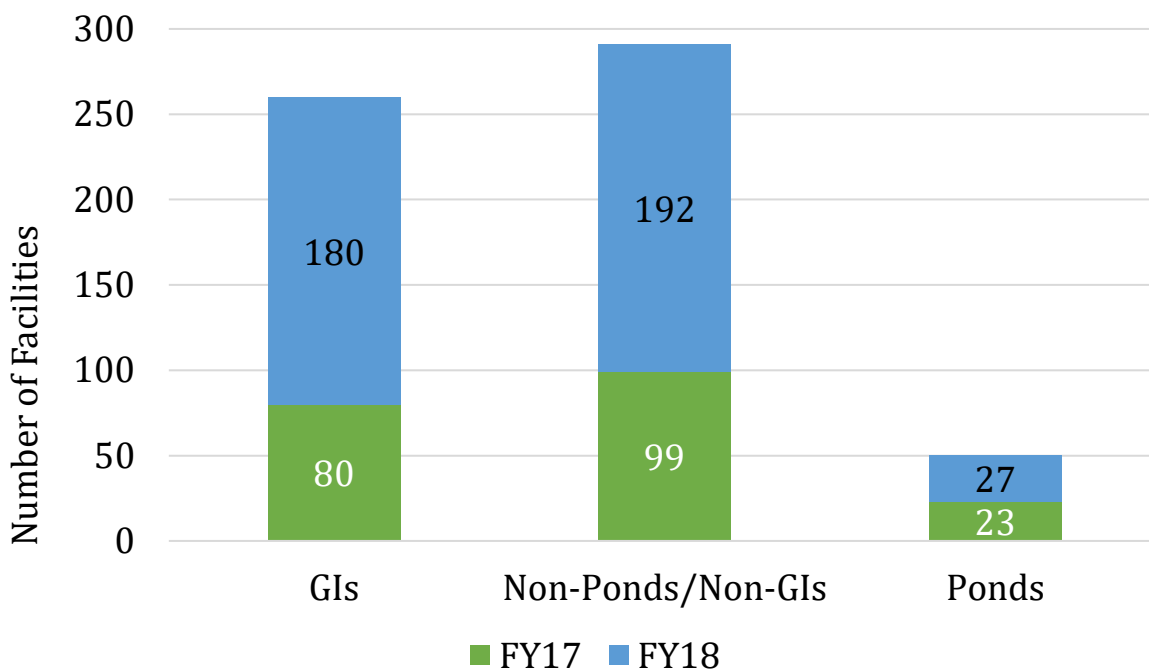


Source: Department of Public Works and Environmental Services

**Figure III-6: Stormwater Management Facility Inventory Distribution as of June 30, 2018—Facility Inventory by Maintenance Responsibility**



Source: Department of Public Works and Environmental Services

**Figure III-7: Number of Facilities Added in FY 2016 and FY 2017, as of June 30, 2018**

Source: Department of Public Works and Environmental Services

MSMD performed preventative maintenance for 1,774 county-maintained stormwater facilities in FY 2018. 1,381 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 from the control structure and appropriately disposed of offsite. The cleaning helps keep the facility functioning as designed. In addition, MSMD performed preventative maintenance on 390 GI practices. In FY 2018, non-routine maintenance (sediment removal, structural repair, invasive plant control, etc.) was performed on 129 facilities, which included 48 ponds, 75 GIs and six 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 2018, 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, 2017 and June 30,

2018, MSMD continued implementation of its storm drainage condition assessment program. Staff inspected 262 miles of storm pipes consisting of about 13,100 pipe segments and as many storm structures by visual ground surface observations. Internal pipe condition assessment video and photo documentation was completed for 86 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, 1.5 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 11 miles of pipe and structures were cleaned, cleared and maintained. Seven outfall channel restoration projects totaling 1,613 linear feet were completed during FY 2018. These are in addition to the stream restoration projects noted earlier.

### **Virginia Department of Transportation Stormwater Treatment**

Nearly 1,000 acres of impervious road surface area runoff 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 the Virginia Department of Environmental Quality. 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 2018, 895 erosion and sediment control (E&S) permits were issued by Fairfax County, authorizing disturbance of 960 acres of land. During that time period, 20,730 E&S inspections and 414 stormwater inspections occurred. A total of 134 E&S violations notices were issued and 17 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.

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 to reach 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](http://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 and Create a Caddisfly (for our younger residents) to 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](http://www.fairfaxcounty.gov/publicworks/stormwater/watershed-education-and-outreach).

The county has numerous handouts on dam safety, careful fertilizers 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 from 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. Notable activities during 2016 and 2017 included the following:

- The 30th Alice Ferguson Foundation Annual Potomac River Watershed Cleanup.
- A Reston Association cleanup event during the 2018 Potomac River Watershed.
- The 2018 International Coastal Cleanup-Friends of Accotink Creek.

### **Northern Virginia Soil and Water Conservation District Support Programs**

The Northern Virginia Soil and Water Conservation District was established in 1945 to work with the agricultural community. Over time, the agency transitioned its programs to also support suburban and urban landowners and communities. NVSWCD's services often begin where others end.

In FY 2017, the NVSWCD Board of Directors reviewed and approved three Soil and Water Quality Conservation Plans (SWQCPs) to renew existing Agricultural and Forestal (A&F) Districts. These plans are tailored to the needs of the operations and provide recommendations for managing nutrients and pests and for reducing pollutant sources through the implementation of best management practices. The goal is to encourage good stewardship and land management. In addition, 13 other SWQCPs (12 of which were first-time plans) were developed to put the operations in compliance with Fairfax County's Chesapeake Bay Preservation Ordinance. Together with those plans for A&F Districts, 758.7 acres over 21 parcels were planned for, including recommendations for the protection of 7,780 linear feet of Resource Protection Area.

Since 2015, NVSWCD has promoted the county-funded Conservation Assistance Program to homeowner associations, civic associations and places of worship. The program supports the resolution of drainage and erosion concerns as well as the promotion of energy efficient practices. Also during this year, the Virginia Conservation Assistance Program (VCAP), funded by an EPA Chesapeake Bay Implementation Grant through the Virginia Department of Environmental Quality, afforded NVSWCD the opportunity to complement the ongoing technical assistance provided to private property owners with funding to implement the proposed water quality solutions. Like the Conservation Assistance Program, VCAP will provide those with approved applications a reimbursement for costs associated with the implementation of best management practices. Over the past year, NVSWCD saw tremendous interest in the program, responding to a total of 149 requests for site visits across all Board of Supervisor districts, which resulted in 11 CAP projects and 37 VCAP projects. See the Water section of the Data Appendix for a list of projects.

A total of 1,306 new storm drains were marked with colorful and watershed-specific labels stating “No Dumping, Drains to [the nearby stream].” The program engaged 150 individuals who volunteered to install the labels, and the program educated 5,361 households.

### **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 valley areas throughout the county. These sensitive areas include floodplains and wetlands along streams, as well as steeply-sloping 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 format 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 in 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 for 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.

### **Comment**

1. 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 \$76.7 million for FY 2019.

The Board of Supervisors’ actions to provide for annual quarter cent increases in the Stormwater Service District Tax rate has 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 will be 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.

The county's existing stormwater conveyance infrastructure includes over 1,600 miles of pipes, man-made ditches, channels and swales. This infrastructure conveys stormwater to over 850 miles of perennial streams and about 400 miles of non-perennial streams in the county. The majority of the stormwater control facilities and pipes were constructed 35 or more years ago. Prior to the board providing a dedicated penny to stormwater in FY 2006, there had never been consistent funding to proactively inspect or reinvest in these stormwater systems. When the video inspections of the inside of pipes were first undertaken in FY 2007, over five percent of the system was identified as being in a state of failure and another 10 percent in need of rehabilitation. With the recently adopted Stormwater Service District tax rate, it is estimated that the reinvestment cycle for stormwater infrastructure has been reduced from well over 1,000 years to less than 200 years. With anticipated increased funding, this should reduce this reinvestment cycle eventually to under a 100-year plan.

Nineteen of the county's stormwater management facilities have dam structures that are regulated by the state. The county must provide rigorous inspection and maintenance of these 19 facilities in order to comply with state requirements. Significant upgrades to the emergency spillways have been required in some cases.

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 these 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. 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.

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.

## 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.”<sup>1</sup>

### **Overview of the Solid Waste Management Program**

As described below, the Fairfax County Solid Waste Management Program (SWMP) oversees solid waste recycling, collection, transfer and disposal within the county.

#### **General**

The SWMP operates two solid waste management facilities, including the I-95 Landfill Complex (I-95) and the I-66 Transfer Station Complex (I-66). In addition, a waste-to-energy facility owned by Covanta Fairfax, Inc. (CFI) is located at the I-95 complex. The I-95 Landfill no longer accepts domestic solid waste. In addition, the county maintains the closed I-66 sanitary landfill at the I-66 complex. These two county-owned landfills require constant upkeep in order to ensure that the facilities are environmentally sound. The county operates a transfer station at I-66. Refuse deposited by collection vehicles is loaded into tractor-trailer trucks and transported to the CFI or other appropriate locations for disposal. Recycling centers are located at the I-95 and the I-66 facilities. County staff also provides various collection services to designated residential districts around the county (approximately 44,000 homes) and most county government offices.

#### **Covanta Fairfax Inc. (CFI)**

The county contracts with CFI to accept the county’s municipal solid waste (MSW) at its waste-to-energy plant in Lorton. CFI burns MSW to power steam turbines that generate electricity. The facility began commercial operation in June 1990. Covanta reports that the plant generates approximately 80 MW of electricity, enough to meet the needs of approximately 80,000 homes.

CFI had a fire in February 2017 lasting about 12 days that halted waste processing. It resumed operation in December 2017 with facilities for enhanced fire detection and prevention.

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<sup>1</sup> 2017 Fairfax County Environmental Vision, Section 2 D, pg. 20,  
[www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf)

### I-95 Landfill Complex Operations

The I-95 Landfill accepted municipal solid waste (MSW) for disposal through 1995. Since that time, the primary material disposed at the landfill has been incinerator ash. The landfill also accepts construction and demolition debris for transfer to other disposal sites. The SWMP is responsible for the operations and maintenance of the facility, including the final cover on the closed landfill sections, the landfill leachate control system<sup>2</sup> and the landfill gas<sup>3</sup> control system. The site also features the following:

- A Recycling and Disposal Center (RDC) for residents and businesses wishing to self-haul their MSW, recyclables, yard waste and brush. The site also accepts construction and demolition debris (CDD) and a wide range of specialty wastes, which are consolidated for transportation and recycling or proper disposal elsewhere (e.g., tires, e-waste, hazardous waste, old propane tanks, scrap metal).
- Collected brush is ground into mulch that is available free to residents and businesses on-site and is also available to the public at a network of designated pick-up locations throughout the county which are serviced by the SWMP.
- A recently-installed glass processing plant, which can process glass bottles and jars into a range of construction materials for civil engineering uses, aesthetic applications and/or manufacturing feedstock.
- A landfill gas-to-energy facility owned and operated by Aria Energy LLC. Aria purchases the landfill gas (LFG) being produced by the closed landfill and uses this gas to generate electricity that it sells to Dominion Energy. The Aria facility also cleans and compresses LFG and delivers it by dedicated pipeline to the county's Noman M. Cole wastewater treatment plant for use as an alternative fuel. This LFG is also used to heat the on-site maintenance facility and truck wash.
- A small recreational facility constructed for the use of remote-controlled model aircraft.

### I-66 Transfer Station Operations

The I-66 Landfill was closed in 1982. The SWMP is responsible for the operations and maintenance of the facility, including the final cover on the closed landfill, the landfill leachate control system, and the LFG control system. SWMP constructed and now operates a 2,000-

tons/day MSW transfer station at the site. The site also features a range of activities similar to I-95, including:

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<sup>2</sup> Leachate is the liquid that drains or 'leaches' from a landfill. It contains both dissolved and suspended material and is difficult to treat.

<sup>3</sup> 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.



- A collection facility for residents and business similar to the I-95 facilities. In addition, this facility can accept recyclables for consolidation and transport.
- The production and distribution of recycled mulch.
- A small glass processing plant.
- Landfill gas recovery for use as an alternative fuel for space heating systems.

#### County Collection from Sanitary Districts and Government Operations Collection Areas

The SWMP provides county-staffed and operated curbside collection services for refuse, recyclables (including yard waste) and bulky items in specific Sanitary Districts. The SWMP also provides vacuum leaf collection to a selected number of residential customers. In total, the SWMP services approximately 44,000 homes, which is about 10 percent of the households in the county. These services are paid for through general fund transfers for the government needs and special tax assessments on the residential customers. The rate for residential collection services is set by the Board of Supervisors. Currently, the creation of a small or local Solid Waste Collection Area (sanitary district) is possible only when a petition is made by a resident and supported by at least 55 percent of the residents within an area of 50 homes or more.

#### Solid Waste Recycling Program

Any recycled materials not sent to CFI or a landfill reduce the cost of municipal waste disposal (MSW) and provide a range of environmental benefits. Three materials (yard waste, comingled waste<sup>4</sup> and paper) comprise over 80% of the recycling reduction as follows:

- Yard Waste (40 percent) – Yard waste is collected curbside and also can be dropped off at drop-off centers around the county; it is either mulched or composted and returned to residents and businesses for use. Yard waste recycling has ups and downs but has remained the foremost Fairfax County recycled material.
- Paper and Cardboard (19 percent) – Much of the paper and cardboard recycled is collected from businesses. Additional paper is collected in residential curbside recycle bins; however, less of this comingled paper is currently being recycled due to contamination and markets.
- Comingled Waste (22 percent/15 percent)<sup>5</sup> is principally collected in bins curbside and sent to privately operated MRFs for separation into marketable and unmarketable materials. The amount of such waste has dropped about 1/3 since its peak in 2012.

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<sup>4</sup> Comingled waste refers to the mix of metals, plastic and glass that is collected curbside from residences.

<sup>5</sup> Anecdotal information suggests 30-35% of the Comingled waste (curbside bin) is not recycled lower this estimate to 15% of the material recycled in Fairfax.

Recycling in Fairfax is changing due to market forces.

In the past, China has purchased more than half of the world's recyclable solid waste. In July 2017, China announced its National Sword policy. Under National Sword, China now rejects several categories of plastic and requires a solid waste contamination level of 0.5 percent or less. Some people in the recycling business feel that this level of contamination is not attainable. Further, China has announced it will stop accepting any solid waste in 2020. Fairfax County revenue for recyclable materials has gone from over a \$100 a ton into the \$20/ton range. Worse, some nearby municipalities are paying for the disposal of recyclable materials.

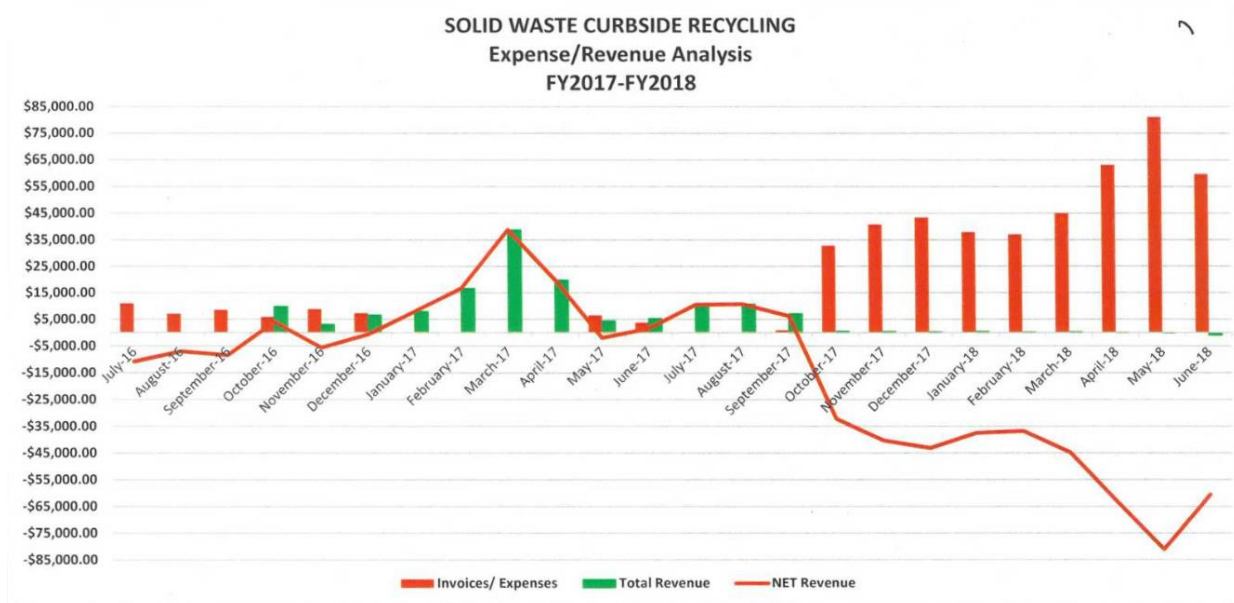
In 2017, the county reported a recycling rate to the Virginia Department of Environmental Quality (VDEQ) of 49 percent. This reported rate appears to have been stable since 2012. However, this reported rate has been kept high by a fourfold increase in construction debris recycling since 2012. If construction debris is left out of the calculation, the actual recycle rate has dropped by about 10 percent (48 percent in 2012 to 43 percent in 2017). The 2017 recycle rate may be even lower due to an increase in unmarketable recycled materials. Anecdotal information suggests that approximately 30 to 35 percent of the recyclables from the Washington, D.C. metropolitan area are unsuitable and are therefore discarded as refuse. Based on market forces, this downward trend is expected to continue.

Historically, Fairfax County's recycling program for solid waste collected from the Sanitary Districts has been perceived to make money. The processing and sale of recovered recyclables generated revenue that largely offset collection costs. In the last year, the program has cost money. The chart below (Figure IV-1) shows revenue in green bars. As shown, the revenue has all but dissipated. As shown by the red bars, expenses have risen substantially, with a net revenue loss (red loss line below) every month since October 2017. The same market forces impacting the county's collection program are impacting private haulers in the county, with reduced revenue and higher expenses.

Actions by the SWMP to keep recycling high and economically viable are described below.

### Education and Outreach Programs

Public outreach and education are key components of any successful municipal recycling program. The SWMP has focused on developing outreach and education programs that take advantage of its partnerships with county agencies, Fairfax County Public Schools, community organizations, commercial businesses and private sector waste collection companies. Outreach programs include: 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.

**Figure IV-1. Solid Waste Curbside Recycling Expense/Revenue Analysis, FY 2017-2018**

### Enforcement Program

The SWMP Code Enforcement Unit regulates the private and public sector waste collection industry within the county. The unit also responds to resident and business complaints, conducts random compliance inspections and initiates legal enforcement actions when necessary. This unit also provides outreach, education and compliance assistance to the regulated community.

### Future Programs

The SWMP has a number of initiatives in startup and planned for the future. These include:

- Proposed Plan for C&D Recycling at the I-66 Transfer Station. Construction and demolition debris (C&D) received at this facility is landfilled. With the Lorton Landfill scheduled to close in December 2018, the SWMP is anticipating an increase in the volume of C&D material it will receive. The Transfer Station is planning on expanding its efforts to separate recyclable materials from incoming C&D, removing recyclable materials such as metal, clean lumber and cardboard prior to consolidation and disposal. Additionally, the SWMP intends to purchase shredding equipment. Shredding will reduce volume, in turn reducing transportation costs and the number of truck trips required each day.
- Glass Recycling. The SWMP is now actively seeking partners to participate in a source-separation program, to deliver loads of only glass containers to I-95. The SWMP has also modified the two residential drop-off centers to encourage residents to source-separate their glass. Once a reliable volume of good quality post-consumer glass has

been secured, it is anticipated that the products from the new equipment may be used for pipe bedding.



- Food Waste Composting at the I-95 Landfill. A pilot-scale composting project at the I-95 Landfill will begin with the composting of yard waste (grass clippings, brush, leaves, tree limbs, etc.) that is currently received at the site (currently shredded and mulched and provided to county residents and businesses at no cost). Following review by VDEQ, the SWMP plans to introduce small quantities of source-separated residential food waste into the pilot 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. Long-term, the SWMP encourages and will support private sector efforts to offer compostable food waste collection to many more county residences, businesses and other producers of food waste 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). Once compost production at I-95 is underway, the finished product will be used on various county projects, such as soil amendments for growing native vegetation and for stabilizing exposed soils on construction sites.

### Other Programs

Programs outside the SWMP that have a positive impact on solid waste management within the county include the county’s Department of Code Compliance (which provides enforcement for visual and other complaints) and two private environmental groups: The Alice Ferguson Foundation and Clean Fairfax.

## **SWMP Status**

The SWMP is reconfiguring the I-95 complex to allow for its use as a transfer station in an emergency, and the construction of a county-owned and operated Materials Recovery Facility (MRF)<sup>6</sup> to promote or explore more diverse and efficient approaches to the collection and resale of collected recyclables.

Also, the SWMP has embarked on a redesign and upgrade of the I-66 Complex. The goal is to improve customer experience, enhance safety, make operations more efficient and improve the facility's environmental performance. The SWMP is also making upgrades to the infrastructure at the I-66 facility. Improvements are being made in storm water management, litter control, tipping floors, lighting, signage and traffic control.

## **Integrated Waste Management**

Integrated solid waste management is a systematic approach to solid waste management that strives to reduce, reuse, recycle and manage the county's solid waste in an efficient manner that is mindful of human health and the natural environment.

## **Components of the Fairfax County/SWMP System**

The four components or functional elements of the county's system include source reduction, recycling and composting, waste transportation and waste disposal.

**Source Reduction** aims at reducing waste generation and therefore lessening the environmental impacts associated with waste handling, transportation and disposal. SWMP source reduction strategies include a variety of approaches, such as:

- Encouraging government operations and the general public to purchase and use products that are: designed for recycling; durable, 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 less or no packaging.
- Providing education on how to minimize food spoilage and waste.
- Discouraging the use of goods that don't last long and can't be reused or recycled.

**Composting** takes collected brush, grass, leaves and other plant debris that otherwise would have been required waste disposal (burned or landfilled) and produces a soil conditioner for public use.

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<sup>6</sup> A materials recovery facility (MRF) is a specialized plant that receives, separates and prepares recyclable materials for sale to end-user manufacturers.

**Recycling**, like composting, can potentially divert materials such as glass, paper and cardboard, metal, plastic, tires, textiles and electronics from waste disposal for beneficial use. Traditional bin recyclables collected curbside in the county are sent to MRF's, where the materials that can be separated and sold at attractive market rates are captured. Materials that have limited value and/or market demand are shipped to a disposal site.

**Waste Transportation** is an activity that must be integrated systematically with the other waste management system components to ensure smooth and efficient operations. For the county, transportation activities include the collection of waste from residential curbside and government facilities, as well as from the I-66 Transfer Station, where waste is reloaded onto tractor-trailers for delivery to CFI or other selected disposal sites as needed. It is important to remember that approximately 90 percent of the waste generated by residents and businesses in the county is collected by private sector firms.

**Waste Disposal**, generally through the use of waste-to-energy or landfilling (in that preferred order), is how the SWMP manages that fraction of our MSW that cannot be recycled. The SWMP insists and ensures that the disposal facilities used by the county are properly-managed and have a good compliance history.

Integrated waste management is used to work towards future system capacity and sustainability. This includes public education for source reduction and reuse, recycling, disposal at the Covanta Energy/Resource Recovery Facility and enforcement.

### **Industry Outreach and Education**

Outreach and education staff have conducted in-person visits to various target sectors of the waste generating community, including office buildings, construction sites, hotels and restaurants. The purpose of these visits has been to assess the level of compliance with the county's recycling ordinance and to make direct contact with business owners, property managers and construction supervisors to help them recycle properly. The SWMP also responds to many ad-hoc requests for assistance from civic groups (e.g., homeowner associations), the business sector and local institutions (e.g., schools, colleges, parks and libraries).

### **Sanitary District Re-routing**

This initiative involved the reorganization and changing of collection route boundaries within the sanitary district so as to maximize the productivity of collection equipment and personnel. In addition, the initiative involved balancing the number of homes collected for each collection vehicle, rationalizing traffic patterns for those vehicles and applying automation where feasible. The SWMP staff reports that this has resulted in a reduction in the number of collection trucks and personnel needed to complete daily tasks. The project is ongoing, with efforts to-date resulting in a re-route of the county collection fleet that has reduced operations by several truck shifts. The personnel required to collect county customers has decreased by 10 percent, and improvements in the operational safety record have been recognized with a national award from the Solid Waste Association of North America. In effect, automating and improving the efficiency of the SWMP system has taken many people out of harm's way.

### **Reduced Collection Frequency Pilot**

In response to an increased demand for less-frequent collection where food waste is largely absent (e.g., office buildings, retail and industrial facilities), a procedure was developed outlining a process for considering such requests on a pilot-program basis.

The reasons that Chapter 109.1 of the Fairfax County Code requires a minimum of once-weekly collection of refuse/recycling include the negative environmental, public health, pest control and nuisance impacts associated with the putrescible components of refuse, which is largely food waste-related. However, non-residential establishments wishing to be allowed collection on a less-than-weekly basis can now complete an application form and undergo a site inspection by SWMP personnel. Following a positive review by the SWMP inspector, the program provides a written authorization to commence less-frequent collection. Approved facilities are subject to random site inspections, and those found to be improperly managing their waste or causing nuisances are required to restore weekly collection. At time of writing, none of the dozens of facilities approved for reduced collection frequency have caused any concern.

### **I-95 Landfill Enhancements**

#### **Honey Bee Initiative**

Honey bee populations in Virginia have declined by two-thirds since 1970 due to Colony Collapse Disorder, invasive mites and pesticides. Bees pollinate one-third of the food we eat, so their health is tied to ours. The SWMP has partnered with George Mason University's Honey Bee Initiative to create pollinator habitat at the I-95 Landfill and has built several apiaries (a cluster of bee hives) on site. The Honey Bee Initiative Pollinator Program will receive \$50,000 over the next five years (\$10,000 per year) from the county's Environmental Improvement Program (EIP). Twenty-five hives have been installed and approximately six acres of pollinator-friendly meadows have been established. This bee project aligns well with the Board of Supervisors' 20-year Environmental Vision and creates educational opportunities for students and community groups. This project is also one of the ways in which the landfill is transforming into a destination for environmental experimentation and education.

#### **Air Park**

The Northern Virginia Radio Control Club (NVRC) has been operating a remote-control airfield at the I-95 Landfill Complex since May 2017. The landfill provides a perfect setting for this use, with large open areas devoid of trees. As part of a Memorandum of Understanding (MOU) with the club, NVRC pursued and received approval of a special exception for the construction and operation the air park for flying radio and remote-controlled aircraft. More information on the airpark can be found at [www.INVRC.com](http://www.INVRC.com).



### **Environmental Preferable Purchasing**

In last year's Annual Report on the Environment, EQAC recommended investigating how to encourage county contractors to manage wastes according to their best environmental use. Staff indicated that the county has an Environmental Preferable Purchasing Policy and has issued solicitations that include scoring for "greenest" end use. This policy states that purchasing will endeavor to accomplish a wide range of environmental stewardship principals in purchasing goods and services including:

- Reduce negative environmental impacts.
- Require contractors to use environmentally preferable products and practices.
- Practices that reduce waste.
- Use vendors that reuse, take back or recycle.
- Balance performance price and environmental benefit.
- Purchase cooperatively with other jurisdictions for environmental benefit.
- Include a contract requirement for reusing, reclaiming or recycling.

The policy also calls for an interdepartmental subcommittee to meet quarterly to implement this policy.

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. The policy is an internal document that is applied on an ad-hoc basis at the discretion of the county's Department of Procurement and Material Management and the soliciting department. The interdepartmental subcommittee has not met in several years. County staff indicated that about 52 percent of 2017 office supplies purchased were products with green attributes. Also, some furniture purchased is produced in low or zero waste facilities. Contracts for computer and mobile devices include "take back" provisions requiring environmentally responsible re-use or disposal of the products and components.

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. It is not available to the public or to county vendors unless added ad-hoc to a particular procurement.

### **Fairfax County Department of Code Compliance and Fairfax County Police Department**

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. Based on the total number of signs in rights-of-way collected over the past two years, it appears that the posting of illegal signs has declined; however, this issue still presents a challenge to the county, as frequent violators have not been deterred by the fines assessed and continue to place signs in the rights-of-way.

Where appropriate, the Fairfax County Police Department (FCPD) issues citations for dumping on public and private property and for leaking trucks. Citation statistics are included in the Data Appendix of this report. The FCPD actions can address specific code violations; however, the county streams continue to have trash, plastic bag and bottle contamination. Below is a photo from Little Hunting Creek in Lee District:



### **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 and more. Details are located at: [www.potomaccleanup.org](http://www.potomaccleanup.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**

### **Fire Recovery Efforts at CFI**

As described above, the Covanta E/RRF has resumed full operations. Upgrades to the rebuilt facility, designed to improve performance and enhance fire prevention include: the use of infrared/thermal imaging cameras; the installation of non-flammable roofing materials and expanded sprinkler systems; and improved waste storage procedures. Covanta has also worked to improve notification and coordination protocols with the county and the Fire and Rescue Department.

### **What the SWMP is Doing to Increase Recycling**

The SWMP continues to expand outreach targeting the county's business sector, apartment buildings and public institutions. Most recently, waste reduction and recycling "tool kits" have been developed for hotels, restaurants, and apartment buildings.



*Outreach Tool Kits and Giveaways*

The SWMP's Outreach & Education Team (O&E Team) is currently targeting multifamily properties, which pose a challenge because nearly all are served by private haulers, limiting the county's control over container set-up, collection schedules, signage and outreach/education. Multifamily properties also offer a number of challenges not experienced at other commercial properties. To test best practices for the delivery of outreach/education and technical assistance at multifamily properties, the O&E Team plans to partner with selected public and private sector apartment buildings to study recycling participation and test various measures that have the potential to reduce recycling contamination.

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 recycle. This method has proven successful in other jurisdictions throughout the country.

### Recycling Markets

As described earlier, National Sword is having a significant negative impact on recycling markets across the United States and in Europe.

Although the state of recyclables markets is a national problem, the SWMP has taken a number of steps to help mitigate the situation. This includes a renewed emphasis on reducing the amount of contamination being delivered to local processors and increasing community outreach and education to explain to residents and business owners that wishful recycling – placing items in the recycling bin because it will probably be recycled – actually harms the system. Programs are being developed at time of writing to get out the “recycle right” message – put only specific materials in the recycling bin--loose, clean and dry.

It is also important to promote “closed loop” thinking – buying items with high recycled content. There are many manufacturers that produce recycled-content goods right here in the United States. Helping residents and businesses find American goods made from recycled material will encourage more sustainable and “China-proof” 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. In such states, the revenue from curbside collection of plastics can be lower.

### Update on Food Waste

In addition to the pilot-scale composting project described earlier, the SWMP has been promoting a pilot food waste composter program, which features firms in the region that offer source-separated food waste collection and composting. For the last two years, food waste composting has been provided at the annual Public Works Week picnic. Following the success of these events, further collaborative efforts are anticipated in the future.

### Hazardous Materials

Almost daily, the news includes an incident somewhere involving a hazardous material. It may be a vehicle accident with spilled fuel, a tanker or train leaking a chemical, a fire in a plant containing hazardous chemicals or a broken mercury thermometer or light bulb. Very little is covered about individuals handling and disposing of hazardous materials that are located in most homes. A hazardous material is any item or agent (biological, chemical, radiological and/or physical) which may cause harm to humans, animals or the environment, either by itself or through interaction with other factors (fire, moisture, other chemicals). Fairfax County is relatively “clean” in that we don't have manufacturing or storage of fertilizers or chemicals. The





Food Composting at Springfest



Food Composting at DWPES Picnic

main concerns are hazardous materials incidents involving spills, leaks, transportation accidents, ruptures or other types of emergency discharges. Secondary is the use and disposal of hazardous materials in either daily household activities or by small quantity commercial generators. In addition to household hazardous wastes, the county has numerous Petroleum Pipelines, rail lines that transport hazardous waste, trucked hazardous waste such as ethanol and commercial hazardous waste.

#### Overview of 2017 Hazardous Materials Incidents

The Fire and Rescue Department's Fire and Hazardous Materials Investigative Services section received 413 case entries in 2017. An actual spill, leak or release of hazardous materials into the environment occurred in 99 of these cases. Petroleum release (gasoline, diesel fuel, heating oil) accounted for more than half of these incidents. Antifreeze and transformer oil were the other two primary chemicals involved in hazardous materials releases in the county. The vast majority of these releases were small scale. Thirty-five (35) of these cases impacted either storm drain systems and/or waterways within Fairfax County in 2017.

In addition, the Fire and Rescue Department's Hazardous Materials Response Team responded to a total of 1,534 hazmat calls. The team responded to a myriad of incidents including ethane/propane gas emergencies, transformer fires, overturned tanker trucks, WMD investigations for suspicious packages or white powder, mercury events, chemical odors or spills, petroleum releases, the dumping of hazardous materials and various other Department of Transportation HazMat Class events.

During calendar year 2017, there were 433 active Tier II facilities, seven of which were bulk petroleum storage facilities. 149 of these facilities stored extremely hazardous substances over threshold planning quantities.

### Household Hazardous Waste (HHW)

A new HHW disposal facility at the I-66 Transfer Station will allow for a fast, convenient way 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 under one roof and supervised by trained, certified county staff. Another key benefit of this change is greatly reduced risk for contaminated runoff from storm events.

Additionally, the Fairfax County HHW program will continue 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” (standing for 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, allowing for the safe crushing and recycling of the steel containers.

### Commercial Hazardous Waste

The management of hazardous waste is regulated under 40 CFR Part 261. Businesses that fall below defined thresholds for how much waste they generate and store are exempt from some of the substantive documentation and disposal tracking requirements (although they must dispose of this waste in a proper, responsible manner). In Fairfax County, these Conditionally Exempt Small Quantity Generators (CESQGs) typically consist of small Fairfax County-based businesses, government agencies, non-profits, schools, universities and places of worship.

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 waste directly with a hazardous waste disposal contractor. Additionally, the program eliminates painstaking recordkeeping requirements to businesses and institutions that contract for disposal directly with hazardous waste disposal service providers. Seven collection events are completed or planned for 2018. See [www.fairfaxcounty.gov/publicworks/recycling-trash/very-small-quantity-generators](http://www.fairfaxcounty.gov/publicworks/recycling-trash/very-small-quantity-generators).

### **Planning for the Future of Solid Waste Management**

#### SWMP Request for Expressions of Interest

The county requested and received expressions of interest (EOI) on how the SWMP could improve its municipal solid waste (MSW) and construction and demolition debris (CDD) management systems. The following projects from the EOI responses that are moving forward to potential procurement include:

- An Alternative Road Materials pilot project using a mix of incinerator ash and glass is proceeding.
- Procurement for metal recovery from landfill ash landfill is proceeding.
- A diversion area to recover books, clothes, etc. is being designed into the I-66 facility. The county will procure a vendor to operate it.

Additional more complex EOI responses requiring more evaluation include the following:

- One respondent seeking to recover selected components of CDD for use in an innovative and proprietary road building technology.
- Five respondents seeking to develop various types of high-volume, complex and proprietary systems to process waste on a large scale, similar to the current disposal choice (Covanta) but not using combustion as the principle processing technology.
- Three respondents seeking to develop a large volume organics composting facility.
- One respondent seeking to develop a complex and proprietary system to process and recover recyclable materials from buried ash at the I-95 landfill.
- One respondent seeking to establish a turnkey recycling project on county property that would accept clothing and various unwanted household items. This project would sort and transport for reuse or recycling elsewhere.

Evaluation of these complex EOI responses is ongoing.

### **Gaps**

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

#### **Use 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. This gap is made more challenging with the China's action to stop accepting solid waste in 2020 and with the economic reality of alternatives to Covanta.

#### **Increase waste recycling; decrease waste disposal**

The board's Environmental Vision includes increasing recyclables and decreasing material disposed. A threat to this 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 in market forces. There are gaps in our knowledge of the cost-effectiveness and the environmental benefit of the county's recycling program. It is generally



accepted that it is environmentally preferable to recycle than to send material to waste disposal. However, the net environmental benefit of collecting material curbside is in flux because more material is now returned to the waste disposal end use and the net environmental benefit of the material recycled is not known. In the past, recycling has produced revenue for the county as well as environmental benefit. Due to National Sword (China's halt on accepting solid waste), recycling revenue is dropping and will continue to drop despite the best efforts of county staff. 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 through creation of 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 Fairfax County staff can accomplish and will require board action.

### Illegal Dumping

The county has implemented Department of Code Compliance procedures to address citizen complaints about illegal dumping. However, the county streams continue to be impacted by trash, plastic bags and bottles.

### Recommendations

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.
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.

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.

## 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.”<sup>1</sup>

### **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 (33,086 acres; 14.6 percent)<sup>2</sup> with the majority of that acreage owned and managed by Fairfax County Park Authority (21,630 acres) and NOVA Parks (7,710).<sup>3</sup> The Data Appendix to this report includes a data table describing this acreage. Another 13,802 acres (6.1 percent) are classified as vacant or natural land.<sup>2</sup> However, land in this designation is zoned for residential, industrial or commercial uses<sup>3</sup> and continues to decrease in amount each year due to the pressures of the growth of the county. The Data Appendix also includes a data table with the description of this acreage.

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

<sup>2</sup> 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](http://www.fairfaxcounty.gov/demographics/find-data-topic)

<sup>3</sup> 06/29/18 email from Fatima Khaja, Manager, Economic, Demographic and Statistical Research, Fairfax Co.

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

Residential property accounts for 132,944 acres (58.5 percent) of the county's area. This significant percentage underscores the impact private property can have on our environmental services and natural capital.

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 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 in Fairfax County**

Recreational park land provides outdoor spaces for residents seeking healthy lifestyles (e.g. physical and mental well-being, environmentally responsible transportation through 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 supporting 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.

### **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 in the streams from erosion of the trail surface. Each year, improvement projects are scheduled to keep up with trail maintenance. These improvements are funded using the 2016 Park Bonds, with work done in 2017 and continued work scheduled for 2018.

Within the Fairfax County Park Authority (FCPA), the number of projects evaluated using the Trail Development Strategy Plan criteria grew by more than 12 percent since last year, up to 158 projects. Of those, four were completed since last year's EQAC report (31 total), nine are currently in design or construction phases and six others have been identified for funding using 2016 Park Bond funds.

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. The trail is located in many areas within the broad floodplain of Bull Run, and 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 include trail sustainable reroutes and trail bridges over streams and tributaries. NOVA Parks also completed placement of 40 mile markers along the Occoquan Water Trail.

#### Occoquan Regional Park Redevelopment

NOVA Parks completed its redevelopment of Occoquan Regional Park with a ribbon-cutting on June 23, 2018. The project includes a new 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<sup>4</sup>) 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 in Fairfax County**

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 additionally preserved land as well. A key principle the county can leverage is the idea of creating, protecting and enhancing ecological conservation corridors.<sup>5</sup> 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 development of strategies to protect and enhance critical components of this network.

The Fairfax County Park Authority is a significant asset in the area of protecting and enhancing ecological resources, with ownership of almost 10 percent of county land. Many of the eleven supporting objectives identified in the Parks and Ecological Resources section of the board's

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<sup>4</sup> p. 60 of the Tysons 2016-2017 Progress Report  
[https://www.fairfaxcounty.gov/tysons/sites/tysons/files/Assets/Documents/PDF/Annual\\_Reports/2017\\_Annual\\_Report.pdf](https://www.fairfaxcounty.gov/tysons/sites/tysons/files/Assets/Documents/PDF/Annual_Reports/2017_Annual_Report.pdf)

<sup>5</sup> Conservation corridors are discussed in this 2012 Northern Virginia Regional Commission report:  
[https://www.novaregion.org/DocumentCenter/View/3099/NVRC-GI\\_Report\\_Jan\\_2012-web?bidId=](https://www.novaregion.org/DocumentCenter/View/3099/NVRC-GI_Report_Jan_2012-web?bidId=)

Environmental Vision overlap with the four management themes and 26 recommended actions of FCPA's Natural Resource Management Plan (NRMP) for park properties.<sup>6</sup> 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<sup>7</sup> reported that an additional \$2,350 per acre of annual funding (for all 17,000 acres of natural area owned by FCPA--close to \$40MM/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 implementing the Community Level Vegetative Classification and Mapping project, funding continues to be an issue in other areas, such as for 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 an ecologist). This position is particularly important due to the high return on investment potential to be secured through increased capacity for volunteer programs (similar to the high ROI seen through FCPA's Invasive Area Management [IMA] program).

Outside of the county's park land, ongoing opportunities to improve ecological resources and conservation corridors exist during county redevelopment of sites, such as in the case of the Embark Richmond Highway project, Huntington levee, and Tysons redevelopment. More broadly, it is also important to remember that 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 recent 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.

### **Fairfax County Park Authority (FCPA)**

Created in 1950, the Park Authority has 427 parks on more than 23,000 acres of land and maintains 325 miles of trails.<sup>8</sup>

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<sup>6</sup> The NRMP can be found online

[www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/nrmp012914.pdf](http://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.

<sup>7</sup> <https://www.fairfaxcounty.gov/parks/sites/parks/files/Assets/documents/plandev/parkscout/needs-assessment-plan-050616.pdf>

<sup>8</sup> [www.fairfaxcounty.gov/parks/about-us](http://www.fairfaxcounty.gov/parks/about-us)

## Guiding Documents

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

- *Great Parks, Great Communities 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*  
<http://www.fairfaxcounty.gov/parks/plandev/fcpa-mp.htm>  
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.<sup>9</sup> 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 back 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 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/Senior Ecologists implementing

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<sup>9</sup> <https://www.fairfaxcounty.gov/parks/sites/parks/files/Assets/documents/plandev/parkscount/needs-assessment-plan-050616.pdf>



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 680 percent (with a 2018 estimated value of \$148,000 to \$632,400) in the form of volunteer hours towards ecological restoration activities 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 FY17, FCPA added 95 acres to its park land inventory through transfers and exchanges. Generally, FCPA concentrates on acquiring land along the county's interior stream valleys. See the Data Appendix for details of land acquisitions.

### Invasive Plant Control

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 (55 sites). In CY 2017, over 2,500 volunteers spent 7,700 hours (a \$190,000 value) restoring habitat through the removal of invasive plants and the planting of native species. See the Data Appendix for a history of statistics regarding this program.

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 for 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.

### Environmental Education

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. FCPA aims to have each of those data sets available online<sup>10</sup> by the end of 2018.

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.

While funding was secured for inventories of NNIAP and its deer data collection efforts, funding needs continue for the vegetative communities inventory, for which only 40 percent of project funding has been allocated (all from Park Authority monopoly funding). Despite budget shortfalls, the vegetative communities mapping already has produced useful information. In the 10 percent of Park Authority property mapped, about 80 new occurrences of rare plant species and communities have been found. This information is already being used to inform natural resource management within FCPA. At current funding levels, the project will be completed in approximately eight years. With the information derived from the inventory and mapping project expected to be useful for 15 to 20 years, the sooner the project can be completed, the higher the return on investment will be from the effort.

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<sup>10</sup> <https://www.fairfaxcounty.gov/maps/interactive-map-gallery>

The Park Authority 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.

### 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 with the lake since its creation in 1940. The contractor Wetland Studies and Solutions (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 closing as of May 28, 2018. Community response indicated a strong preference for retaining some amount of lake via dredging but also a notable level of support for the option that would recreate a single stream channel while retaining a smaller offset lake. If a dredging option is pursued, funding needs would exceed FCPA's capabilities and support from the BOS would be necessary (e.g. to support a bond) to move forward. FCPA is continuing analysis of this project. For detailed information, see <https://www.fairfaxcounty.gov/parks/planning-development/lakeaccotink>

### NOVA Parks

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.<sup>11</sup> 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, Bull Run and Occoquan Rivers.

### Guiding Documents

- *NOVA Parks' 2018-2022 Strategic Plan*<sup>12</sup>  
Adopted in July 2017, numerous objectives in the Strategic Plan directly support and further the supporting objectives from the Parks and Ecological Resources section of the Board of Supervisors' Environmental Vision.

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<sup>11</sup> <https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2019/advertised/cip/nvrpa.pdf>

<sup>12</sup> <https://www.novaparks.com/2018-22-nova-parks-strategic-plan>

### 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 Dominion Virginia Power to reestablish a native based plant community on 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.

### **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<sup>13</sup> 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 will be used as the basis for a long-term forest health monitoring program. The study also 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 which tree species 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<sup>14</sup> (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.

This type of information is essential in making management and policy decisions in the county to maximize the benefits that the urban forest provides.

#### *Urban Tree Canopy Analysis (UTC); comparing 2011 and 2015*

In May 2017, the county received a new Urban Tree Canopy Analysis (UTC)<sup>15</sup> from the University of Vermont Spatial Analysis Laboratory. This land use analysis was based on high resolution satellite imagery, including LiDAR imagery, taken in 2015. A similar study was conducted in 2011. The change analysis of the two comparable data sets between 2011 and 2015 showed that the amount of tree canopy in the county increased by less than one percent in those

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<sup>13</sup> [https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/ffcounty\\_ecoreport\\_1.pdf](https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/ffcounty_ecoreport_1.pdf)

<sup>14</sup> <http://www.bringingnaturehome.net/what-to-plant.html>

<sup>15</sup> <http://gis.w3.uvm.edu/utc/>

five years. The amount of impervious surfaces also increased by one percent during the five-year period.

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 stands of trees and tree plantings.

The UTC is a land use analysis and data layer, not just 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 away 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 staff currently consists of nine full-time and three part-time urban foresters who work with a wide range of partners on a variety of urban forest management issues. Two Urban Forester IIs were added to the staff in fall 2016 to provide increased staff capacity to address the rapid growth of Infill Lot Development (ILD) plan submissions throughout the county and particularly in the Dranesville District, where a significant number of ILD plans come in for review. A total of 1,934 requests for assistance by customers and partners were fulfilled by the Forest Conservation Branch in FY 2018, an increase of 307 over FY 2017.

#### Fairfax County Tree Commission (FCTC) Activities

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 then in our understanding of the benefits provided by trees and the stresses impacting them in our urban forest, including the human and natural elements of our environment. As of the date of preparation of this report, work on a new draft was continuing, with review by stakeholders and partners for their assessment of the proposed actions. TAP2018 expands and improves on the earlier plan and provides for more effective implementation through greater involvement of key government agencies, private organizations and the public. The revised plan was to have been submitted to the Board of Supervisors for approval in fall 2018.

## 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 works not only 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*<sup>16</sup>

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 2018. However, gypsy moth populations are cyclical and it is not uncommon for outbreaks to occur following dormant phases.

### *Fall Cankerworm*<sup>17</sup>

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 have, in recent years, experienced the most severe infestations and associated defoliation. Forest Pest Management staff observed population outbreak levels in the winters of 2012 and 2013 and declining populations since 2014. As a result of monitoring efforts in the winters of 2016 and 2017, staff determined that no insect populations warranted control measures in the springs of 2017 and 2018.

Since 2014, staff has received input from civic groups in regard to the strategies that are 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*<sup>18</sup>

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.

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<sup>16</sup> Gypsy moth information: <https://www.fairfaxcounty.gov/publicworks/caterpillar-look-alikes>

<sup>17</sup> Fall Cankerworm information: <https://www.fairfaxcounty.gov/publicworks/fall-cankerworm>

<sup>18</sup> Emerald Ash Borer information: <https://www.fairfaxcounty.gov/publicworks/emerald-ash-borer-fairfax-county>



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.

In 2016, a graduate student from the University of Maryland and a researcher from the Smithsonian Institute both partnered with UFMD to perform separate research projects investigating EAB parasites. Results from both research projects are still currently being processed.

Current county control for EAB is provided through:

- *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 169 ash trees for EAB. In 2017, staff retreated 38 trees. In 2018, following annual monitoring, staff determined that 55 trees needed retreatment as well as five newly identified trees.
- *Release of non-native EAB parasitic wasps*<sup>19</sup>  
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). In spring 2019, monitoring for these insects' establishment will begin using yellow bowl traps and felling and peeling ash trees to check for larval parasitism.

### *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 2016 and 2018.

### *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

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<sup>19</sup> 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.

years. Urban foresters established monitoring sites for the walnut twig beetle during summer 2012 and disease symptoms were found in the county.

In 2017, Forest Pest staff learned that statewide and regional efforts yielded no walnut twig beetles (WTB) in traps deployed in 2016. Urban foresters are deploying WTB traps in confirmed Fairfax County locations for 2018.

### *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. There were to have been monitoring efforts for this insect in summer 2018.

### *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.<sup>20</sup> UFMD leads school programs (e.g. Alien Invaders), hosts or participates in public meetings and community events (e.g. speaking to homeowner associations, participating in Fairfax SpringFest), and leads trainings (e.g. for Master Gardeners, 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 efforts and to effectively administer the Tree Conservation Ordinance.

### **Ecological Resources on Non-Park Land**

The majority of land in Fairfax County is classified as “non-park” land (e.g. residential, government-owned, commercial). While parts of this chapter touch on how various organizations

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<sup>20</sup> UFMD’s Educations Programming site is: <https://www.fairfaxcounty.gov/publicworks/education-programs>

are helping encourage ecological improvements on this type of property, this section directly addressing this topic.

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 the U.S.] in half and 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.”<sup>21</sup>

This approach could be further encouraged in Fairfax County with the goal of leveraging the ecological services and natural capital provided by such a transition of property.

As a new topic this year, this section has been included as an introduction to the idea. In next year’s report, this topic will be further documented to explore areas such as:

- Current Fairfax County regulations and how they may affect private properties seeking to improve their ecology (e.g. weed ordinances, Zoning Ordinance requirements such as maximum coverage requirements).
- Current Fairfax County resources which may provide guidance or a model for private properties to draw from (e.g. natural landscaping on county property, public facilities manual).

### **Other Governmental Agencies and Programs**

#### **Local**

##### *Fairfax Chapter of the Virginia Master Naturalist Program*<sup>22</sup>

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 volunteer must provide at least 40 hours of volunteer service and receive eight hours of advanced training. In 2017, 139 active FMN volunteers provided a total of 10,524 hours of service for a total economic contribution of \$274,571. These contributions included:

- 2,420 hours of Education/Outreach.
- 2,316 hours of Stewardship.
- 4,304 hours of Citizen Science.

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<sup>21</sup> <https://www.highcountrygardens.com/gardening/bringing-nature-home-interview-with-doug-tallamy/>

<sup>22</sup> <http://www.vmnfairfax.org/>

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<sup>23</sup>) 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<sup>24</sup> 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.

#### *Fairfax County Restoration Project (FCRP)<sup>25</sup>*

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.

The 495 Express Lanes corridor has suffered from unauthorized mowing, large numbers of dead trees and erosion problems. In early 2017, FCRP partners, several members of VDOT, representatives from the 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 areas were documented and scheduled for repair and maintenance and good progress has been made both from the construction side and the additional reforestation efforts that have transpired. 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.

FCRP continues to run the Reforest Fairfax<sup>26</sup> program, through which each \$35 gift purchases 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<sup>27</sup>*

The Fairfax County Wetlands Board provides resources for private citizens. Owners of property on the waterfront 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-

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<sup>23</sup> <https://www.boarddocs.com/vsba/fairfax/Board.nsf/goto?open&id=867SG92A805A>

<sup>24</sup> <http://get2green.fcps.edu/>

<sup>25</sup> <https://www.fcrrp3.org/>

<sup>26</sup> <http://reforestfairfax.org/>

<sup>27</sup> <https://www.fairfaxcounty.gov/bacs/BoardDetails.aspx?BoardID=23219>

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.<sup>28</sup>

#### *Land Development Services (LDS)*

LDS administers the Public Facilities Manual,<sup>29</sup> 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.

#### *Northern Virginia Soil & Water Conservation District (NVSWCD)*

NVSWCD, 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 Municipal Separate Storm Sewer System Program and Chesapeake Bay Preservation Ordinance.

In 2017, NVSWCD's website received 118,829 unique visitors, with: 87,261 viewing NVSWCD's Solving Drainage and Erosion Problems Online Guide for Homeowners; 7,144 downloading the Rain Garden Design and Construction Guide for Homeowners; 798 downloading the Residential Low Impact Landscaping Guide; and another 12,424 visiting NVSWCD's Earth Friendly Suburban Horse Keeping publication. 2,850 copies of the semi-annual *Conservation Currents* newsletter were also distributed.

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)<sup>30</sup> afforded NVSWCD the opportunity to provide funding as a complement to the ongoing technical assistance provided to private property. Both programs support the resolution of drainage and erosion concerns as well as the promotion of energy efficient practices. Over the past year, NVSWCD saw tremendous interest in the program, responding to a total of 149 requests for site visits across all Board of Supervisor Districts, which resulted in 11 CAP projects and 37 VCAP projects. See the Water section of the Data Appendix for a list of projects.

NVSWCD also participates in and supports numerous additional events and programs throughout the year, including, but not limited to:

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<sup>28</sup> <https://www.fairfaxcounty.gov/landdevelopment/tidal-shoreline>

<sup>29</sup> <https://www.fairfaxcounty.gov/landdevelopment/public-facilities-manual>

<sup>30</sup> VCAP is funded by an EPA Chesapeake Bay Implementation Grant through the Virginia Department of Environmental Quality.

- Holding a yearly annual native tree and shrub seedling sale.
  - The 2017 theme was “Deer Tolerant;” over 382 customers purchased a total of 7,400 seedlings, almost 2,000 more than last year with a similar number of customers.
- Hosting six Green Breakfasts each year focusing on a variety of environmental topics.
  - In 2017, one of the six was cancelled due to weather.
- Organizing and leading the yearly Sustainable Garden Tour.
- Ongoing outreach including presentations (nearly 100 in 2017 on a wide variety of natural resource topics), participation in the annual Alice Ferguson Foundation Potomac Watershed Cleanup, seminars to build composters and rain barrels and direct requests for assistance via phone, email or in-person.
- Supporting the joint-venture storm drain marking program.
- Judging for the county’s Land Conservation Awards program.
- Supporting certified site leaders monitoring 28 sites through its Volunteer Water Quality Monitoring Program; doing 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

### *Agriculture and Forestal Districts*

Landowners may apply to place their land in special Agricultural and Forestal Districts that are taxed at reduced rates. A&F Districts, which are created by the Commonwealth of Virginia, must have 200 or more acres. A&F Districts of local significance, governed by the Fairfax County A&F District ordinance, must have at least 20 acres and must be kept in this status for a minimum of eight years.

In CY 2017, two districts were renewed (one each in Dranesville and Springfield districts), one was amended (60 acres in Sully district), and there was a reduction of 61.99 acres due to the expiration of three districts in Springfield. 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, The*

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

### *Virginia Department of Forestry (VDOF)*

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.

#### *Virginia Department of Environmental Quality*

The Virginia Department of Environmental Quality (DEQ) 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, 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 I-495 Inner Loop from 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 integrate with any major projects as well, such as the Embark Richmond Highway Initiative or 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 species along state maintained roadways, within rest areas and park and rides. Revenue to support these programs comes from purchase of “Wildflowers” or “Protect Pollinator” license



plates from the Virginia Department of Motor Vehicles (DMV). Maintaining current and planting new locations for either program are dependent the on available funding each fiscal year.

### *Virginia Outdoors Foundation, The*

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 2018, VOF held easements on more than 800,000 acres in 107 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 <sup>31</sup>

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 old Leven House in order to better assist with the management of the grounds. The preservation of the house concluded in June 2017 and Earth Sangha staff now living on the premises has allowed for more rapid progress on the grounds (e.g. invasive removal and native plantings).

#### Fairfax ReLeaf <sup>32</sup>

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 5,517 trees and shrubs in calendar year 2017. Highlights of its 2017 plantings include:

- Planting/distribution of 4,743 trees and shrubs for HOAs and private property.
- Support for plantings of nearly 400 stems at schools.

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<sup>31</sup> <http://www.earthsangha.org/>

<sup>32</sup> <http://www.fairfaxreleaf.org>

- Planting of 268 trees and shrubs in riparian areas.
- Planting of 150 trees and shrubs on park land.
- Removal of over 677 cubic feet and 300 pounds of invasive species strangling mature trees and competing with new, native growth on Resource Protection Area, park and HOA sites.

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 (MWCOC)

MWCOG's Regional Tree Canopy Workgroup drafted a Regional Tree Canopy Management Strategy document in cooperation with local forestry staff. This document is a guideline for local government staffs 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<sup>33</sup> (COG'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. The final report was expected to have been published in 2018.

#### 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 700 acres throughout Fairfax County through conservation easements, fee ownership and partnerships. NVCT holds 55 conservation easement properties and owns three parcels in Fairfax County. In 2017, NVCT recorded one new donated easement in the county which protects 90 acres adjacent to Manassas National Battlefield Park, increasing connectivity for wildlife and providing a buffer of conservation land for the national park. 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.

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<sup>33</sup> <https://www.mwcog.org/committees/region-forward-coalition/>

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 2017, 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) <sup>34</sup>

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 events are their work with nurseries to better label native plants and provides speakers for organizations wanting to learn more.

Potomac Conservancy, The <sup>35</sup>

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, seventy-seven 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 fifty-nine volunteers, spending 118 hours, planted 1,200 native grass plugs and 200 tree saplings near local waterways.

Reston Association, The

The Reston Association (RA), the HOA for the large, planned community of Reston (population >60,000), is a community founded on the preservation and appreciation of natural 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 HOAs.

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<sup>34</sup> <https://www.plantnovanatives.org/>

<sup>35</sup> <https://potomac.org/>

In 2017, for the first time, RA published the Reston Annual State of the Environment Report (RASER).<sup>36</sup> This document presents a comprehensive evaluation of the HOA with actionable steps to continue to improve its ecological quality.

A locally related issue is that of Hidden Creek Country Club's sale to the developer Wheelock Communities in 2017,<sup>37</sup> which opened the possibility that it 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 cat tail marsh located near holes four and five.

### **Comments**

1. EQAC commends the Fairfax County Park Authority 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. To best protect and preserve the county's ecological resources, it is important to know the existing county inventory of resources in more detail what the county has so that plans can be crafted for the most efficient way to protect these resources. EQAC commends Fairfax County Park Authority'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. 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. These programs help support important efforts by the agencies mentioned. EQAC also commends FCPA for efforts in beginning 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. EQAC commends the Board of Supervisors for revisiting the county's Natural Landscaping Implementation Plan which was endorsed in 2007. EQAC hopes it will be possible to review the natural landscaping recommendations in the coming year.

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<sup>36</sup> <http://www.reston.org/Parks.RecreationEvents/NatureEnvironmentalResources/NatureOverview/tabid/959/Default.aspx>

<sup>37</sup> <https://patch.com/virginia/reston/reston-golf-club-sold-could-be-turned-housing-complex>

### **Recommendation**

1. EQAC recommends that the Board of Supervisors increase full time staff capacity for Fairfax County Park Authority's 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.

## 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<sup>1</sup> 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<sup>2</sup> and its participation in regional efforts, as discussed below. The Environmental Vision, and the related Fairfax County Sustainability Initiatives document,<sup>3</sup> highlight past actions by Fairfax County to reduce GHG emissions. This chapter discusses aspects of these efforts and recommends additional actions for consideration by the Board of Supervisors.

According to the National Oceanic and Atmospheric Administration (NOAA), the United States had its third warmest June on record this year.<sup>4</sup> This rise in temperature is part of a trend of increasing temperatures and higher atmospheric GHG emissions. The overwhelming consensus of the scientific community is that man-made GHG emissions are extremely likely to have been the dominant cause of the observed warming of the climate since the mid-20<sup>th</sup> century.<sup>5</sup> While there are multiple sources of GHGs, the most significant source is carbon dioxide (CO<sub>2</sub>). The adverse impact of CO<sub>2</sub> emissions has encouraged numerous governmental agencies to reduce

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<sup>1</sup> See [www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf) (referenced July 31, 2017).

<sup>2</sup> See [www.fairfaxcounty.gov/environment/cool-counties](http://www.fairfaxcounty.gov/environment/cool-counties) (referenced July 31, 2017).

<sup>3</sup> See [www.fairfaxcounty.gov/environment/sustainability-initiatives](http://www.fairfaxcounty.gov/environment/sustainability-initiatives) (referenced July 31, 2017).

<sup>4</sup> National Oceanic and Atmospheric Administration, 2018, *Assessing the U.S. Climate in June 2018*. See: [www.ncei.noaa.gov/news/national-climate-201806](http://www.ncei.noaa.gov/news/national-climate-201806)

<sup>5</sup> 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](http://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.

such emissions through policies to increase energy efficiency and the use of renewable energy and other low carbon energy sources. CO<sub>2</sub> 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. These impacts include:<sup>6</sup>

- 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.<sup>7</sup>

The Northern Virginia Regional Commission (NVRC) has identified potential impacts of sea level rise to the Belle Haven area of the county (Figure VI-1). In addition, in response to an EQAC recommendation from 2014, county staff highlighted impacts that are expected to result from climate change in Fairfax County.<sup>8</sup> These potential impacts 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 increase in flood frequency due to changes in precipitation patterns.
- Increased health impacts due to excessive heat, vector-borne and communicable disease.

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.<sup>9</sup>

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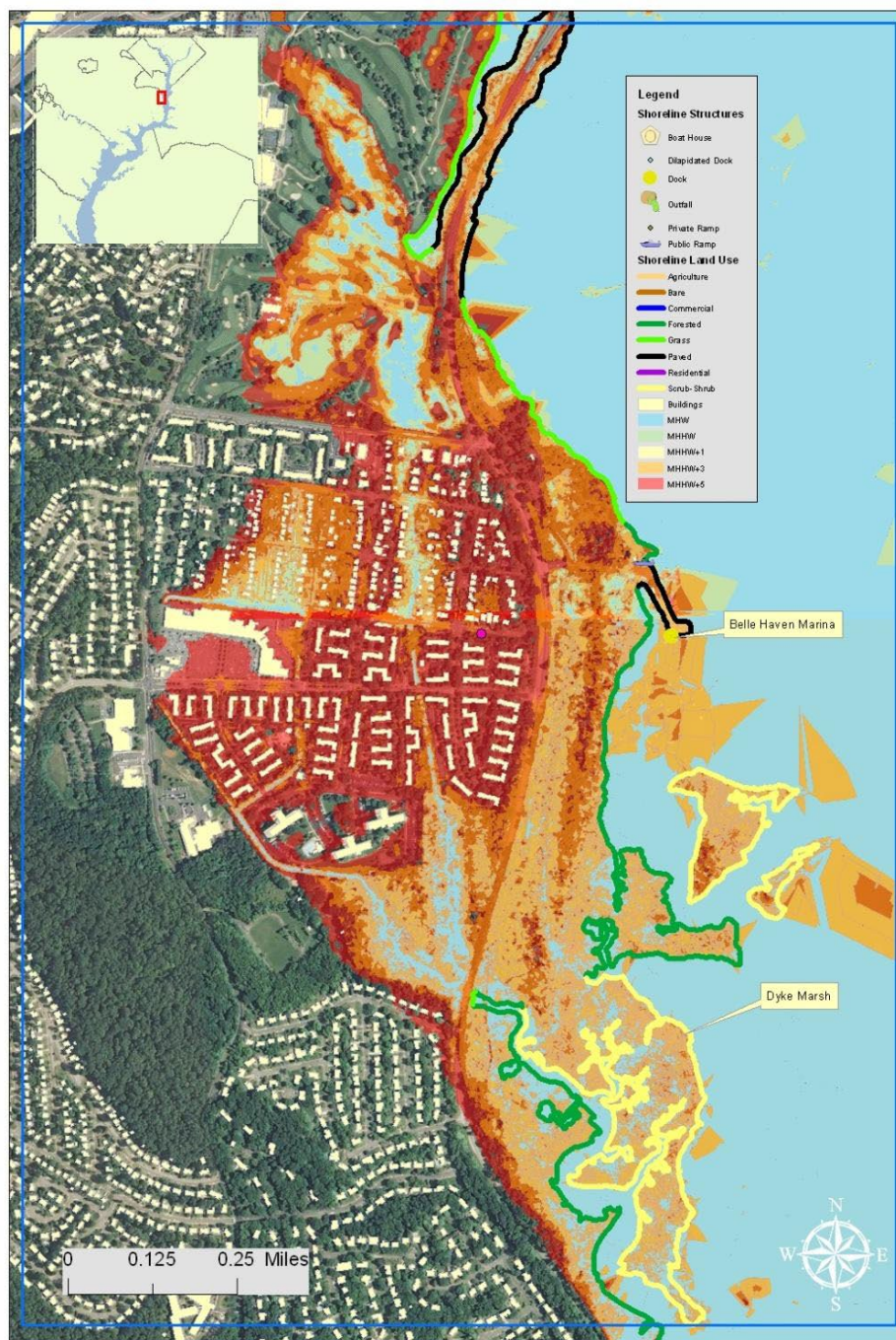
<sup>6</sup> National Oceanic and Atmospheric Administration. 2018. Global Climate Change. See: <https://climate.nasa.gov/effects/>.

<sup>7</sup> National Oceanic and Atmospheric Administration. 2018. Global Climate Change. See: <https://climate.nasa.gov/effects/>.

<sup>8</sup> Memorandum from David J. Molchany to the Board of Supervisors, Agency Responses to the Environmental Quality Advisory Council Recommendations Contained within the 2014 Annual Report on the Environment, March 27, 2015. [www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/annual%20reports/2014/nip%20and%20attachment%20i%20-%20ecc%20responses%20to%20eqac%202014%20annual%20report%20on%20the%20environment.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/annual%20reports/2014/nip%20and%20attachment%20i%20-%20ecc%20responses%20to%20eqac%202014%20annual%20report%20on%20the%20environment.pdf)

<sup>9</sup> 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](https://assets.nrdc.org/sites/default/files/climate-change-health-impacts-virginia-ib.pdf?_ga=2.263595084.1328872708.1524495601-853793054.1524495601)



**Figure VI-1. Projected flooding due to climate change<sup>10</sup>****Fairfax County - Belle Haven / New Alexandria  
Shoreline Land Use**

<sup>10</sup> Northern Virginia Regional Commission. *Sustainable Shorelines and Community Management in Northern Virginia, Phase III*, 2013.

Earlier this year, 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, and this tool estimates the expected temperature and rainfall impacts by location.<sup>11</sup> 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 new report<sup>12</sup> 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. Two degrees Celsius is a level that the new IPCC report highlights as a substantial impact that would almost entirely destroy coral reefs, and nearly one million additional square miles of permafrost would thaw at two degrees Celsius warming. 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.<sup>13</sup> Because total GHG emissions affect climate change, reductions from all parties are needed. Actions at the country level should be more efficient in reducing GHG emissions because the GHG emission reductions will be realized over greater areas for more people than local actions alone.

Recently, the Metropolitan Washington Council of Governments (MWCOG) provided comments to the U.S. Environmental Protection Agency (EPA) that further emphasized the importance of federal actions in reducing GHG emissions. In a letter to EPA, MWCOG expressed concern about the proposed Affordable Clean Energy (ACE) rule, initiated in 2018 to replace the Obama Administration's Clean Power Plan. The MWCOG letter stated that the proposed rule:

“... does not go far enough to support our regional climate goals or to sufficiently protect our region's air quality and natural resources upon which we depend.” They further concluded that “Federal government leadership in delivering effective regulatory limits on emissions from power plants, including measures to reduce demand and increase renewable energy production is a critical component of the region's ability to meet mandated environmental objectives. The ACE rule should be revised to ensure pollution levels are further reduced to ensure pollution levels are further reduced both in metropolitan Washington and upwind areas.”<sup>14</sup>

There are clear impacts that are taking place and even more that are predicted as a result of climate change and that are likely to have far greater long-term adverse economic risks.<sup>15</sup> These increases in temperature are linked to increasing levels of GHGs in the atmosphere.

This chapter summarizes activities that are underway in Fairfax County to reduce GHG emissions and increase energy efficiency and renewable energy. While empirical evidence

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<sup>11</sup> See <https://crt-climate-explorer.nemac.org/>

<sup>12</sup> See: [http://report.ipcc.ch/sr15/pdf/sr15\\_spm\\_final.pdf](http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf)

<sup>13</sup> See: [www.washingtonpost.com/energy-environment/2018/10/08/world-has-only-years-get-climate-change-under-control-un-scientists-say/?utm\\_term=.1ee927c35193](http://www.washingtonpost.com/energy-environment/2018/10/08/world-has-only-years-get-climate-change-under-control-un-scientists-say/?utm_term=.1ee927c35193)

<sup>14</sup> Letter from Hans Riemer, Chair, Metropolitan Washington Air Quality Committee, and Mary Lehman, Chair, Climate Energy and Environment Policy Committee to EPA Administrator Andrew Wheeler. September 26, 2018.

<sup>15</sup> 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/>

shows that increases in temperature are happening now and that continued increases are expected to continue (particularly if GHG emissions are not reduced), the changes that we have seen to date have been modest relative to the projected climate changes. In addition, the chapter recommends additional actions for consideration by the Board of Supervisors.

### **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,<sup>16</sup> its commitment to the climate goals of the Metropolitan Washington Council of Governments (MWCOC),<sup>17</sup> the Climate and Energy Section of the county's 2017 Environmental Vision,<sup>18</sup> 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 to 2050.<sup>19</sup> The board's recent 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 (MWCOC), 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 MWCOC. In reviewing this material and the recommendations provided, by the workgroup<sup>20</sup> and an associated technical report,<sup>21</sup> a number of state and federal actions are recommended to support this target. Action by EQAC and the board's Legislative Committee in recent months 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.

<sup>16</sup> Fairfax County, *Cool Counties Stabilization Declaration*, 2007, available at <https://www.fairfaxcounty.gov/environment/us-cool-counties-climate-stabilization-declaration>

<sup>17</sup> Metropolitan Washington Council of Governments, *National Capital Region Climate Change Report*, p. 10, available at [www.mwcog.org/file.aspx?D=nkj8YO%2fkjRN-NgtCccf1PKUintZaQWLtNS78xjv0Etdl%3d&A=qxBOq%2fgSA75HDE45SukELC%2fPqw%2frs%2fSm90AnaJ5ke4Q%3d](http://www.mwcog.org/file.aspx?D=nkj8YO%2fkjRN-NgtCccf1PKUintZaQWLtNS78xjv0Etdl%3d&A=qxBOq%2fgSA75HDE45SukELC%2fPqw%2frs%2fSm90AnaJ5ke4Q%3d)

<sup>18</sup> 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>

<sup>19</sup> See [www.fairfaxcounty.gov/environment/us-cool-counties-climate-stabilization-declaration](https://www.fairfaxcounty.gov/environment/us-cool-counties-climate-stabilization-declaration) (referenced July 31, 2017).

<sup>20</sup> 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/](http://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).

<sup>21</sup> See: [www.mwcog.org/documents/2016/08/01/multi-sector-approach-to-reducing-greenhouse-gas-emissions-in-the-metropolitan-washington-region-final-technical-report/](http://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).

The third element of Cool Counties asks local governments to continue to urge Congress and the Administration to enact specific requirements, 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.

MWCOG's collection and analysis includes 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 development of policies and programs at local and regional scales. COG reports metrics of the 2020 Regional Climate and Energy Action Plan's progress on the Climate and Energy Dashboard at [www.mwcog.org/environment/data-and-tools/climate-and-energy-progress-dashboard/](http://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:<sup>22</sup>

- 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.

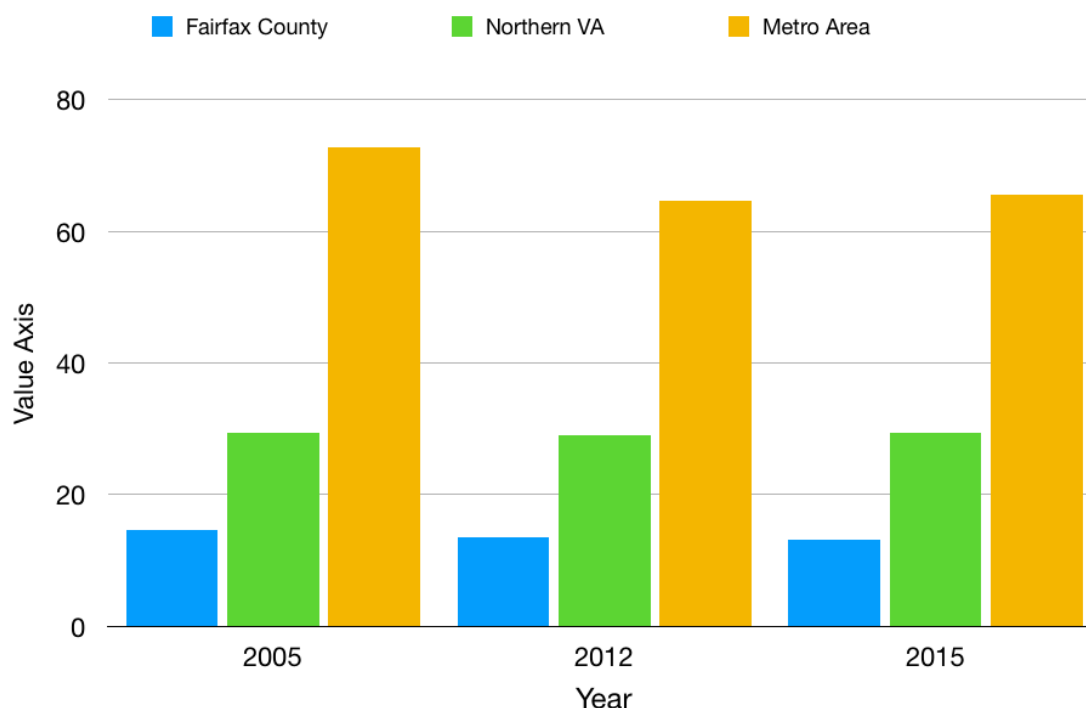
In order to provide for greater consistency in the analysis of GHG emissions, such emissions estimates have been developed through a coordinated effort with the MWCOG. Figure VI-2 shows that Fairfax County community-wide GHG emissions declined by over nine percent between 2005 and 2015.<sup>23</sup> 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.

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<sup>22</sup> Metropolitan Washington Council of Governments. 2018. Climate and Energy Progress Dashboard. See: [www.mwcog.org/environment/data-and-tools/climate-and-energy-progress-dashboard/](http://www.mwcog.org/environment/data-and-tools/climate-and-energy-progress-dashboard/).

<sup>23</sup> 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](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/fairfax-county-greenhouse-gas-emissions-factsheet-may-2018.pdf)

Figure VI-2. CO<sub>2</sub>e Emissions (MM Tons) for Fairfax County, Northern Virginia, and the Metropolitan Washington Area



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.”<sup>24</sup>

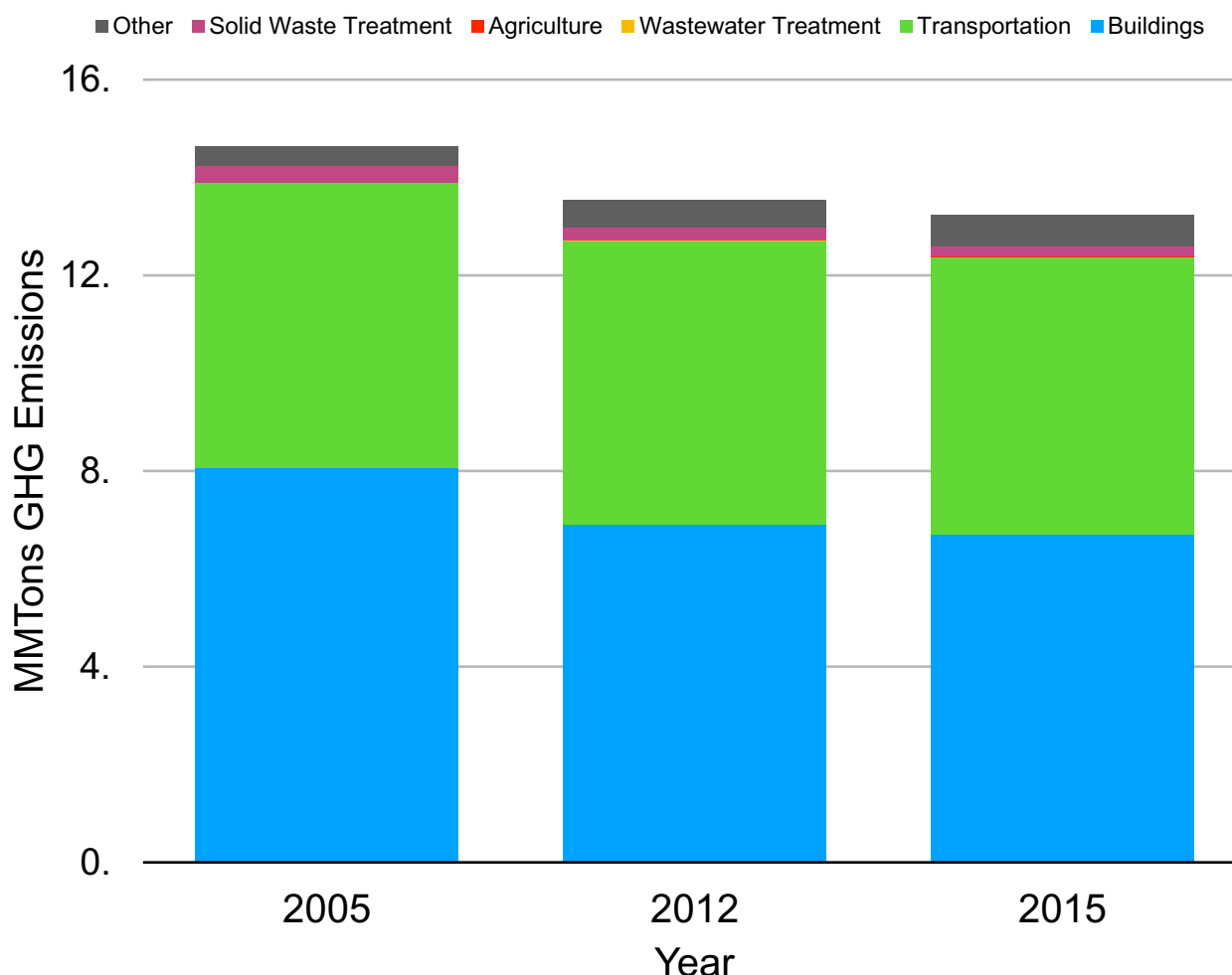
Figure VI-3<sup>25</sup> shows Fairfax County emissions by category. This figure shows that 2015 emissions associated the residential and commercial building sectors accounted for 51 percent of GHG emissions and that transportation and mobile sources accounted for 43 percent. It is important to note that GHG emissions associated with mobile sources have been reduced because of county actions described in the transportation chapter as well as federal vehicle

<sup>24</sup> 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/>

<sup>25</sup> 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](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/regional-greenhouse-gas-inventory-fact-sheet.pdf).



Figure VI-3. Fairfax County Wide GHG Emissions  
by Category



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,<sup>26</sup> which appears to largely result from a switch from coal to natural gas.

Fairfax County faces challenges in reducing GHG gas emissions since its population increased by 13 percent between 2005 and 2015. However, this is the same challenge faced by many communities since 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

<sup>26</sup> 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](http://www.fairfaxcounty.gov/energy/energydata/download).

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 transitioning to cleaner fuel sources for the generation of electric power.<sup>27</sup>

The transition to cleaner power sources and reduced carbon dioxide (CO<sub>2</sub>) emissions by electric utilities in Virginia will be accelerated by executive action taken by the past two Virginia Governors. According to a September 12, 2018 press release, Governor Ralph Northam is “working to finalize a regulation that would reduce carbon pollution from large power plants by 30 percent over 10 years.”<sup>28</sup> This regulation represents the culmination of Executive Directive (ED)-11, issued by Governor Terry McAuliffe in May 2017. Further information about ED-11 is contained in the Data Appendix.

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.<sup>29</sup> 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.

This year, 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.<sup>30</sup> County government operations reported that GHG emissions associated with electrical use and combustion of natural gas declined by 20 percent from 2006 to 2017.<sup>31</sup>

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

<sup>27</sup> Fairfax County Energy Website, *Fairfax County CO<sub>2</sub> Data – 2006 to 2016, Conversion Factor Tab*, available at [www.fairfaxcounty.gov/energy/energydata/download](http://www.fairfaxcounty.gov/energy/energydata/download)

<sup>28</sup> Press Release of Governor Ralph Northam, *Northam Administration Takes New Steps to Fight Climate Change, Ocean Acidification, Sept. 12, 2018*, available at [www.governor.virginia.gov/newsroom/all-releases/2018/september/headline-829610-en.html](http://www.governor.virginia.gov/newsroom/all-releases/2018/september/headline-829610-en.html)

<sup>29</sup> Fairfax County, *Cool Counties Website*, available at [www.fairfaxcounty.gov/environment/cool-counties](http://www.fairfaxcounty.gov/environment/cool-counties)

<sup>30</sup> 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](http://www.fcps.edu/node/31156).

<sup>31</sup> *Fairfax County CO<sub>2</sub> Data, 2006 and 2017*, available at [www.fairfaxcounty.gov/energy/energydata/download](http://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.



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.

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<sub>2</sub> 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.

### **Energy and Climate Policies and Activities Relating to County Operations**

#### **LED Streetlights Initiative**

One of the most significant energy and climate policy actions taken by Fairfax County in 2018 was the county's active participation in a regional effort to facilitate the conversion of streetlights to high-efficiency Light Emitting Diode (LED) fixtures. This effort was extremely important because 15.5 percent of the entire electricity consumption by Fairfax County government operations in 2017 was attributed to streetlight use.<sup>32</sup>

Fairfax Board Chairman, Sharon Bulova, and other Northern Virginia elected officials initiated the streetlight effort in 2017 through the Northern Virginia Regional Commission with a letter to the Chief Executive Officer of Dominion Energy.<sup>33</sup> They urged action to convert Dominion-owned streetlights to LED technology.<sup>34</sup> Such action was necessary because "the vast majority

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<sup>32</sup> Fairfax County, *Energy Data Download*, County Overall and Public Works tabs, available at [www.fairfax-county.gov/energy/energydata/download](http://www.fairfax-county.gov/energy/energydata/download)

<sup>33</sup> Letter from Sharon Bulova and Other Northern Virginia Elected Leaders to Thomas F. Farrell, Chairman and Chief Executive Officer, Dominion Energy, p. 1, 2017.

<sup>34</sup> Ibid.

of streetlights in [Northern Virginia] communities are owned and maintained by Dominion” and only about 300 of the hundreds of thousands of streetlights owned by Dominion in the entire Commonwealth of Virginia have been converted to LED technology.<sup>35</sup> An unfavorable Dominion cost structure for conversion and a very limited number of fixture options greatly impeded the conversion of streetlights to LED fixtures.

In summer 2018, the regional group completed a successful negotiation with Dominion Energy for new rates and additional fixture options for LED conversions.<sup>36</sup> In Fairfax County, this agreement means that LED conversion of the 56,421 streetlight fixtures that Dominion owns will be less expensive.<sup>37</sup> Such LED streetlight conversion will provide positive returns on investment in as little as six to eight years.<sup>38</sup>

As highlighted in Table VI-1 below, an estimate of the reduction in electricity use resulting from a preliminary plan for this conversion is 1,644,440 kWh/month or a 51.6 percent reduction in electricity use when compared to the current, conventional streetlights.<sup>39</sup> According to county staff, this increased energy efficiency would result in a reduction in CO<sub>2</sub> emissions of 7,251 metric tons per year – a very significant improvement.<sup>40</sup>

<b>Table VI-1</b> <b>PRELIMINARY FAIRFAX COUNTY PLAN &amp; COST ESTIMATES FOR CONVERSION TO LED STREETLIGHTS<sup>41</sup></b> (Estimates reflect upgrades to existing Dominion Energy-owned streetlights)								
	# Fixtures	Conversion Cost	kWh per Month		Monthly Operating Cost	+	Riders, Fees and Fuel	= Total Monthly Cost

<sup>35</sup> *Ibid.*

<sup>36</sup> E-mail from NVRC to Noel Kaplan, Attachment, p. 2, Aug. 10, 2018.

<sup>37</sup> Communication from Susan Hafeli, Fairfax County Staff, to Larry Zaragoza and Debra Jacobson, October 4, 2018.

<sup>38</sup> Communication from Kambiz Agazi and Susan Hafeli, Fairfax County Staff, October 10, 2018.

<sup>39</sup> *Ibid.* <sup>40</sup> *Ibid.* This estimate is based on the most recent (2016) estimate of CO<sub>2</sub> emissions from electricity generation on the regional grid serving Fairfax County of 0.810131 lbs/kWh of CO<sub>2</sub>. See *Fairfax County Energy Data Download CO<sub>2</sub> Data (Conversion Factor Tab)*, available at [www.fairfaxcounty.gov/energy/energydata/download](http://www.fairfaxcounty.gov/energy/energydata/download). Application of this conversion factor results in a figure of 1,332,212 CO<sub>2</sub> lbs/month. Since CO<sub>2</sub> emission reductions are typically presented as reductions in metric tons/year, we have used the conversion factor of 2204.6 lbs/metric ton to develop the final figure.

<sup>40</sup> *Ibid.* This estimate is based on the most recent (2016) estimate of CO<sub>2</sub> emissions from electricity generation on the regional grid serving Fairfax County of 0.810131 lbs/kWh of CO<sub>2</sub>. See *Fairfax County Energy Data Download CO<sub>2</sub> Data (Conversion Factor Tab)*, available at [www.fairfaxcounty.gov/energy/energydata/download](http://www.fairfaxcounty.gov/energy/energydata/download). Application of this conversion factor results in a figure of 1,332,212 CO<sub>2</sub> lbs/month. Since CO<sub>2</sub> emission reductions are typically presented as reductions in metric tons/year, we have used the conversion factor of 2204.6 lbs/metric ton to develop the final figure.

<sup>41</sup> These estimates reflect a proposal developed by the staff of the Capital Facilities Division of the Fairfax County Department of Public Works and Environmental Services (DPWES). Any such proposal will need to be approved by the senior management of DPWES as well as the Board of Supervisors prior to implementation.

Today	56,421	--	3,185,895		\$512,715	+	\$135,617	=	\$648,332
Possible Upgrade	56,421	\$8,986,794	1,541,455		\$484,825	+	\$67,505	=	\$552,330

<b>Table VI-2. Per-Fixture Conversion Cost for Existing Dominion Streetlights</b>			
<b>Existing Fixture Billed as:</b>	<b>Conversion Cost</b>	<b>TERF (Tax Effect Recovery Factor)</b>	<b>Total Conversion Cost</b>
Standard	\$130.00	\$19.94	\$149.94
Premium	\$386.00	\$59.21	\$445.21

Important next steps in this effort involve the provision by Dominion of available fixture specifications and other information (so that localities can complete conversion scenarios)<sup>42</sup> and the completion of a budget proposal by county staff.<sup>43</sup> We urge rapid action by Dominion Energy and Fairfax County to implement this beneficial LED technology.

#### Fairfax County Operational Energy Strategy

On July 10, 2018, the Fairfax County Board of Supervisors adopted the first comprehensive energy strategy for reducing utility costs and GHG emissions resulting from energy use in county buildings, vehicles and other general county government operations.<sup>44</sup> As noted previously, energy use for the Fairfax County Public Schools (FCPS) is managed separately from the rest of the county government operations, and the new Fairfax County Operational Energy Strategy only addresses non-FCPS energy use.

This Fairfax County Operational Energy Strategy is a step forward because it establishes concrete goals, targets and deadlines for reducing energy use and increasing renewable energy use in county operations for the first time. In addition, the introduction to this document emphasizes the important points that: (1) “investing in efficiency improvements and other actions to reduce energy and water consumption will generate returns for decades, well beyond initial payback periods;” and (2) “adequate staffing and resources” are essential.<sup>45</sup>

<sup>42</sup> E-mail from Susan Hafeli, Fairfax County, to Eric Goplerud, Aug. 9, 2018.

<sup>43</sup> Fairfax County Press Release, *New Regional Agreement Lights the Way for LED Streetlights in Fairfax County*, Aug. 6, 2018, available at [www.fairfaxcounty.gov/publicaffairs/new-regional-agreement-lights-way-led-street-lights-fairfax-county](http://www.fairfaxcounty.gov/publicaffairs/new-regional-agreement-lights-way-led-street-lights-fairfax-county)

<sup>44</sup> Fairfax County, *Fairfax County Operational Energy Strategy*, July 10, 2018, available at [www.fairfax-county.gov/energy/energy-strategy](http://www.fairfax-county.gov/energy/energy-strategy)

<sup>45</sup> *Ibid.*, p. 1.

Moreover, the energy efficiency target for county operations incorporated in the energy strategy is substantially higher than energy efficiency activities in recent years. EQAC has been advised that target for energy efficiency is a total reduction of energy use of two percent per year between 2019 and 2029.<sup>46</sup> The county is also seeking to incorporate sustainable landscaping practices that will improve energy efficiency.

The Fairfax County Operational Energy Strategy should be a “living document” in which changes will be made regularly to the goals and targets. We believe that special focus should be made on incorporating targets for reducing GHG emissions and establishing an aggressive target for renewable energy.

Meeting the county’s GHG emission commitments would benefit from a mix of energy efficiency and renewable energy projects. The recently launched initiative to develop a Request for Proposals for solar power purchase agreements (PPAs) for on-site solar presents a great opportunity to pursue an increase in renewable energy use within the county. Such a PPA would increase renewable energy development for county operations,<sup>47</sup> and it could play an important role in accelerating the adoption of solar energy across Northern Virginia. In addition, we are encouraged by the approval by the county’s Legislative Committee on October 2, 2018 of a position statement in support of legislation in the 2019 session of the Virginia General Assembly to remove several barriers in current law that impede the use of renewable energy by local governments.<sup>48</sup>

In addition, EQAC supports the emphasis of the operational energy strategy on installing electric vehicle charging stations at major county facilities. The target is for level 2 charging at up to 20 major county facilities. The first list of sites includes facilities frequented by the public that include: the Fairfax County Government Center; the Herrity Building; the Pennino Building; the McConnell Public Safety and Transportation Operations Center (MPSTOC); the South County Center; the Merrifield Center (Fairfax-Falls Church Community Services Board); the

<sup>46</sup> Although the energy efficiency target on page 6 of the Energy Strategy might be construed to be a reduction of 20 percent kBtus **per square foot** between 2019 and 2029, EQAC was advised that the target is an absolute reduction of 20 percent kBtus for the 10-year period (or two percent per year). Fairfax County Environmental Quality Advisory Council, *Minutes of July 11, 2018 Meeting*, available at [www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/meeting%20minutes/2018/eqac%20minutes--july%2011,%202018--approved.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/meeting%20minutes/2018/eqac%20minutes--july%2011,%202018--approved.pdf) (hereinafter cited as *July 11 EQAC Minutes*).

<sup>47</sup> Informal Presentation by Kambiz Agazi, EQAC Meeting, July 11, 2018. Although this initiative was not part of the operational energy strategy, county staff advised EQAC on July 11 that work had begun on a request for proposals (RFP) for a power purchase agreement (PPA) for the installation of rooftop solar arrays on county facilities. EQAC was informed that this RFP was targeted for release in fall 2018 and that the RFP was to have been drafted so that the Fairfax County Public Schools (FCPS) and other local governments in Northern Virginia could ride the RFP and final contract. In October 2, 2018 Legislative Committee meeting, Dr. Agazi indicated that the RFP was expected to include 30 to 50 projects of between 5 to 10MW for both FCPS and general county government buildings. See video link in fn. 17.

<sup>48</sup> Fairfax County Legislative Committee, October 2, 2018, see discussion on video at [video.fairfaxcounty.gov/MediaPlayer.php?view\\_id=9&clip\\_id=1156](http://video.fairfaxcounty.gov/MediaPlayer.php?view_id=9&clip_id=1156) (minute 32:36 to 53:56). This favorable action followed an EQAC position statement in support of the Solar Freedom legislation. See [www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resolutions%20and%20positions/2018/2018,%20july--legislative%20position%20statement,%20solar%20freedom%20legislation.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resolutions%20and%20positions/2018/2018,%20july--legislative%20position%20statement,%20solar%20freedom%20legislation.pdf)

Courthouse; board offices; and other similar buildings. The following facilities already have conduits in place for charging stations: Stringfellow Park and Ride; Reston Police Station; Newton Maintenance Facility; Mid-County Human Services; Public Safety Headquarters; Herndon Station Garage; and Innovation Station Garage. While the planned installation is subject to funding, the planned timetable for installation of these charging stations is five years.

As a follow up to the adoption of the Fairfax County Operational Energy Strategy, EQAC also urges the emphasis on two other issues highlighted in our May 16, 2018 letter<sup>49</sup> on the strategy:

1. Importance of considering multiple funding options, include proven budget-neutral strategies, such as energy savings performance contracts, public-private partnerships and solar power purchase agreements (PPAs).

As stated in the May 2018 EQAC letter, such financing approaches may be valuable “to facilitate meeting aggressive energy and climate goals while minimizing the impact on taxpayers.” The county staff has taken a good first step by initiating the development of its request for proposals for a solar PPA.

EQAC supports the county’s action on September 25, 2018 to approve the first \$4.5 million of energy efficiency funding from general revenues as part of the FY 2018 Carryover Review. However, we strongly believe that the board should be presented with a complete analysis of alternatives to funding energy efficiency and other measures from sources other than real estate taxes for the nine subsequent years of the energy strategy. In fact, such a detailed analysis of funding options is recommended by the U.S. Department of Energy as a best practice in its 2013 Guide to Community Energy Strategic Planning.<sup>50</sup>

2. The issuance of an annual greenhouse gas emissions inventory for county operations.

The Fairfax County Operational Energy Strategy provided information on **future** energy savings and projected GHG emission reductions from county operations. However, it did not provide information on: (1) the **past** county record in this area; (2) the progress expected compared to the Cool Counties goal of a 20 percent GHG emission reduction by 2020; or (3) the detailed assumptions underlying the estimates of future emission reductions.<sup>51</sup> Inclusion of such information in the future would provide greater transparency to the Board of Supervisors and the general public as they evaluate the elements of future updates to the operational energy strategy.

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<sup>49</sup> See [www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/re-solutions%20and%20positions/2018/2018,%20may--eqac%20comments%20on%20the%20draft%20operations%20energy%20strategy.pdf](http://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/re-solutions%20and%20positions/2018/2018,%20may--eqac%20comments%20on%20the%20draft%20operations%20energy%20strategy.pdf)

<sup>50</sup> U.S. Department of Energy, *Guide to Community Energy Strategic Planning*, chapter 7, 2013, available at [www.energy.gov/sites/prod/files/2014/05/f15/cesp\\_guide.pdf](http://www.energy.gov/sites/prod/files/2014/05/f15/cesp_guide.pdf)

<sup>51</sup> Appendices 3 and 4 provided the only data in the Fairfax County Operational Energy Strategy on projected emission reductions but the data underlying these appendices were not readily available.

This review highlights the importance for detailed annual reporting of the county's annual GHG emissions from county operations. A useful model for the county government's reporting of its GHG emissions is the GHG inventory publicly released by FCPS on an annual basis.<sup>52</sup> Policy makers use this GHG inventory data to track emission trends, develop strategies and policies and assess progress.<sup>53</sup>

The county did take a major step forward with its new energy data website,<sup>54</sup> which launched in December 2017.<sup>55</sup> However, this website only reports GHG emissions from county operations for two years – 2006 and 2017, and it does not provide either an analysis of the results or all relevant assumptions.

## **Reducing GHG Emissions in the Private Sector**

### **Introduction – Businesses and Residents are Primary Source of County-Wide GHG Emissions**

As previously noted, “County government and public schools account for only 3 percent of total greenhouse gas emissions in Fairfax.” Thus, “the other 97 per cent are generated by homes and businesses.”<sup>56</sup> As a result, community-wide GHG emission reductions from residential, commercial and industrial energy users are critical in achieving county and regional GHG reduction goals. The EQAC believes that a climate and energy strategy for the entire county would be an important step towards achieving the needed reductions in GHG emissions. As noted in the Climate and Energy Data Appendix, public opinion polling of Fairfax County residents demonstrates strong concern about climate change.<sup>57</sup>

### **Fairfax County Chairman Bulova's 2011-12 Private Sector Energy Task Force**

The chairman of the county board recognized the importance of private sector action to reduce GHG emissions when she established the Private Sector Energy Task Force in 2011. This Task Force was charged with:

<sup>52</sup> Fairfax County Public Schools, *Greenhouse Gas Inventories- 2013 to 2016*, available at [www.fcps.edu/node/31156](http://www.fcps.edu/node/31156) Fairfax County Public Schools, *Greenhouse Gas Inventories- 2013 to 2016*, available at <https://www.fcps.edu/node/31156> The report is required by *School Board Policy 8542.1 on Facilities and Transportation Services, Environmental Stewardship*, September 26, 2013, available at [www.boarddocs.com/vsba/fairfax/Board.nsf/files/9BXHHY484F83/\\$file/P8542.pdf](http://www.boarddocs.com/vsba/fairfax/Board.nsf/files/9BXHHY484F83/$file/P8542.pdf)

<sup>53</sup> See Appendix B to this report, *Spotlight on Fairfax County Public Schools*, p. B-9.

<sup>54</sup> Fairfax County Energy Website, *Energy Data Download*, available at [www.fairfaxcounty.gov/energy/energydata/download](http://www.fairfaxcounty.gov/energy/energydata/download)

<sup>55</sup> Fairfax County Environmental Committee, *Meeting Minutes*, Feb. 13, 2018, p. 7, available at [www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf](http://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf)

<sup>56</sup> Fairfax County, *Explanation of Cool Counties Climate Stabilization Declaration*, available at [www.fairfaxcounty.gov/environment/cool-counties](http://www.fairfaxcounty.gov/environment/cool-counties) See also, *Community Greenhouse Gas Inventory for Fairfax County, Virginia: Report of Findings for 2006 to 2010*, April 2013, p. 4, available at [www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/2013-greenhouse-gas-inventory.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/2013-greenhouse-gas-inventory.pdf)

<sup>57</sup> Yale Program on Climate Change Communication, *Yale Climate Opinion Maps: U.S. 2016*, available at <http://climatecommunication.yale.edu/visualizations-data/ycom-us-2016/?est=worried&type=value&geo=county&id=51059>

“... identifying opportunities to develop a transformational vision, supported by achievable strategies that will define the steps our community can take to position itself as a leader in the area of energy efficiency, sustainability, and ‘green’ technology.”<sup>58</sup>

The task force developed a detailed report and recommendations for the Board of Supervisors in September 2012<sup>59</sup> as well as 30 pages of supporting information.<sup>60</sup> The report and recommendations focused on two energy use sectors: buildings and transportation. The report recognized that the county had set very challenging GHG reduction goals, including the following:

- (1) “Support for the regional effort to reduce carbon emissions 80% from the MWCOG baseline by 2050 through collaboration with the private sector and regional organizations;”
- (2) “A carbon-neutral Tysons Corner by 2030 as noted in the Tysons Land Use & and Transportation Concept Plan accepted by the County.”<sup>61</sup>

The Report of the Private Sector Energy Task Force recommended that the county “develop a strategy” to meet its aggressive goals.<sup>62</sup> This recommendation was based on the finding that “there appear to be no realistic plans in place to meet these goals.”<sup>63</sup>

#### County Actions to Address GHG Emissions from the Private Sector from 2012 to 2018

As of late 2018, Fairfax County has not developed a comprehensive energy and climate action plan to facilitate the achievement of regional GHG reduction goals. According to the transportation chapter of this report, emissions from the transportation sector, which accounted for 43 percent of GHG emissions in the county in 2015, “remained relatively unchanged between 2005 and 2015.” The progress in the buildings sector also has been limited.

At the same time, the county has initiated a large number of programs in the transportation sector and a small number of initiatives in the buildings sector that should be acknowledged. For example, as noted in the Transportation chapter of this report, the county joined other

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<sup>58</sup> Fairfax County, *Fairfax County Chair’s Private Sector Energy Task Force: Supporting Information for Recommendations to the Board of Supervisors*, September 26, 2012, p. 1 (hereinafter cited as Task Force Supporting Info), available at [www.fairfaxcounty.gov/chairman/private-sector-energy-task-force](http://www.fairfaxcounty.gov/chairman/private-sector-energy-task-force)

<sup>59</sup> Fairfax County, *Fairfax County Chair’s Private Sector Energy Task Force: Report and Recommendations for the Board of Supervisors*, Sept. 26, 2012, (hereinafter cited as Task Force Report), available at [www.fairfax-county.gov/chairman/sites/chairman/files/assets/images/energy task force recommendations.pdf](http://www.fairfax-county.gov/chairman/sites/chairman/files/assets/images/energy%20task%20force%20recommendations.pdf)

<sup>60</sup> Task Force Supporting Info.

<sup>61</sup> Task Force Report, p. 5. The long-term goal of carbon neutrality (i.e., no net increase of greenhouse gas emissions from Tysons) remains in the 2017 Edition of the Fairfax County Comprehensive Plan for the Tysons Urban Center, available at [www.fairfaxcounty.gov/tysons/sites/tysons/files/assets/documents/pdf/comprehensive\\_plan/fc\\_comp\\_plan2017ed\\_tysons\\_amended04\\_04\\_2017.pdf](http://www.fairfaxcounty.gov/tysons/sites/tysons/files/assets/documents/pdf/comprehensive_plan/fc_comp_plan2017ed_tysons_amended04_04_2017.pdf)

<sup>62</sup> *Ibid.*

<sup>63</sup> Task Force Supporting Info., p. 2



jurisdictions in Virginia, Maryland and the District of Columbia in providing dedicated funding to the Washington Metropolitan Transit Authority for the first time in 2018.

In the buildings sector, county action has been limited by staffing constraints with only “one full-time equivalent position that is dedicated to energy outreach to the private sector.”<sup>64</sup> The county’s community energy outreach activities relating to the residential sector are administered under the Energy Action Fairfax program, and several staff members from other programs also have contributed to this effort.<sup>65</sup>

The Energy Action Fairfax program coordinated the Solarize Fairfax Campaign in collaboration with the Northern Virginia Regional Commission and the Local Energy Alliance Program in 2017 and 2018.<sup>66</sup> This program has been valuable in reducing the cost and complexity of installing solar panels for residents and businesses. The 50 contracts signed under the 2017 program represented 400 kilowatts of solar capacity.<sup>67</sup> The final data for the 2018 program are not yet available. The future of this program will be enhanced by new efforts by the Northern Virginia Soil and Water Conservation District to assist groups like homeowners, condominium associations and faith-based groups to apply to this program through a matching grant program<sup>68</sup> funded through the county’s Environmental Improvement Program.

In spring 2018, Energy Action Fairfax also held a series of LED lightbulb exchanges at regional libraries throughout the county.<sup>69</sup> Under this program, the county provided valuable educational materials about the energy efficiency benefits of LED lightbulbs and distributed approximately 8,000 LEDs.<sup>70</sup> According to county officials, the CO<sub>2</sub> emission reductions resulting from this program would be 280,000 pounds – the same as taking 28 passenger vehicles off the road.<sup>71</sup>

Energy Action Fairfax also has coordinated a thermal camera loan program at regional libraries<sup>72</sup> to assist residents in conducting energy audits to improve home energy efficiency. The program also coordinates with the Fairfax Employees for Environmental Excellence, and it launched a valuable Energy Dashboard in December 2017.<sup>73</sup>

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<sup>64</sup> E-mail from Noel Kaplan, Fairfax County Planning and Zoning Dept., to Larry Zaragoza and Debra Jacobson, July 24, 2018.

<sup>65</sup> *Ibid*

<sup>66</sup> Fairfax County Department of Cable and Consumer Services, Information Response to EQAC, June 14, 2018.

<sup>67</sup> The data for 2018 were not available at the time of staff response to the council.

<sup>68</sup> Northern Virginia Soil and Water Conservation District, *Conservation Assistance Program for Civic/Homeowners Associations and Places of Worship*, available at <https://www.fairfaxcounty.gov/soil-water-conservation/cap-community>

<sup>69</sup> Fairfax County Department of Cable and Consumer Services, Information Response to EQAC, June 14, 2018.

<sup>70</sup> Energy Action Fairfax, Sustainability News, July 2018.

<sup>71</sup> *Ibid*.

<sup>72</sup> Fairfax County Environment Committee, *Presentation on Community Energy Initiatives*, February 13, 2018, available at [www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-community-energy-initiatives-2018.pdf](http://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-community-energy-initiatives-2018.pdf) Video of presentation available at [video.fairfaxcounty.gov/MediaPlayer.php?view\\_id=9&clip\\_id=971](http://video.fairfaxcounty.gov/MediaPlayer.php?view_id=9&clip_id=971)

<sup>73</sup> Summary of Feb. 13, 2018 Environmental Committee Meeting, p. 7, available at [www.fairfax-county.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf](http://www.fairfax-county.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf)

The community energy outreach programs directed at the commercial sector are the Green Business Partners Program and a small business technical assistance program. According to a presentation by county staff in February 2018, the current commercial program is “mainly a recognition program.”<sup>74</sup>

Earlier this year, the county staff formed a working group to pursue a far more significant action in the commercial buildings sector. This workgroup led to a staff recommendation in June 2018 to the county Board's Environment Committee to direct the drafting of an ordinance to support the development and implementation of a Commercial Property Assessed Clean Energy (C-PACE) program in the county.<sup>75</sup>

The county's work on C-PACE is important because a C-PACE program will facilitate the financing of energy efficiency, renewable energy and water savings measures in new and existing commercial buildings (including multi-family residences with five or more units). In addition, nonprofits, such as religious congregations, can utilize this financing approach.

If the ordinance is adopted, the county staff would then need to draft a request for proposal to hire a third-party program administrator and adopt implementation guidance. All of these steps will be facilitated by the fact that C-PACE experts in Virginia and the region have developed Virginia-specific model ordinances and model program guidance.<sup>76</sup> At the EQAC meeting on September 12, 2018, the county's Environmental Coordinator indicated that the C-PACE ordinance would be considered at the next Board of Supervisors Environmental Committee meeting in February 2019 and that there would be an expectation that a request for proposals for a program administrator would be issued in the spring; it would also be anticipated that a final ordinance and contract would be completed by the end of 2019.<sup>77</sup>

Prior to the Environmental Committee action, EQAC approved a resolution supporting the adoption of a C-PACE ordinance by the Board of Supervisors. The EQAC resolution stressed that “enactment of a C-PACE ordinance could be an important tool in meeting th[e] challenge of reducing GHG emissions in the private sector.”<sup>78</sup>

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<sup>74</sup> Fairfax County Environmental Committee, *Meeting Minutes*, Feb. 13, 2018, available at [www.fairfax-county.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf](http://www.fairfax-county.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/feb13-environmental-summary.pdf)

<sup>75</sup> Fairfax County Environmental Committee, *Presentation on Commercial Property Assessed Clean Energy (C-PACE)*, June 12, 2018, available at [www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/june12-environmental-commercial-pace.pdf](http://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2018/june12-environmental-commercial-pace.pdf) Video of presentation available at [video.fairfaxcounty.gov/MediaPlayer.php?view\\_id=9&clip\\_id=1083](http://video.fairfaxcounty.gov/MediaPlayer.php?view_id=9&clip_id=1083)

<sup>76</sup> See for example, the regional toolkit developed by the Mid-Atlantic PACE Alliance, available at [www.pacealliance.org/toolkit](http://www.pacealliance.org/toolkit)

<sup>77</sup> Environmental Quality Advisory Council, *Minutes for September 12, 2018*, p. 5, available at [www.fairfax-county.gov/planning-zoning/environmental-quality-advisory-council/minutes](http://www.fairfax-county.gov/planning-zoning/environmental-quality-advisory-council/minutes)

<sup>78</sup> Memorandum from Stella Koch, EQAC Chair, to Board of Supervisors, May 31, 2018, available at [www.fairfax-county.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resolutions%20and%20positions/2018/2018,%20may--eqac%20support%20for%20a%20c-pace%20program.pdf](http://www.fairfax-county.gov/planning-zoning/sites/planning-zoning/files/assets/documents/eqac/resolutions%20and%20positions/2018/2018,%20may--eqac%20support%20for%20a%20c-pace%20program.pdf)

EQAC recommends the timely adoption of the C-PACE ordinance and program so that county businesses can take advantage of this important opportunity. In addition, the development and public release of a detailed timetable for C-PACE action by the county would be extremely valuable to inform the private sector and maximize the ultimate economic benefits resulting from the program.

### Need for Development & Implementation of a Community-Wide Energy & Climate Action Plan

#### *Assessment of Current Status of Private Sector GHG Reduction Actions in Fairfax County and June 2017 Commitment of the Board of Supervisors to Develop a Climate Action Plan*

As further discussed in the Data Appendix, leading energy experts have highlighted the importance of community energy and climate action plans in achieving large reductions in GHG emissions as well as jobs and community investment benefits.<sup>79</sup> Although the existing community energy outreach programs and the C-PACE initiative in Fairfax County are valuable, the scope and resources of these programs are far more limited than typical community-wide energy and climate action programs.

For example, Arlington County has a full-time Energy Manager and contractor support was utilized for the development of its original 2013 Community Energy Plan. The elements of Arlington's Community Energy Plan relating to private sector energy use are implemented by approximately five to six full-time staff members.<sup>80</sup>

On July 24, 2018, county staff confirmed that “the Board has not adopted a plan to address community greenhouse gas emissions,”<sup>81</sup> and the county has not begun work to develop a climate action plan. The only county action plan in place is the Fairfax County Operational Energy Strategy discussed earlier in this chapter, and the July 24 communication emphasized that “[T]he Operational Energy Strategy is intended to reduce energy use by county government; it is not an emissions reduction strategy.”<sup>82</sup>

The Board of Supervisors adopted a resolution endorsing the Mayor's National Climate Action Agenda at its meeting on June 6, 2017.<sup>83</sup> Chairman Bulova emphasized at that meeting that the

<sup>79</sup> ICLEA USA, Local Governments for Sustainability, “*Localizing the Paris Agreement: A Guide for Local Government Action*,” 2017, p. 30, available at <http://iclei.usa.org/wp-content/uploads/2017/09/Localizing-the-Paris-Agreement-ICLEI-USA-2017.pdf>; U.S. Department of Energy, *Guide to Community Strategic Energy Planning*, March 2013, p. 1-2, available at [www.energy.gov/sites/prod/files/2014/05/f15/cesp\\_guide.pdf](http://www.energy.gov/sites/prod/files/2014/05/f15/cesp_guide.pdf)

<sup>80</sup> Telephone Discussion with Joan Kelsch, Arlington County, July 30, 2018. Arlington's complete program – Arlington Initiative to Rethink Energy -- covers not only community outreach activities but also manages county energy operations and was funded at a level of \$1.7 million with 10 staff in Fiscal Year 2018.

<sup>81</sup> Response from county staff to Inquiry from Larry Zaragoza and Debra Jacobson, July 24, 2018, p. 2.

<sup>82</sup> *Ibid.*

<sup>83</sup> Fairfax County Clerk, *Clerk's Board Summary for Meeting of June 6, 2017*, pp. 16-17, 32, available at <https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting%20materials/board/2017/june06-board-summary.pdf>. It should be noted that all current members of the Climate Mayor's Agenda are actually City Mayors and that Fairfax County is not currently listed as a member on the Climate Mayor's web site. [www.climatemayors.org/about/members/](http://www.climatemayors.org/about/members/). Instead, Fairfax County is listed as a member of a similar group called We Are Still In, see [www.wearestillin.com/cities-counties](http://www.wearestillin.com/cities-counties)

“development of a climate action plan” was one of the three main pillars of the Climate Mayor’s Agenda.<sup>84</sup> The board adopted this resolution shortly after President Trump announced his intent to withdraw the U.S. from participation in the Paris Climate Accord. Fairfax County also is listed as a signatory of the “We Are Still In” declaration “to continue to support climate action to meet the Paris Agreement.”<sup>85</sup> However, these commitments require substantial action to fulfill the goals.

### *Energy and Climate Action Plans by Other Localities*

Meanwhile, many other cities and counties have moved forward with aggressive climate action plans. For example, in 2012, the District of Columbia established a goal of reducing GHG emissions by 50 percent below 2006 levels by 2032,<sup>86</sup> and in December 2017, Mayor Bowser strengthened this initial goal by announcing a commitment to reduce greenhouse gas emissions by 100 percent and to achieve carbon neutrality by 2050.<sup>87</sup> In 2013, Arlington County, Virginia also developed a comprehensive Community Energy Plan<sup>88</sup> and followed up the plan with implementation strategies in 2015.<sup>89</sup> Earlier this year, Arlington began a stakeholder process to update its energy plan.<sup>90</sup>

There are a variety of policy tools that can be implemented under an energy and climate action plan, and numerous resources are available to aid Fairfax County in developing such an action plan.<sup>91</sup> GHG reduction efforts are typically focused on the following four sectors: buildings; electricity; transportation; and industry.

One example – voluntary benchmarking of building energy efficiency against other building owners -- serves to highlight the range of practical options available to Fairfax County. This tool has been used Arlington County and Charlottesville to promote energy efficiency in the private sector. For example, Charlottesville sponsored a Better Business Challenge to encourage businesses to promote energy efficiency, as well as other action items, through a scorecard

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<sup>84</sup> *Ibid.*, p. 17.

<sup>85</sup> *We Are Still in Declaration*, available at [www.wearestillin.com/cities-counties](http://www.wearestillin.com/cities-counties)

<sup>86</sup> Sustainable DC, “*Sustainable DC*,” 2012, p. 10, available at [www.sustainabledc.org/wp-content/uploads/2012/10/SDC-Final-Plan\\_0.pdf](http://www.sustainabledc.org/wp-content/uploads/2012/10/SDC-Final-Plan_0.pdf).

<sup>87</sup> Executive Office of the Mayor, “Mayor Bowser Commits to Make Washington DC Carbon-Neutral and Climate Resilient by 2050,” December 4, 2017, available at <https://mayor.dc.gov/release/mayor-bowser-commits-make-washington-dc-carbon-neutral-and-climate-resilient-2050>

<sup>88</sup> Arlington County, *Community Energy Plan*, 2013, available at <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/13/2013/07/Arlingtons-Community-Energy-Plan.pdf>

<sup>89</sup> Arlington County, *Community Energy Plan Implementation Framework*, 2015, available at <https://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/13/2015/08/Arlingtons-CEP-Implementation-Framework.pdf>

<sup>90</sup> Arlington County, *Arlington Initiative to Rethink Energy web site*, available at <https://environment.arlingtonva.us/energy/community-energy-plan-cep/>

<sup>91</sup> Two examples are as follows: Rocky Mountain Institute, *Community Energy Resource Guide*, 2015, available at [https://rmi.org/wp-content/uploads/2017/04/Community\\_Energy\\_Resource\\_Guide\\_Report\\_2015.pdf](https://rmi.org/wp-content/uploads/2017/04/Community_Energy_Resource_Guide_Report_2015.pdf); U.S. Department of Energy, *Guide to Community Strategic Energy Planning*, March 2013, p. 1-2, available at [www.energy.gov/sites/prod/files/2014/05/f15/cesp\\_guide.pdf](http://www.energy.gov/sites/prod/files/2014/05/f15/cesp_guide.pdf)

system. The challenge focused primarily on implementing energy efficiency practices, including benchmarking. Over 150 businesses in Charlottesville competed in the challenge.<sup>92</sup>

One of the important “lessons learned” highlighted by experts in strategic energy and climate planning is that “a good planning process is a prerequisite for success.”<sup>93</sup> Critical elements include strong collaboration with the local community and transparency in the process and the reporting of results.<sup>94</sup>

### Need for Development and Implementation of a Climate Resiliency and Adaptation Action Plan

#### *Introduction and Summary*

In its Climate and Energy Action Plan for 2017 to 2020, MWCOG recommended that local governments “increase the resiliency of the region’s infrastructure, economy, communities, and environment to prepare for the impacts of climate change.”<sup>95</sup> The action plan emphasized that:

*The region is experiencing the impacts of a changing climate. **Taking practical, common sense steps to address climate change impacts today is in the best interest of future generations...** There will likely be an increase in extreme events such as severe storms, flooding, and heat waves.*<sup>96</sup> (emphasis added)

In March 2015, in response to a recommendation in the 2014 EQAC Annual Report, the Deputy County Executive advised the Board of Supervisors that action should be taken to better plan for the potential impacts of climate change.<sup>97</sup> In addition, Fairfax County has initiated some projects to address climate risks at its wastewater and stormwater facilities and has actively participated in regional resiliency planning efforts for several years. However, the county has not yet developed or implemented its own comprehensive resiliency and adaptation action plan.

#### *Fairfax County Action to Address Climate Risks to Fairfax County’s Wastewater and Stormwater Facilities and in Other Areas*

Fairfax County has conducted some evaluation of specific climate risks. For example, in 2015, as part of updates to the master plan for Noman M. Cole, Jr. Pollution Control Plant (NMCPCP), the Fairfax County Department of Public Works and Environmental Services contracted with an

<sup>92</sup> Shrink-Energy, *Benchmarking: What’s Happening in Virginia*, 2018, available at <https://energy-shrink.com/benchmarking-happening-virginia/>

<sup>93</sup> Rocky Mountain Institute, *Community Energy Resource Guide*, 2015, p. 8, available at [https://rmi.org/wp-content/uploads/2017/04/Community\\_Energy\\_Resource\\_Guide\\_Report\\_2015.pdf](https://rmi.org/wp-content/uploads/2017/04/Community_Energy_Resource_Guide_Report_2015.pdf)

<sup>94</sup> *Ibid.*

<sup>95</sup> MWCOG, *Regional Climate and Energy Action Plan – 2017 to 2020 Plan*, March 2017, p. 23, available at [www.mwcog.org/documents/2017/03/23/regional-climate-and-energy-action-plan-climate--energy-climate-change-energy/](http://www.mwcog.org/documents/2017/03/23/regional-climate-and-energy-action-plan-climate--energy-climate-change-energy/)

<sup>96</sup> *Ibid.* p. 23.

<sup>97</sup> Memorandum from David Molchany, Deputy County Executive, to Board of Supervisors, *Agency Response to EQAC Recommendations Contained in 2014 Annual Report on Environment (Response to Climate and Energy Recommendation #4*, Mar. 27, 2015, available at [www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/annual-report-environment/2014](http://www.fairfaxcounty.gov/planning-zoning/environmental-quality-advisory-council/annual-report-environment/2014)

engineering consulting firm to prepare a preliminary evaluation of potential climate risks to Fairfax County's wastewater and stormwater facilities, with a focus on NMCPCP and Pohick Creek. The report identified the following risks to the county's wastewater system as a result of climate change:

- Changes in rainfall patterns that could affect the design criteria for wastewater collection systems, drainage systems and floodplain management.
- Increased storm surge impacts resulting from sea level rise.
- Power outages resulting from increased frequency of extreme wind events.
- Strain on power requirements from extreme heat episodes.

The report recommended that the county establish robust design guidelines for future wastewater and stormwater infrastructure upgrades/designs and consider making regular updates to the county's design guidelines based on projected rainfall until 2050, at least. The report also recommended identifying site-specific protective measures for a range of future climate scenarios, noting that projects should be identified to provide incremental decreases in climate risk only when other asset renewal or capacity expansions are undertaken. A final recommendation of the report is to conduct a more in-depth assessment of the vulnerability of critical wastewater infrastructure assets and to engage in regional climate resilience planning efforts.<sup>98</sup>

In response to the report, the county "has initiated a number of projects to begin adaptation to climate change."<sup>99</sup> Three relatively large projects have either been completed or will be completed within the next year. Other initiatives are under study. The three major projects are as follows:

- Pohick Creek Stream Stabilization – Phases I and II. These projects provided armoring where the Pohick Creek was encroaching on treatment ponds. The two projects totaled about \$4 million and were completed in the winter of 2017-18.
- Equalization Basin Upgrades. As part of this project, the county is constructing more than 2,000 linear feet of floodwall along the Pohick Creek at a cost of over \$2 million.
- Backup Power Reliability. As part of this project, five 2,000 kW backup generators were purchased and installed at the Noman M Cole Pollution Control Plant, which allows the plant to operate "off the grid" in the event of an emergency.<sup>100</sup>

In addition, in recent years the county issued a bond for a stormwater levee to address periodic flooding in the Huntington area of the county.<sup>101</sup> "[A]dditional height has been designed into this levee in order to account for 'risk and uncertainty.'" "While sea level rise is not explicitly

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<sup>98</sup> E-mail from Fairfax County Staff to Larry Zaragoza and Debra Jacobson, July 23, 2018.

<sup>99</sup> E-mail from Michael McGrath to Noel Kaplan, July 26, 2018.

<sup>100</sup> *Ibid.*

<sup>101</sup> E-mail from Fairfax County Department of Public Works and Environmental Services to Noel Kaplan, Aug. 6, 2018. This project is discussed in more detailed in the Stormwater Chapter of this report.

identified as the driving factor for this additional height, the effect is that anticipated sea level rise impacts are being accommodated through this design.”<sup>102</sup> There also has been some work done on identification of possible flood protection efforts for the Belle Haven/Belle View/New Alexandria communities (beyond an existing flood gate that already provides some level of protection).<sup>103</sup>

### *County Participation in Regional Resilience Planning*

Since 2013, Fairfax County has participated in a number of regional efforts to help assess the projected impacts of climate change and increase regional resilience. The county participated in a regional sea level rise study that was completed by the Northern Virginia Regional Commission (NVRC) in 2013. More recently, NVRC followed up on that effort through the coordination of a regional Climate Resiliency Team. In 2018, NVRC and MWCOG developed a report titled “Resilient Critical Infrastructure: A Roadmap for Northern Virginia,”<sup>104</sup> and Fairfax County officials participated in this roadmap initiative. This report presented a high-level set of objectives and strategies that can inform local government resiliency efforts. Following the award of additional state funding, NVRC plans to continue to work with local governments to develop tools to assist with prioritization of resiliency planning, share best practices and assist localities with implementation of Roadmap strategies.<sup>105</sup>

Since 2017, MWCOG has been working with the United States Army Corps of Engineers (Army Corps) to develop a scope of work and budget for a Coastal Storm Risk Management (CSR) Study for the region with the United States Army Corps of Engineers (Army Corps). The study will investigate flood risks in the vicinity of the region’s tidal areas and identify potential solutions to protect any critical infrastructure as well as any communities in these areas. This effort will build upon existing studies for the region and collaborate with a wide range of stakeholders to leverage ongoing efforts and to avoid duplication. MWCOG has identified Fairfax County as a cost-share partner for the study. The final county contribution will depend on the detailed scope of the study as well as mutually agreed credits for in-kind services.<sup>106</sup>

The CSR study is intended to develop a plan for Fairfax County to mitigate tidal flooding impacts and support community resilience. The study also will analyze regional climate information and project results to assess current and future, non-tidal, localized flooding impacts from major storm events. The Army Corps is expected to complete this comprehensive study in approximately 2021. Preliminary findings will be presented to Fairfax County and other stakeholders during the course of the study.<sup>107</sup>

<sup>102</sup> *Ibid.*

<sup>103</sup> *Ibid.*

<sup>104</sup> Northern Virginia Regional Commission, *Resilient Critical Infrastructure: A Roadmap for Northern Virginia*, available at: [www.novaregion.org/DocumentCenter/View/11933/Resilient-Roadmap-Final-PDF](http://www.novaregion.org/DocumentCenter/View/11933/Resilient-Roadmap-Final-PDF)

<sup>105</sup> Telephone Interview with Dale Medearis, NVRC, July 27, 2018.

<sup>106</sup> E-mail from Fairfax County Staff to Larry Zaragoza and Debra Jacobson, July 23, 2018.

<sup>107</sup> *Ibid.* E-mail from MWCOG staff to Debra Jacobson, Sept. 20, 2016.



### *Resilience and Adaptation Planning by Other Localities*

A leading model for aggressive resilience and adaptation planning in the Washington Metropolitan Area is the District of Columbia. In November 2016, D.C. launched its “Climate Ready DC Plan: The District of Columbia’s Plan to Adapt to a Changing Climate.”<sup>108</sup> The Climate Ready DC Plan outlines detailed goals and a resiliency and adaptation action plan for D.C. in four major areas: (1) transportation and utilities; (2) buildings and development; (3) neighborhoods and communities; and (4) governance and implementation.<sup>109</sup>

The transportation and utility focus area highlights the comprehensive nature of the DC resiliency plan. In this area, the stated goal is to “[i]mprove transportation and utility infrastructure in order to maintain viability during periods of extreme heat, severe weather, and flooding.”<sup>110</sup> The plan sets forth five action items (with 18 detailed subactions) to accomplish the transportation and utilities goal.<sup>111</sup> For example, the plan identifies one of its action items as “develop[ing] site-level adaptation plans for all facilities and service areas identified as at-risk from sea level rise and flooding.”<sup>112</sup> One of the specific sub-actions for this item is to “[i]dentify at-risk facilities and develop adaptation or retirement plans for those facilities, prioritizing upgrades based on the age and criticality of the assets as well as their vulnerability.”<sup>113</sup>

In addition, DC appointed a Chief Resilience Officer in July 2017 to implement the Climate Ready DC Plan<sup>114</sup> as well as to address non-climate resiliency issues that threaten the economy of the District, including cybersecurity challenges.<sup>115</sup> DC created this position in partnership with 100 Resilient Cities, a project created by the Rockefeller Foundation that provides financial assistance to participating cities.<sup>116</sup>

### *Overall Assessment*

In summary, Fairfax County has initiated a significant effort to strengthen its wastewater and stormwater facilities to protect against climate change, has built a levee in the Huntington area and has participated in regional resiliency planning efforts for several years. However, the

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<sup>108</sup> D.C. Department of Energy and Environment Press Release, *District Launches Climate Ready DC Plan*, Nov. 15, 2016, available at <https://doee.dc.gov/release/district-launches-climate-ready-dc-plan-announces-projects-reduce-flood-risks>

<sup>109</sup> District of Columbia, *Climate Ready DC*, Nov. 15, 2016, available at [https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service\\_content/attachments/CRDC-Report-FINAL-Web.pdf](https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/CRDC-Report-FINAL-Web.pdf)

<sup>110</sup> *Ibid.*, p. 8.

<sup>111</sup> *Ibid.*, pp. 8-9, 13-15.

<sup>112</sup> *Ibid.*, p. 13.

<sup>113</sup> *Ibid.*

<sup>114</sup> Office of the DC Mayor, Press Release, *Mayor Bowser Appoints Kevin Bush as Washington, DC’s First Chief Resilience Officer*, July 21, 2017, available at <https://mayor.dc.gov/release/mayor-bowser-appoints-kevin-bush-washington-dcs-first-chief-resilience-officer>

<sup>115</sup> Kojo Nnamdi Radio Show, *Interview with Kevin Bush, DC Chief Resiliency Officer on Broadcast What Another Super Soaker Week Says About Climate Change in Our Region*, Aug. 1, 2018, available at <https://thekojonnamdishow.org/shows>

<sup>116</sup> Office of the DC Mayor, Press Release, *Mayor Bowser Appoints Kevin Bush as Washington, DC’s First Chief Resilience Officer*, July 21, 2017, available at <https://mayor.dc.gov/release/mayor-bowser-appoints-kevin-bush-washington-dcs-first-chief-resilience-officer>

county has not developed or implemented a comprehensive, county-specific resiliency action plan. Yet, as county residents and businesses experience more extreme weather events and other climate change impacts, the need for action is highlighted.

The Data Appendix provides additional information from regional reports underscoring the importance of county-specific resilience planning as well as the need for integrating climate resilience considerations into policies and processes across all departments. The DC Climate Ready Plan also provides a useful model for consideration.

### **Comments**

1. In recent years, the county website and other public information often have highlighted reductions in greenhouse gas (GHG) emissions on a **per capita** basis rather than reductions in **total** GHG emissions. In order to assess the impact of GHG emissions on climate change, total emissions are the relevant metric, and this metric is routinely used by governmental agencies and others. Reporting of **per capita** emission reductions may be of interest as a supplementary statistic (particularly since population is increasing in the county) but **total** emissions should be the primary reporting statistic.
2. EQAC commends the county's agreement with the local electric utility to reduce the costs of converting streetlights to high-efficiency LED fixtures. We urge rapid implementation of this agreement by the utility and county.
3. The county's adoption (in July 2018) of an energy strategy to reduce energy use and increase clean energy in government operations was an important step forward. Described as a "living document," EQAC expects that the goals and targets in the document will be strengthened during the annual review contemplated next year.
4. EQAC believes the action of the Board of Supervisors Environmental Committee directing staff to draft an ordinance to support a Commercial Property Assessed Clean Energy (C-PACE) program will be an effective way to reduce GHG emissions.
5. According to Department of Energy Guidance, it is valuable for elected officials to evaluate multiple options for the long-term funding of county operational energy strategies, including third-party financing options (e.g., power purchase agreements, Energy Savings Performance Contracts and public-private partnerships). This information allows for the consideration of funding approaches that might support more aggressive GHG reduction goals while reducing impacts on real estate taxes.
6. The county's participation in the MWCOG study of sea level rise will aid in the development of plans to reduce impacts associated with predicted increases in sea level rise for tidal waters in Fairfax County.
7. In order to ensure the implementation of the recommendations of this report chapter and the board's Environmental Vision, EQAC expects that the county will need to undertake a detailed evaluation of its current organizational structure, staffing and resources for climate and energy functions in light of best energy management practices.

## **Recommendations**

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 (MWCOC) 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.<sup>117</sup>
  - ◆ 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 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.

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<sup>117</sup> Fairfax County Public School, Greenhouse Gas Inventory Report for Calendar Year 2015, *available at* [www.fcps.edu/sites/default/files/media/pdf/calendar2015.pdf](http://www.fcps.edu/sites/default/files/media/pdf/calendar2015.pdf)

## 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]<sup>1</sup>*

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, D.C. 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 (MWWOG), 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. There are several air quality-related figures presented in this chapter and the Data Appendix that supports this report, and all of them tell the same story: our air has gotten cleaner. 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 ([www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be](http://www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be)).

The county’s major responsibilities in the aforementioned federal-state-regional-local 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

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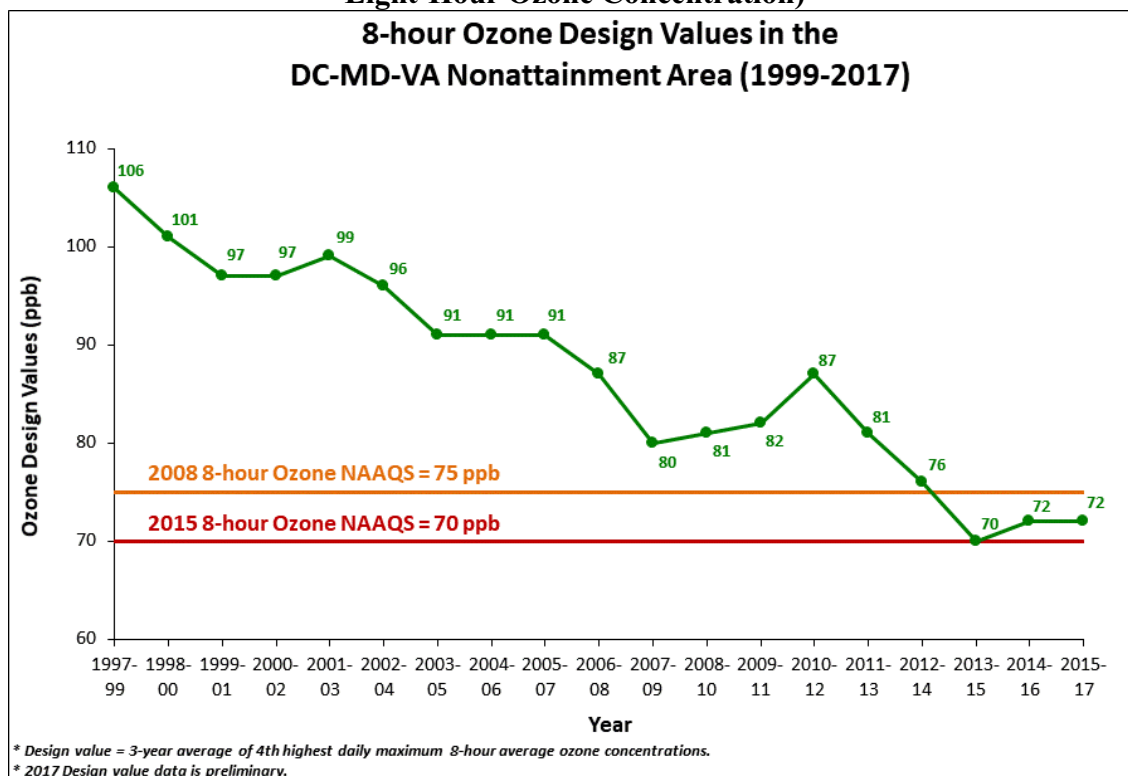
<sup>1</sup> 2017 Fairfax County Environmental Vision, Section 2 F, pg. 28,  
[www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf)

programs that help to minimize or eliminate air pollution. This air quality chapter focuses on: criteria pollutant air quality matters, such as for ground-level 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 about air quality.

### **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, D.C. 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 2017. 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<sub>2.5</sub>) over a multiple-year period of monitoring for the metropolitan area.

**Figure VII-1. Ozone Design Value in Relation to the 2008 and 2015 Eight-Hour Ozone Standards (Three-Year Average of Fourth-Highest Daily Maximum Eight-Hour Ozone Concentration)**



Source: Metropolitan Washington Council of Governments. 2017 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 lowering the ozone level, 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.

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.

Monitors in the metropolitan region recorded data on eight days during the 2017 ozone season when ozone values were greater than the 70 ppb standard (2015 standard). These days were all noted as “Code Orange” (unhealthy for sensitive groups). None were “Code Red” (unhealthy) or “Code Purple” (Very Unhealthy) days.

### Fine Particulate Matter

Data show that the region continues to comply with both the annual ( $12 \mu\text{g}/\text{m}^3$ ) and daily ( $35 \mu\text{g}/\text{m}^3$ ) standards for fine particulate matter ( $\text{PM}_{2.5}$ ). Based on data for 2014 – 2016, the annual design value for  $\text{PM}_{2.5}$  was  $9.1 \mu\text{g}/\text{m}^3$  (relative to the  $12 \mu\text{g}/\text{m}^3$  standard) and the 24-hour (daily) design value was  $21 \mu\text{g}/\text{m}^3$  (relative to the  $35 \mu\text{g}/\text{m}^3$  standard). Additional improvements are expected due to the installation of upwind control devices and other changes that reduce the emissions of sulfur dioxide ( $\text{SO}_2$ ), a precursor to  $\text{PM}_{2.5}$ . Most of the major Virginia upwind control programs are listed in the Caroline, Fredericksburg, Richmond-Petersburg and Hampton Roads Ozone Advance Action Plans, which can be found on DEQ's Web page at [www.deq.virginia.gov/Programs/Air/AirQualityPlans/OzoneandPM25RegionalPlanningActivities.aspx](http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OzoneandPM25RegionalPlanningActivities.aspx).

Since the Washington region is in attainment of the PM<sub>2.5</sub> standards, it is no longer required to perform transportation conformity analyses for any PM<sub>2.5</sub> standard.

### Nitrogen Dioxide—NO<sub>2</sub>

On February 9, 2010, EPA published a revised NAAQS for nitrogen dioxide (NO<sub>2</sub>), 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<sub>2</sub> 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<sub>2</sub> 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.

### Sulfur Dioxide--SO<sub>2</sub>

On June 22, 2010, EPA published a revised NAAQS for sulfur dioxide (SO<sub>2</sub>) 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<sub>2</sub> 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<sub>2</sub>. 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 µg/m<sup>3</sup>. 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 2017 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<sub>x</sub>) from electric generating units in 22 eastern states. There may be indirect benefits to Fairfax County from these reductions in summertime NO<sub>x</sub>, even though the county has no electric generating units.



### Reasonably Available Control Technology

The Clean Air Act establishes that all major stationary sources of volatile organic compounds (VOC) and NO<sub>x</sub> 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). DEQ 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, DEQ has determined that additional controls are needed at the Covanta facility in order to satisfy RACT requirements (letter dated September 29, 2017); coordination between DEQ and Covanta is continuing. As described in that letter, DEQ will consider the installation and operation of Covanta's patented "Low NO<sub>x</sub>" combustion system, in combination with selective non-catalytic reduction, as meeting RACT requirements for each of the four 750 tons per day municipal waste combustor units at its Lorton facility. DEQ expects to publish the proposed draft RACT permits for both of these facilities in 2018.

### Air Quality Monitoring

Fairfax County does not have an air quality monitoring program; it works with the Metropolitan Washington Council of Governments (MWCOC) to assess air quality in the region. The Virginia Department of Environmental Quality (DEQ) 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](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.

DEQ operates a motor vehicle inspection and maintenance (IM) program in Northern Virginia. This program requires that vehicles pass an emissions test every two years in order to register or re-register with the Virginia Department of Motor Vehicles. In 2017, 818,815 initial emissions inspections were performed in Northern Virginia, with an overall fail rate of 2.5 percent. Vehicles registered in Fairfax County represent approximately 45 percent of the IM fleet in the area.

In March 2016, DEQ implemented the RapidPass program, allowing up to 30 percent of the IM fleet's cleanest vehicles to receive a clean screen by driving through on-road remote sensing devices. This system allows vehicle owners to redeem clean screens online in lieu of submitting their vehicles for a traditional emissions inspection at a station. In calendar year 2017, the RapidPass program identified 252,448 eligible RapidPass candidates and motorists redeemed 87,308 clean screens.

In August 2017, DEQ restarted a High Emitter Program, which also 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 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 DEQ if repair costs exceed the waiver threshold. In 2017, DEQ issued 385 high emitter NOVs.

### Alternatives to Use of Motor Vehicles

The Fairfax County Board of Supervisors has directed the Fairfax County Department of Transportation 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 must establish and fund a \$2.925 billion environmental mitigation trust as part of settlement agreements with the U.S. Justice Department. The agreements address Volkswagen's installation and use of emissions testing defeat devices in over 500,000 vehicles sold and operated in the United States beginning in 2009. Virginia was approved as a beneficiary to the state trust agreement (Trust) resulting from the Volkswagen settlement. Virginia's allocation from the Trust is \$93.6 million. Funds from the Trust may only be used to implement 10 mitigation actions eligible under the Trust. Virginia's proposed state mitigation plan allows for the selection of all eligible mitigation projects including using up to 15 percent (maximum allowed under the Trust) on electric vehicle charging infrastructure. In accordance with the State Trust Agreement, public comment and Virginia's clean air and energy goals, DEQ issued a request for proposals in October 2017 to establish a statewide public electric vehicle charging network to accelerate the adoption and use of electric vehicles. A process to determine additional funding priorities and methods to distribute the remaining Trust funds is underway.

### Public Agency Responsibilities

#### Metropolitan Washington Air Quality Committee—Overview

Although compliance with National Ambient Air Quality Standards and resulting air quality management responsibilities is a function of federal law, in Fairfax County and in 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. Fairfax County holds a seat on, and the county staff is required to support, the lead planning organization for the metropolitan Washington area, the Metropolitan Washington Air Quality Committee. 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/](http://www.mwcog.org/committees/metropolitan-washington-air-quality-committee/).

*Special Project: What We Can Do to Improve Air Quality in the Washington Region*

Working with the MWCOC Air and Climate Public Advisory Committee, the MWAQC Chair initiated 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. 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 the May 23, 2018 MWAQC meeting and are summarized in a draft report entitled “What We Can Do to Improve Air Quality in the Washington Region.” A final report was to have been published later in 2018.

MWAQC operates through a subcommittee system. Subcommittees include:

- The Technical Advisory Committee—see [www.mwcog.org/committees/mwaqc-technical-advisory-committee/](http://www.mwcog.org/committees/mwaqc-technical-advisory-committee/).
- The Interstate Air Quality Council--A high-level interstate body providing guidance on shared air quality goals, including compliance with federal standards.
- The Forecasting Subcommittee—Focuses on ozone monitoring and reporting, including how to devise guidelines for issuing health alerts during the ozone season.
- The Attainment Subcommittee—Focuses on control measures needed to attain the eight-hour ozone standard.
- The Conformity Subcommittee—Reviews Air Quality Conformity Determinations prepared by the Transportation Planning Board to ensure that regional transportation plans are consistent with plans to improve air quality.
- The Air and Climate Public Advisory Committee (see [www.mwcog.org/committees/air-and-climate-public-advisory-committee/](http://www.mwcog.org/committees/air-and-climate-public-advisory-committee/)).
- The Control Measures Workgroup—Researches emission-reducing control measures and develops a plan of control measures for the region in support of ozone attainment.

MWAQC staff participates in the Mid-Atlantic Regional Air Management Association (MARAMA) to follow its 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 2008 and 2015 ozone standards.

In 2016, MWAQC commented on the transportation conformity analysis (2016 Constrained Long-Range Transportation Plan and 2017-2022 Transportation Improvement Program). Conformity was tested against the attainment and contingency mobile budgets in the region's eight-hour ozone State Implementation Plan for the 1997 ozone standard. The conformity analysis showed current and future mobile emissions lower than the maximum allowable VOC and NO<sub>x</sub> mobile budgets for the 2008 ozone NAAQS.

#### *MWAQC FY 2019 Work Program*

For FY 2019, MWAQC will lay the ground 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 2019, MWAQC Core Program objectives include:

- Begin 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.
- Finalize What We Can Do to Improve Air Quality analysis and identify follow-up activities.

#### **Transportation Planning Board**

The Transportation Planning Board (TPB), which also is part of MWCOG, serves as the designated Metropolitan Planning Organization for the 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 nonprofit (501(c)(3)) partnership chartered by the Metropolitan Washington Council of Governments 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/](http://www.cleanairpartners.net/).

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**Comments**

1. EQAC appreciates that Fairfax County relies on 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](http://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. Although Fairfax County Health Department staff no longer participates in air quality monitoring or planning activities, 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. EQAC supports the efforts of Fairfax County, the Virginia Department of Transportation and the 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**

Fairfax County Health Department. E-mail from John Yetman, Environmental Health Supervisor, to Noel Kaplan, EQAC. August 6, 2018.

MWCOG. E-mail from Amanda Campbell to Noel Kaplan, EQAC. June 25, 2018.

VA DEQ. E-mail from Doris McLeod to Noel Kaplan, EQAC. June 15, 2018.

## 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.”<sup>1</sup>

*[Excerpt from the vision statement for the Parks and Ecological Resources core service area]*

### **Introduction**

The Fairfax County Sustainability Initiatives<sup>2</sup> 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.

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

<sup>2</sup> 2017 Fairfax County Sustainability Initiatives, pg. 67,  
[www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/sustainability-initiatives-report-fy2018.pdf](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/sustainability-initiatives-report-fy2018.pdf)

The Fairfax County Park Authority (FCPA) has a progressive, stepwise Wildlife Conflict Policy (Policy 202<sup>3</sup>) 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 for supporting the goose management program.

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.<sup>4,5</sup> 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 destruction of property will be lowered. Prior to the implementation of the county's management program, the Virginia

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<sup>3</sup> Fairfax County Park Authority Policy Manual

[www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/administrative/park-policy-manual.pdf](http://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/administrative/park-policy-manual.pdf)

<sup>4</sup> Virginia Deer Management Plan 2015-2024, Virginia Department of Game and Inland Fisheries

[www.dgif.virginia.gov/wildlife/deer/management-plan/](http://www.dgif.virginia.gov/wildlife/deer/management-plan/)

<sup>5</sup> 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](http://www.fs.fed.us/nrs/news/review/review-vol16.pdf)



Department of Game and Inland Fisheries (DGIF) estimated deer density levels ranging from 90-419 deer per square mile throughout Fairfax County parks. FCPA has 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.<sup>6</sup>

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 are 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).
  - White-tailed deer browse impact data have been published to the county's enterprise geographic information system (GIS) database and are expected to be made available on the public access site before the end of FY 2019.
- **Deer Density Camera Surveys.**
  - 2015: 13 parks (26 camera stations).
  - 2016: 33 parks (48 camera stations).
  - 2017: 21 parks (45 camera stations).
  - 2018: 21 parks (52 camera stations).
- **Aerial infrared (FLIR) surveys with fixed-wing aircraft.**
  - 21 parks were surveyed in winter 2013-2014.

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<sup>6</sup> FCPD, Wildlife Management Specialist Office Website, Deer Management Frequently Asked Questions [www.fairfaxcounty.gov/wildlife/deer-management-frequently-asked-questions](http://www.fairfaxcounty.gov/wildlife/deer-management-frequently-asked-questions)

- **Deer-Vehicle Collision Data.**

- Police records and Virginia Department of Transportation (VDOT) work orders (see Table A-VIII-1 in the Data Appendix for details).

Game camera surveys and/or aerial infrared (FLIR) surveys with fixed-wing aircraft, which are used for population estimates, have been conducted in 64 percent of the parks included in the Deer Management Program from 2013-2018. FCPD and FCPA have been consistently collecting 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, much of the browse impact data collected in 2018 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.

### 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 to be used by 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 DGIF. Experimental techniques may be permitted under a scientific collection permit by DGIF if the project represents *bona fide* scientific research. DGIF 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 special-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 2018 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 2018 season, deer herd reduction was sustained through the incorporation of two management methods: archery hunts and sharpshooting. Deer herd reduction activities in FY 2018 yielded 1,091 deer harvested for all parks, as compared to the FY 2017 season, during which reduction activities removed 1,145 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.<sup>7</sup> Archery is a quiet and short-range method, with most deer being taken within less than 60 feet. DGIF identified Fairfax County as an area for deer population reduction based on the abundant status of deer herds within the county. Thus, DGIF has set liberal regulations to assist population control efforts, including no daily or season bag limits and an extended eight-month deer season. DGIF has authorized an early season on lands within Fairfax County; qualified bowhunters may hunt from the first Saturday in September through the last Sunday in April.

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.<sup>8</sup> In FY 2018, over 95 percent of the deer (1,041 deer) harvested in the Deer Management Program were taken by archery, with the remainder being harvested by sharpshooting. In FY 2018, 588 volunteer archers contributed 43,688 hours to the Deer Management Program for an average of 74 hours per volunteer. The county's FY 2018 archery program was organized as 18 hunt clusters, which includes 98 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

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<sup>7</sup> [www.fairfaxcounty.gov/wildlife/individual-archer-standards](http://www.fairfaxcounty.gov/wildlife/individual-archer-standards)

<sup>8</sup> <http://fairfaxcountygis.maps.arcgis.com/apps/webappviewer/index.html?id=409cc24c643d453387f752ce6e06bcad>

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.

### Sharpshooting

Night-time sharpshooting operations conducted by the Fairfax County Police Department were held at eight parks and accounted for less than five percent (50 deer) of the harvest in FY 2018. 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.

### Public Managed Hunts

Managed hunts were not conducted in FY 2018, but are planned to be conducted in the Sully Woodlands area again in FY 2019 in conjunction with archery. Parks where managed hunts previously occurred in the Sully Woodlands area were transitioned to archery due to public managed hunts having higher personnel costs, lower harvests for several hunt seasons and weather-related events that impacted scheduled managed hunts. 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. Archery has proven to be more cost-effective overall and can be conducted while parks remain open to the public. Staff will use a combination of archery and managed hunts at Ellick Preserve, Rock Hill District Park and Mountain Road District Park. Changes that will be implemented to the program 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.

### 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<sup>9</sup> on Wildlife Fertility Control hosted in Washington, D.C. by the Humane Society of the United States and Bobstiber Institute for Wildlife Fertility Control.

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<sup>9</sup> [www.regonline.com/builder/site/default.aspx?EventID=1895243](http://www.regonline.com/builder/site/default.aspx?EventID=1895243)

*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 use of drugs in vertebrate wildlife is still required, and DGIF 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*

The City of Fairfax recently completed a five-year experimental research effort to surgically sterilize deer within the city limits. The estimated cost of sterilizing one doe is \$1,000, but there is currently an additional cost of \$436 in police overtime. 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.”<sup>10</sup>*

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 website<sup>11</sup> is a good resource

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<sup>10</sup> [www.pwconserve.org/wildlife/mammals/deer/DGIF\\_Lethal%20vs%20Non-lethal%20deer%20management%20Statement-%20Official.pdf](http://www.pwconserve.org/wildlife/mammals/deer/DGIF_Lethal%20vs%20Non-lethal%20deer%20management%20Statement-%20Official.pdf)

<sup>11</sup> [www.fairfaxcounty.gov/wildlife/deer-management-program](http://www.fairfaxcounty.gov/wildlife/deer-management-program)

for the public, proactive outreach 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. 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.<sup>12</sup> 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 Department of Game and Inland Fisheries and Virginia Tech. Using this survey will allow for comparison of deer management in Fairfax County to other jurisdictions in Virginia. 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 FY19.

The creation of informational pages (e.g., on website, as an online pamphlet), covering topics such as problems created by overabundance of deer, methods of population management and conflict mitigation approaches, could also aid in public outreach. Providing the option for take-home information (e.g. a small ¼ sheet of paper with a link to the information pages on the website) at locations such as public information meetings, schools, fairs, local Supervisors' offices and civic group meetings could aid in information dissemination. Similarly, making available a comprehensive bibliography of up-to-date literature on deer management in urban environments could further aid in public education.<sup>13</sup>

#### 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 DGIF 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, south through Clifton, Occoquan and Mason Neck.<sup>14</sup> 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

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<sup>12</sup> [www.fairfaxcounty.gov/wildlife/sites/wildlife/files/assets/documents/pdf/deer%20management/fy-2011-deer-management-survey-results.pdf](http://www.fairfaxcounty.gov/wildlife/sites/wildlife/files/assets/documents/pdf/deer%20management/fy-2011-deer-management-survey-results.pdf)

<sup>13</sup> This effort has been started online at: [www.fairfaxcounty.gov/wildlife/bibliography](http://www.fairfaxcounty.gov/wildlife/bibliography)

<sup>14</sup> [www.fairfaxcounty.gov/wildlife/population-control-options-private-property](http://www.fairfaxcounty.gov/wildlife/population-control-options-private-property)

occurs within the county outside of the Deer Management Program. DGIF reported that 1,905 deer were harvested within Fairfax County in 2017 outside of the county's management program. This number has been consistent over the last several years, averaging 2,045 deer per year since 2010.<sup>15</sup>

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."

## **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 at parks and open grassy areas (e.g. of 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).

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<sup>15</sup> [www.dgif.virginia.gov/wildlife/deer/harvest/?county=Fairfax](http://www.dgif.virginia.gov/wildlife/deer/harvest/?county=Fairfax)



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 for the normal period, 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 eggs that were addled in that year.<sup>16</sup>

*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 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.

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<sup>16</sup> <https://epermits.fws.gov/eRCGR/>

### *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 for 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 may be 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 lessens 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 initiative to implement goose management on their properties. Staff with the Wildlife Management Specialist Office conducts addling on government properties, but also still covers several locations on private property, with landowner consent, under the county permit. 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 2018 Canada Geese Management

FCCA supports efforts to control resident Canada goose populations by participating in humane egg oiling programs and educating the public about resident Canada geese. In 2018, 92 nests containing 397 eggs were oiled on county parkland at the following parks:

- Burke Lake (81 nests, 344 eggs).
- Huntley Meadows (2 nests, 8 eggs).
- Laurel Hill Golf Course (1 nest, 6 eggs)
- Pinecrest Golf Course (3 nests, 13 eggs).
- Royal Lake (2 nests, 11 eggs).
- Twin Lakes Golf Course (3 nests, 15 eggs).

In 2018, 140 nests containing 765 eggs were oiled on properties under the countywide registration held by the Wildlife Management Specialist office, including: a VDOT property; the county's Public Safety and Transportation Operations Center; Fair Oaks Mall; the Fair Oaks District Police Station; Fair Oaks Fire Station 21; Fairfax Court Shopping Center; Crosspointe Lake; Kingstowne Lake; Pinewood Lake; Manchester Lakes; and various stormwater management ponds.

In addition to egg oiling, FCCA 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 amongst 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.<sup>17</sup>

- Negative health consequences and cruelty to the animals themselves, which are subjected to harsh weather, injury or death from cars or wildlife, hunger and disease.

### Management Method

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 spread disease and will not continue to add to the feral cat population. The website also notes that feral cat populations subjected to TNR will naturally decline over time as reproductive rates are decreased.

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. A recent study,<sup>18</sup> which compiled and analyzed the results of dozens of previous published scientific articles on the subject, found 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 in to question the efficacy of TNR-type programs, particularly when applied across a large geographic area.<sup>19 20 21</sup> 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 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.<sup>22</sup>

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

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<sup>17</sup> [https://stacks.cdc.gov/view/cdc/43106/cdc\\_43106\\_DS1.pdf?](https://stacks.cdc.gov/view/cdc/43106/cdc_43106_DS1.pdf?)

<sup>18</sup> [www.nature.com/articles/ncomms2380](http://www.nature.com/articles/ncomms2380)

<sup>19</sup> [www.ncbi.nlm.nih.gov/pmc/articles/PMC5120395/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5120395/)

<sup>20</sup> [www.avma.org/News/Journals/Collections/Documents/javma\\_227\\_11\\_1775.pdf](http://www.avma.org/News/Journals/Collections/Documents/javma_227_11_1775.pdf)

<sup>21</sup> [www.ncbi.nlm.nih.gov/pubmed/19245489](http://www.ncbi.nlm.nih.gov/pubmed/19245489)

<sup>22</sup> [www.avma.org/News/Journals/Collections/Documents/javma\\_227\\_11\\_1775.pdf](http://www.avma.org/News/Journals/Collections/Documents/javma_227_11_1775.pdf)

from the Wildlife Management Specialist's office, which advises against intentionally or unintentionally feeding wildlife to avoid human-wildlife conflicts.<sup>23</sup>

## **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. Coyotes can be affected by mange,<sup>24</sup> a skin disease, and are often mistaken to have rabies due to their sickly appearance or abnormal behavior. 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://fcpdnews.wordpress.com/2016/01/11/coyote-awareness-tips/> 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. A fox information sheet can be found online at [www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/stewardship%20brochures/foxcards.pdf](http://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/naturalcultural/stewardship%20brochures/foxcards.pdf).

### 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

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<sup>23</sup> [www.fairfaxcounty.gov/wildlife/wildlife-management](http://www.fairfaxcounty.gov/wildlife/wildlife-management)

<sup>24</sup> <https://fcpdnews.wordpress.com/2016/10/14/you-mangy-fox-isnt-just-a-saying-its-a-skin-condition-caused-by-mites/>

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 Department of Game and Inland Fisheries. 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/](http://www.fairfaxcounty.gov/news2/bear-aware-season-bear-sightings/)

### **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.<sup>25</sup> 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 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.

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<sup>25</sup> [www.cdc.gov/westnile/statsmaps/cumMapsData.html](http://www.cdc.gov/westnile/statsmaps/cumMapsData.html)

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 Permethrin 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](http://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 213 cases in 2012 – 2016. 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<sup>26</sup>

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;<sup>27</sup> understanding the source(s) of bacteria in a water body can inform remediation actions and which steps can 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.

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<sup>26</sup> [www3.epa.gov/npdes/pubs/bacsortk.pdf](http://www3.epa.gov/npdes/pubs/bacsortk.pdf)

<sup>27</sup> [www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations](http://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations)

## **Comments**

### **Deer Management**

1. EQAC commends the county for continuing and expanding the archery program. Archery is particularly cost-effective, relying on hundreds of qualified volunteers contributing 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. 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 push to grow various management programs, both in staff 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.

### **Goose Management**

3. 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 pollution of the streams and water bodies that are sources of drinking water and 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. 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).

### **References**

- Fairfax County Police Department: Emails from Katherine Edwards, Ph.D., Certified Wildlife Biologist, July 2018
- [www.fairfaxcounty.gov/wildlife/deer-management-program](http://www.fairfaxcounty.gov/wildlife/deer-management-program)
- [www.fairfaxcounty.gov/wildlife/geese-management-program](http://www.fairfaxcounty.gov/wildlife/geese-management-program)

## 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.<sup>1</sup>*

### **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 ([www.fairfaxcounty.gov/informationtechnology/sites/informationtechnology/files/assets/itplan/2019-adopted/fy2019itplan.pdf](http://www.fairfaxcounty.gov/informationtechnology/sites/informationtechnology/files/assets/itplan/2019-adopted/fy2019itplan.pdf)), and numerous GIS applications are offered to the public as interactive mapping services ([www.fairfaxcounty.gov/maps/interactive-map-gallery](http://www.fairfaxcounty.gov/maps/interactive-map-gallery)). Enterprise GIS is managed by Geographic Information Systems and Mapping Services, which is a branch of Fairfax County's Department of Information Technology. 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.

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<sup>1</sup> [www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf-vision](http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf-vision)

Later in this chapter, an innovative and highly efficient use of mobile GIS to speed mosquito control is highlighted.

## **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 three categories: planimetric/topographic; imagery (raster); and related special data (e.g., property parcels and associated data). The on-line Appendix to this chapter provides tables listing the key datasets in each category.

- 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 provided by the state. Surface (topographic) data provide elevations of the county's surface. These are essential data for stormwater analyses and dam inundation area determinations. LIDAR data also provide elevations of structures and tree canopy and are highly valuable in urban forestry canopy assessments. Another round of LIDAR acquisition will take place in winter 2018.
- 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.
- 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 discussed are already publicly available, mostly at no charge, through the county's GIS Open Data section website: [www.fairfaxcounty.gov/maps/open-geospatial-data](http://www.fairfaxcounty.gov/maps/open-geospatial-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 three main categories of GIS applications and tools: desktop GIS software; broad based Web GIS software; and targeted Web GIS applications. 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 responsibility.
- Broad-based Web GIS software: One of the essential components of a complete GIS system is GIS client software that provides 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. (A public version of GEM will be available in 2019.
- 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 Applications: <https://www.fairfaxcounty.gov/maps/interactive-map-gallery>

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 the county uses.

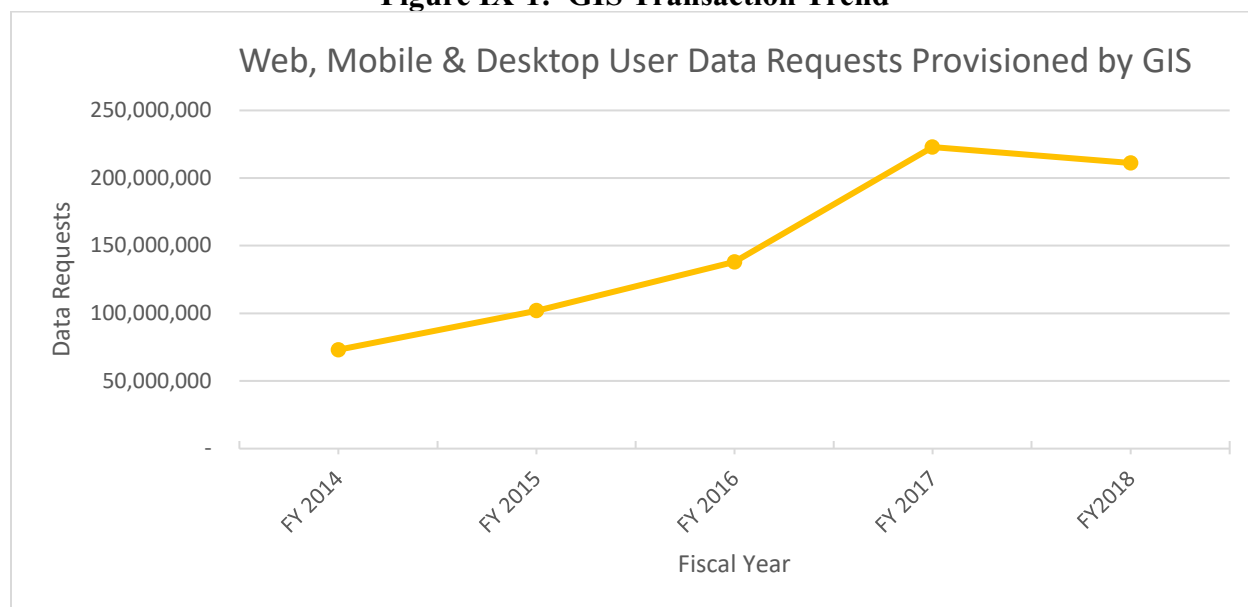
Based on the trend in software development, some of the targeted Web applications will likely expand in functionality yet still remain intuitive to even those who have no training. Work is nearly complete on creating a public version of GEM. GIS is working with the relevant agencies on making data and tools available to the public and the format and content of the report are being evaluated.

## **Usage Statistics**

Looking at both Web applications and desktop tools, it is interesting to note the heavy usage of GIS by agencies whose responsibilities involve environmental stewardship. During fiscal year 2018, ArcGIS Desktop was used for a total of 218,000 hours from environmental agencies (See Tables A-IX-8 and A-IX-9 in the Data Appendix). GEM served 14 million requests from all agencies. Note that due to a software version and code change, we were able to more accurately capture request data – thus the 2017 data were updated along with 2018 for better comparison (Tables A-IX-10 and A-IX-11 in the Data Appendix), with the largest users being Stormwater Management, Land Development Services, Planning and Zoning and the Park Authority. Some of the most critical applications also are listed in Table A-IX-12 in the Data Appendix.

Figure IX-1 illustrates the increase in GIS usage across all county agencies and the public. It uses GIS data requests as the variable to reflect GIS usage across the desktop and Web, both internal and external. Transactions dropped about five percent in 2018, but the overall trend is clear.

**Figure IX-1: GIS Transaction Trend**



Source: GIS System metrics--Fairfax County Department of Information Technology, Geographic Information Systems and Mapping Services Branch.

## **Evolving Environmental Agency GIS Capabilities**

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.



### Department of Public Works and Environmental Services (DPWES)

DPWES has consolidated its seven GIS positions into one group under the DPWES IT Director and created a new position to supervise that group. DPWES, outside of the Enterprise GIS office, is the single heaviest user of GIS both from the data creation and management perspective, as well as usage of the GIS systems and data. This new approach will enable closer coordination of GIS activities across the agency as well as give it tighter and more coordinated connection to IT initiatives across DPWES.

### Fairfax County Park Authority

The Park Authority added one full-time position and one limited-term position under its existing senior GIS position. The senior GIS position has engaged in a range of GIS activities from streamlining field data collection for invasive species, structuring and aggregating park data and working on integrating GIS into its asset management system as well as researching alternatives. Due to those successes as well as the overwhelming demand for GIS services across the agency, it has significantly increased its GIS capabilities.

### Land Development Services (LDS)

LDS, recently split from DPWES, was left without any GIS staffing. Despite it being significantly smaller than DPWES, it is a very large user of GIS per staff person. LDS realized that it needed its own GIS capabilities to help support its development review operations. As a result, LDS established and filled a senior GIS position.

### **Select Agency Profiles**

#### Fairfax County Health Department Using Mobile GIS to Enhance Mosquito Abatement

The Fairfax County Health Department performs routine mosquito inspections of county-maintained stormwater dry ponds. Inspectors check ponds for immature mosquitoes and treat with a larvicide, as needed. The current inspection program has been in place since 2016 and the fieldwork being performed historically required over 1,400 sets of physical maps and scores of pages of inspection records, larval identification records and pesticide treatment records. All the handwritten data were later transferred to electronic spreadsheets, requiring approximately 100 staff hours for data entry alone.

In 2017, more than 8,100 site inspections were performed, 35,000 mosquito larvae were collected and identified and about 675 pesticide applications were made. During early 2018, the Disease Carrying Insects Program began working on a mobile solution to field and site navigation, as well as field and lab data collection, using two mobile GIS applications: Collector for ArcGIS and Survey 123 for ArcGIS. The goal was to leverage available technical and software resources to increase staff efficiency in the field and lab by reducing reliance on physical maps and forms while maintaining consistent, reliable data collection.

The information from the paper maps and inspection forms was used as the basis for the design of a geodatabase for use in Collector. Figure IX-2 shows the geodatabase layers over a base map on a smart phone. The Survey123 mobile application eliminates the need for paper forms and hand-written documentation, having cascading questions based on previous answers, and captures images of the sites during inspections. Other functionalities include area measurements based on physical location and aerial imagery, as well as calculations to convert between square feet and acres when determining pesticide application rates/quantities.

The apps were customized for program-specific needs and field testing was performed to ensure their functionality and usefulness. A point layer was used to capture basic site information such as site identifier, site address, access comments and site size in acres for all existing routine inspection locations. Three additional data layers were created that related back to the point “site” layer: inspections; treatments; and identifications. Each of these related layers had a survey created within Survey123 Connect to capture the required inspection information based on the site conditions present. Using the Collector app, custom URL callouts launch the requisite survey in Survey123 (Figure IX-3) and pull information important for those records such as site GUID,

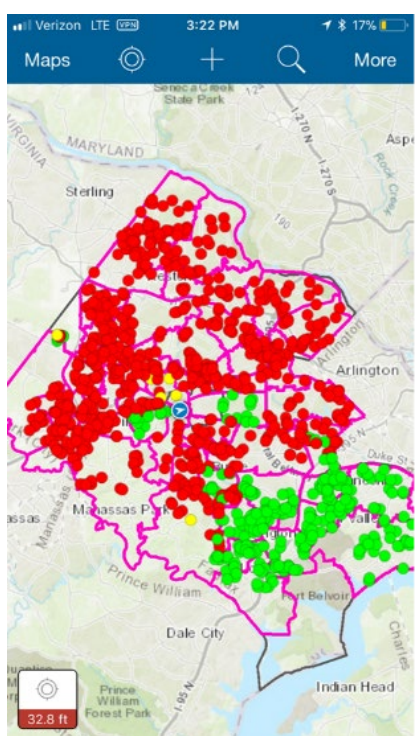


Figure IX-2: Inspection Status in Collector App where red dots show completed inspections and green dots show incomplete inspections.

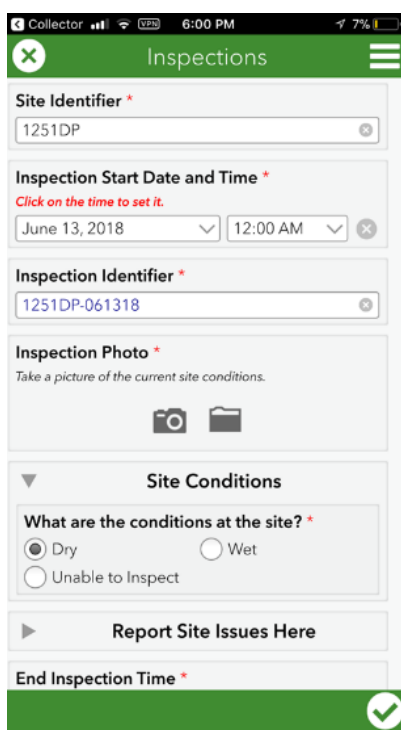


Figure IX-3: Survey123 Inspection Survey Example



Figure IX-4: Collector App Map with inspection sites, access trails, and parking locations.

site identifier and site address. The ability to use one app to open the other greatly reduces the chance for data entry error for the basic site information required for entry. Technicians are also able to update the inspection status of each site while they are in the field, which is reflected on the map through symbolized dots (Figure IX-4).

The new methodology is now in place and used daily by the mosquito program technicians. This end to end solution streamlines what was once a paper based data heavy solution and replaces it with a state of the art field collection regiment saving hundreds of hours and putting all tools necessary for the survey in one hand and on one device. Data collected in the field are immediately ready for reporting and analysis where in the past they were delayed by the need to transfer the information to digital formats. This project is a model for future field collection efforts that Fairfax County will pursue and an example of the modern efforts the county undertakes for the environment and public health.

### **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 per square meter. 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 will necessarily increase. The usage trend shown in Figure IX-1 is unambiguous. 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 and maintained as well as 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.

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 fresh and accurate data, agencies will not be able to make as informed decisions as necessary and to carry out the most effective actions.

## **Comments**

### **1. Increasing use of GIS Applications**

Fairfax County already is a leader in GIS data, applications and systems, and this leadership is paying 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. In particular, a public-facing version of GEM would provide a powerful tool to the public. Looking farther 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.

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.

In addition to the update to the planimetric and topographic data started in FY 2018, the county should continue to pursue regular updates to its LIDAR and multi-spectral data which have proven useful for stormwater, urban forestry, watershed analysis and land use/land cover determinations. LIDAR, for example, will be critical for a proposed study of coastal flooding risks by the U.S. Army Corps of Engineers.

## **Recommendation**

### **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.

## **2. Access to Data**

EQAC recommends that the county continue its efforts to ensure convenient public access to GIS and other environmental data.

### **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.

# **APPENDIX A**

## **2018 VIRGINIA GENERAL ASSEMBLY:**

### **Overview of Environmental Issues of Note**

Each year, the Virginia General Assembly considers scores of bills that could impact the environment and conservation efforts in the commonwealth. Appendix A in the Data Supplement identifies and summarizes several such bills that were considered by the General Assembly in 2018.

While there was no environmental legislation affecting Fairfax County this session, the General Assembly did entertain a variety of bills which could be of interest to Fairfax County. Two items of particular note include the establishment of dedicated state funding for Metro, as well as a sweeping utility bill which lifted a previously established rate freeze on electricity from Dominion Energy. Regarding the first piece of legislation, questions remain about how this will impact Fairfax County residents, as the funding that will be shifted to Metro is being moved from funds traditionally available for the Northern Virginia Transportation Authority (NVTA). The dedicated funding is also conditional on the other member jurisdictions of the Metro compact providing equal amounts of funding, as well as Metro itself seeing a growth in operating expenses of no more than three percent per year. If any of the conditions listed previously is not met, the funding from Virginia will cease. Having a functional mass transit system is critical to meeting Fairfax County's transportation goals as well as environmental goals; while this funding is a positive development, questions remain about its long-term stability in its current form.

Regarding the utility bill, while the legislation was designed to ensure that Dominion be able to provide ratepayers with rebates, it is unclear what form or amount those rebates will come in. The legislation also carries stipulations for Dominion to further invest in the development of alternative energy sources, which is welcomed. However, such investment is not mandatory and it remains to be seen if Dominion will carry through with expanding its alternative energy portfolio, which at present has been limited to a number of individual projects.

# **APPENDIX B SPOTLIGHT ON FAIRFAX COUNTY PUBLIC SCHOOLS**



Fairfax County Public Schools (FCPS) is the 10th largest school district in the nation, 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:

**Transportation** – The vision document notes how Fairfax County maintains the ninth largest school bus fleet in the nation.

**Waste** – Solid Waste Management Program’s responsibilities include enhancing educational programs with local schools to promote recycling, resource conservation and waste prevention. Supporting objectives for the community at-large include promoting policies that make recycling as convenient as disposal for all residents, particularly in the schools and in public spaces.

**Climate and Energy** – The Environmental Coordinating Committee and the Energy Efficiency and Conservation Coordinating Committee are noted as vital to helping ensure that cross-cutting action is coordinated across county agencies, authorities and schools.

**Environmental Stewardship** – The vision document notes how the county partners with FCPS to support the Get2Green program; this program enriches school grounds with outdoor learning labs, and supplements K-12 learning with engaging programs developed with a local focus to meet Virginia Standards of Learning requirements. A supporting objective encourages organizations (for example, those that work on stream monitoring, stream valley restoration and habitat protection or enhancement) to involve schools, community groups and individuals of all ages in their work.

## **FCPS Spotlight Overview**

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, referred to as “Get2Green,” in the following areas: FCPS policies and regulations; energy and climate; transportation; recycling and waste reduction; stormwater management; wildlife habitats; and environmental education. This Spotlight describes recent achievements by FCPS and upcoming plans in these areas. 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 Policies and Regulations**

FCPS has expressed a commitment to continue to take innovative and cost-effective steps to reduce greenhouse gas emissions and to address a range of other environmental considerations. That includes prioritization of systems and practices that maximize energy efficiency and provide for the cost effective transition to clean and renewable alternatives to fossil fuels. FCPS has enacted the following policies intended to address global warming and meet other important environmental initiatives:

- [Environmental Stewardship \(Policy #8542\)](#) – A commitment to reductions in energy and water use through the use of energy-efficient heating and cooling equipment; the use of energy-saving lighting and controls; optimization of indoor environmental conditions conducive to high student achievement; reduction of air pollutant emissions from school buses; and environmentally-beneficial recycling, grounds management, landscaping and purchasing practices.  
<https://www.boarddocs.com/vsba/fairfax/Board.nsf/goto?open&id=867SG92A805A>
- [Energy Conservation \(Regulation #8534\)](#) – A commitment to minimization of facilities operation expenses by conserving energy, including procedures governing: temperature settings in facilities; energy-sensitive conservation practices; maintenance; and monitoring of energy use.  
[https://www.boarddocs.com/vsba/fairfax/Board.nsf/files/B2USUS6DE537/\\$file/R8534.pdf](https://www.boarddocs.com/vsba/fairfax/Board.nsf/files/B2USUS6DE537/$file/R8534.pdf)
- [Recycling \(Regulation #8541\)](#) – Requirements pertaining to the recycling of paper, cardboard, glass, metal, plastic and fluorescent light tubes and bulbs.  
[https://www.boarddocs.com/vsba/fairfax/Board.nsf/files/ACQQ2J66462A/\\$file/R8541.pdf](https://www.boarddocs.com/vsba/fairfax/Board.nsf/files/ACQQ2J66462A/$file/R8541.pdf)

FCPS is also committed to educating students and staff members on environmental stewardship responsibilities and to use their critical thinking and communication skills to debate the appropriate measures needed for responsible stewardship of the environment.

## **Energy and Climate**

As EQAC noted in the 2017 Annual Report on the Environment, one of the most notable accomplishments of FCPS's Sustainability Team was the development of a public website with school-by-school energy and recycling data; that website went live in summer 2016. Additional information about this is at <http://get2green.fcps.edu/energy.html>. The website was designed to be used by student eco-teams as they work on stewardship projects. In addition, the website is open to the public so all members of the community, and other interested people, can access this information. A key component of the website is the interactive data dashboards, including dashboards for greenhouse gas data, energy data, recycling and trash data and the Get2Green inventory. New website sections on outdoor learning, healthy living and engagement were added in late 2017. A new section on climate and updates to the energy and recycling sections are planned for the 2018-19 school year.

The website provides data both online and in downloadable excel files. For example, the “Energy Reduction Impact” dashboard (about greenhouse gases), which was most recently updated on June 5, 2018, showed that FCPS emitted approximately 151,000 metric tons of carbon dioxide equivalent (CO<sub>2</sub>e) and had a total energy reduction impact of more than 31,000 metric tons of CO<sub>2</sub>e avoided (about 21 percent) over a billing period of April 2017 to March 2018. Several schools showed avoidance of more than 40 percent over that period. Other recent updates include dashboards about “Energy and Cost” (March 15, 2018), “Recycling and Trash” (February 2, 2018) and “Get2Green Inventory” (March 5, 2018).

FCPS has been installing and operating Central Control and Monitoring Systems (CCMS) in its 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. FCPS currently operates about 240 computerized Energy Management Systems (EMS).

Every year, FCPS monitors over 10,000 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 are 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.

While most energy efficiencies are paid for through funding mechanisms such as capital improvement bonds, FCPS has also used energy performance contracting and shared savings agreements to provide energy conservation measures (ECMs). Examples of these programs are listed below.

- In 2003, FCPS entered into an energy performance contract with Noresco to provide ECMs. Noresco provided upgrades such as lighting system improvements, upgrade and integration of building control systems, variable frequency drives on fans and pumps, boiler tune-ups and new energy efficient windows, investing \$19.2 million in 106 schools. These upgrades resulted in an annual savings of more than \$2.4 million over a twelve-year period.
- In 2014, FCPS began a performance contract with Cenergistic to provide energy management, conservation and related educational services. Since the program’s inception, FCPS has reduced its anticipated energy cost by more than \$21 million. 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 that can be reinvested in facility and equipment improvements.

FCPS is currently in the process of determining how to provide those types of services following the completion of the Cenergistic contract in July 2019. This might involve getting support through a contract or with use of in-house personnel.

FCPS forecasts more than \$140 million in deferred maintenance for structural, mechanical, electrical and plumbing equipment at risk of exceeding its useful life, with much of it relevant to energy management and conservation. Some, but not all, of this need is addressed in the FCPS capital improvement program (CIP). FCPS staff noted that energy savings could be reinvested in ECMs; this could provide upgrades for aging equipment, add renewable energies such as solar and geo-thermal and continue to reduce overall energy costs.

FCPS is currently looking at the potential for power purchase agreements (PPA) to provide solar panels on schools (PPAs are further discussed in the Climate and Energy chapter of this report). FCPS is evaluating the potential applicability of related efforts being pursued by Arlington County Schools, and there may be a potential for collaboration on PPA efforts being considered by Fairfax County government staff.

FCPS's commitment toward renewable energy is to be consistent with the Fairfax County Operational Energy Strategy (further discussed in the Climate and Energy Chapter of this report). FCPS has five solar installations: roof-mounted photo-voltaic solar arrays at Rachel Carson Middle School (paid for by grants and fundraising) and Frost Middle School (paid for by grants and fundraising); and roof mounted installations for solar thermal heating of potable water at Glasgow Middle School (CIP-funded), Thomas Jefferson High School (paid for by grants and fundraising) and a ground-mounted photo-voltaic array at Franklin Sherman Elementary School (new in 2018). In addition to solar, FCPS also has a geothermal installation at Mason Crest Elementary School (CIP-funded).

FCPS's Office of Facilities and Transportation Services (FTS) has taken measures to ensure that it meets FCPS's goals for a sustainable future. These measures include:

- Purchasing clean energy – nearly 40 percent of Dominion Energy electricity is produced by renewable sources (e.g., water, solar, wind or biomass) or nuclear power.
- Implementing the Virginia CHPS Criteria (VA-CHPS), a state-specific benchmark system for the design and construction of high performance school buildings, with a goal to provide guides for developing energy efficient, comfortable, environmentally responsible and healthy spaces of learning.
- Certifying building operations through ENERGY STAR®, a voluntary program offered by the U.S. Environmental Protection Agency (EPA) that helps businesses and individuals save money and protect the climate through superior energy efficiency.
- Adding new requirements for LED lighting to FCPS's master design specifications and details for all new construction and renovation projects.
- Using innovative and adaptive practices to repurpose existing office and residential structures for instructional use (e.g., New Bailey's Upper Elementary School).
- Installing high efficiency mechanical, plumbing and electrical systems in all schools and office buildings such as LED lighting, variable refrigerant flow (VRF) units and energy recovery units (ERU).
- Improving school campuses and grounds by providing site upgrades like underground storm water management, dry ponds, cisterns and bio-filter systems.
- Making building envelope improvements such as roofing, insulation and low-E window installations to reduce energy waste.

In early 2017 and 2018, Get2Green hosted an energy conservation competition open to all schools in FCPS. Students and staff engaged in energy saving measures such as daylighting classrooms, turning off electronics when not in use and adjusting window blinds to reduce energy consumption. Winning schools were rewarded with water bottle refill stations.

FCPS's most recent accomplishments related to energy and climate include the following:

- **ENERGY STAR Partner of the Year in 2017 and 2018.**
  - FCPS is re-certifying all schools as ENERGY STAR certified in 2018. It is anticipated that more than 160 schools will meet the Top 25 percent national criteria.
  - 151 schools were ENERGY STAR certified in 2016. This, along with 146 schools in 2015, was the most of any school division in the nation two years in a row.
  - FCPS also played a key role in helping Washington D.C. achieve EPA's #1 city for ENERGY STAR certified buildings (2015-2017). In 2018, Washington D.C. was recognized as EPA's #2 city for ENERGY STAR certified buildings (<https://www.energystar.gov/buildings/topcities>).
- **\$21 Million in Cost Avoidance Savings since 2014.**
- **1 Billion KBTU Reduced since 2014.**
  - 13.5 percent reduction in Energy Use Intensity.
- **100,000 Metric Tons of CO<sub>2</sub>e reduced since 2014.**
  - Equal to more than 2.5 million tree seedlings planted.
  - Equal to more than 20,000 cars not being driven for one year.

## **Transportation**

### **Safe Routes to School**

FCPS's Safe Routes to School (SRTS) programs help students get physically active while taking cars off the road. Over the past four decades, the percentage of students who walk and bicycle to school has declined from 48 percent (1969) to 13 percent (2009). During this time, the percentage of parents using Kiss and Ride has increased, exacerbating traffic conditions around many schools and making it more difficult for student walkers and bicyclists to get to school.

SRTS was established to improve the health and well-being of children by enabling and encouraging them to walk and bike to school. SRTS helps kids be healthy by increasing physical activity and helps the community by reducing traffic congestion and air pollution. 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).

Earlier in 2018, SRTS was the recipient of a generous donation from Innovation Health, which has enabled more schools to teach bike safety in Physical Education classes. Twenty-two of FCPS's schools now have their own fleet of bikes in addition to two travelling fleets of

bikes. SRTS encourages students to bike or walk to school throughout the year as an effort to boost more physical activity.

In 2018, Bike to School Day featured students from 79 FCPS schools who took to their bikes and scooters or put on their walking shoes to get to school while reducing pollution around schools and getting some exercise on a beautiful spring morning. Over half of the FCPS middle schools participated, which is an all-time high.

### **Green Diesel Technology**

To help improve air quality in the region, FCPS maximizes the use of green diesel technology using ultra-low sulfur diesel fuels and, when replacing equipment, school vehicles and buses. When purchasing vehicles, FCPS gives preference to improved fuel economy and reduced emissions.

FCPS is currently working in conjunction with Fairfax County and the Virginia Department of Environmental Quality (DEQ) on a voluntary program to reduce emissions from diesel-powered school buses by retrofitting buses with an EPA-verified emissions control technology within the exhaust system, called diesel particulate filters (DPF) and temperature control devices (TCD). The DPF performs the function of removing particulate matter from the exhaust, converting it to ash. As the vehicle runs, the DPF will periodically require regeneration to cleanse itself. To alert drivers to the status, TCD indicators have been added to the driver's console. The anticipated program outcomes are improved air quality and reduced exposure to diesel particulate matter, hydrocarbons and carbon monoxide emissions.

In addition to vehicles, FCPS's Grounds Department is purchasing "Tier 4" clean diesel tractors for school use in snow removal and mowing operations. Tier 4 is the U.S. Environmental Protection Agency's recommended reduction in harmful exhaust gases for diesel powered equipment. Generally, Tier 4 engines include after-treatment devices such as diesel oxidation catalysts and DPF to further reduce FCPS's environmental impact.

### **Electric School Buses**

FCPS is assessing the continued development of electric vehicle technology and will determine whether it is a smart infrastructure investment. While traditionally not a cost-effective replacement to diesel powered buses, electric school buses are becoming a viable alternative to diesel-powered buses due to declines in battery costs and continued improvements in performance, including expanded driving range. However, reliability and range remain critical components to supporting FCPS's mission of safe student transport and delivery.

### **Recycling and Waste Reduction**

Get2Green hosted a "Recycling Olympics" in February 2018 to bring awareness and action to schools' recycling programs. 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 schools. Sixteen schools participated and were awarded a total of approximately \$16,000 in

infrastructure (bins, dollies) to improve the recycling programs at their schools. Many schools developed sustainable education plans for their staffs and students going into the 2018-19 school year. Get2Green is currently working closely with facilities staff and FCPS's recycling hauler to update posters and communications for recycling for the 2018-19 school year.

FCPS has approximately 15 to 20 schools under renovation and/or expansion at any one time. During renovations, HVAC, plumbing, electrical and structural components that are replaced at those buildings that still have useful life are salvaged and either used as replacements for failing equipment in other buildings, stored for future use, have their parts cannibalized for future repairs or are sold, when possible. Examples are windows, doors, water heaters, roof top units (RTU), chillers, electrical circuit breakers and switches, motors, pumps and other building materials. This practice reduces replacement costs, extends lifetime use of the items and avoids adding material to landfills.

### **Stormwater Management**

Throughout 2017, FCPS continued working with the Fairfax County Department of Public Works and Environmental Services (DPWES) to identify opportunities to enhance stormwater management efforts (beyond code requirements) on school properties. These include: evaluation of opportunities to provide additional storm water management onsite during the design and construction of projects in the CIP; opportunities for DPWES 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.

Another part of this effort includes placing visible signage in advance of stormwater management activities to be installed on school property that includes a description of the planned improvement. Such signage helps students and others at the schools increase their appreciation of these efforts; it is useful as an educational tool.

### **Wildlife Habitat and Garden Implementation**

Get2Green is assisting many schools with developing and expanding wildlife habitats. These habitats may take the form of meadows, enhanced woodland areas or pollinator gardens. Many of them are created to alleviate erosion issues and enhance stormwater management on local campuses. Significant progress has been made in working with DPWES on increased stormwater education in the classroom and planning student wildlife habitat projects. This includes collaborating on the *Revitalize, Restore, and Replant!* (R3) program to provide hands-on learning opportunities for students through the transformation of stormwater facilities on FCPS campuses. Through R3, students have planted dry ponds and bioretention areas with native plants at Braddock ES, Mantua ES, Lake Braddock SS, Camelot ES and Rose Hill ES.

FCPS is partnering with federal, state and local organizations to form an Urban Wildlife Habitat Program with the purpose of educating students, faculty, staff and the general public about the importance of protecting and maintaining local wildlife habitats and gardens on campus. The U.S. Fish and Wildlife Service provided interns for the 2016-17 and 2017-18 school years to enhance and expand this program. These interns worked with Bailey's Elementary to plan and

install a wildlife habitat in the school's courtyard, using the entire process as a learning tool for students.

A workshop series was hosted on multiple dates in the 2017-18 school year in partnership with Earth Sangha and Friends of Accotink Creek. Workshops provided training and resources to teachers on planning and installing schoolyard wildlife habitats.

Get2Green partnered with the Fairfax County Health Department, Virginia Cooperative Extension and others to expand the availability of sustainable food in the Baileys Crossroads area. Through a grant, money and a part-time organizer are available to help Glen Forest ES and Bailey's ES to develop vegetable gardens and nutrition education.

### **Environmental Education and Action**

In November 2017, Get2Green launched the Get2Green newsletter to share information about environmental stewardship initiatives, opportunities and resources in FCPS with the community. Get2Green maintains an active social media presence on Twitter and on its Google+ Community. These communication tools have helped teachers, students and the community engage in environmental stewardship.

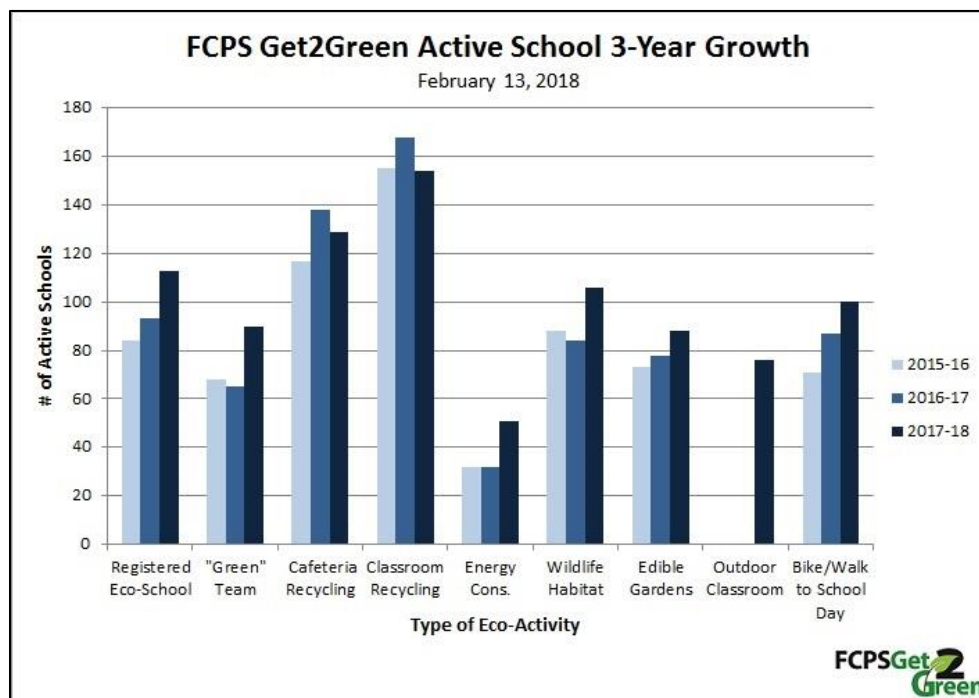


Figure 1. School Participation in FCPS Get2Green Eco-Activities over Past Three Years

As shown in Figure 1, participation in school-based eco-activities has generally grown each year for the past three years. As of February 2018, FCPS has 114 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. Franklin Sherman and Lake Anne have earned two Green Flags, while Centreville ES, Flint Hill ES and Lanier MS have earned three Green Flags. Centreville earned the U.S. Department of Education Green Ribbon School award for 2017 and Lanier MS earned the same award in 2018.

The school district works with many external partners across the county and region to bring expertise and resources to the schools. Get2Green is working with the Fairfax County Park Authority (FCPA) to train teachers to use parks adjacent to the schools as additional outdoor classroom space. Students are engaged in service learning projects to improve the parks by removing invasive plants and litter.

In 2017, FCPS was nationally recognized as a U.S. Department of Education Green Ribbon School District awardee.

### **Testing for Lead in School Buildings**

FCPS provided the following information about testing potable drinking water for lead in school buildings. This information was provided very close to the deadline for this report, and EQAC notes that it is intending to follow up with FCPS to help clarify the information. Areas where EQAC is interested in following up include the results from the testing conducted in 2016-2017, FCPS's five-year testing plan (developed in school year (SY) 17-18 and implemented in SY19/20 through 23/24), and public communications about these two testing efforts.

FCPS initiated a sampling program on September 20, 2016, to ensure the safety of drinking water at all schools. The sampling program was conducted by an independent firm hired by FCPS, following federal and state guidelines. At that time, there were no regulatory standards that govern FCPS school facilities concerning lead-in-drinking water. Under the "Lead in Drinking Water at Schools and Child Care Facilities" technical guidance, the Environmental Protection Agency (EPA) recommended potable water sources not exceed a level of 20 parts per billion (ppb). The testing was performed to determine if elevated levels of lead were present in sampled potable water sources at all school buildings. The water sources included fountains and dual-handled sinks that are frequently used for potable water.

On May 13, 2017, the sampling of potable water in all schools was completed. Of the 1,631 samples analyzed, seven (7) samples or 0.43 percent of the total samples taken exceeded 20 ppb. Elevated lead samples were detected at one (1) secondary school, one (1) middle school and two (2) elementary schools. Upon the identification of any elevated water source, that water was immediately shut-off and not used until the water source was investigated, mitigated and retested. All elevated water sources were removed and replaced, with resampling results falling well below the EPA action level.

During this process, FCPS worked with the Fairfax County Health Department during each of the elevated lead level detections. Messaging related to the elevated lead levels went out to each of the respective school communities which included a family letter, a frequently asked questions document and references to the EPA website, where detailed information could be found on the topic.

A review of all of the result data revealed that 1,482 samples (91 percent) had lead concentrations below the laboratory limits of detection or less than 1 ppb. For all of the 1,631 water samples, the average lead result was 1.34 ppb, well below the EPA action level of 20 ppb. Based on those results, FCPS reported that its water was considered as safe to drink.

On July 1, 2017, Senate Bill 1359 (SB 1359) was passed which amended the Code of Virginia by adding a section numbered 22.1-135.1--Potable water; lead testing. This law requires each local school board to develop and implement a plan to test, and if necessary to remediate, potable water sources identified by EPA as high priority for testing. These high priority water sources include: bubbler-style and cooler-style drinking fountains; cafeteria or kitchen taps; classroom combination sinks and drinking fountains; and sinks known to be or visibly used for consumption. Additionally, the testing plan should prioritize schools built before 1986. Working with Division Counsel and the Virginia School Plant Management Association for guidance on the program, the FCPS Office of Safety and Security developed a water testing plan during SY 17/18 as required. The plan is scheduled to commence in SY 19/20, with completion anticipated in SY 23/24 (five-year project).