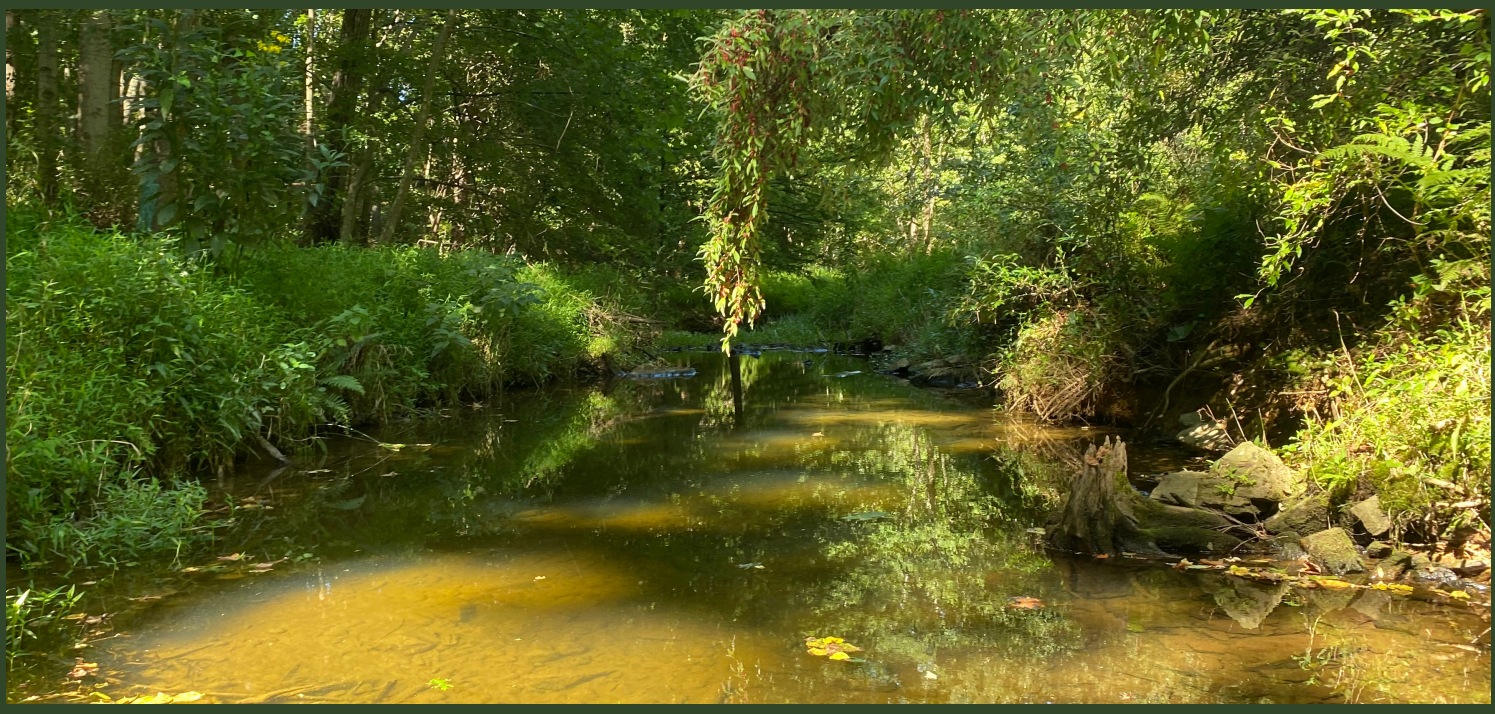
2023

Annual Report on the Environment



Environmental Quality Advisory Council
December 2023

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A Fairfax County, Va., publication

The cover depicts photos taken in Fairfax County. Top left: Butterfly spotted near Lake Thoreau; top right: Dragonfly spotted near Lake Audubon; bottom: Stream along the Gerry Connolly Cross County Trail.

Cover design & photos by Oaklen Kalinichenko, Student Member, Environmental Quality Advisory Council

ANNUAL REPORT
on the
ENVIRONMENT
2023

Fairfax County, Virginia

Environmental Quality Advisory Council

December 2023

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INTRODUCTION

The Environmental Quality Advisory Council (EQAC) recognizes the many environmental challenges facing the county and the difficulties in addressing them. Fairfax County is fortunate to have both a strong base of environmental policies and talented county staff who welcome the opportunity to meet these challenges as directed by the Board of Supervisors (the Board).

Historically, county staff prepared written responses to the EQAC Annual Report on the Environment (Annual Report) recommendations. Many EQAC recommendations were provided over multiple years with little progress. Staff indicated that while EQAC's recommendation might be clear, the implementation of the recommendation would require a substantial amount of planning to implement. In late 2022, the Board directed county staff to work with EQAC to focus on three to five priority projects based on the recommendations in the Annual Report. These priority projects, which are developed in conjunction with county staff, focus on recommendations that will benefit from coordination to improve their efficient implementation. EQAC recommendations requiring budgetary investments will continue to be directed to the Board. For all other recommendations, EQAC members will discuss progress with staff.

<u>EQAC Annual Report Priorities for 2023</u>

As explained above, EQAC prioritized recommendations into two groups; priority recommendations that will be coordinated with county staff and priority budget recommendations for the Board's consideration. However, EQAC determined that one overarching priority related to staff vacancy rates and their potential impact on environmental programs did not fit well into either group. The Department of Public Works and Environmental Services (DPWES) reported vacancy rates of 16% to 22% (and higher, up to 32%, within major functions) within business areas. The ability to recruit and retain staff is important to ensure the continued safe operations of wastewater treatment and manage the increased cost of solid waste operations. For these reasons, EQAC is highlighting the following "top" priority.

> **Update employee compensation policy for areas with critical staff shortages such as wastewater and solid waste to attract and retain employees.**

The first five priority recommendations will benefit from staff collaboration to achieve the desired outcomes. The second group of priorities is suggested to be addressed via budget allocations by the Board.

1. Priorities requiring EQAC coordination with county staff:

a) Recommendation 1LU-2019.3: Implement specific processes that minimize ecological degradation from development pressure.
b) Recommendation 4WM-2023.1: Budget and implement an accountable Zero Waste Plan for the public and private sector.
c) Recommendation 6CE-2022.2: Adopt a Climate Plan for public consumption that shows how CECAP, Resilient Fairfax and other climate related efforts, such as VCEA, are being implemented and the progress being made toward achieving goals.
d) Recommendation 6CE-2021.5: Plan and implement an EV charging network so that residents of buildings without EV charging and travelers will have options for charging their EVs.

2. Budget Priorities for the Board:

a) Recommendation 3B-W-2021.1: Set the fee rate collected for wastewater treatment to meet the documented needs of the necessary upgrades and maintenance requirements for all the plants that serve the county and their respective wastewater collection system.

b) Recommendation 3C-W-2022.1: Increase funding for the stormwater program by either an increase in the Stormwater Service District rate in FY 2024 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100 or fund the increase through a change in the tax rate.

3. Other Recommendations

The status of all recommendations is provided in the scorecard. As reflected in the scorecard, some new recommendations were introduced; the majority of EQAC recommendations are undergoing varying degrees of progress.

The 2022 Annual Report Priority Recommendations

1. Recommendation 1LU-2019.3: Improve Processes to Minimize Ecological Degradation from Development Pressure.

2. Recommendation 5PER-2021.2: Improve Land Development Process by Prioritizing Trees

3. Recommendation 6CE-2022.2 Adopt a Climate Plan for public consumption that shows how CECAP, Resilient Fairfax and other Climate related efforts, such as VCEA, are being implemented and the progress being made towards achieving goals.

While none of these three recommendations have been completed, the first two are expected to be addressed as part of the Planning Commission's Environment Committee review of the Environmental Policy Plan. Progress on the third recommendation is expected as an update to the Climate Action Dashboard by the end of 2023. EQAC coordinated with staff and provided input on improvements to the dashboard.

Three Recommendations from the 2022 ARE Were Successfully Completed:
EQAC thanks the Board and congratulates staff on their success of completing the following recommendations:

1. Recommendation 9TECH-2021.1: Fund recapture of LiDAR data in 2022 to provide ongoing data for metrics on tree cover and stream erosion as well as other benefits.

2. Recommendation 9TECH-2021.1: Examine planimetric data update cycle and determine a method to maintain the base map information.

3. Recommendation 8WIL-2021.1: Hiring of part-time wildlife assistant.

Coordination with the Planning Commission's Environment Committee
As of the preparation of this report, EQAC is working with the Planning Commission's Environment Committee and discussing priorities of interest to both organizations. EQAC has offered to assist with updates to the Environmental Policy Plan and possibly other documents. This effort and other coordination are expected to focus on matters of common interest to the Environment Committee and EQAC (e.g., minimize ecological degradation from development).

Accountability and Budgets
EQAC has often said to county staff that it is not sufficient to just do good work, it is important that the progress and completion and benefits of the county's work be shared with residents and businesses so that the good work will be appreciated. Providing information on programs and funding to support environmental priorities is important so that residents and businesses can see county investments are improving the environment and quality of life. EQAC recommends that the county provide the following

information on a user-friendly county website: the assignment of responsibility, a budget (which might be expended over multiple years), performance metrics with time frames, and deliverables. Without these basic project management components, it is difficult to assess the extent to which a project is a sound expenditure of tax dollars. This information would provide transparency for the public to better understand progress on county investments, especially for priority county projects like CECAP and Resilient Fairfax. While the Climate Dashboard is helpful to provide information on climate programs, additional information as outlined above would be helpful. The same information for other environmental programs would also benefit from providing similar information to the public.

Unanticipated Impacts of Data Centers

Data centers provide computing power and cloud storage that all computer and smartphone users rely upon. While the tax revenue associated with data centers has become highly desired by some northern Virginia local governments, the energy demands, noise, and water impacts can be very significant. This year's Annual Report highlights impacts of data centers, which have increased state energy usage so that Virginia is a net importer of energy and the Virginia Power's carbon neutrality goals are threatened.

Conclusion

We thank the Board of Supervisors for their leadership on environmental issues. We also thank staff for their work improving the environment and for providing EQAC with the information needed to prepare this report.

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SCORECARD

	Land Use *Four Recommendations in 2023*	**Status / EQAC Comments**
1	*Recommendation: 1LU-2018.1* **Update the State of the Plan and Concept for Future Development map.** EQAC recommends that the Board authorize an update to the State of the Plan document. The last State of the Plan covered 2000 to 2010. Since then, the county has seen significant growth and changes in process and technology. A review of the plan and the effects of the processes is timely. EQAC also recommends that the Board authorize the development of a Concept for Future Transportation, Development, and Green Infrastructure. The 1992 Concept for Future Development map has largely been realized and a future map that looks out 20 to 50 years is needed. **Summary of Action Taken by Agency or Department** This recommendation is being addressed. Work on the State of the Plan document is ongoing. The document was set to be published in 2022 but is delayed to include analysis of 2020-2022 and should be done in early 2024. The county is moving towards greater use of interactive mapping applications, rather than static maps, including the JADE mapping tool that allows users to display multiple layers of data and dynamically turn on and off information and data.	Making progress / Recommended since 2018  Recent discussions have noted the publication is being delayed to include analysis of 2020-2022 and is on track for 2024 completion. The Concept for Future Transportation, Development, and Green Infrastructure will provide a long-term vision for large investment projects and holistic rejuvenation of the county environmental infrastructure.
2	*Recommendation: 1LU-2019.3* **Improve processes to minimize ecological degradation from development pressure.** As the county addresses build-out, it is important to prioritize environmental protection of increasingly valuable open space. EQAC recommends that the county adopt a policy that all development provides a **net environmental benefit** to the county. EQAC also recommends that the ecological function of existing land be a consideration when new development is proposed on open space. This establishes the value of land that can be applied consistently across all projects and fits into the multi-dimensional rubric that needs to be considered for future planning. This recommendation applies to development in mixed-use centers with dense growth potential, as well as infill development where fragile lands that are unsuitable for development are under development pressure.	Making progress / Recommended since 2019  With the intense development pressure on natural space, this recommendation is increasingly important. On December 6, 2022, the Board of Supervisors authorized consideration of a

	Land Use *Four Recommendations in 2023*	**Status / EQAC Comments**
	Summary of Action Taken by Agency or Department This recommendation is discussed through Comprehensive Plan policies, which address the identification, preservation, protection, and enhancement of plant and animal life and the creation of an integrated network of ecologically valuable land and surface waters. The county seeks to balance the protection and enhancement of these resources while planning for the orderly development and redevelopment of the county. These efforts have focused primarily on Environmental Quality Corridors (EQCs), Resource Protection Areas (RPAs), floodplains, and steep slopes and tree preservation and tree cover. These areas contain valuable ecological resources and help create an ecological network. Resources within these areas are considered on a site-by-site basis as land use applications are reviewed by staff and evaluated by the Planning Commission and Board of Supervisors.	Comprehensive Plan amendment to update the Countywide Policy Plan. The environmental plan is the section to include these recommendations. The update needs to establish appropriate expectations for improved natural resource protection. There are many examples of inappropriate development, low environmental priority on land use decisions, and missed preservation opportunities of scarce natural lands. Examples: auctioned land along Accotink Creek near RPA and adjacent to the Cross County Trail, road expansion along Route 7 in Great Falls.
3	*Recommendation: 1LU-2021.1* **Private sector green building standards.** EQAC commends the county for adopting strong green building standards for public facilities. With the recently accepted Community-wide Energy and Climate Action Plan (CECAP) goal of net-zero energy by 2050, it is necessary to begin adopting Comprehensive Plan language and zoning regulations to encourage private sector land use to achieve the net-zero goals.	Making progress / Recommended since 2021  EQAC continues to encourage rapid adoption of policies to achieve the CECAP goals. The county

	Land Use *Four Recommendations in 2023*	**Status / EQAC Comments**
	Summary of Action Taken by Agency or Department This recommendation is in the process of being addressed. Actions are currently underway to review existing policies and identify areas for CECAP implementation. As part of a future Plan or Zoning Ordinance Amendment, research and study will be required to determine anticipated growth, estimated energy consumption, and what measures should be recommended to attain net-zero energy. All actions necessary to address EQAC's recommendation would be conducted during a future Plan or Zoning Ordinance Amendment.	has adopted exemplary public sector green building standards. Private sector standards need to follow.
4	*Recommendation: 1LU-2023.1* **Tidal wetlands outreach.** Conduct outreach to RPA and tidal wetlands property owners to convey the responsibility to protect these resources and obtain permits for modifications where required.	New in 2023 

	Transportation *Three Recommendations in 2023*	**Status / EQAC Comments**
1	*Recommendation: 2TRANS-2021.1* **Develop a formal plan to increase light-duty electric vehicle (EV) registrations to at least 15% of total registrations by 2030.** **Summary of Action Taken by Agency or Department** Efforts to address this recommendation are being implemented and/or coordinated by the Office of Environmental and Energy Coordination (OEEC). For example, OEEC's Carbon-Free Fairfax program provides resources and campaigns promoting EV adoption including information on incentives. OEEC is working with the Fairfax County Department of Tax Administration to help evaluate the number of EV registrations. Further, OEEC has made a Climate Action Dashboard available to the public showing progress toward achieving the CECAP goal to have at least 15% of all light-duty vehicle registrations in Fairfax County be EVs.	Making progress / Recommended since 2021  Achieving the 15% goal will require further efforts than are currently in place.
2	*Recommendation: 2TRANS-2021.2* **Develop a formal plan to increase transit and non-motorized commuting (including teleworking) to at least 30% by 2030, including setting interim target goals to be achieved by 2024 and 2027. Further, the BOS should provide the staff positions to implement the Safe Streets for All Program which the BOS unanimously endorsed on May 10, 2022.**	Making progress / Recommended since 2021  FCDOT has had delays in completing Phase Two of the

	Transportation *Three Recommendations in 2023*	**Status / EQAC Comments**
	Summary of Action Taken by Agency or Department Efforts to address this recommendation are being implemented by the Fairfax County Department of Transportation (FCDOT). That agency is leading the development of the Active Fairfax Transportation Plan which is focused on improving and expanding the pedestrian and bicycle networks throughout the county including public outreach for the planning effort. In May 2022, FCDOT completed Phase One which included the development of a vision statement with supporting goals and objectives. FCDOT is in the process of conducting Phase Two which includes the development of active transportation network recommendations and facility and an implementation approach that includes policy, program, and project prioritization strategies.	Active Fairfax Transportation Plan. Staff and resources should be budgeted to implement a Safe Streets for All program as well as for maintenance of bicycle and pedestrian infrastructure.
3	*Recommendation: 2TRANS-2023.1* **Provide the resources and funding needed to complete and implement the Active Fairfax Transportation Plan in a timely manner, including the Safe Streets for All Program.** The Active Fairfax Transportation Plan, once completed, is a framework to improve county residents' access to infrastructure needed for walking, biking, and other forms of non-motorized transportation. The Safe Streets for All Program is a critical component of such a plan however the Board of Supervisors has not budgeted any staff to implement it as a program. Adequate staffing and funding need to be provided by the Board to implement both the Active Fairfax Transportation Plan and Safe Streets for All. The Board also needs to provide the resources to address maintenance needs of non-motorized infrastructure.	New in 2023 

	Water *Six Recommendations in 2023*	**Status / EQAC Comments**
1	*Recommendation: 3A-W-2021.1* **Continue and enhance the protection of the Occoquan Reservoir, as needed.** **Summary of Action Taken by Agency or Department** Unlike the vastly larger Potomac Watershed, the Occoquan water supply is very susceptible to pollutants introduced by local jurisdictions. There has been an effort by the BOS to look at consequences of additional data centers.	Making progress / Recommended since 2021 

	Water *Six Recommendations in 2023*	**Status / EQAC Comments**
2	*Recommendation: 3A-W-2021.2* **Fund monitoring and modeling of emerging contaminants such as PFAS and of the rising sodium levels in the Occoquan Reservoir.** **Summary of Action Taken by Agency or Department** The Occoquan Watershed Monitoring Lab (OWML) budget was increased around 2019. However additional increased budget allocations will be needed for the lab to continue to look to adequately address emerging contaminants and salts. Included in this need are next-generation water quality modeling tools (e.g., real-time interactive models to provide rapid answers to "what if" scenarios and support strategic policy decisions. Dr Grant of OWML and Norm Goulet of the Northern Virginia Regional Commission (NVRC) have laid the foundational work for this work.	Stalled / Recommended since 2021 
3	*Recommendation: 3B-W-2021.1* **Set the fee rate collected for wastewater treatment to meet the documented needs of the necessary upgrades and maintenance requirements for all the plants that serve the county and their respective wastewater collection system. This may include the necessary increases to hire and retain adequate wastewater personnel.** **Summary of Action Taken by Agency or Department** Funding of the wastewater program by increasing sewer fees is essential to successful operation and maintenance of the sewer system.	Stalled / Recommended since 2021 
4	*Recommendation: 3B-W-2021.2* **Continue aggressive public education and monitoring of the new alternate septic systems performance.** **Summary of Action Taken by Agency or Department** Homeowners may not be aware of their responsibilities for maintaining these systems. Education from the private sector and government sector, including both Fairfax County Department of Public Works and Environmental Services and the Health Department, is essential to prevent a high failure rate of the new more complex systems.	Making progress / Recommended since 2021 

	Water *Six Recommendations in 2023*	**Status / EQAC Comments**
5	*Recommendation: 3B-W-2023.1* **Wastewater operates as an enterprise fund and the department needs to be supported in creating a salary structure and pursuing benefit programs that will hire and keep adequate numbers of employees in these essential positions.**	New in 2023 
6	*Recommendation: 3C-W-2022.1* **Increase funding for the stormwater program by either an increase in the Stormwater Service District rate in FY 2024 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100 or fund the increase through a change in the tax rate.** **Summary of Action Taken by Agency or Department** The inventory of stormwater infrastructure continues to grow by approximately 500 stormwater management facilities and eight miles of pipe per year. In addition, much of the stormwater infrastructure in Fairfax County is reaching the end of its life cycle, and as the system ages it remains critical to maintain adequate inspection and rehabilitation programs to avoid infrastructure failures and ensure the functionality of stormwater treatment systems. and sustain current levels of service.	Stalled / Recommended since 2022 / Recurring yearly  The last rate increase from 3.00 cents to 3.25 per $100 of assessed real estate value occurred in FY 2019.

	Waste *Six Recommendations in 2023*	**Status / EQAC Comments**
1	*Recommendation: 4WM-2023.1* **Budget and implement an accountable Zero Waste Plan for the public and private sector.** Twenty percent of the schedule to achieve zero waste by 2030 is expended and the actual recycling rate has decreased since the BOS called for Zero Waste. A specific action plan with deadlines and realistic reduction targets for each action is needed. A re-evaluation of how waste is addressed is needed. Food waste diversion will be required on a large scale. Restaurants, commercial firms, and institutions will need to be required to implement specific actions. Practical means of recycling will be needed for multi-family residents. Haulers and recycling processors will need to be a part of the solution. Outreach alone will be insufficient to obtain the goal.	New in 2023 
2	*Recommendation: 4WM-2023.2* **Utilize existing County authority or obtain legislative authority to:** • Implement the Zero Waste Plan for all public and private waste.	New in 2023 

	Waste *Six Recommendations in 2023*	**Status / EQAC Comments**
	• Efficiently enforce solid waste regulations and policy • Modify existing ordinances as practicable. • Collect Accurate Data Efficiently • Expand Sanitary Collection Districts or implement franchising that allows including Zero Waste Plan elements in hauling and recycling contracts.	
3	*Recommendation: 4WM-2021.1* **Institute recycling data collection and reporting.** Data indicates that countywide residential curbside recycling is low. To obtain the cultural change needed to meet the Board's goals, the county is encouraged to continue improving outreach, but to also require private haulers to report to their customers their annual percentage of curbside collection that is recycled. In addition, institute outreach requirements and accurate data reporting policies on private waste haulers that result in increased recycling. **Summary of Action Taken by Agency or Department** SWMP staff is implementing an alternate approach to accomplishing this recommendation based principally on outreach. The Four Touch Points initiative requires licensed collectors to deliver at least four specific pieces of waste reduction or recycling outreach and/or education to their customers every year. The county has provided guidelines to the collectors. County staff report that most of the collectors are complying and using county supplied contracts.	Making progress / Recommended since 2021  SWMP staff are commended for developing an approach to achieve the intent of the recommendation. Outreach is at or nearing the limit of effectiveness. In addition, haulers have little or no "skin in the game" to increase recycling, and will need to be more engaged to accomplish the county's zero-waste goal
4	*Recommendation: 4WM-2021.2 (Revised)* **Institute litter control.** • Support Virginia law changes for a container redemption fee ("bottle bill") • Enforce litter control requirements on Waste Haulers *(Two year)* County streams and public land continue to be impacted by illegal dumping and litter. Complaints about litter around dumpsters have increased substantially. **Summary of Action Taken by Agency or Department.** Complaints increased in 2022. County staff analysis indicates many complaints are due to delayed collection and due to insufficient collection containers at the property. Some properties have many more residents than the collection bins are designed for. While DPWES has the authority to enforce, it is cumbersome and difficult to apply. The "bottle bill" recommendation is stalled.	Making progress / Recommended since 2021  Concerns continue about enforcement to correct litter around collection times. Dumpster complaints have been increasing at an alarming rate. Consideration to pursue strong enforcement authority is suggested.

	Waste *Six Recommendations in 2023*	**Status / EQAC Comments**
5	*Recommendation: 4WM-2021.3* **Establish environmental purchasing numeric targets.** The county has expanded staff to improve environmental purchasing. However, without specific goals and reporting, it is difficult to assess how successful and worthwhile this investment is. **Summary of Action Taken by Agency or Department** No response to the recommendation this year. Based on this no targets have been developed.	Stalled / Recommended since 2021  Without numeric targets, success or failure of the program cannot be assessed by EQAC. It is of greater concern that the Department of Procurement and Material Management is now in charge of the Zero Waste Plan for County and School facilities. That program needs measurable targets as well.
6	*Recommendation: 4WM-2021.5* **Consider environmental and safety benefits of sanitary collection districts petitions.** There are many factors to consider in the establishment of Sanitary Collection Districts. One of the considerations is the impact on the environment and safety. There are environmental and safety benefits of having a single hauler for a neighborhood. **Summary of Action Taken by Agency or Department** Staff supports this recommendation. County staff report multiple petitions to provide County collection have been received. County staff report that the intention is to contract the collection services provided by the County rather than to attempt to increase staff. This is due in part to the difficulty in filling existing SMWP positions.	Making progress / Recommended since 2021  The vacancies in Solid Waste and throughout DPWES must be resolved, not only to provide for County Collection in Sanitary Districts, but also to protect the environment all over the county

	Parks & Ecological Resources *Five Active Recommendations in 2023 (One Closed)*	**Status / EQAC Comments**
1	*Recommendation: 5PER-2023.1* **Ensure equitable investment in ecological restorations and corridors.** As the county considers initiatives to invest in ecological restorations and/or improving ecological corridors, EQAC encourages the Board to direct staff to balance priorities of working to preserve ecologically important and sensitive habitats while at the same time making equitable investments to expand green space and ecological corridors using the One Fairfax lens. For example, FCPA's Landscape Legacy and Sustainability Program may inadvertently be deprioritizing more urbanized areas, resulting in further divestment in areas previously neglected. For restorations, particularly those in urban areas such as White Gardens, without sustained funding to maintain these areas, invasive plants quickly take over. Similarly, the county's current definition of Environmental Quality Corridors (EQCs) may be interpreted to be focused only on preserving currently healthy corridors which could similarly inadvertently deprioritize urbanized or channelized waterways given their low ecological value. EQAC encourages a stronger focus on examining which programs out there today may need to be adjusted to ensure equitable investments.	New in 2023 
2	*Recommendation: 5PER-2023.2* **Invest in authentic community connections to achieve a healthy, equitable tree canopy.** Last year, one of EQAC's recommendations was "Support additional staffing for Urban Forest Management Division (UFMD)." (5PER-2022.1). While some new staff have been hired, the Forest Conservation Branch's move to Land Development Services (LDS) has meant that a small UFMD team remains. With a finalized Resilient Fairfax plan adopted in 2022 to complement CECAP and a focus on One Fairfax a key component of the plan, UFMD's most significant capacity needs are to invest in authentic community connections as they pursue the goal of a healthy, equitable tree canopy. Authentic engagement doesn't happen overnight or as a one-off initiative. UFMD will require further investment in this skillset and expertise to ensure trusted community connections are made in advance of tree plantings.	New in 2023 
3	*Recommendation: 5PER-2021.4* **Strengthen authority to address management of invasive species throughout the county.** EQAC commends progress in this area and continues to encourage the county to explore what it can do to provide further support holistic and equitable solutions in the management of all invasive plant species. Ideas include: • Pursue state support for authority to create a special tax district to assist with funding invasive removal on private property.	Making progress / Recommended since 2021  While the implementation of the bamboo ordinance is a positive step forward, additional measures will be needed to combat the

	Parks & Ecological Resources *Five Active Recommendations in 2023 (One Closed)*	**Status / EQAC Comments**
	• Seeking ways to work with developers to avoid the use of non-native invasive plants in landscaping and to include a ban on homeowner use of non-native invasive plants, similar to Reston Association, in initial covenants of new developments. • Seeking authority to fund matching grants through the Northern Virginia Soil & Water Conservation District to treat invasive plants. • Supplementing any additional programmatic solutions with additional resources for public outreach and education about using native plants and avoiding non-native invasives. **Summary of Action Taken by Agency or Department** The most significant progress made on this front was in 2022 when the Board of Supervisors adopted a new Running Bamboo ordinance, meant to help stop the spread of this invasive plant, which went into effect on January 1, 2023. There are no updates on other possible initiatives mentioned above.	significant backlog of management of invasives and to preserve the ecological integrity of our natural lands. Some progress here may require additional state authority.
4	*Recommendation: 5PER-2021.2* **Improve the land development process by prioritizing trees.** While some progress has been made in this area, new recommendations this year reframe some of the recommendations from this initial ask. One outstanding and actionable next step is for the Board of Supervisors to direct staff to take next steps on the implementation of the Fall 2022 tree-related recommendations from the Mount Vernon Infill Development Task Force. Relatedly, EQAC supports the Tree Commission's recommendations related to prioritizing trees during the land development process and will track progress through their efforts. EQAC will continue to monitor this and other Tree Commission comments and recommendations regarding land development concerns to determine if further EQAC's support is appropriate. **Summary of Action Taken by Agency or Department** Staff's 2022 responses to six recommendations included in the September 2, 2021 Tree Commission letter[1] to the Board of Supervisors indicate that some progress is being made on this front.	Closed / Recommended since 2021  There is more work to be done in this area, particularly with the Mount Vernon Infill Development Task Force recommendations, and EQAC is reframing some of the asks from this prior recommendation. EQAC will also monitor Tree Commission recommendations.
5	*Recommendation: 5PER-2022.1* **Support additional staffing for Urban Forest Management Division (UFMD)**. As Fairfax County begins implementation of climate-focused initiatives related to natural resources, as identified by plans such as CECAP and Resilient Fairfax, UFMD's role and leadership will no doubt also	Making progress / Recommended since 2022 

[1] https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/20210902_tree_commission_policyrecommendations.pdf

	Parks & Ecological Resources *Five Active Recommendations in 2023 (One Closed)*	**Status / EQAC Comments**
	continue to grow. Full-time positions, rather than non-merit or contract positions, would provide the long-term sustainability needed to support these initiatives. An additional recommendation this year (via 5PER-2023.2 (Invest in authentic community connections to achieve a healthy, equitable tree canopy.)) builds on this ask from 2022. **Summary of Action Taken by Agency or Department** With funds from the FY23 budget, UFMD has brought on an Urban and Community Forestry Coordinator and also a Tree Planting Coordinator.	This recommendation was new last year and while some new staff was brought on, more capacity is needed.
6	*Recommendation: 5PER-2021.3* **Seek more stable funding sources for Fairfax County Park Authority (FCPA) initiatives.** Budgeting challenges for FCPA result in instability over the long term, particularly in terms of maintenance for and management of the parks' natural resources. EQAC is excited to see progress on this front and recommends the Board continue to work with staff and the FCPA Board to seek additional means of stable, long-term funding for FCPA's natural resources maintenance activities. **Summary of Action Taken by Agency or Department** The Board of Supervisors have approved notable budget increases for natural resources each of the past two years including $751,000 for The Landscape Legacy and Sustainability Program in FY23, one-time Third Quarter Review funds in FY23 of $400,000 for bamboo removal on Park property and $500,000 to better address the forest management backlog of tree-concerns on Park property, as well as FY24 funding for four additional full-time staff positions including one position to support bamboo mitigation ($152,642) and three positions to support forestry operations ($293,463).	Making progress / Recommended since 2021  Over the past two years, the Board of Supervisors have provided notable increases to FCPA's funding, both in one-time and recurring funding. This is a positive step forward, but FCPA funding is still insufficient. Funding for FCPA cannot be cut without compromising service, staff, or both.

	Climate & Energy *Six Recommendations in 2023*	**Status / EQAC Comments**
1	*Recommendation 6CE-2022.1* **Incorporate Adequate Funding for both CECAP Implementation and Resilient Fairfax in the annual operations and CIP Budget.** **Summary of Action Taken by Agency or Department** EQAC thanks the Board for funding climate work in the budget. However, significant funding is needed to implement climate and energy projects.	Making progress / Recommended since 2022  EQAC recognizes that much of the work being undertaken at this stage is in the

	Climate & Energy *Six Recommendations in 2023*	**Status / EQAC Comments**
		beginning or pilot stages and that substantially more funding will be required in future years.
2	*Recommendation 6CE2022.2* **Adopt a Climate Plan for public consumption that shows how CECAP, Resilient Fairfax and other climate related efforts, such as VCEA, are being implemented and the progress being made towards achieving goals.** **Summary of Action Taken by Agency or Department** The Resilient Fairfax Implementation Roadmaps and the CECAP Implementation Plan identify priority strategies and climate action programs for implementation. In addition, the county has developed a Climate Action Dashboard to track progress and plans to improve and regularly update the information and data on the dashboard.	Making progress / Recommended since 2022 
3	*Recommendation 6CE-2021.4* **Seek the ongoing advice of business leaders on climate and energy issues.** **Summary of Action Taken by Agency or Department** While the county has relaunched the Green Business Partners program, the participation of businesses in the program is just beginning. Leadership from businesses that have successfully implemented programs to address climate and energy issues will be needed.	Making progress / Recommended since 2021 
4	*Recommendation 6CE-2021.5* **Plan and implement an EV charging network so that residents of buildings without EV charging and travelers will have options for charging their EVs.** **Summary of Action Taken by Agency or Department** The County is seeking funds from transportation infrastructure funding working through the Metropolitan Council of Governments that will, if awarded, support EV charging stations and fueling for alternative fuels. This should be an effective method to achieve the desired goal.	Making progress / Recommended since 2021 

	Climate & Energy *Six Recommendations in 2023*	**Status / EQAC Comments**
5	*Recommendation 6CE2023.1* **Collect energy consumption information on current and planned data centers in the county and determine the extent to which data centers obtain green energy in order meet the county's carbon neutrality targets.** **Summary of Action Taken by Agency or Department** The Board has directed staff to review data centers and their impacts and provide recommendations by the end of calendar year 2023.	New in 2023 
6	*Recommendation 6CE-2021.3* **Implement major Community Engagement and Educational campaign on the actions that businesses and residents can do to reduce GHG emissions.** **Summary of Action Taken by Agency or Department** This recommendation was moved to a comment last year when EQAC understood that all climate information would be provided on the dashboard and other outreach. At this point, substantial outreach will be needed to implement county climate programs with community support.	Making progress / Recommended since 2021 

	Air Quality *One Recommendation in 2023*	**Status / EQAC Comments**
1	*Recommendation: 7AQ-2021.1* **County officials should continue efforts to strongly encourage people to telework where possible, take public transit, and use alternative forms of transit**. Many air quality issues are tied to federal and state actions over which the county has little or no control. This is one area where the county can take an active role to reduce single vehicle trips within the county and thus enhance air quality through a decrease in vehicle emissions, which are a major contributor to ground-level ozone formation and greenhouse gas emissions in the county. **Summary of Action Taken by Agency or Department** County staff concurs with this recommendation and is taking steps to implement it.	Making progress / Recommended since 2021  This recommendation remains an important action in helping to achieve county goals.

	Wildlife Management *Three Recommendations in 2023 (One Completed)*	**Status / EQAC Comments**
1	*Recommendation: 8WIL-2021.1* **Hiring of part-time wildlife assistant.** **Summary of Action Taken by Agency or Department** Additional positions per the program's request were granted and filled in FY23.	Completed / Recommended since 2021
2	*Recommendation: 8WIL-2023.1* **Expand survey methods for deer population data collection.** EQAC supports the exploration of alternative survey methods such as drone surveys to establish humane methods of data collection that will be a key component in supporting any proposed recommendations to an updated Deer Management Plan or Comprehensive Wildlife Management Plan.	New in 2023
3	*Recommendation: 8WIL-2023.2* **Expand public outreach and education for the county's deer management program through partnerships and offer more equitable opportunities for participation.** EQAC supports the exploration of partnerships with state, federal, military, veteran, or sportsman agencies/organizations to determine opportunities for increasing hunter retention and recruitment and reaching underserved groups. This could include events such as novice deer hunter workshops, hunter skills workshops, field to fork initiatives, Women in the Outdoors, disabled veteran hunts, etc.	New in 2023
4	*Recommendation: 8WIL-2023.3* **Make changes to zoning codes to grant exceptions for deer processing operations in Fairfax County to minimize impacts on participation to the deer management program.** EQAC supports reexamining the county code and zoning requirements to determine if an exception can be granted for deer processing operations in Fairfax County to minimize impacts to deer management efforts while keeping complaint with the restrictions imposed due to the county's recent inclusion in a Chronic Wasting Disorder Disease Management Area.	New in 2023

	Technology *Three Active Recommendations in 2023 (Two Completed)*	**Status / EQAC Comments**
1	*Recommendation: 9TECH-2021.1* **Fund recapture of LiDAR data in 2022 to provide ongoing data for metrics on tree cover and stream erosion as well as other benefits.** **Summary of Action Taken by Agency or Department:** Staff's response indicated that this recommendation has been addressed. LiDAR was flown in December 2022 and will be received in 2023.	Completed / Recommended since 2021 Successful completion led to a follow-up recommendation 9TECH 2023.1.
2	*Recommendation: 9TECH-2021.2* **Prepare a plan for fully staffing GIS support positions in FY 2024 and beyond, with particular attention to Spatial Analyst (SA) IV positions**. **Summary of Action Taken by Agency or Department:** Agencies and DIT are adjusting resources as situation allows. SA IV position and SA III position established for LDS. DIT created one SA IV position in 2022 to address high end data needs in remote sensing.	Making progress / Recommended since 2021 As a next step in staff planning, increase customer service capacity in the GIS Division to ensure adequate resources for maintenance, administration, and continued innovation with GIS. An additional SA III in the Agency Geospatial Services branch will allow for expanded support to new business areas such as the OEEC. This will permit additional time for the remote sensing specialist to continue advanced and cutting-edge work in the area of environmental management more broadly.

	Technology *Three Active Recommendations in 2023 (Two Completed)*	**Status / EQAC Comments**
	Recommendation: 9TECH-2022.1 **Examine planimetric data update cycle and determine a method to maintain the base map information.** **Summary of Action Taken by Agency or Department:** The GIS Division has worked over the past year to identify more cost-effective methods to employ than have been used in the past. An agency needs survey was conducted. A vendor was engaged to determine estimates for a yearly update cycle using newer techniques and current business requirements. Funding is being pursued now to begin in 2023 or 2024.	Completed / Recommended since 2022  Successful completion led to a follow-up recommendation 9TECH 2023.2.
	Recommendation: 9TECH-2023.1 **Continue investments in aerial photography, LiDAR, multispectral imagery on a business-driven cycle.**	New in 2023  Ensure proper funding for critical data collections on cycle for maximum benefit. LiDAR – 4-5 years Aerial Photography – annually Multispectral imagery – 2 years
	Recommendation: 9TECH 2023.2 **Establish a yearly update cycle for planimetric data.**	New in 2023  This recommendation is a direct follow-up to the successful completion of Recommendation 9TECH-2022.1

1. 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."[2]

INTRODUCTION

Fairfax County covers approximately 395 square miles with over 1.172 million residents and 418,800 households[3]. As the population has grown and the county has transitioned toward a more urban environment, the Fairfax County Comprehensive Plan and the decision-making processes for how land is used have also evolved. When the first Environmental Vision was adopted in 2004, the county was fast approaching "build-out," whereby little vacant or undeveloped land was available. To continue growing after build-out, the focus of land use across the county shifted from new development to revitalization and redevelopment. The county is now well into that transformation and significant development continues to provide new jobs and housing. These changes allow the county to continue to grow and prosper within a finite environmental footprint and have the potential to improve negative environmental impacts from older projects.

Historical Perspective

Fairfax has gone through several generations of planning, from the original farmland into the complex county in which we live. The 2019 EQAC Annual Report on the Environment (ARE) documents the major steps starting with the 1970's decision to "*thwart the negative effects of rapid urbanization by spending eighteen months and $1.5 million on a planning program to control the rate and direction of future growth."* The legacy continued into the 1980s when the Board took action to protect the Occoquan watershed. More than 38,500 acres of property were down-zoned from one-acre to five-acre development, *"citing a study that predicted the Occoquan reservoir could turn into a smelly swamp if some action is not taken."* Through the 1990s and 2000s, the focus was the Chesapeake Bay Preservation Act and Ordinance that codified Resource Protection Areas (RPAs) and defined them using perennial streams as the ecological basis for protecting land from development.

With build-out, it has become more challenging to protect large parts of the county's ecosystem. The challenge for planning is most evident with the Tysons transformation that reimagined a primarily single-use shopping and work district into a 24-7 livable community. The Tysons plan is supporting future growth that supports "live, work, and play", as well as incorporating stream restoration and stormwater management to address stormwater runoff, along with equities such as access to natural spaces for parks

[2] 2017 Fairfax County Environmental Vision, Section 2 A, pg. 6, http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf#page=12
[3] Demographic Reports 2022, County of Fairfax, Virginia

and recreation. The key to creating a vibrant, desirable, and healthy future community is applying a holistic lens that equally values business, social, cultural, and environmental priorities.

CURRENT STATUS AND CONCERNS

The most pressing land use challenges in 2023 are global climate change and dealing with multiple divergent priorities on land including equity, resilience, and tax revenue diversity. The county signed the Carbon Neutral Counties Declaration to become carbon neutral in its energy use for government operations by 2040[4] and accepted the Community-wide Energy and Climate Action Plan (CECAP)'s goals to reduce the community's greenhouse gas emissions by half by 2030 and achieve carbon-neutrality by 2050[5]. Resilient Fairfax was adopted in 2022. The county is also focusing on equity through the One Fairfax Policy and the recommendations from the Chairman's Taskforce on Equity & Opportunity, which took into account the direction noted in the Countywide Strategic Plan and Economic Recovery Framework[6]. These topics were not central to prior generational considerations yet are critical to today's holistic considerations for using land.

The county is also making decisions to enhance economic development opportunities of land. One example is allowing development in the Dulles Airport Noise Impact Overlay District. This district allows development that was deemed inappropriate in the past due to concerns with the loud airplane landing[7] noise. Specifically, as noted in the Staff Report:

"The FAA has adopted DNL 65 dBA as the threshold of significant noise exposure. …
The consideration of new residential uses within the 60-65 DNL airport noise contour area …, could, with appropriate noise mitigation, enhance economic development opportunities, provide additional housing, and provide opportunities for residents to live and work in a mixed-use area with reasonable commutes along the Route 28, I-66, and Dulles Tollway corridors. Allowing new residential uses within the 60-65 DNL airport noise contour area would also allow the conversion of under-performing, single-use, non-residential uses, such as office parks, into residential and mixed-use developments with a mix of amenities that could keep these areas economically viable."

Another example is encouraging data centers to be built which consume large amounts of space and energy and generate significant revenue without traditional employment increases. These energy intensive industrial uses were not a consideration of prior comprehensive plans.

EQAC is also following One Fairfax and supports recommendations from the Strategic Plan & Economic Recovery Framework Alignment Matrix[8]. In particular:

Recommendation 16: Develop, pilot, and institute Fairfax County equity-based decision-making tools for planning, projects, decision making and resource allocation.
Strategic element EEG 12: Implement a workplace culture change effort to actively promote equity and inclusion, collaboration, excellence, innovation, customer service, transparency, accountability, and trustworthiness.

EQAC is concerned that the tools used to make land use decisions, namely the Comprehensive Plan, especially the Policy Plans, do not fully incorporate these new concerns. We are encouraged that the county adopted the Policy Plan Amendment, 2022-CW-2CP, to update the Policy Plan elements, add new Policy Plan elements as needed and ensure the Policy Plan is in alignment with the Countywide Strategy

[4] https://www.fairfaxcounty.gov/news/fairfax-county-commits-carbon-neutral-energy-use-2040
[5] https://www.fairfaxcounty.gov/environment-energy-coordination/climate-planning-action
[6] https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/meeting-materials/2021/sept21-budget-chairman-task-force-recommendations-and-actions.pdf
[7] https://www.fairfaxcounty.gov/planning-development/plan-amendments/airport-noise-policy
[8] https://www.fairfaxcounty.gov/topics/sites/topics/files/assets/documents/pdf/july%2029.%2021%20memo%20to%20bos.pdf

Plan, and other relevant policies and initiatives. These policies encode the values used for making decisions across divergent priorities. The Policy Plan elements need a comprehensive review incorporating new priorities along with a rubric that appropriately expresses Fairfax land use values.

Holistic Development Process

EQAC has been a steady advocate for holistic planning processes that bring all county and private concerns together as changes to the Comprehensive Plan and new developments are considered. This approach is more effective than opportunistic plans based on single parcels that were effective before the county was fully built-out. The current Site-Specific Plan Amendment (SSPA) Process combines holistic planning with opportunistic development proposals. EQAC recommends a 10-year review of the State of the Plan to assess the prior and current processes to make sure the planning process is delivering the vision for development across the county. This report is currently underway and will be the first step in reviewing how the Comprehensive Plan and Policy Plans have been meeting their intended goals. The report has been delayed until 2024 to include analysis of development through 2021.

The holistic approach that evolved as the county approached build-out must now consider additional dimensions for conserving energy and align with an equitable and sustainable future. One of the first Comprehensive Plan updates to face this additional complexity was the Reston Comprehensive Plan update[9] which was adopted in September 2023. The Reston Task Force had to consider new business and lifestyle models necessitated by Covid-19 along with climate change and rapid technological changes. Sections in the Plan highlight environmental stewardship, equity, affordable housing, health, heritage, and art.

Development Pressures

The 2019 EQAC ARE included a discussion of development pressures that were having a negative effect on the environment. EQAC supports development as part of a holistic process that balances growth with environmental protection and other elements of a healthy community. EQAC specifically called out the need for a development policy that calls for a **net-environmental benefit** across all new projects. Currently, net-benefit is defined for environmental corridors and RPAs, but the concept can be generalized to apply to all new development. This is quite appropriate for redevelopment where prior development had minimal protections and redevelopment can fix prior issues.

The 2019 EQAC ARE also listed several cases where negative environmental effects occurred on fragile land that was approved for development. This is caused by land values increasing past the point where unsuitable land that is slated for development is engineered so that it meets the bare minimum of the Comprehensive Plan and Zoning regulations. However, this ignores the ecological significance of these fragile lands. When looked at holistically, there is no justification for allowing inappropriate development. However, staff has told EQAC the criterion for such cases is minimum compliance.
These development pressures apply to all open space, not just fragile ecological lands. In 2021, a complicated case arose at Justice High School in the Mason District. Justice High School is in desperate need of an expansion, and the county approved bond funding for the project. The proposal builds a new structure on an existing school parking lot. However, the school needs to replace the lost parking spaces. The neighboring Justice Park was proposed to transfer several acres from the Fairfax County Park Authority (FCPA) to Fairfax County Public Schools (FCPS) replacing a public field with a parking lot. This proposal was made with token public outreach and after much conflict and public opposition, it was replaced with a parking waiver to be reviewed in five years. The plan ignored the value of urban open space serving the community in the zip code of highest socio-economic need[10]. It also highlighted the lack of investment in community parks that are frequently overridden by invasive plants and do not function

[9] https://www.reston.org/reston-comprehensive-plan
[10] Zip code 22041 surrounds Justice Park and ranks #1 in socioeconomic need in Fairfax County: http://www.livehealthyfairfax.org/index.php?module=indicators&controller=index&action=socioneeds

effectively. Such environmental and equity issues will become more common as open space becomes scarcer and land values continue to increase.

Another example of development pressures and the inability to manage lands inappropriate for development occurred in the Accotink stream valley. Seven undeveloped properties that border the RPA and Cross County Trail were assumed by the county for back taxes. These properties are clearly unsuitable for development but could not be protected and had to be auctioned to the highest bidder. The Northern Virginia Conservation Trust tried to acquire them for transfer to the FCPA but bidding by developers was too high.

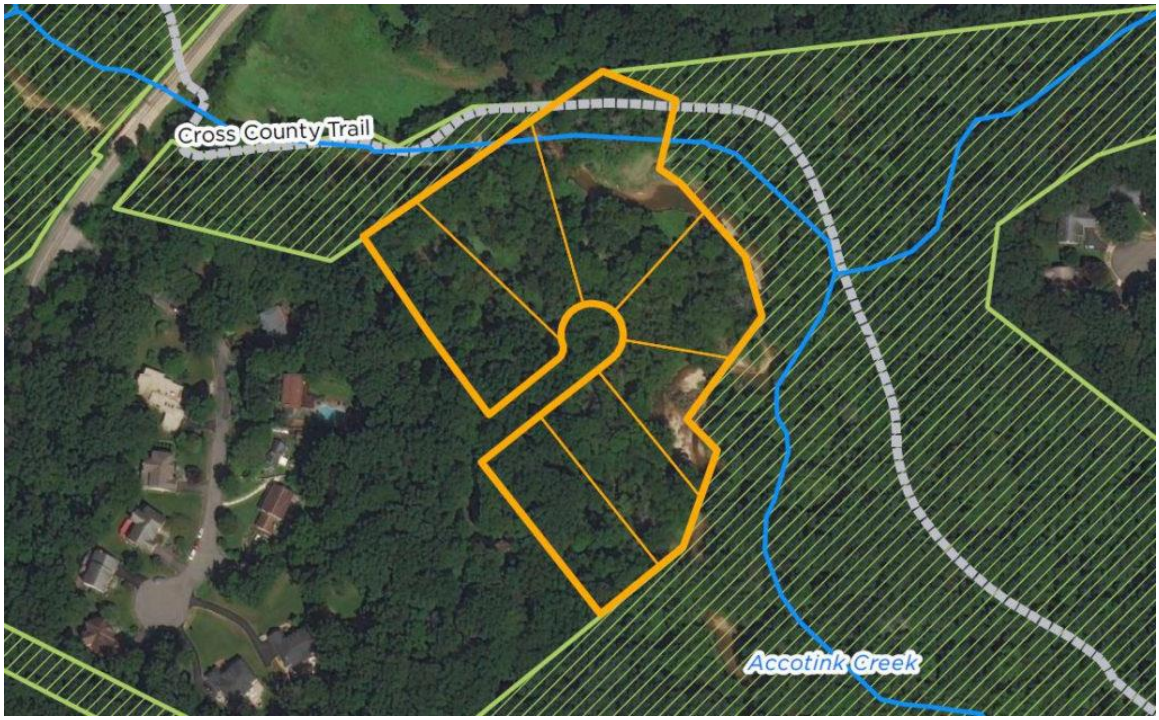

Figure 1-1. Accotink Creek Properties Auctioned in 2022 (Source: Annandale today, May 24, 2022: Environmental group hopes to prevent developers from buying Annandale land https://annandaletoday.com/environmental-group-hopes-to-prevent-developer-from-buying-annandale-land)

From the perspective of a net-environmental benefit, these lands in good forested condition have the highest potential environmental benefit. The county needs the tools and resources to make decisions that protect these fragile lands as well as those that provide equitable benefit to all county residents and meet the future commitments made to address global climate change.

Climate Change, Green Buildings, & Heat Islands

The county has made important commitments to address climate change and resiliency, many of which depend on changing the way land is developed, redeveloped, and used. Fairfax County has policies for both government and private properties. In 2021, the county approved the updated Operational Energy Strategy, which is aligned with the Sustainable Building Policy for Capital Projects, setting a path for county government buildings in design and construction beginning 2021 to be net-zero energy.[11] The county is on track to meet the public sector commitment of the Carbon Neutral Declaration, as shown in

[11] https://www.fairfaxcounty.gov/environment-energy-coordination/green-building

Figure 1-2, with future construction meeting net zero standards. Net zero means the total energy used by the building is equal to the amount of renewable energy generated on-site or through offsite procurement.

FAIRFAX COUNTY
VIRGINIA

County Sustainable Development Policy

1: Concept | 2: Design | 3: Permit | 4: Construction | 5: Complete

- TOTAL Green County Buildings: **41** completed, **30** in progress

#	Site	LEED	Solar Ready	Net Zero	EV Ready	Post OES?	Status
1	Police Heliport	Silver	No	No	Yes	No	5
2	Innovation Garage	n/a	Yes	No	Yes	No	5
3	Reston Fire Station	Silver	Yes	No	No	No	5
4	Sully Community Center	Gold	Yes	No	Yes	No	5
5	Woodlawn Fire Station	Platinum	Yes	No	No	No	5
6	Lorton Community Ctr & Library	Gold	Yes	No	Yes	No	5
7	Edsall Road Fire Station	Silver	Yes	No	No	No	5
8	South County PS & Animal Shelter	Silver	Yes	No	Yes	No	4
9	Springfield CBC Commuter	n/a	Yes	No	Yes	No	4
10	Stormwater Wastewater Facility	Gold	Yes	Yes	Yes	No	4
11	Operational Support Bureau	Gold	Yes	Yes	Yes	No	4
12	Monument Garage **820 spaces	Parksmart	Yes	No	Yes	No	4
13	Seven Corners Fire Station	Gold	Yes	No	Yes	No	4
14	Kingstowne Library/Franconia PS	Gold	Yes	No	Yes	No	4
15	Mount Vernon Rec Center	Silver	Yes	No	Yes	No	4

#	Site	LEED	Solar Ready	Net Zero	EV Ready	Post OES?	Status
16	Patrick Henry Shelter	Silver	Yes	No	Yes	No	3
17	Original Mt. Vernon HS	Gold	Yes	No	Yes	No	3
18	Fairview Fire Station	Gold	Yes	Yes	Yes	Yes	3
19	Judicial Complex Building One	Gold	Yes	Yes	Yes	Yes	2
20	Mason Police Station	Gold	Yes	Yes	Yes	Yes	2
21	Gunston Fire Station	Gold	Yes	Yes	Yes	Yes	2
22	West Annandale Fire Station	Gold	Yes	Yes	Yes	Yes	2
23	Tysons Fire Station #29	Gold	Yes	Yes	Yes	Yes	2
24	Patrick Henry Library Garage	Gold	Yes	Yes	Yes	Yes	2
25	Willard Health Center	Gold	Yes	Yes	Yes	Yes	1
26	Audrey Moore Rec Center	Gold	Yes	Yes	Yes	Yes	1
27	Penn Daw Fire Station	Gold	Yes	Yes	Yes	Yes	1
28	Eleanor Kennedy Shelter	Gold	Yes	Yes	Yes	Yes	1
29	Crossroads	Gold	Yes	Yes	Yes	Yes	1
30	George Mason Library	Gold	Yes	Yes	Yes	Yes	1

Figure 1-2. County Sustainable Development Policy delivering Net Zero for all future building designs and some currently under construction. (*Source: Staff Report on Climate Action Implementation:*https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/agenda%20item%205b_staff%20report%20on%20climate%20action%20implementation%20_a-1a.pdf)

The county commitment to net zero construction demonstrates the feasibility of high building standards across the public and private sector. The private sector goal is much broader and more impactful. The county cannot delay establishing specific policies and guidance that weave climate priorities and ecological protection into private sector developments and redevelopments.

EQAC is also concerned with the heat island effect caused by urban development. Research has shown that tree-covered surfaces and paved surfaces can differ by 40 degrees Fahrenheit[12]. New buildings should include landscaping standards to minimize the heat island effect[13].

EQAC includes a recommendation to accelerate the creation of private development planning guidance and zoning regulations that will align with the Community-wide Energy and Climate Action Plan (CECAP) and Resilient Fairfax reports.

Resource Protection Areas (RPA) Outreach, Especially Tidal Wetlands

RPAs are regulated shorelines of streams, rivers and other waterways associated with environmentally sensitive land that lie alongside or nearby which drain into the Chesapeake Bay and are a key component of resiliency[14]. RPAs protect water quality, filter pollutants from stormwater runoff, reduce the volume of stormwater runoff, prevent erosion, and perform other important biological and ecological functions. Development is generally not permitted even when there is sufficient buildable area. Accessory structures

[12] Ziter, Carly D., et al. "Scale-dependent interactions between tree canopy cover and impervious surfaces reduce daytime urban heat during summer." *Proceedings of the National Academy of Sciences* 116.15 (2019): 7575-7580.

[13] https://www.epa.gov/green-infrastructure/reduce-urban-heat-island-effect

[14] https://www.fairfaxcounty.gov/landdevelopment/chesapeake-bay-preservation-ordinance

like sheds, gazebos, pools, etc. require approval via a public hearing and fees. Clear-cutting is not permitted. The county's Land Development Services (LDS) has engaged in outreach to RPA property owners by providing an annual mailer, dedicated webpage, and Channel 16 videos to help inform landowners of their responsibilities to protect the RPA land.

More specifically, Fairfax County also has extensive tidal wetlands, which are also in the RPA, that provide important ecosystem services, such as protection against flooding and erosion and serve as nursery and feeding grounds for waterfowl, fish, and shellfish. However, engagement with owners of tidal wetlands is not sufficient, particularly given a change in state law in 2020.

Since 1972, Commonwealth law and later County Code have called for tidal wetlands to be protected. The County Wetlands Ordinance was updated to coincide with the 2020 Commonwealth update to the law including a requirement that living shorelines be used for shoreline erosion protection wherever suitable. Living shoreline methods use natural elements to create effective buffers for absorbing wave energy and protect against shoreline erosion.

In 2022 the Fairfax County Wetlands Board developed specific county guidelines at the request of the Board of Supervisors to preserve and protect tidal wetlands. Concerns have been raised by the Mount Vernon Community Council and others about the impact of the new law, ordinance, and guidelines. Landowners of tidal wetlands would significantly benefit from additional clarity and targeted outreach on this topic.

RECOMMENDATIONS

The Scorecard for this Annual Report on the Environment (ARE) contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Update the State of the Plan and Concept for Future Development map.**
   Recommendation: 1LU-2018.1 | Age: 6 years | Status: Making progress
2. **Implement specific processes that minimize ecological degradation from development pressure.**
   Recommendation: 1LU-2019.3 | Age: 5 years | Status: Making progress
3. **Private sector green building standards.**
   Recommendation: 1LU-2021.1 | Age: 3 years | Status: Making progress
4. **Tidal wetlands outreach.**
   Recommendation: 1LU-2023.1 | Age: New | Status: New this year

COMMENTS AND/OR CONCERNS

The following section summarizes some additional material covered in this chapter. While not rising to the level of recommendations, they nonetheless are deserving of thought as we move forward.

1. **Affordable Housing**
   EQAC commends the continued focus on affordable housing in the Communitywide Housing Strategic Plan and the Strategic Plan to Facilitate the Economic Success of Fairfax County. There are many development efforts under way that allow people to live and work nearby, reducing commuting pollution and development sprawl and decreasing pressure on natural areas.

2. **Holistic Comprehensive Planning Process**
   EQAC is an advocate for holistic planning processes and supports the Site-Specific Plan Amendment (SSPA) Process. Holistic approaches align with the vision to consider economic, social, and environmental factors resulting in vibrant, healthy, and desirable places. Prior reports elevated this topic to a recommendation. EQAC will continue tracking the process to ensure that SSPA continues to:

a. Prioritize large study areas that encompass multiple projects.
b. Include a robust screening process to ensure that the most appropriate projects are considered at a site-specific level.

Develop Policy Plan amendments that improve environmental outcomes across all projects.

3. **Advance Land Development Applications and Information**
EQAC commends the county for completing phase 4 of the PLUS system to create a single system of record for land development. This provides a centralized platform for analyzing the Comprehensive Plan development potential both during review and when amendments are approved.

4. **County Green Buildings Standards**
EQAC commends the county for adopting strong green building standards for public facilities that target net-zero over time and create aspirational examples for the private sector. EQAC urges the county to consistently hold private sector development to the highest building standards, both current standards and future ones that address climate change and adapt a policy of net-benefit to the environment when considering exceptions.

2. TRANSPORTATION

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

INTRODUCTION

Transportation is a key element impacting the quality of life for Fairfax County residents, and transportation planning choices must be made which balance a myriad of concerns, including but not limited to convenience, cost, efficiency, health, equity, and environmental impact. Fairfax County residents and visitors are overwhelmingly dependent on automobile transportation due to the long distances that often must be traveled, neighborhoods designed for cars, as well as the lack of convenient or safe (actual or perceived) alternative options such as mass transit, bicycling, or walking. Yet it is this heavy dependence on automobiles that has resulted in some of the worst traffic congestion in the United States, and with that congestion, large amounts of wasted time and productivity, as well as added pollution from vehicle emissions that degrades our air quality and contributes to climate change. There is a lack of reliable data currently available to fully understand the relative use of different modes for transportation in Fairfax County. The main data source used to inform the understanding is the American Community Survey (ACS), which collects data for the means used by workers for transportation to work. The most recent data was collected in 2020[15] (i.e., 3 years ago, at the height of the COVID-19 pandemic). In 2020, ACS showed that there were approximately 613,000 trips in Fairfax County for workers to get to work. Of those, about 76% were by car, truck, or van; 9% by public transportation; 12% worked from home; and less than 4% other (including taxicab, motorcycle, bicycle, or walking). Approximately 88% of those trips made by car, truck, or van were by a person driving alone (i.e., a single-occupancy vehicle (SOV)). What are not included in this data are the many non-work trips taken in Fairfax County, especially on weekends.

Fairfax County has significant transit and non-motorized infrastructure in place to build from. Fairfax County contributions to the Washington Metropolitan Area Transit Authority (WMATA) (Metrorail and Metrobus), Virginia Railway Express (VRE), and Fairfax Connector total nearly $220 million, and range from about 2.5% to 24% of operating budgets (see Table 2-1).

Operating Budget	Fairfax County Contribution	Total Operating Budget	Fairfax Percentage of Operating Budget
WMATA	$168,723,585	$2,261,652,000	~7.5%
VRE	$4,721,011	$185,477,588	~2.5%
Fairfax Connector	$42,965,059	$180,189,749	~24%

Table 2-1. Summary of Fairfax County's Contribution to Public Transit Organizations. (Source: FCDOT, e-mail from Zachary Krohmal; April 14, 2023.)

[15] https://data.census.gov/table?q=Fairfax+County,+Virginia&t=Commuting&y=2020&tid=ACSDT5Y2020.B08301

Fairfax County's main planning effort related to non-motorized infrastructure is the Active Fairfax Transportation Plan, including the Safe Streets for All Program which the Board of Supervisors (BOS) unanimously endorsed on May 10, 2022. The Fairfax County Department of Transportation (FCDOT) is currently targeting late 2024 for finishing this plan which will include network map recommendations. They are currently conducting coordination with internal stakeholders. FCDOT estimated that it added approximately 4.5 miles of bicycle lanes, 0.6 miles of trails, 2.3 miles of sidewalks, and enhanced 39 crosswalks during 2022 in coordination with the Virginia Department of Transportation (VDOT). Much of the work to construct non-motorized infrastructure is performed by VDOT. However, the estimates provided by FCDOT do not include any infrastructure constructed by VDOT or private developers; such data were not made available to EQAC. Recently, portions of the east-west trail being constructed parallel to I-66 that will connect Gallows Road to Centreville were opened to the public.

In 2021, Fairfax County published the Community-wide Energy and Climate Action Plan (CECAP) which lays out multi-sector greenhouse gas reduction strategies and identifies roles and responsibilities for federal, state and local stakeholders. CECAP focuses on actions that can be taken by the community (residents, business, and others) toward achieving a set of pre-defined emissions reductions goals. A review of Fairfax County's Climate Action Dashboard[16] (Dashboard) shows that transportation is the second-largest source of greenhouse gas emissions in Fairfax County after buildings (Figure 2-1). The Metropolitan Washington Council of Governments (MWCOG) data shows that transportation greenhouse gas emissions decreased by 23% between 2005 and 2020 (from 5,667,115 MTCO2e in 2005 to 4,360,972 MTCO2e in 2020, where MTCO2e is the metric tons of carbon dioxide equivalent).

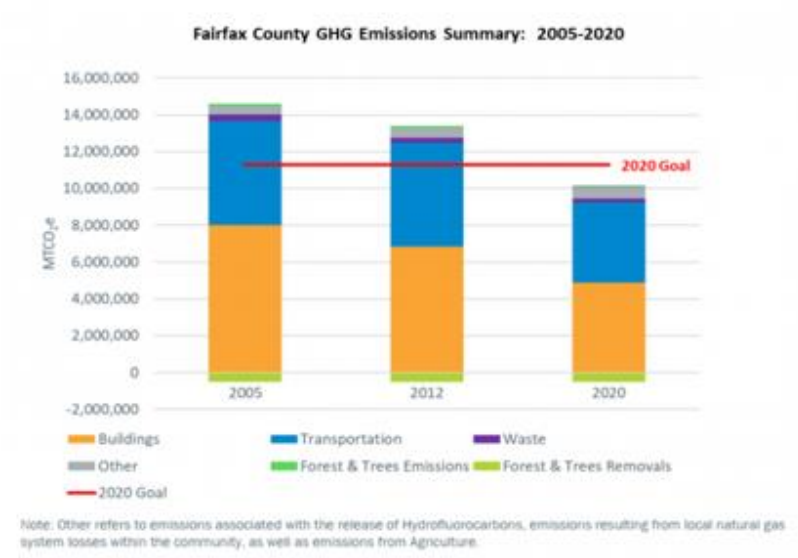

Figure 2-1. Fairfax County Greenhouse Gas Emissions Summary (2005 – 2020) Including Transportation Sector. (Source: https://www.fairfaxcounty.gov/environment-energy-coordination/climate-action/overall-metrics; downloaded June 11, 2023.)

Specific goals for transportation include increased use of electric vehicles (EVs) to at least 15% of all light-duty vehicle registrations by 2030 and increased use of transit and non-motorized commuting to at least 30% (including teleworking) by 2030. The Dashboard shows that, as of 2020, EV registrations in Fairfax County were 1.1% of total light-duty vehicle registrations (Figure 2-2).

[16] https://www.fairfaxcounty.gov/environment-energy-coordination/climate-action; downloaded May 2023

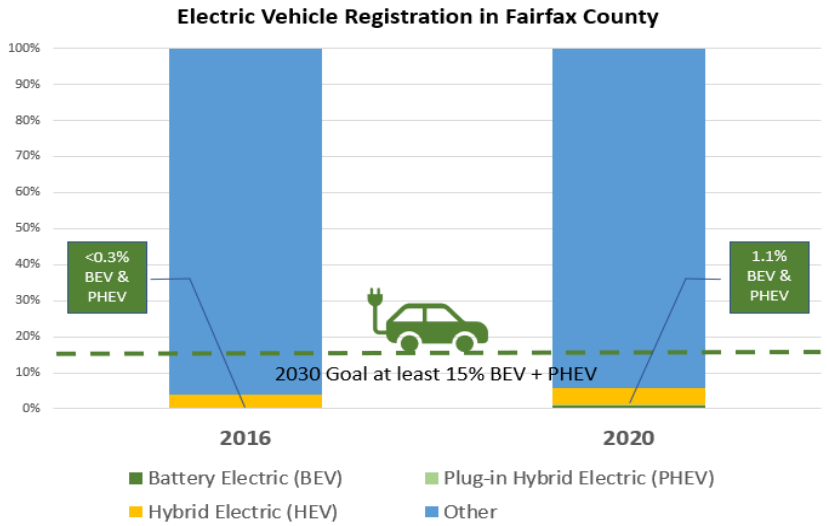

Figure 2-2. Electric Vehicle Registration in Fairfax County. (Source: Fairfax County Dashboard; https://www.fairfaxcounty.gov/environment-energy-coordination/climate-action/transportation; downloaded May 18, 2023.)

Battery electric vehicles (BEVs) accounted for 0.8% of this total, with plug-in hybrid EVs (PHEVs) accounting for the rest. The Dashboard also shows that the transit and non-motorized commuting goal of 30% had been met in 2022 for the D.C. metro area (a total of about 57%, comprising transit – 7.8%; bike/walk/scooter – 1.7%; and telework – 47.6%). Other modes were carpool/vanpool – 1.7%; and drive alone/taxi – 41.2%. Given that the telework numbers (which account for 83% (calculated based on 47.6/57) of the transit and non-motorized commuting) are likely to drop as the pandemic recedes, a conclusion to say that this goal has been achieved may be premature.

CURRENT STATUS AND CONCERNS

An evaluation of traffic congestion for 2022 ranked Washington, D.C. as 20th worst in the world and 8th worst in the United States, with each driver losing an average of 83 hours to congestion, corresponding to a cost of $1,398 for wasted fuel per driver[17] . There is no doubt that the COVID-19 pandemic has significantly impacted commuting patterns in Fairfax County and elsewhere throughout the U.S. In addition, it is likely that the situation in 2023 as this report is being written is very different from that which is reflected in the 2020 ACS data, since those data were collected at the height of the pandemic when many offices and other business were closed. Since that time, there has been somewhat of a return to pre-pandemic norms, though transit ridership remains depressed and work-from-home numbers remain elevated. Data was not available to inform a current understanding of the relative use of different transportation modes in Fairfax County. In June 2023, WMATA issued a release that indicated they are anticipating a projected $750 million shortfall in the fiscal year 2025 budget when federal covid relief funding runs out.[18] Fairfax County staff are following this announcement and noted they expect WMATA to release new budget numbers after Labor Day; in addition, county staff and others throughout the region are examining possible sources of revenue, in the event that the jurisdictions are asked to take on a larger share of the burden.

Anecdotal information suggests that, as of mid-2023, traffic congestion has substantially returned to Fairfax County with SOV use still the predominant mode used in the county. Such information suggests

[17] https://inrix.com/scorecard/

[18] https://www.wmata.com/about/news/Metro-FY25-shortfall-and-service-impacts.cfm#:~:text=June%2022%2C%202023-,Metro%20lays%20out%20potential%20service%20impacts%20needed%20to%20close%20%24750,covid%20relief%20funding%20runs%20out

that traffic congestion is also no longer limited to traditional rush hour times but occurs throughout the day. In addition, safety issues such as aggressive driving (e.g., speeding well in-excess of the speed limit) and distracted driving (e.g., driving while looking at a cell phone or other mobile device) are considerable problems. Anecdotal information also indicates that many more people were walking and biking during the pandemic. For example, bike shops were not able to keep enough inventory to meet demand and customers had long wait times for purchasing a new bicycle. Further, that information indicates that county residents are beginning to adopt one or more of the many micro-mobility options such as bike share and scooters. Electric bike sales also expanded. EQAC appreciates the county's efforts to support public transit and micro-mobility options but is concerned about the impacts of traffic congestion and the predominant use of SOVs in Fairfax County.

Taking actions to achieve the transportation-related goals in the CECAP report is critical given that transportation is the second-largest source of greenhouse gas emissions in Fairfax County, and, unlike buildings, transportation showed relatively fewer decreases in greenhouse gas emissions on the Fairfax County Dashboard. Efforts to have at least 15% of all light-duty vehicle registrations in Fairfax County be EVs by 2030 will be helpful for decreasing greenhouse gas emissions. Such efforts will also need coordination with activities described in the Climate and Energy Chapter such as increased availability of charging stations. Further, efforts to maintain the use of transit and non-motorized commuting of at least 30% will require diligence as teleworking is likely to drop as the pandemic recedes (the Dashboard shows this mainly being achieved through COVID-related teleworking).

Ongoing efforts are needed to complete the Active Fairfax Transportation Plan in a timely manner, including the Safe Streets for All Program, and to provide the resources and funding needed for implementation. This program would be helpful for people walking, biking, and using other forms of active transportation (Figure 2-3 shows use of bike racks at Oak Hill Elementary School).

Figure 2-3. Use of Bike Racks at Oak Hill Elementary School

While the Board of Supervisors has endorsed the Safe Streets for All concept, it has not budgeted any staff to implement it as a program. Rather, FCDOT staff continue to work on safety through their regular work. Further, there is insufficient maintenance of the non-motorized facilities and a need for the county to provide dedicated funding to support such maintenance; also, there is a lack of the use of Transportation Demand Management (TDM) funds to support micro-mobility encouragement and

education efforts. EQAC also recommends that equity concerns, as articulated through One Fairfax, be included in actions taken to achieve the transportation-related goals in the CECAP report. FCDOT staff did not have input about the ways that One Fairfax was being used in county efforts to increase light-duty EV registrations. However, staff reported that Phase One of Active Fairfax included actions related to One Fairfax such as the development of a countywide map of socio-economic need to inform future active transportation project priority decisions as well as holding meetings and providing translations in languages other than English to improve outreach to communities that are often underrepresented in stakeholder engagement.

RECOMMENDATIONS

The Scorecard for this Annual Report on the Environment (ARE) contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Develop a formal plan to increase light-duty electric vehicle (EV) registrations to at least 15% of total registrations by 2030.**
   Recommendation: 2TRANS-2021.1 | Age: 3 years | Status: Making progress

2. **Develop a formal plan to increase transit and non-motorized commuting (including teleworking) to at least 30% by 2030, including setting interim target goals to be achieved by 2024 and 2027. Further, the BOS should provide the staff positions to implement the Safe Streets for All Program which the BOS unanimously endorsed on May 10, 2022.**
   Recommendation: 2TRANS-2021.2 | Age: 3 years | Status: Making progress

3. **Provide the resources and funding needed to complete and implement the Active Fairfax Transportation Plan in a timely manner, including the Safe Streets for All Program.**
   Recommendation: 2TRANS-2023.1. | Status: New this year

3. WATER

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

INTRODUCTION

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

"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 myriads of 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 we 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 mainstem. Difficult Run, in turn, drains into the Potomac River (Figure 3-1).

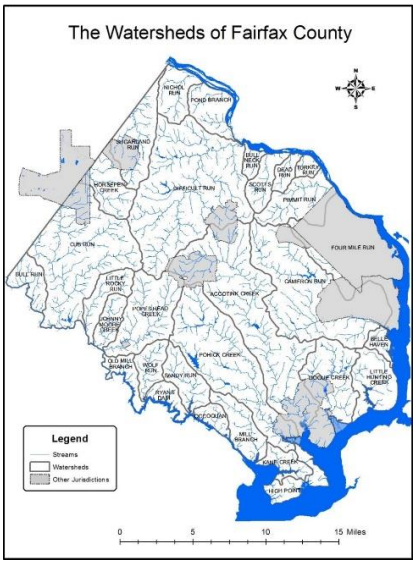

Figure 3-1. Watersheds of Fairfax County

The Potomac River watershed is a sub-watershed of an even larger watershed, the Chesapeake Bay watershed, which has an area of 64,000 square miles and includes portions of the states of New York, Pennsylvania, Delaware, West Virginia, Maryland, and Virginia as well as the District of Columbia. All of Fairfax County ultimately drains to the Potomac River, which drains to Chesapeake Bay.

The concept of One Fairfax when applied to the water resources of the county would mean that all citizens, neighborhoods, and water resources would receive equitable treatment by the Fairfax County government.

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 obtain water from surface water and groundwater, and then treat the raw water to drinking water standards.
2. **Wastewater management** – The collection and treatment in closed systems of sewage from homes and business to return it to surface waters or groundwater.
3. **Protecting and restoring streams, ponds and lakes, and tidal and freshwater wetlands** – Stormwater management includes the maintenance/restoration of those resources to ecologically healthier systems. Stormwater management also involves protecting homes and infrastructure from flooding.

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

There are five areas of significant concern addressed in this chapter that merit recommendations or comments.

1. New modeling and monitoring for the Occoquan Reservoir. The present models and monitoring do not presently address management and understanding of new and emerging threats such as per- and polyfluoroalkyl substances (PFAS) and salt.

2. Support for and expansion of policies and ordinances that protect the drinking water supplies and natural resources of the county. These become even more important considering climate change and its flooding impacts.

3. Support for maintenance and staffing of our wastewater conveyance and treatment systems.

4. The need for aggressive public education and monitoring concerning alternative private wastewater treatment facilities.

5. Adequate monies through rate increases to address expanding stormwater needs for flood control and other emerging requirements for maintenance, and for increases in salaries for attracting and retaining personal within the Department of Public Works and Environmental Services (DPWES).

I - DRINKING WATER

The majority of the county's drinking is provided by Fairfax Water. About two-thirds come from the Potomac River and one-third from 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 and modeling within the system. It must also include a discussion of emerging contaminants; regional and local policies for land use/source water protection; and water allocation agreements, especially during droughts.

CURRENT STATUS AND CONCERNS

EQAC believes that, overall, Fairfax County has an adequate supply of good quality drinking water. Like everyone in the U.S., we need to keep a wary eye on new and emerging contaminants that may need further treatment. The local Occoquan supply also bears watching because of threats to its quality and quantity.

Fairfax Water – Potomac River and Occoquan Reservoir Supply

Fairfax Water withdraws water from the Potomac River near the James J. Corbalis Water Treatment Plant by Herndon, and from the Occoquan Reservoir at the Frederick F. Griffith Water Treatment Plant, in Lorton. Fairfax Water provides about 167 million gallons per day (mgd) of 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 the City of Falls Church systems were incorporated into Fairfax Water's system.

In addition, Fairfax Water purchases 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.

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. The 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 are also performed at sampling sites throughout the system using portable instrumentation.

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

Monitoring Treated Drinking Water Supplies and Reports

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.

Although Fairfax Water produces safe and high-quality drinking water that meets all current standards, some water-quality concerns are appearing at the National level. For example, the U.S. Environmental Protection Agency (EPA) recently released four drinking water health advisories for PFAS. While these advisories do not carry the force of regulations, they nevertheless indicate a need for watchfulness over possible future monitoring or treatment requirements. Any additional water treatment for PFAS (i.e., beyond the current ozone and activated carbon systems) will be extremely expensive.

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, explored the insights derived from new monitoring data on the timetable for achievement of water quality standards in the Potomac estuary.

The Interstate Commission on the Potomac River Basin (ICPRB) also digitized data collected by the Washington Aqueduct at their intakes over many years. Entitled "Potomac River Water Quality at Great Falls: 1940-2019". ICPRB staff also created a short video that tells the story of the changing composition of the river.

Occoquan Reservoir Policy, Monitoring, and Modeling

The Occoquan Watershed covers about 590 square miles and includes the Occoquan Reservoir, which serves as the boundary between Fairfax and Prince William counties (Figure 3-2). Unlike the vastly larger Potomac Watershed, the Occoquan water supply is very susceptible to pollutants introduced in local jurisdictions.

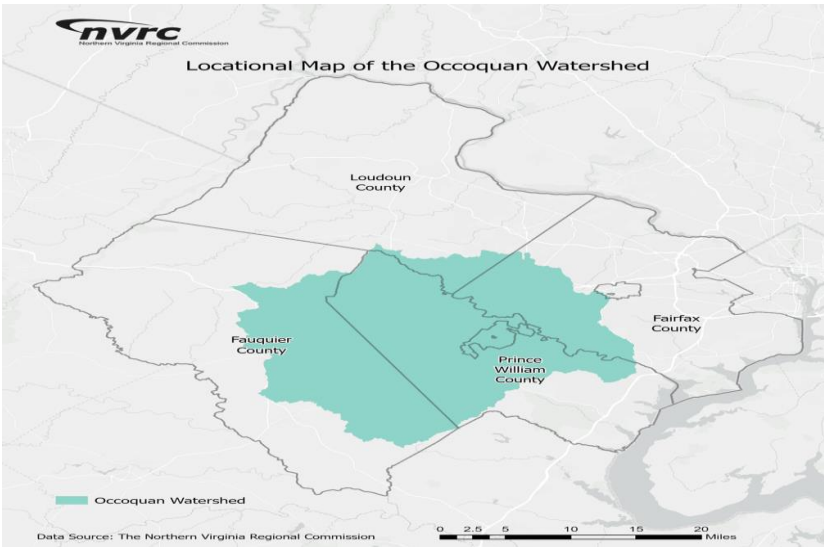

Figure 3-2. Locational Map of the Occoquan Watershed (Source: Northern Virginia Regional Commission)

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:

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

The Occoquan Watershed Monitoring Laboratory (OWML) has consistently monitored for nitrogen, phosphorus and sediment since the inception of monitoring in the Occoquan Basin. In addition, synthetic organic compounds (SOCs) have been monitored quarterly in the Occoquan Watershed since 1982. Water samples at stream and reservoir monitoring stations and sediment samples at reservoir monitoring stations are taken quarterly. Fish samples are taken at three reservoir stations semi-annually. In general, monitored water quality in the Occoquan Reservoir has also remained stable over the years. The reservoir continues to be enriched with nutrients (eutrophic). The water quality has not deteriorated for some time. Overall, results of the SOC monitoring in 2016 show that the watershed conditions, regarding SOCs, continues to be excellent. A large portion of the lab's newer resources are focused on chloride and sodium, with additional funding requests sought to increase monitoring salinization in the watershed.

While salt concentrations are rising in freshwater nationally, the trend is particularly acute in the Occoquan Reservoir. According to Dr. Stanley Grant, Director of the OWML[19], sodium ion concentrations in drinking water from the Griffith Plant is now higher than 93% of all Virginia public water systems that rely on surface water for water supply. At the present time, the EPA guidance level for sodium in drinking water is 20 mg/L. This value was developed for those individuals restricted to a total sodium intake of 500 mg/day and should not be extrapolated to the entire population. More than 90% of samples collected in the past 5 years from Griffith's finished drinking water exceed 20 mg/L sodium.

The purpose of the Northern Virginia Regional Commission's (NVRC) Occoquan Basin Nonpoint Pollution Management Program is to help localities maintain acceptable water quality in the reservoir through control of nonpoint source pollutant loadings. NVRC maintains the Occoquan Basin Computer Model, which during the early 1980s served as the basis for downzoning the Fairfax County portion of the watershed to protect drinking water from pollution caused by urban development.

Every five years, NVRC performs an assessment of land use changes in the watershed to update the model. This helps localities determine whether additional land management efforts are necessary. Over time, more accurate data and updated technology have become available and NVRC's land use tracking methodology has changed along with it.

For the 2015 Land Use Update, NVRC developed a new land use tracking method that focuses on impervious and pervious surface area. The detailed methods for this update is discussed in the White Paper: Updating the 2015 Land Use for the Occoquan Watershed. NVRC will continue to update the land use for the Occoquan Watershed every five years, now using the updated method discussed in this paper.

Wells and Groundwater Monitoring

As the county continues to urbanize, groundwater supplies will come under increasing stress. There is no indication of any regional problem so far, but continuing monitoring efforts are prudent.

[19] Email correspondence to Stella Koch, EQAC, May 23, 2023

There are approximately 15,000 family residences and businesses that are served by individual well water supplies in Fairfax County. The Fairfax County Health Department offers private well evaluations, and the application can be accessed on the county's website.

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. On January 1, 2014, the Eastern Virginia Groundwater Management Area was expanded to include the areas of Fairfax County located east of Interstate 95.

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

RECOMMENDATIONS – DRINKING WATER

The Scorecard for this ARE contains the following recommendations pertaining to this subchapter. Please see the Scorecard for details.

1. **Continue and enhance the protection of the Occoquan Reservoir, as needed.**
   Recommendation: 3A-W-2021.1 | AGE: 3 years | Status: Making progress

2. **Fund monitoring and modeling of emerging contaminants such as PFAS and of the rising sodium levels in the Occoquan Reservoir.**
   Recommendation: 3A-W-2021.2 | AGE: 3 years | Status: Stalled

II - WASTEWATER

Nearly all wastewater in Fairfax County is collected from homes and commercial sites and carried through the county maintained sanitary sewer pipe system to one of five advanced regional treatment facilities (county's own Noman M. Cole Jr., Pollution Control Plant, Upper Occoquan Service Authority, DC Water's Blue Plains Advanced Wastewater Treatment Plant, Alexandria Renew Enterprises, and Arlington Water Pollution Control Plant) that release the treated waters into local waterways. A small amount (about 20,000 gallons per day) of the county's wastewater is treated at the Prince William County Service Authority's plant. The only small treatment plant remaining in the county serves the Harborview subdivision of Mason Neck. About 5% of homes are served by septic systems.

CURRENT STATUS AND CONCERNS

EQAC recognizes Fairfax County is served by an excellent wastewater conveyance and treatment infrastructure. However, we must not rest on our laurels. Facilities will require continued maintenance and upgrades as they age, and hiring qualified staff remains a continuing challenge.

The treatment of sewage is a complex and shared responsibility among neighboring jurisdictions. Of the 100 million gallons per day (mgd) collected daily through the sanitary sewer system, approximately 40 percent is treated by the county-owned Noman M. Cole, Jr. Pollution Control Plant (NMCPCP) in Lorton, Virginia. 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). Fairfax County pays a pro rata share of the cost of these facilities. Fairfax County has representatives on UOSA, DC Water, and Alexandria Renew Enterprises governing boards.

Wastewater produced within the County's Approved Sewer Service Area, which covers approximately 290 square miles of the county's total of 400 square miles, is conveyed by the county's 3,380-mile-long collection system to the above mentioned five plants for advanced wastewater treatment including nutrient removal. Two of the five treatment facilities are in Fairfax County; the county's NMCPCP and the independent UOSA. An overview can be found here.

The Wastewater Management Program within the county is managed as an enterprise fund which means the fees collected for hookups and for service fund the system. The Board of Supervisors sets the fee rate.

For approximately 5% of Fairfax County residents, wastewater is treated on-site via septic systems through which the water infiltrates into the ground and ultimately reaches groundwater.

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

The NMCPCP, located in Lorton, Virginia, is a 67 mgd advanced wastewater treatment facility that incorporates preliminary, primary, secondary, and tertiary treatment processes to remove pollutants from wastewater. The plant is owned by the county and operated by the Fairfax County Department of Public Works and Environmental Services - Wastewater Management. The original plant, which began operation in 1970 at a treatment capacity of 18 mgd, has undergone three capacity and process upgrades to meet more stringent water quality standards. After treatment, the wastewater is discharged into Pohick Creek, a tributary of Gunston Cove and the Potomac River.

The NMCPCP continues to more than meet the performance standards for the limits of parameters monitored. Additional information is available on the Fairfax County website. This 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. This water can be safely used to water lawns, in commercial car washing businesses, in construction and for other industrial uses.

The Water Reuse Project uses cleaned wastewater from the NMCPCP for irrigation and industrial purposes. Reusing the treated water reduces 1 mgd of water demand on the county's drinking water system. In addition, 0.25 mgd is reused on the plant site. This equals to a total of 2 billion gallons of reused water annually. A pipeline supplies reuse water to Covanta Fairfax, Inc., the Resource Recovery Plant, the Laurel Hill Golf Course, and the South County ballfields.

In a conversation in July 2022 with the Director of DPWES, Chris Herrington, it was stated that there was a 38% vacancy rate in positions within wastewater. The county needs to have industry competitive salaries to attract and retain personnel. Recent market rate adjustments, performance increases, compression study and hiring bonuses should help with attracting and retaining skilled employees in the wastewater program. A review of compensation and benefit levels needs to be conducted to maintain competitiveness in hiring and retaining these skilled employees.

Wastewater Treatment and Gunston Cove Recovery

The improved water quality of Gunston Cove (which receives effluent from NMCPCP), the Occoquan Reservoir (which receives effluent from UOSA) and the Potomac River (which receives effluent from Blue Plains) are testament to the high standards of treatment in the last decades by these facilities.

Since 1984, Fairfax County, with assistance from George Mason University, has been monitoring water quality and aquatic life in the Gunston Cove area. As a major discharger of treated wastewater into the tidal Potomac River from the Noman M. Cole Jr., Pollution Control Plant, Fairfax County has been proactive in decreasing nutrients, a major cause of water quality impairment, since the late 1970s. Due to the county's commitment to advanced wastewater treatment at the Noman M. Cole Jr., Pollution Control Plant, nitrogen and phosphorus loadings in Gunston Cove have reduced dramatically over the study period. Chlorine and solids in treated water have also been reduced or eliminated. The reduction in loadings has been achieved even as flow through the plant has remained high. Fairfax County has demonstrated how effective wastewater management can improve water quality, and thereby restore the aquatic ecosystem. The Gunston Cove study has proven to be an extremely valuable case study in ecosystem recovery for the Chesapeake Bay region and internationally.

Maintenance of the Wastewater Conveyance System

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

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. This is due to WCD's aggressive maintenance and rehabilitation program. As part of the collection system's asset management program, CCTV inspection of the gravity system identifies defects in the sewer system for repair and maintenance recommendations. These recommendations are incorporated into WCD's maintenance programs as well as the Capital Improvement Program (CIP). An imperative highlight from the CIP is the use of trenchless technologies to rehabilitate pipes throughout the system. This technology provides significant cost savings over traditional open cut repairs, and reduced disruption to residents, the surrounding environment and traffic.

The sewage pump stations' supervisory control and data acquisition (SCADA) system provides remote monitoring, alarm management, and limited control capabilities for the pump stations' operations. To ensure continued operation of pumping stations during power outages, 60 backup power generators, located at pumping stations throughout the county service area are maintained. WCD is currently implementing a new geographic information system (GIS) centric computerized maintenance management system (CMMS) to replace and modernize its current system. In addition, WCD is monitoring and investing in new technology such as artificial intelligence to introduce efficiencies, improve effectiveness and service delivery to the residents of Fairfax County.

The collection system which 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, is aging. The costs for replacement of older infrastructure and increased maintenance have risen. In February of 2014, the Wastewater Management Program (WWM) Asset Management Team was formed to develop a dynamic asset management program for prioritizing and optimizing the operation, maintenance, and capital asset reinvestment of the linear assets. Several phases of the Asset Management program have been completed. Funding of the wastewater program by increasing sewer fees is essential to successful operation and maintenance of the sewer system.

Fairfax County's Pretreatment Program

Fairfax County has an effective and enforceable pretreatment program to protect the county's wastewater collection, conveyance, and treatment infrastructure, and to prevent certain pollutants from passing through the wastewater treatment facilities to receiving waters. The pretreatment program is in full compliance with all applicable requirements.

Septic Systems and On-site Disposal

Over 21,000 homes and businesses are served by on-site sewage disposal systems in Fairfax County. About 5% of these systems are alternative sewage disposal systems, which require more extensive maintenance than conventional systems. All septic systems are required to be pumped out every five years. The operation and maintenance of all onsite sewage disposal facilities is regulated by the county's Health Department. Permits are issued for residents to utilize pump and haul because of a failing on-site sewage disposal system. About 195 homes in the Town of Clifton and the Gunston and Wiley communities are on community pump and haul systems. These locations are outside of the ASSA and the county's central sewer system and cannot be extended to these locations.

Areas of the county that have been deemed unbuildable in the past (due to the inability of the property to support a conventional septic system) are now being considered for development using alternative on-site sewage disposal technology. Developers, because of the need to maximize land development potential, are using alternative systems as one tool to achieve this goal. Unlike conventional systems, alternative systems require advanced, prescribed, and regular maintenance to ensure systems adequately handle wastewater. Key to ensuring these systems work properly is homeowner knowledge of how they generally operate and considerable involvement in ensuring maintenance is performed. All alternative systems require an annual maintenance inspection to ensure proper function of the system and homeowners may not be aware of their critical role for maintaining these systems through these inspections. To ensure these complex systems are functional for a long time, educational outreach to homeowners is critical. Outreach can be provided by both the private and public sectors, to include Fairfax County Health Department and Department of Public Works and Environmental Services.

Upper Occoquan Service Authority (UOSA)

UOSA is an independent authority that operates an advanced water reclamation facility in Centreville, Virginia and serves the western portions of Fairfax and Prince William counties, as well as the cities of Manassas and Manassas Park. UOSA's Drinking the Water video shows individuals comfortably drinking the treated water from the 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 upstream of the Occoquan Reservoir. UOSA continues to meet its performance criteria. Additional information can be found on the UOSA website. The Director of the Wastewater Planning and Monitoring Division at Fairfax County serves as the chair of the UOSA Board.

Monitoring the Success of Improved Treatment

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 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. There are concerns with emerging contaminants and increased sodium and chloride in the Occoquan Reservoir.

RECOMMENDATIONS – WASTEWATER

The Scorecard for this ARE contains the following recommendations pertaining to this subchapter. Please see the Scorecard for details.

3. **Set the fee rate collected for wastewater treatment to meet the documented needs of the necessary upgrades and maintenance requirements for all the plants that serve the county and their respective wastewater collection system. This may include the necessary increases to hire and retain adequate wastewater personnel.**
   Recommendation: 3B-W-2021.1 | Age: 3 years | Status: Stalled

4. **Continue aggressive public education and monitoring of the new alternate septic systems performance.**
   Recommendation: 3B-W-2021.2 | Age: 3 years | Status: Making progress

5. **Wastewater operates an enterprise fund and the department needs to be supported in creating a salary structure and pursuing benefit programs that will hire and keep adequate numbers of employees in these essential positions.**
   Recommendation: 3B-W-2023.1 | Status: New this year

III - PROTECTING AND RESTORING STREAMS, PONDS & LAKES

INTRODUCTION

Stormwater management is the art and science of managing the potential damaging effects of polluted and excessive runoff on our natural environment (streams, ponds, lakes, and rivers) and on our built environment (bridges, roads, and buildings). This is achieved by attempting to manage both the quality, quantity, and timing of runoff.

The dispersed and intermittent nature of rainfall makes runoff pollution difficult to control. Excessive nutrients, including nitrogen and phosphorus (organic matter, fertilizer) 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), salts from winter deicing of impervious surfaces, toxics (from oil, paint, pesticides, chemicals, and metals), pathogens including bacteria (such as animal waste, failing septic systems and leaking sewer systems) and litter. In areas with buildings, roads and parking lots, the water flows over these surfaces into storm drains directly to streams.

As development and redevelopment occur, natural areas that once had vegetative cover capable of absorbing water and filtering pollutants are replaced by impervious surfaces such as roads, driveways, parking lots, and buildings. With no chance to infiltrate into the ground, and with surfaces often designed to minimize water retention, increased runoff flows into streams more quickly. This “flashier” runoff results in scouring, downcutting and loss of streamside vegetation. When stream channels become incised from downcutting, they become disconnected from their floodplains. Water cannot overflow banks onto the adjacent floodplain where flows can be dissipated and drop their sediment loads. 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 further stressing aquatic life. Over time, increased erosion, flooding, and sediment deposition lead to habitat loss, water quality problems and damage to homes, utilities, and infrastructure. Collectively, this phenomenon is known as “urban stream syndrome” and is typical of many Fairfax County streams (Figure 3-3).

Figure 3-3. Examples of a healthy stream (left) well-connected to its floodplain, and an incised stream (right) separated from its floodplain. (Source: Photos provided by the Fairfax County Department of Public Works and Environmental Services.)

The purpose of stormwater management is to manage both the quality and quantity of water coming off sites because of increased impervious surfaces. Stormwater runoff is treated by constructing facilities that

capture the rainfall on site and infiltrate it into the ground or by conveyances and facilities such as detention ponds that treat and release the water more slowly into streams or lakes. “Best Management Practices” for stormwater reduce pollutants and control volume to reduce flooding and the erosive quality of increased water flow on stream banks and bottoms.

Stormwater management requires a complex integration of public and private facilities, differing choices for restoration and protection of streams, ongoing inspections and maintenance for all facilities and public education and involvement in handling runoff. Enforcement and enhancement of regulations based on current science to reflect future conditions to minimize impacts on our streams and ecosystems should be pursued. It requires inspections of development sites for adequate stormwater protection. Imperative in all this is monitoring, not only the receiving streams, but also the effectiveness of stormwater facilities and treatment practices in protecting natural and built conveyance systems and improving water quality.

The results of these combined efforts should lead to healthier, protected, and restored streams, and increased resilience from the more frequent intense storm events accompanying climate change. These efforts result in cleaner local streams, a healthier Occoquan Reservoir and Potomac River, and ultimately, an improved Chesapeake Bay ecosystem.

CURRENT STATUS AND CONCERNS

Monitoring Streams and Lakes

Several stream monitoring programs are ongoing within Fairfax County and county streams have been the subject of several studies. EQAC believes current stream monitoring efforts present an accurate picture of stream conditions within Fairfax County, and recommends these efforts be continued. Stream quality, as noted below, bears watching but does not call for expanded monitoring at this time.

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), Fairfax Water, 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 citizen volunteer water quality monitoring programs. Fairfax County’s GIS (See Chapter 9) provides extensive online geospatial data to help analyze watersheds. All these data help provide a comprehensive understanding of the condition and health of Fairfax County’s water resources.

The county collects extensively both system-wide and specific watershed data; the county also collects data that focuses on some specific stormwater treatment methods to monitor their effectiveness.

DPWES Stream Quality Assessment Program

Born from the 2001 Stream Protection Strategy Baseline, this program 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 on a countywide basis. The Stream Quality Index (SQI) is based on annual data collected on resident populations of stream benthic macroinvertebrates. As benthic macroinvertebrates are excellent indicators of water quality, the SQI is used to evaluate long-term trends in the overall health of streams. The index rates the composite conditions of stream sampled each year on a 1-5 numerical scale, with an index of 1 indicating “very poor” average stream health, and a score of 5 indicating “excellent” stream health countywide.

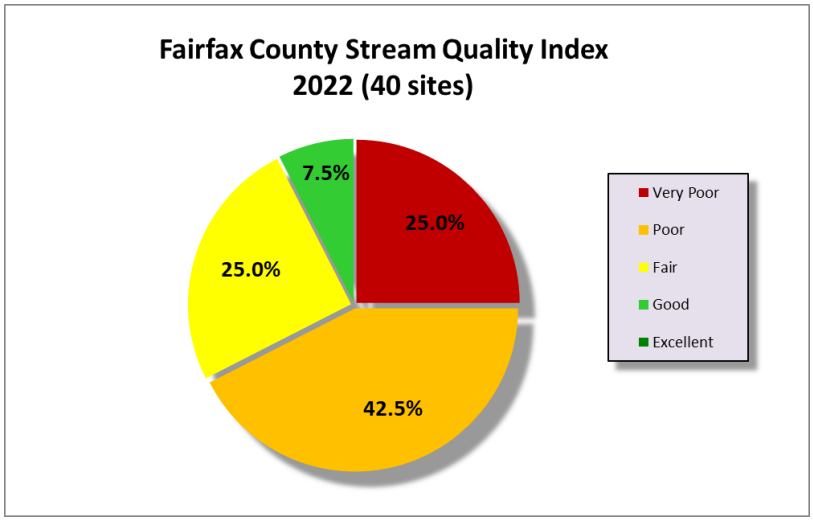

Figure 3-4. 2022 Fairfax County Stream Quality Index

For almost two decades, this biological monitoring effort continues to indicate that approximately 80% of the county's waterways are in "Fair", "Poor", or "Very Poor" condition (Figure 3-4). However, Fairfax County streams have shown a slight amount of improvement since 2004, when the current monitoring program began (Figure 3-5). Although the changes have been relatively minor, it is important to note that they have occurred against a backdrop of continued urbanization and population growth. In 2022, the index dipped from 2.5 to 2.2. This dip was also seen in the high-quality, "best condition" reference sites located outside of the county- suggesting a common influence (such as weather). Annual fluctuations in the SQI are expected due to annual climatic variability and the nature of the randomized sampling framework. It remains to be seen whether the 2022 dip was an aberration or a warning of some trend.

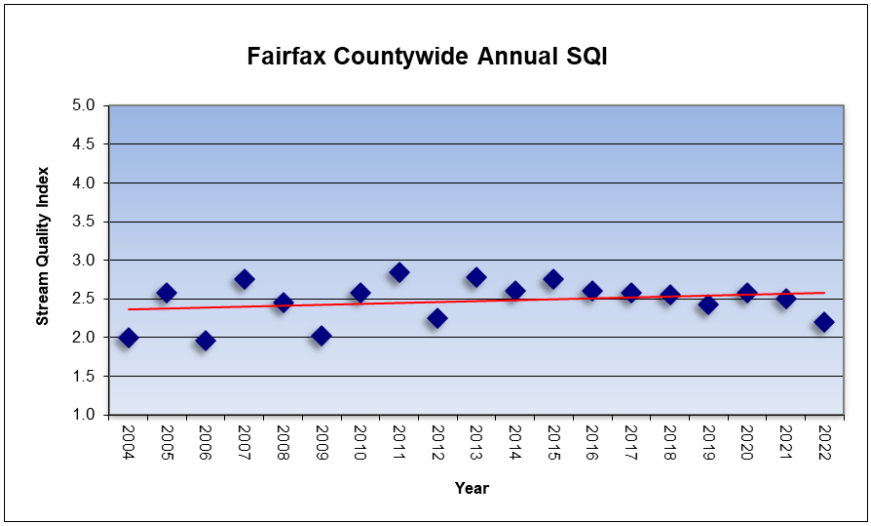

Figure 3-5. Countywide Stream Quality Index (SQI) (2004-2022)

DPWES Bacteria Monitoring Program

This annual probabilistic monitoring provides information on the general levels of bacteria in streams and is used as a screening tool that can identify areas of concern for further, more intensive investigations of potential sources (e.g., sewer leaks). 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. Based on these

results, recreational direct contact with surface waters is discouraged and additional information can be viewed online.

DPWES Stream Protection Strategy Baseline Study
Published in 2001, this study provides a holistic initial ecological baseline assessment of county streams and management recommendations.

DPWES 2005 Stream Physical Assessment
This study provided countywide baseline field reconnaissance data including information on habitat conditions, impacts on streams, general stream characteristics and geomorphic classification of stream type. This information was used as the basis for the development of countywide Watershed Management Plans. The county has recently developed an updated stream physical assessment program.

USGS Watershed Study Partnership
This partnership was established in 2007 as a collaborative, long-term trend study to evaluate watershed scale changes in water quality and quantity in response to the large-scale implementation of watershed capital improvement projects (e.g., stream restorations, stormwater management retrofits, green infrastructure, etc.). This is accomplished through a network of jointly operated stream gages that collect high-density monitoring data throughout the county. To date, three USGS extensive scientific reports have been published from this work, including a recent 2023 publication. These findings will inform the County's Stormwater Management Program and promote strategies for watershed restoration.

Ponds and Lakes
Since 2014, four large, county-managed water control impoundments in the Pohick Creek watershed have been monitored by DPWES. These lakes (i.e., Barton, Huntsman, Woodglen and Royal) were built in the 70s and 80s by NVSWCD and Fairfax County as flood and sediment control facilities. By monitoring the lakes over time, it has been shown that dissolved oxygen concentrations strongly stratify during the growing season, and that dredging can lower nutrient, chlorophyll, and suspended solid concentrations (in the water column) but that these concentrations tend to trend back up over time, post dredge.

The Reston Association, the homeowner’s 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. This report and other information about Reston’s lakes can be obtained from its Lake Report.

Watershed Management and Restoration
Protecting environmental assets is an essential part of resiliency planning in the face of climate change. EQAC urges the county to enhance environmental policies and ordinances where possible.

The county has developed a series of policies and ordinances to protect receiving waters, stream valley lands and other environmental assets to include the Floodplain Regulations of the Zoning Ordinance, the Environmental Quality Corridor (EQC) Policy of the Comprehensive Plan, the Chesapeake Bay Preservation Ordinance, the Occoquan Reservoir protections, and the Stormwater Management Ordinance.

The county has added and proposed additional programs that integrate green infrastructure and nature-based solutions. These practices provide multiple benefits to reduce flooding, heat island effect and greenhouse gas emissions, improve water and air quality, and provide human health and ecological benefits. Resilient Fairfax recommended strategies include:

- Develop a Consolidated Natural Resources Management Plan
- Pursue Green Infrastructure Projects That Provide Climate Resilience Benefits
- Inventory and Update to the Comprehensive Plan to Enhance Resilience
- Expand Targeted Tree Plantings
- Pursue and Implement a Flood-Risk Reduction Plan for the Fairfax County Community
- Encourage Heat-Resilient Design, Development, Upgrades, and Practices
- Update Capital Improvement Program Process to Include Climate Resilience Considerations.

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.

Watershed Management Plans

Between 2003 and 2011, a total of 13 watershed management plans, which cover all 30 county watersheds, were developed and adopted by the Fairfax County Board of Supervisors. From this planning effort, more than 1,700 structural and non-structural projects were identified as opportunities to help restore and protect our vital natural resources.

Fairfax County Watershed Projects and Stream Restorations

Data shows that the most cost-effective means of achieving nutrient (total nitrogen and total phosphorous) and sediment reduction goals (total suspended solids) is through stream restorations using natural channel design (NCD) techniques. The county has completed 231 stormwater projects treating about 61,504 acres and restored over 119,261 linear feet (22.58 miles) of degraded streams since July 2009. The county often leverages resources and has obtained over $40 million in grant funding from the Virginia Department of Environmental Quality (VDEQ) through the Stormwater Local Assistance Fund (SLAF) for 32 projects.

Clean Water Act Designated Impaired Streams and Total Maximum Daily Loads (TMDLs)

As required by the federal Clean Water Act, every two years the VDEQ prepares a list of water bodies in the Commonwealth that have been listed as "impaired" for specific designated uses such as swimming, fishing, recreational contact, aquatic life use, and others. Many bodies of water in Fairfax County have been designated as being "impaired" under the federal Clean Water Act. For most of these bodies of water, a "Total Maximum Daily Load" (TMDL) must be prepared to identify pollutant load reductions that would be needed to remedy the impairment. To date, several TMDLs have been established for streams and embayments in the county. Impairments identified include bacteria (fecal coliform and/or E. coli); sediment (benthics); polychlorinated biphenyls (PCBs) and chloride. Through the requirements of the County's Municipal Separate Stormwater System (MS4) discharge from these TMDL designated streams must have action plans developed which outline the measures the county will take to improve the conditions. The list of current TMDL action plans, which include the impaired waters associated with each pollutant, is available online.

For more information on impaired waters and the TMDL program, including an interactive map of TMDL and impaired waters in the county, please visit the VDEQ's water quality web page.

Salt (Chloride) TMDL

There is growing regional and local concern about the amount of salt accumulating in our soils and entering our waterways and negatively impacting our water ecosystems. Data collected by DPWES Stormwater Planning along with other partners in the region, show increasing salinity in county streams and water supplies. In 2018, Fairfax County, other Northern Virginia localities, organizations, and community groups, assisted VDEQ with the development of the Salt Management Strategy to reduce the

amount of salt entering our waterways. The county is working with the Metropolitan Washington Council of Governments (MWCOG) and Northern Virginia Regional Commission (NVRC) to distribute educational materials regarding salt application and management. The Salt Management Strategy will help Fairfax County to develop a chloride TMDL action plan for Accotink Creek as part of the county's next MS4 permit renewal (expected in 2023). For additional information on salt, please visit the Metropolitan Washington Council of Governments webpage on Winter Salt Smart.

Reston Stream Mitigation Bank

Beginning in 2008, over 11 miles of streams in Reston have been restored as part of a private stream mitigation bank. This is an ongoing project independent of county efforts. Additional information can be viewed online .

Flood Remediation/Reduction Programs in Belle Haven and Huntington

The New Alexandria, Belle View, and Riverview neighborhoods are susceptible to tidal flooding. Notably, tidal surges from Hurricane Isabel in 2003 caused extensive damage to the communities and posed a significant risk to the residents' safety. In 2022, the United States Army Corps of Engineers (USACE) completed the Metropolitan Washington Coastal Storm Risk Management Study and identified flood mitigation measures to protect the region. The Tentatively Selected Plan (TSP) included a levee and floodwall to reduce flood risk in the Belle Haven community. The USACE TSP completed a public and agency comment period. Due to the lack of community support the USACE will not be moving forward with TSP for the Belle Haven Community.

Flood Risk Reduction Program

The county has several active flood risk reduction activities and an ongoing interdepartmental effort to develop a comprehensive countywide flood risk reduction plan. DPWES currently manages 16 active flood mitigation projects, is modeling and mapping approximately 813 stream miles with county-regulated floodplains of 70 acres or more and is working with the Federal Emergency Management Agency to provide outreach on the updated Flood Insurance Rate Maps. Land Development Services (LDS) developed a localized flooding mitigation policy for infill lot development and supported the creation and enhancement of GIS-based tools to help identify flood prone properties during the plan review process. Fairfax County Department of Planning and Development continues to encourage stormwater management practices above the regulatory requirements on properties going through the zoning application and development review process that are located upstream of known drainage issues. LDS issued a letter to industry about residential infill. Detention is now being required on single residential lots that are generating certain levels of runoff.

In July 2022, county departments presented to the Board of Supervisors Environmental Committee on recommended options to reduce flooding risks for existing and future development. In that presentation it was noted that the county's flooding and drainage service requests indicate that urban flooding outside of the county's floodplains is a concern across many of the areas of the county; 97% of the service requests were urban flooding requests (located outside of floodplains). It is essential to consider both the delineation and protection of floodplains along with the flood mitigation efforts addressing urban flooding. The strategies in the Resilient Fairfax plan address the issues of both floodplains and urban flooding.

The county often leverages resources and has obtained $15.4 million in funding for four flood mitigation projects from the VA Department of Conservation and Recreation through the Community Flood Preparedness Grant Program.

Stormwater Management Facilities and Infrastructure Maintenance and Repair

There are approximately 8,200 public and private stormwater management facilities in Fairfax County's inventory. Much of the inventory consists of ponds, manufactured (proprietary) devices, infiltration trenches, underground and rooftop detention facilities, and sand filters. Other practices like bioretention gardens, swales, tree filters, permeable pavement and green roofs are referred to as green stormwater infrastructure (GSI). GSI requires a greater level of maintenance to ensure functionality. The county inspects county-owned structures biannually and public ones every five years. These inspection rates are consistent with the Municipal Separate Storm Sewer System (MS4) program requirements.

The Maintenance and Stormwater Management Division (MSMD) performs preventative maintenance on county-maintained stormwater facilities and inspections of 20 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 up to seven times per year. More information can be found at the DPWES website.

The county's storm drainage systems, valued at more than $1 billion, includes over 1,400 miles of pipes, 200 miles of constructed open conveyance channels, and almost 68,000 storm structures, some up to 80 years old. Approximately 7,000 county stormwater outfalls are regulated under the MS4 permit. MSMD continued implementation of its storm drainage condition assessment program consistent with the MS4 program requirement to inspect 100 percent of the county's storm drainage system once every five years and at least 15 percent annually. Restoration and rehabilitation of the system is ongoing. Information pertaining to the MS4 Program Plan and annual reports are online.

EQAC commends the Board of Supervisors for its actions in 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 $100.8 M in FY 2024.

The Board of Supervisors' actions to provide for annual quarter cent increases in the Stormwater Service District Tax rate have allowed the county's stormwater program to increase stormwater infrastructure replacement, create a more comprehensive low impact development maintenance program and rehabilitate a number of older stormwater management dams as well as other critical components. The last rate increase from 3.00 cents to 3.25 per $100 of assessed real estate value occurred in FY 2019. The inventory of stormwater infrastructure continues to grow by approximately 500 stormwater management facilities and eight miles of pipe per year. In addition, much of the stormwater infrastructure in Fairfax County is reaching the end of its life cycle, and as the system ages it remains critical to maintain adequate inspection and rehabilitation programs to avoid infrastructure failures and ensure the functionality of stormwater treatment systems. and sustain current levels of service. 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. Additional funding is needed for maintenance dredging of publicly maintained lakes to sustain their environmental and recreational benefits.

In addition to supporting infrastructure reinvestment, the capital program funds critical capital projects from the watershed management plans including increasing number of 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 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. Additionally, they support the county's Environmental Vision and Strategic Plan.

Older suburban neighborhoods that were developed before the establishment of effective stormwater management regulations, including the requirements of stormwater conveyance, detention, and overland relief, may experience storm drainage issues. Lot-by-lot residential infill redevelopment, where an existing home is replaced by a larger home with more impervious area, generates additional stormwater flow that impacts the already inadequate stormwater management system. Over the next century, precipitation events are expected to become more intense, which is predicted to lead to more frequent flooding. Additional funding is needed to address neighborhood drainage improvement projects to reduce localized flooding and obtain water quality benefits in older neighborhoods that were developed without or with limited stormwater management controls.

Erosion and Sediment Control Inspections, Stormwater Compliance Inspections

Erosion and sediment control (E&S) permits are issued by Fairfax County Department of LDS, authorizing disturbance of acres of land each fiscal year. Erosion and sediment control violation notices and stormwater violations are issued, and usually are resolved. For more information on how many inspections were conducted during the fiscal year, please see the MS4 Annual Report.

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 MS4s within the urbanized areas of Virginia). TMDLs have been developed for sediment, nitrogen, and phosphorus by the VDEQ. Fairfax County continues to explore ways to partner with VDOT on potential stormwater management enhancements that go beyond minimum state regulations and better reflect the county’s more stringent stormwater management requirements. Under the County Safety and Operation Improvement Fund (CSOI), VDOT partners with DPWES Stormwater Planning to address maintenance level stormwater drainage projects. Recently, on the VDOT 495 Express Lanes Northern Extension project, VDOT provided funding to support the county’s restoration of a segment of Scotts Run stream that will be impacted by the transportation improvements.

Outreach Activities

The county has numerous, award-winning watershed education and outreach programs and materials that are regularly utilized by the Fairfax County public school system and others. These programs include the Revitalize Restore, Replant! Program (R3), Stormy the Raindrop education campaign and Create a Caddisfly (for our younger residents), and the Stream Crime Investigation (SCI) and geomorphology labs designed for high school students. More information about these and many other programs can be found on the Stormwater Management website.

Staff from the Stormwater Planning Division, Solid Waste Management Program, Wastewater Management Program, Fairfax County Park Authority and the NVSWCD support large and small-scale volunteer cleanups coordinated by the Alice Ferguson Foundation, Clean Virginia Waterways and Clean Fairfax.

In 2019 a new partnership was initiated between DPWES and the Office to Prevent and End Homelessness (OPEH) to benefit the environment and provide assistance for individuals experiencing homelessness. Operation Stream Shield (OSS) provides part-time, temporary work experience to guests of

four of the county's homeless shelters to help improve the water quality of local streams. The program helps the county meet its mandate by keeping streams clean through the removal of litter and non-native invasive plant species, maintaining the county's pedestrian trail system, providing assistance to the county's Noman M. Cole, Jr., Pollution Control Plant, I-66 Transfer Station, and the I-95 Landfill Complex, and engaging in assigned special projects as they become available.

Northern Virginia Soil and Water Conservation District Support Programs

- Review and approve Soil and Water Quality Conservation Plans (SWQCPs) to renew existing Agricultural and Forestal (A&F) Districts.
- Assist homeowner associations, civic associations, and places of worship in resolution of drainage and erosion concerns as well as the promotion of energy efficient practices. Also, with funds provided by DPWES provides ongoing technical assistance to private property owners with funding from the Virginia Conservation Assistance Program and the Conservation Assistance Program to implement the proposed water quality solutions.
- Organize storm drain marking efforts with colorful and watershed-specific labels stating, "No Dumping, Drains to [the nearby stream]."

RECOMMENDATIONS – PROTECTING AND RESTORING STREAMS, PONDS, AND LAKES

The Scorecard for this ARE contains the following recommendations pertaining to this subchapter. Please see the Scorecard for details.

6. **Increase funding for the stormwater program by either an increase in the Stormwater Service District rate in FY 2024 by at least one-quarter penny, from a rate of 3.25 cents per $100 assessed real estate value to 3.50 cents per $100 or fund the increase through a change in the tax rate.**

Recommendation: 3C-W-2022.1 | Age: 2 years | Status: S*talled*

4. WASTE MANAGEMENT

Board of Supervisors Environmental Vision:
"Fairfax County will use integrated waste management principles to ensure future system capacity and sustainability. The county will promote policies and practices that maximize resource conservation and pollution prevention. The objective is an increase in water reuse, diversion and recycling. Furthermore, the county will strive to decrease the amount of material disposed of; reduce greenhouse gas emissions by managing landfill gas; encourage the development of renewable energy and alternative fuels for buildings and vehicles; and preserve open space, green space, and wildlife habitats."[1]

INTRODUCTION

This chapter provides an overview of the county's solid waste management system and discusses a range of waste management issues as follows:

- Components of the Solid Waste Management Program (SWMP);
- SWMP Operations Overview;
- Current status and concerns for key issues; and
- Recommendations to realize the Board of Supervisor's Environmental Vision.

Components of the Solid Waste Management Program (SWMP)
The six components of the SWMP are described below:

- *Source Reduction* is principally comprised of the Fairfax County Government and Schools Zero Waste Plan[20]. The plan goal is to divert 90% of generated waste away from landfills or incinerators and decrease generated waste by 25%.
- *Reuse* encourages using items multiple times for their original purpose or different function and is a part of the Zero Waste Plan.
- *Composting* includes yard waste such as brush, grass, and leaves. These materials are diverted from disposal to produce compost that can be added to soil to help plants grow. A pilot food waste composting program is also underway
- *Recycling* targeted materials include glass, paper, cardboard, metal, plastic, tires, motor oil, and electronics. In addition to the environmental benefits, recycling is significantly less costly than Municipal Solid Waste Disposal.
- *Collection and Transfer* refers to containerized refuse collection from residents, businesses, and institutions that is consolidated into larger, tractor-trailer loads at a transfer station.
- *Municipal Solid Waste (MSW) Disposal* includes material not diverted from the waste stream by recycling, composting or other methods. Fairfax County MSW disposal takes place primarily at the Covanta Fairfax, LLC (Covanta) facility described below. The remaining ash, after energy recovery, is processed to remove metals, stabilized to prevent leaching of toxic components, and

[20] Fairfax County Government and Schools Zero Waste Plan (October 2021). https://www.fairfaxcounty.gov/procurement/sites/procurement/files/assets/fairfax%20county%20government%20and%20schools%20zero%20waste%20plan%20v2.pdf

landfilled at the I-95 Landfill Complex. When Covanta is non-operational for repairs and maintenance, or any other reason, refuse is transported to one of several contracted landfills.

SWMP Operations Overview

SWMP's Operations Division oversees the collection, transfer, and disposal of solid waste and recyclables within the county. There are two county-owned disposal facilities; the I-66 Transfer Station and the I-95 Landfill Complex. Most of Fairfax MSW is processed from Waste-To-Energy (WTE) at the WTE facility owned by Covanta and is located on the I-95 Landfill Complex. The SWMP also provides collection services to approximately 43,000 single family homes and most county-owned properties and buildings.

- *County Sanitary Collection Districts*. For about 10% of residents, Fairfax County provides curbside collection services for refuse, recyclables, yard waste, and bulky items within Sanitary Districts (SDs). Outreach and data collection to the sanitary district residents is under the control of county staff.

- *Private Collection.* The remaining 90% of collection and all recyclers are private firms that in the past have not been required to do outreach. Data collection from these private firms is cumbersome.

- *Single Stream Recycling*. In addition to the County Sanitary Collection District recycling, most county residents have single stream recycling available to them. With single stream recycling, recyclables including newspaper, cardboard, plastic, aluminum, and junk mail, are placed in a single bin for recycling. These recyclables are collected by a single truck and taken to a Materials Recovery Facility (MRF) to be sorted into various commodity streams for sale to markets. A separate truck typically collects additional municipal solid waste that has not been separated for recycling.

- *Outreach & Education.* Community outreach programs focus on educating residents, county employees, and businesses about the importance of source reduction, reuse, composting, and recycling. Under the Four Touch Points (4TP) initiative, which started in March 2023, all private haulers are required to provide at least one piece of waste reduction and/or recycling outreach/education material to their residential customers at least four times per year. The 4TP program is planned to further educate the community; however, in recent years, education and traditional outreach have been ineffective in increasing reuse, reduction, and recycling.

- *Household Hazardous Waste (HHW) Drop-off.* Locations at the I-66 and I-95 facilities provide a means for residents to dispose of items such as paints, pesticides, herbicides, aerosols, pool chemicals, household cleaners, solvents, fluorescent bulbs, recycle electronics (e-waste), motor oil, antifreeze, batteries, cooking oil, ink/toner cartridges, and empty compressed gas cylinders. Additionally, the HHW operation maintains a partnership with Habitat for Humanity to recycle latex paint, and stages very small quantity generator events as an affordable solution to hazardous waste disposal for Fairfax County businesses and government agencies that generate small quantities of hazardous waste.

- *Food Waste Drop-Off Programs.* Food waste is diverted from MSW via drop-off locations for food scrap composting at the I-66 and I-95 facilities, five locations at selected farmers markets, and food waste collection at county events and in selected government office kitchens, libraries, and legislative offices. The program is now being taken over and expanded by the Fairfax County Park Authority, which operates a network of farmers markets throughout the County. The next wave of implementation will place drop-off locations at ten markets across the county. A county operated food composting pilot is underway at the I-66 facility.

- *Glass Collection.* Glass is banned from single stream commingled collection because it contaminates reusable materials. The county provides nineteen drop off locations as part of the purple can club network in the region.

- *Enforcement Program.* A stand-alone SWMP enforcement unit responds to complaints, conducts scheduled and unannounced compliance inspections, and may initiate enforcement actions, when necessary, on solid waste haulers. Most of the hauler complaints are about missed collection, collecting too early, and for mixing MSW with recycled waste. In 2023, additional enforcement is focusing on collection and storage system adequacy and access to recycling at multi-family housing properties and non-residential waste generators such as retail operations. Enforcement of the solid waste code is time consuming and cumbersome when compared to parking citations. Fines are also limited to $500, which can be too low to encourage change. In addition to the SWMP enforcement unit, the Department of Code Compliance (DCC) addresses litter and illegal dumping complaints.

- *Regional Coordination.* SWMP staff serve on several industry-related advisory boards and committees with the Northern Virginia Regional Commission (NVRC) and the Metropolitan Washington Council of Governments (MWCOG). This work promotes coordination and collaboration amongst jurisdictions across the region and promotes shared research and data, and the adoption of best management practices among planners and regulators.

- *Disposable Plastic Bag Tax.* Effective January 1, 2022, disposable plastic bags provided at point of sale to consumers at grocery stores, convenience stores and drugstores in Fairfax County are subject to a five-cent tax. To avoid the tax, consumers may use reusable shopping bags. Paper bags are not subject to the five-cent tax, although certain retailers may have their own fees for paper bags. The purpose of the tax is to curb the collective use of disposable plastic bags, to reduce the amount of plastic waste in local waterways, roadways, and open spaces, and the damage it causes.

CURRENT STATUS AND CONCERNS

Recycling Data

Both commercial firms and residents are required under the county code to separate recyclables from their municipal solid waste for recycling. Recycling is not voluntary. Data on recycled material is collected from a variety of sources and reported to the Virginia Department of Environmental Quality (VDEQ). The system for reporting to VDEQ contains complex credits and adjustments. The data reported below does not contain these modifications to the raw data.

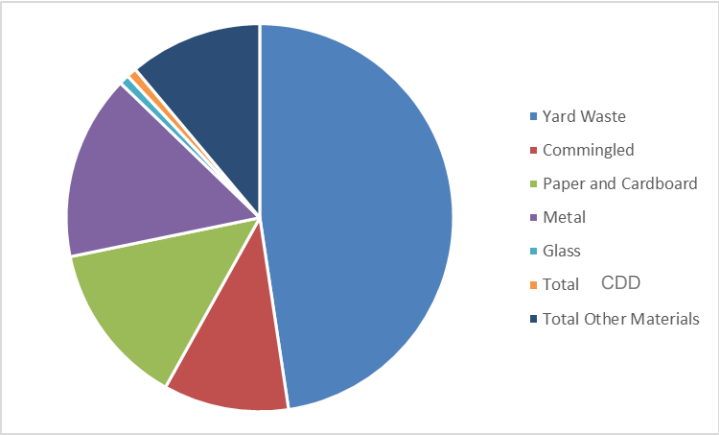

Figure 4-1. Distribution of Recycle, MSW and Construction Debris as Reported by Virginia DEQ (2012-2022)

Recycled Material	2022	Historical (2012-2022) Average	Maximum Historical (2012-2022)	2021 2022 Change	2022% Max	2022 Item % of total recycled
Yard Waste	194,388	207,556	243,927	-2%	80%	35%
Commingled	67,992	95,375	157,038	0%	43%	12%
Paper and Cardboard	44,064	84,931	116,547	-17%	38%	8%
Metal	68,549	60,686	77,637	-5%	88%	12%
Glass	4,861	1,890	5,197	-7%	94%	1%
Food Waste	11,863	8,354	14,379	-21%	83%	2%
Total CDD	91,992	68,667	125,471	33%	73%	16%
Total Other Materials	74,346	39,318	74,346	29%	50%	7.0%
Total Recycled	558,054	564,270	647,450	6%	82%	100%
Household MSW	250,692	253,991	261,172	0%	100%	47%
Commercial MSW	367,037	353,804	375,165	-2%	85%	69%
Total MSW	617,729	620,630	665,509	-1%	87%	
Total MSW and Recycled	1,175,783	1,186,264	1,312,959	2%	85%	
Recycled Percent of Total	47%	48%	49%	4%	97%	
Commingled + Glass % of total Household	23%	28%	38%	-0.4%	42%	

Table 4-1. Recycle, MSW and Construction Debris Data from 2012-2022 SWMP Reports to Virginia DEQ

Table 4-1 includes more details on current and the last 10 years of recycling.

- Paper and cardboard recycling is down 17%
- Food waste is down 21%
- CDD (Construction materials) is up 33%
- Glass collection is down 7%
- With these decreases, total recycling is at 47%, just below the historic average of 48% principally due to the large amount of yard waste increase, other category recycling and a significant increase in CDD. CDD increases may be due to high construction activity.

Commingled waste is the recycled material most familiar to Fairfax County residences because it comes principally from what they put out for collection. Commingled waste together with glass is estimated at 23% of the total municipal solid waste. Based on studies for the Zero Waste Plan, 23% may be less than half of what could be recycled.

Of the MSW, less than a quarter was recycled in 2021, including the county's glass recycling program. While not directly comparable to Fairfax County, the Montgomery County single family recycle rate is 63% and the commercial recycle rate is 29%.[21]

[21] Aiming for Zero Waste Montgomery County Maryland Baseline Review and Current State Assessment Technical Memorandum #1 December 2018, https://www.montgomerycountymd.gov/SWS/Resources/Files/master-plan/baseline-review-current-state-assessment-executive-summary.pdf

Figure 4-2 shows the historic MSW and Commingled Recycled material as a percent of the 10-year average. The sum of total MSW and recycled material has been stable. However, the data indicates that commingled material has been in decline. Curbside recycling as estimated by commingled recycling is 25 percent below the historic average and less than half its peak.

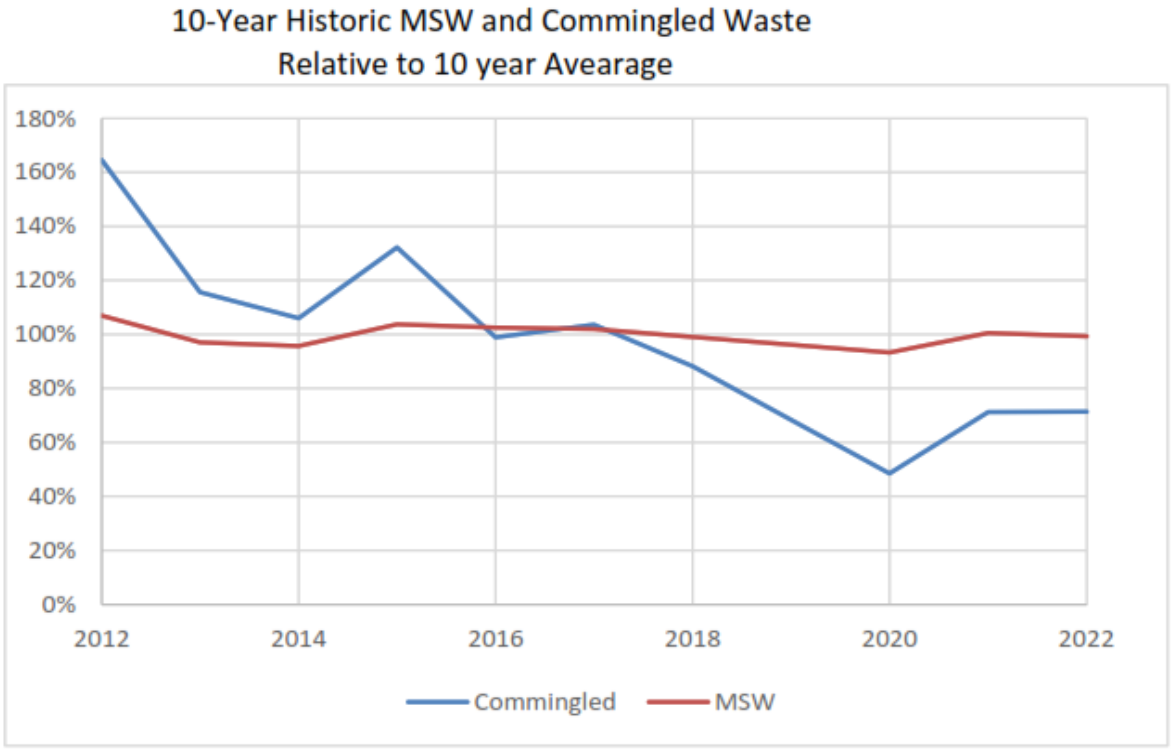

Figure 4-2. Historic MSW and Commingled Recycled Material as a Percent of the 10-Year Average
(Source Reduction Fairfax County Government and Schools Zero Waste Plan)

In 2021, the Fairfax County Board of Supervisors approved a Zero Waste Plan[22] for Fairfax County government and schools to achieve zero waste by 2030 through the implementation of twenty-four optimal strategies. It is two years since the goals for this plan were established and much of the progress appears to focus on planning, voluntary actions, and outreach. While many of the 24 optimal strategies are worthwhile, the heavy dependence on outreach is a concern. The County SWMP has been attempting to increase the level of reduction and recycle for the last 10 years using outreach strategies and they have concluded that outreach is not effective. Based on the SWMP experience, more aggressive action is needed if the Supervisors' goals are to be met. Ten percent of the zero-waste implementation time has passed and in 2023 county recycling of solid waste actually decreased.

The Zero Waste Plan is laudable and can be used as a motivating example to energize the private sector. It is helpful for county government to "walk the walk" before asking more from the private sector. However, the Government and Schools Zero Waste Plan addresses less than 2% of the total solid waste of the SWMP. Therefore, to move the entire county to less waste, it will be necessary to take significant bold steps in the private sector.

[22] Fairfax County Government and Schools Zero Waste Plan, October 2021, fairfax county government and schools zero waste plan v2.pdf

Zero Waste by the Numbers

To be successful, the Zero Waste Plan must establish quantitative objectives and a schedule for each of the 24 optimal strategies. Doing this will require a realistic look at the distinct categories of the plan including the following:

- Reduce and Reuse – The Zero Waste Plan has Reduce and Reuse Strategies that can be implemented by the county and the schools. Some of these strategies are currently being implemented. Numeric objectives need to be established for the current plan and include means of incorporating the private sector.
- Commingled (including Curbside) Recycling – Analysis by county staff has shown that recycling is less expensive than utilizing Covanta. The Fairfax County Solid Waste Management Ordinance requires recycling. However, only 25% of the MSW (commercial and residential) material was recovered in commingled collection. Data on the specific amount of recycled material in Fairfax MSW is needed, however, based on national[23] and local data, the current percentage appears to be less than half of what is recyclable. The plan should consider means of motivating the haulers with economic incentives to increase this economical aspect of zero waste.
- Recycled Rejects – Fairfax County commingled recycling is sent to recycling businesses that operate with a profit motive. This means that only the profitable material in commingled recycling is recycled. Specific Fairfax County data is needed on the reject rate. The SWMP has utilized outreach to reduce the reject rate by asking residents to only include recyclable materials in curbside pickup. However, a large part of the problem is not residents, but misleading industry practice. Many plastics are labeled as recyclable by industry that are not actually profitable to recycle and as a result are rejected. This issue requires national action; however, the Zero Waste Plan should consider ways to reduce the sale of materials labeled as recyclable that are in fact not.
- Food Waste – Based on local and national data, less than 2% of the Fairfax County potential food waste is currently being recycled (i.e., composted). Some jurisdictions (including New York City) are requiring food waste recycling. To move toward Zero Waste, the county will need to invest significantly in this aspect of recycling.
- Covanta Advantage – While reduce, reuse and recycle is preferred, Fairfax County has the advantage of energy recovery of materials that cannot be practically recycled. The Zero Waste Plan should include numeric analysis of the energy recovery from Covanta.
- Outreach - The county staff have indicated that current outreach efforts are not likely to advance the recycling rate significantly toward the zero waste goal. Monetary enforcement incentives should be considered.

Trash Collection Service Issues

Starting in 2019, multiple petitions have been made to the county to form or expand the existing Sanitary Collection Districts which service about 10% of Fairfax County residents. Nationwide and in Fairfax County there is a shortage of public works labor. This shortage has contributed to a deterioration in quality collection services.

The Board could approve new sanitary districts or request authority from the legislature to create franchise districts, which would then be serviced by a private hauler contracted by the county. There are pros and cons to this approach. One benefit is fewer trucks on the road, improving safety and lowering emissions. In addition, with the private haulers acting under contract to the county, outreach and data collection could be required by contract. County staff have reported that legislative changes would be required to implement this model.

[23] https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials.

Trash Collection and Recycle processing companies will play important roles in extending the county's zero waste goals to all of Fairfax County. While the current county ordinances can be used to make progress toward the goal, zero waste actions by these firms will be required.

Approximately 25,000 customers receive vacuum leaf collection service from Fairfax County's Department of Public Works and Environmental Services (DPWES). The county leaf collection program has had multiple difficulties in recent years. From an environmental perspective, keeping leaves and yard waste on site by not collecting grass or leaves at all or by composting on-site, provides an environmental benefit to the soil and reduces waste that must be processed. This action supports the zero waste goals of the county. However, county residents who receive leaf collection voted for this service and pay for it. County staff has proposed to discontinue vacuum leaf service when the upcoming season concludes, along with the tax imposed for the service.

In mid-September 2023, DPWES was experiencing a severe shortage of personnel both in the Solid Waste Department and in the Wastewater Department. Approximately, twenty-one percent (21.9%) of skilled (merit) positions in Solid Waste were vacant, and in Wastewater it was 15.5% percent. Front-line, lowest pay positions have the highest vacancy rate. As of this writing, 25 percent of all DPWES merit employees do not earn enough individually to afford rent for a 1-bedroom apartment in Fairfax County. These positions are essential for the safe management of our wastewater treatments plants and the safe management of our solid waste systems. Both of these departments are run as enterprise funds and the departments need to be allowed and supported in creating a salary structure that will hire and keep adequate numbers of employees in these essential positions.

Environmental Preferable Purchasing

The Department of Procurement and Material Management (DPMM) manages the Environmental Preferable Purchasing (EPP) Policy through the Green Purchasing Program. DPMM is also charged with implementing the Zero Waste Plan. While DPMM has invested considerable time and effort in communicating the county goals to county departments, it is difficult to track actual progress as there are no numeric criteria and no schedule with accountable milestones.

Litter and Illegal Dumping

There are multiple volunteer organizations addressing litter including the Alice Ferguson Foundation and Clean Fairfax. In addition, 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. DCC receives but does not record and track litter and illegal dumping complaints, which are estimated by DCC to be less than ten in the last year. DCC has issued Notice of Violations and worked with the responsible parties to obtain compliance without taking anyone to court.

Notwithstanding the low number of litter complaints, the county's streams continue to have trash, plastic bags, and bottle contamination. The county experimented with structural controls in Little Hunting Creek and concluded that Operation Stream Shield (OSS) is more beneficial. OSS provides part-time, temporary work experience to guests of the Eleanor U. Kennedy Shelter, Bailey's Crossroads Community Shelter, and The Lamb Center, to help improve the water quality of local streams. The program includes the removal of litter and non-native invasive plant species, maintenance of the county's pedestrian trail system, providing assistance to the county's Noman M. Cole, Jr. Pollution Control Plant, I-66 Transfer Station, and the I-95 Landfill Complex, and engaging in assigned special projects as they become available.

Solid Waste Collection Complaints and Litter

Late collection, overflowing containers, waste on the ground (not placed in containers) all result in litter that despoils the neighborhoods and often contaminates county streams. Residential complaints about solid waste collection are addressed by DPWES.

As shown in Figure 4-3, complaints about collection services and about litter around collection sites have been increasing substantially with over 1,500 complaints in 2022 recorded. County staff indicate that no citations were issued in 2022 because enforcement is cumbersome and most complaints against haulers are quickly addressed. The county plans to concentrate enforcement more on property owner responsibility for inadequate storage and recycling facilities.

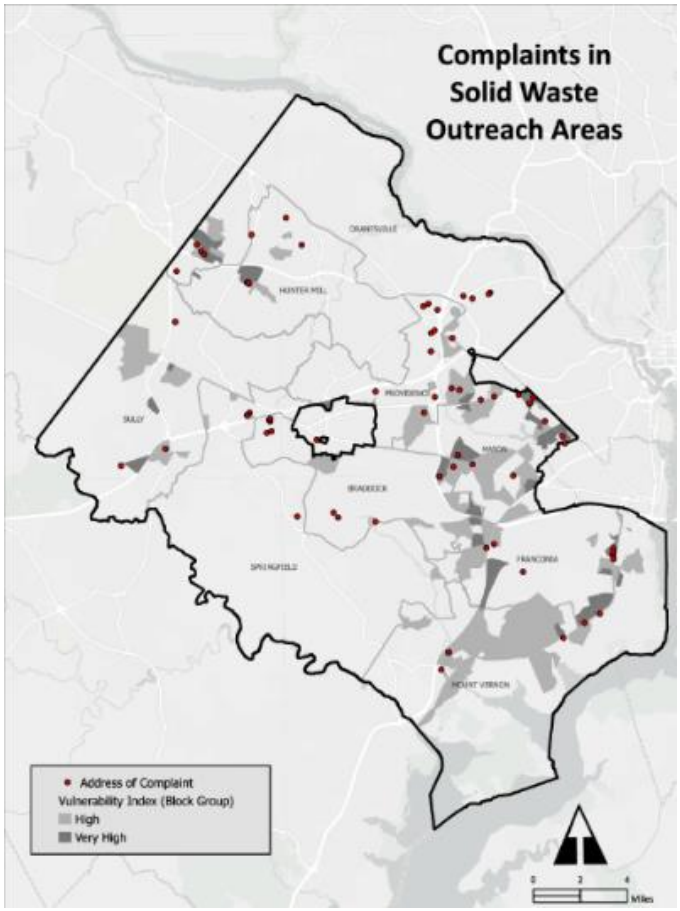

Figure 4-3 Complaints in Solid Waste Outreach Areas

RECOMMENDATIONS

The Scorecard for this Annual Report on the Environment (ARE) contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Budget and implement an accountable Zero Waste Plan for the public and private sector.**
   Recommendation: 4WM-2023.1 | Status: New

2. **Utilize existing County authority or obtain legislative authority to:**
   - Implement the Zero Waste Plan for all public and private waste.
   - Efficiently enforce solid waste regulations and policy
   - Modify existing ordinances as practicable.

- Collect Accurate Data Efficiently
- Expand Sanitary Collection Districts or implement franchising that allows including Zero Waste Plan elements in hauling and recycling contracts.

Recommendation: 4WM-2023.2 | Status: New

3. **Institute recycling data collection and reporting.**
Recommendation: 4WM-2021.1 | Age: Three years | Status: Making progress

4. **Institute litter control.**
- Support Virginia law changes for a container redemption fee ("bottle bill")
- Enforce litter control requirements on Waste Haulers *(Two year)*

Recommendation: 4WM-2021.2 | Age: Three years | Status: Making progress

5. **Establish environmental purchasing numeric targets.**
Recommendation: 4WM-2021.3 | Age: Three years | Status: Stalled

6. **Consider environmental and safety benefits of sanitary collection districts petitions.**
Recommendation: 4WM-2021.5 | Age 3 years | Status: Making progress

5. 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… 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."[24]

INTRODUCTION

Fairfax County contains roughly 226,655 acres of developable land[2]. The county's ecological resources, owned by different entities, are dispersed across this acreage. This chapter will focus on the health of the county's natural ecosystems with an emphasis on the plant and tree components of green infrastructure described above in the Board's Environmental Vision (whereas Water and Wildlife Resources are addressed in other chapters). The topic of trails, as it relates to the environment, is generally covered by the Transportation chapter.

How Land is Used

As the county seeks to maintain healthy, natural ecosystems, the way land is used and developed is a critical aspect to consider. The following three classifications of land use account for nearly 80 percent of the land in the county:

- **Parks and recreation** (15.3 percent; 34,584 acres)[25]
  - Most of this acreage is owned and managed by the Fairfax County Park Authority (FCPA) (23,636 acres in 2023[26]) and the Northern Virginia Regional Park Authority (NOVA Parks) (8,591 acres in 2023[27]).

- **Vacant or natural** (5.3 percent; 12,051 acres) [2]
  - This land decreased 438 acres when compared to January 2021 and 1,751 acres between 2017-2022 due to growth pressures within the county as it is zoned for residential, industrial, or commercial uses and continues to be developed.

- **Residential** (59.3 percent; 134,389 acres) [2]
  - This significant percentage underscores the impact that private property can have on our environmental services and natural capital. Residential property in the county increased 361 acres since January 2021 and increased by 1,445 acres between 2017-2022.

[24] 2017 Fairfax County Environmental Vision, Section 2 E, page 24 http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf#page=30

[25] 2022 Land Use and Zoning Data, Acres of Land by Existing Land Use Category (Planning District, Supervisor District & Human Services Region); Acreage does not include areas of roads (which generally increase each year as land is developed and county acreage decreases), water, or small areas of land unable to be zoned or developed. Data provided via email by Department of Management & Budget's Xuemei Han (https://www.fairfaxcounty.gov/demographics/find-data-topic).

[26] FCPA acres: https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2024/adopted/volume1/51.pdf

[27] NOVA Parks acres: https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2024/adopted/cip/8-nvrpa.pdf

While not all the acreage described above can be considered equally valuable as natural habitat, all areas—including active recreation areas, private open space, county and school properties, and residential areas—can each enhance the environment (e.g., by reducing stormwater runoff, adding trees) if properly managed and/or designed. Furthermore, the many economic, social, and health benefits that ecological resources provide cannot be overlooked.[28]

Organizations of Note

A wide variety of organizations and programs impact Fairfax County's ecological resources with a broad set of stakeholders including federal, state, local, non-profits, and private landowners. This chapter provides a reference list of organizations in the "Additional Information" section.

Ecological Resources on Non-Park Land

With most land in Fairfax County classified as "non-park" land (e.g., residential, government-owned, and commercial), the linkage between regulations, land use decisions, and the county's broader ecological resources is a critical consideration for the ecological health of the county.

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 45.6 million acres of lawn [in the U.S.] in half, 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."*[29]

A variety of ordinances and policies provide guidance for private property owners on topics which directly impact Fairfax County's ecological resources. This chapter provides a reference list in the "Additional Information" section.

CURRENT STATUS AND CONCERNS

As the county continues to develop land, it is important to actively preserve, protect, enhance, and expand its current park land and tree canopy, not only for the enjoyment of residents but also as a climate and resiliency strategy. County government plays an important role in preserving and protecting ecological resources, particularly on private land, through its site planning process. In all these efforts, it is important to consider the quantity, quality, and equity of the county's tree canopy to improve air and water quality as well as to help mitigate climate crisis impacts, such as heat island effects and increased stormwater runoff.

Tree Canopy

Reporting on Tree Canopy Coverage

The 2011-2015 Land Cover Change Analysis[30] from 2017 reports that Fairfax County, at that time, had a 57% canopy coverage. A more recent 2021 study conducted by Casey Trees[31] showed 53.6% canopy coverage and a 0.3% decrease in tree canopy (633 acres) between 2014-2018. However, because analyses of tree canopy vary in their methodology and which underlying data is being used, these two reports cannot be compared directly.

As of August 2023, Urban Forest Management Division (UFMD) was awaiting tree cover analysis by the county's non-profit partner Casey Trees using National Agriculture Imagery Program (NAIP) 0.6-meter land cover data. The data will provide the first chance to view tree canopy changes between 2012 and 2021 from a consistent, comparable dataset. Staff are using quality assurance techniques to ensure data

[28] Green Cities: Good Health (washington.edu)
[29] https://www.highcountrygardens.com/gardening/bringing-nature-home-interview-with-doug-tallamy/
[30] https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/tree-canopy-report-2015.pdf#page=4
[31] https://caseytrees.org/treereportcard2021/

accuracy and appropriateness for use as a policy and program metric. Publication of the data is scheduled for the fall 2023. Drawing from this publicly accessible data set in the future should also allow for future changes to be directly compared.

A Note About Reporting on Tree Canopy Coverage

One note of concern about tree canopy reporting is the limitation of the current technology. Current imagery can be interpreted to measure canopy coverage (quantitative), but it cannot today report on canopy *quality*. For example, invasive vines (which threaten tree canopy) and invasive trees such as Callery pears and Tree of Heaven show up as tree canopy coverage the same as a native oak tree. As such, interpretation of current and upcoming reports must be carefully considered. The 2017 i-Tree Eco Urban Forest Assessment reported on field study data from 2009-2010 of 204 plots across the county. This on-the-ground sample data can help the county extrapolate quality; however, this data too must be kept current to be most useful. An updated
i-Tree report analyzing data from 2017 is expected in late 2023 or early 2024.

Tree Canopy Concerns

EQAC commends the county for tree canopy being an important component of the Community-wide Energy and Climate Action Plan (CECAP) as well as Resilient Fairfax. One of CECAP's sector goals proposes that Fairfax County expand the tree canopy to 60% with a minimum of 40% tree canopy coverage in every census tract by 2030 and a minimum of 50% tree canopy coverage in every census tract by 2050, prioritizing areas of highest socioeconomic need first[32]. Similarly, in Resilient Fairfax, the goals incorporated in "Adaptive Environments Implementation Roadmaps"[33] include a focus on enhancing the county's tree canopy. The following are three top concerns regarding tree canopy:

- *Healthy, equitable tree canopy*
  Without regular data updates *and* analysis, the county lacks a critical tool needed to achieve a healthy, native tree canopy that, in the spirit of One Fairfax, is equitably distributed across the county to ensure all residents reap the benefits of tree cover. EQAC appreciates that Strategy IAP.2f of Resilient Fairfax calls for the county to "Continue to Collect Tree Canopy Data" – analysis of this data is equally important.

- In 2021, staff in the Department of Public Works and Environmental Services (DPWES) put together an initial map[34] (Figure 5-1) overlapping areas of existing tree canopy coverage with a vulnerability index that help identify areas with the greatest need of increased tree canopy. The County should seek new tree canopy data and analysis as frequently as possible to ensure maps such as these can help drive decision making.

[32] Page 56: CECAP implementation plan; county staff noted that where this plan says "block" it should be "tract": https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/cecap/cecap%20implementation%20plan%201623_a-1a.pdf
[33] Resilient Fairfax: https://www.fairfaxcounty.gov/environment-energy-coordination/resilient-fairfax
[34] Tree canopy & vulnerability map of Fairfax County developed by DPWES staff Yeoanny Venetsanos and Juan Reyes, 2021.

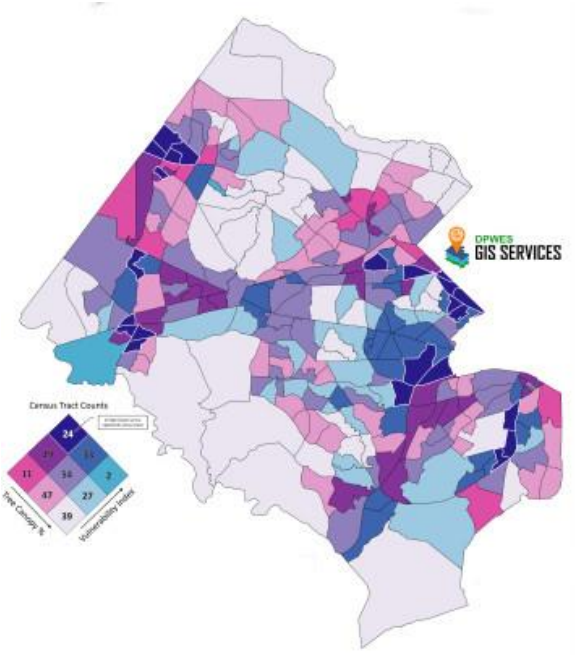

Figure 5-1: Tree Canopy and Vulnerability Index Mapping Areas of Greatest Tree Canopy Need. (Source: Tree canopy & vulnerability map of Fairfax County developed by DPWES staff Yeoanny Venetsanos and Juan Reyes, 2021 available as a GIS map here: https://fairfaxcountygis.maps.arcgis.com/apps/webappviewer/index.html?id=3e53aba65959421ab352f63096273a51)

- *Authentic community connections*
  Outreach and engagement with communities, in areas where additional tree canopy can provide the greatest impact, is critical to the long-term success of tree plantings[35]. While tree planting pilot programs, such as the one that took place in the Route 1 corridor in 2021, were successful, more resources will be needed to make authentic community connections to facilitate additional successful plantings. EQAC commends UFMD for applying for a United States Department of Agriculture (USDA) Forest Service Urban and Community Forestry grant for $11,500,000 to fund the establishment of a street tree planting program to reduce urban heat islands. (Grantees will be announced in the fall of 2023.) EQAC encourages the county to continue to pursue grants as per Strategy IAP.3b of Resilient Fairfax as authentic community engagement requires consistent re-investment of resources.

- *Improving land development*
  As properties continue to develop and re-develop, well-designed land use can contribute to a healthy ecology. This topic is addressed in the Land Use chapter in greater detail, but it is worth noting here that concepts such as biophilic designs[36] (designs of buildings aiming to increase occupant connectivity to the natural environment) can significantly enhance an area's natural resources. The following are four key areas for consideration:
    - While the county has a 10-year tree canopy requirement, without analysis of its effectiveness, it is not possible to know if we are achieving the tree canopy proposed in development plans. A graduate student at Virginia Tech is working with Casey Trees, using data from Fairfax County, to analyze development plans from 2012 versus current conditions on the ground to

[35] https://www.bloomberg.com/news/articles/2019-01-11/why-detroiters-didn-t-trust-city-tree-planting-efforts
[36] https://www.greenroofs.com/2019/02/20/biophilia-turning-conventional-architecture-inside-out/

see if the county has achieved the canopy coverage proposed. The results of this master's thesis is expected to be completed in under two years, and it is expected that the data and findings will be publicly available.

- In late 2022, UFMD's Forest Conservation Branch (comprised of thirteen foresters) was moved out of UFMD and into Land Development Services (LDS). This move has allowed UFMD to focus on urban forestry (and not development) which could help better to achieve the goals of new policies such as Resilient Fairfax and CECAP. We urge Fairfax County to monitor this change to be able to see what the outcomes have been.
- In late 2022, the Mount Vernon Infill Development Task Force[37] put forth a slate of recommendations which could positively affect tree canopy. EQAC encourages the Board of Supervisors to provide directions for staff for implementation of those recommendations (e.g. more rigorous tree condition assessment, tree-related updates to the Public Facilities Manual)
- Creating a resource which provides a comprehensive look at the county's natural resources could further inform the land development process. In that vein, EQAC appreciates Strategy AE.1a of Resilient Fairfax which calls for the county to "Develop a Consolidated Natural Resources Management Plan".

FCPA Funding Model

The current funding structure for FCPA continues to create challenges in supporting the long-term health of FCPA's natural resources. One-off funding sources, such as funds from proffers, donations, Environmental Improvement Program (EIP)[38], and project-based bond funds, are critical under the current structure. However, project-based funding means that once a project, such as an ecological restoration, has been completed, the long-term maintenance and upkeep—managing for invasive plants, for instance—must be funded through different means. Underscoring the discrepancy in funding versus need, FCPA's 2016 Needs Assessment[39] reported that an additional $2,350 per acre of annual funding (for all 17,000 acres of natural area owned by FCPA--close to $40M/year) would be needed to perform the necessary maintenance activities for the county's natural resources. Today's funding falls significantly short of that goal.

EQAC commends the recent allocations in the budget, beginning in FY23, in FCPA's Landscape Legacy and Sustainability Program. This recurring program funding is a good start and plays a critical part in maintaining the integrity of some of FCPA's key areas into the long-term.

Particularly challenging in the current funding structure is hiring people to lead longer-term initiatives. Disparate funding avenues lead to instability and lack the long-term security needed to effectively protect natural resources. While the current funding has challenges and funding levels are not sufficient for maintaining FCPA's natural resources as documented above, these initial investments are a good start to begin to address the underfunding issue.

Ecological Corridors

The county's Comprehensive Plan[40] contains strong language in support of the Board's Environmental Vision, particularly in the Environment[41] section. A key objective the county should continue to focus on is identifying, protecting, and enhancing an integrated network of ecologically valuable land and surface waters for present and future residents of Fairfax County such as designating Environmental Quality

[37] Mount Vernon Infill Development Task Force: https://www.fairfaxcounty.gov/mountvernon/infill-development-task-force-idtf
[38] FY2020 EIP projects: https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/pdf/fy%202020%20sustainability%20initiatives.pdf#page=108
[39] https://www.fairfaxcounty.gov/parks/sites/parks/files/Assets/documents/plandev/parkscount/needs-assessment-plan-050616.pdf
[40] https://www.fairfaxcounty.gov/planning-development/fairfax-county-comprehensive-plan
[41] https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/compplan/policy/environment.pdf

Corridors (EQCs).[42] While EQCs are a strong concept, it should be noted that a comprehensive, countywide GIS layer of approved and/or potential EQCs does not exist. As mentioned above, Strategy AE.1a of Resilient Fairfax (Develop a Consolidated Natural Resources Management Plan) would produce a resource to document EQCs and other ecologically important areas.

Ecological resources on private property are also worth noting here as well, as individual properties have the opportunity to be "habitat stepping stones" linking public lands as part of ecological corridors. Fairfax County may wish to consider how policy changes or incentives for private landowners may help further this goal.

One aspect that the county should consider is the equitable distribution of ecological corridors. A network of interconnected green spaces and increased tree canopy where it is lacking today would benefit residents and wildlife alike, such as in some of the county's more urban settings.

Natural Threats

The relationship between our excessive native white-tailed deer populations and non-native invasive plants is an important one to highlight in terms of how they degrade our ecological resources. When deer populations rise above the carrying capacity[43] of an area, they can strip an area of native vegetation, including tree seedlings, up to a height of six feet, destroying the understory layer of the forest and preventing forest regeneration. Invasive plants, which deer do not generally eat, expand rapidly by their nature, putting further pressure on understory and forest regeneration.

- *Deer*
  This topic is addressed in the Wildlife Management chapter in greater detail. Fairfax County is the only jurisdiction in Virginia with an active deer management program, with adjacent jurisdictions not having a program or relying on the public to manage deer populations.

- *Non-native invasive plants*
  The problem of invasive plants is systemic: many plants which would otherwise be classified as noxious weeds[44] are permitted to be sold in the landscaping trade[45]. Landowners then purchase them, dispersing them throughout the county. Unmanaged natural lands are especially impacted as wind, birds, and other forces distribute invasive plant material far and wide, disregarding property lines. EQAC appreciates the General Assembly's passage of HB 2096[46] which requires commercial landscapers to label invasive plants.

- FCPA's Invasive Management Area (IMA) program[47] leverages the power of volunteer site leaders to lead invasive plant removals on FCPA property, providing the county hundreds of thousands of dollars in value each year. The Early Detection Rapid Response (EDRR)[48] program, as part of the IMA program, finds new populations of certain invasive species and aims to eradicate them before they cause serious ecological harm. The IMA program is the strongest of its kind in Northern Virginia, and yet it only focuses on a small subset of the 10 percent of land owned by FCPA.

[42] https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/compplan/policy/environment.pdf#page=15
[43] https://dwr.virginia.gov/wildlife/deer/deer-management-program/
[44] https://www.vdacs.virginia.gov/plant-industry-services-noxious-weeds.shtml
[45] https://law.lis.virginia.gov/vacodefull/title3.2/chapter8/
[46] https://lis.virginia.gov/cgi-bin/legp604.exe?231+sum+HB2096
[47] https://www.fairfaxcounty.gov/parks/invasive-management-area
[48] https://www.fairfaxcounty.gov/parks/invasive-management-area/early-detection

- Effectively addressing this threat requires collective action between public and private landowners. Specific needs include encouraging private landowners to address these problems on their land, facilitating improvements, and encouraging long-term management to ensure continued ecological benefits. Reston Association has set an example for others in their 2016 banning, through the covenant process, of the use of any plant on the Virginia Department of Conservation and Recreation list of invasive plants[49].

- EQAC commends the Board's FY24 budget investments in support of the IMA program, Operation Stream Shield (which helps fight invasives), and water chestnut management. EQAC also commends the Board's new Running Bamboo ordinance which went into effect on January 1, 2023. However, it should be noted that sustained funding and resources for entities such as FCPA and UFMD will be required to combat bamboo on county-owned properties and in parks.

- *Non-native insects and disease*
  Additionally, non-native insects (e.g., Hemlock Woolly Adelgid, Emerald Ash Borer) and disease (e.g., Thousand Cankers Disease) are added or potential stressors to our native, ecological resources. Of emerging concern is the Spotted Lanternfly which was found in Fairfax County in May 2022[50]. The invasive Tree of Heaven is problematic both as the Spotted Lanternfly's preferred host and as a generally invasive tree. Fairfax County UFMD's Forest Pest Management Branch[51] addresses the wide range of invasive forest pests that pose a threat to the county's urban forest.

RECOMMENDATIONS

The Scorecard for this Annual Report on the Environment (ARE) contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Ensure equitable investment in ecological restorations and corridors.**
   Recommendation: 5PER-2023.1 | Status: New this year

2. **Invest in authentic community connections to achieve a healthy, equitable tree canopy.**
   Recommendation: 5PER-2023.2 | Status: New this year

3. **Strengthen authority to address management of invasive species throughout the county.**
   Recommendation: 5PER-2021.4 | Age: 3 years | Status: Making progress

4. **Support additional staffing for Urban Forest Management Division (UFMD).**
   Recommendation: 5PER-2022.1 | Age: 2 years | Status: Making progress

5. **Seek more stable funding sources for Fairfax County Park Authority (FCPA) initiatives.**
   Recommendation: 5PER-2021.3 | Age: 3 years | Status: Making progress

This prior recommendation has been closed as requests for improving this process are being pursed via the Tree Commission.

6. **Improve the land development process by prioritizing trees.**
   Recommendation 5PER-2021.2

[49] https://www.dcr.virginia.gov/natural-heritage/invsppdflist
[50] https://www.fairfaxcounty.gov/news/scrape-away-spotted-lanternfly and https://www.washingtonpost.com/dc-md-va/2023/02/01/spotted-lanternfly-fairfax-invasive-insect/
[51] https://www.fairfaxcounty.gov/publicworks/trees/forest-pests

ADDITIONAL INFORMATION

List of Organizations Impacting Ecological Resources

Various organizations and programs impact Fairfax County's ecological resources. This list is provided to demonstrate the distributed nature of our county's ecological resources and to provide context to the wide variety of entities involved in influencing their preservation:

Key County Organizations / Departments

- Fairfax County Park Authority (FCPA)
- NOVA Parks
- Urban Forest Management Division (UFMD)
- Office of Environmental and Energy Coordination (OEEC)

Other Governmental Agencies, Programs, and/or Properties

- Local
  - Agricultural and Forestal Districts[52]
  - Fairfax County Public Schools (FCPS)
    - Policy for Environmental Stewardship (Policy #8542[53])
    - Get2Green[54] program
  - Fairfax County Wetlands Board[55]
  - Fairfax County Stormwater Management Program[56]
  - Land Development Services (LDS)
    - LDS administers the Public Facilities Manual[57] which covers several important environmental topics, including a section for Tree Conservation.
  - Northern Virginia Soil & Water Conservation District (NVSWCD)[58]
- State and Federal
  - Gunston Hall[59] (553 acres on the Mason Neck Peninsula in Fairfax County)
  - National Park Service
    - As of June 2015, the National Park Service held 38 conservation easements covering 326 acres in Fairfax County.
  - Virginia Department of Conservation and Recreation[60] (1,856 acres in Fairfax County)
  - Virginia Department of Forestry (VDOF)[61]
  - Virginia Department of Environmental Quality[62]
  - Virginia Department of Transportation (VDOT)[63]
  - Virginia Outdoors Foundation (VOF)[64]
    - VOF holds seven easements covering 127 acres in Fairfax County.
  - US Bureau of Land Management[65] (800 acres in Fairfax County)

[52] https://www.fairfaxcounty.gov/planning-development/agricultural-forestal-district
[53] https://www.boarddocs.com/vsba/fairfax/Board.nsf/goto?open&id=867SG92A805A

[54] http://get2green.fcps.edu/
[55] https://www.fairfaxcounty.gov/bacs/BoardDetails.aspx?BoardID=23219
[56] https://www.fairfaxcounty.gov/publicworks/stormwater
[57] https://www.fairfaxcounty.gov/landdevelopment/public-facilities-manual
[58] https://www.fairfaxcounty.gov/soil-water-conservation/
[59] https://gunstonhall.org/
[60] https://www.dcr.virginia.gov/state-parks/mason-neck
[61] https://dof.virginia.gov/
[62] https://www.deq.virginia.gov/
[63] https://www.virginiadot.org/programs/pr-environmental.asp
[64] https://www.vof.org/resources/statistics/easements-by-locality/
[65] https://www.blm.gov/office/lower-potomac-field-station

- US Fish and Wildlife Service[66] (2,350 acres in Fairfax County)

Non-Profits, Homeowner Associations (HOAs), and related initiatives

- Earth Sangha[67]
- Fairfax Chapter of the Virginia Master Naturalist Program[68]
- Fairfax County Restoration Project (FCRP)[69]
- Fairfax ReLeaf [70]
- Metropolitan Washington Council of Governments (MWCOG)[71]
- The Nature Conservancy (TNC)[72]
  - TNC owns the 233-acre Fraser Preserve on the Potomac River.
- Northern Virginia Conservation Trust (NVCT)[73]
- Plant NOVA Natives (PNN)[74]
- Reston Association (RA)[75]
  - Beginning in 2017, RA published the Reston Annual State of the Environment Report (RASER) which evaluates the state and management of Reston's 1,300+ acres of open space, including 800 acres of woodlands, four lakes, four wetlands, three ponds, and 50 meadows.

Ordinances and Policies

Various Fairfax County ordinances and policies[76] provide guidance for private property owners on topics including, but not limited to:

- Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) located within the unincorporated areas of Fairfax County (Chapter 118, Chesapeake Bay Preservation Ordinance[77])
- The conservation (i.e., preservation and planting) of trees during the land development process (Chapter 122, Tree Conservation Ordinance[78])
  - While this ordinance sets standards such as ten-year tree canopy requirements, it should be noted that, by law, LDS *can* allow development plans to take precedence over the requirements. Deviations, in whole or part, from the tree preservation target may be requested under certain conditions. Similarly, where strict application of the requirements would result in unnecessary or unreasonable hardship to the developer[79], exceptions to the tree canopy requirements can also be granted. In practice, it should be noted that the Urban Forest Management Division has been given the responsibility for the review and approval of any deviations to the tree preservation target and any modifications to the 10-year tree canopy requirement.
  - The Tree Conservation section of the Public Facilities Manual[80] provides support for the ordinance mentioned above. It provides incentives for planting native tree species and

[66] https://www.fws.gov/refuge/mason_neck/
[67] http://www.earthsangha.org/
[68] http://www.vmnfairfax.org/
[69] https://www.fcrpp3.org/
[70] http://www.fairfaxreleaf.org
[71] https://www.mwcog.org/committees/regional-tree-canopy-workgroup/
[72] https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/fraser-preserve/
[73] https://www.nvct.org/
[74] https://www.plantnovanatives.org/
[75] https://www.reston.org/nature-environmental-overview
[76] https://www.fairfaxcounty.gov/landdevelopment/codes-and-standards
[77] https://www.fairfaxcounty.gov/landdevelopment/chesapeake-bay-preservation-ordinance
[78] https://www.fairfaxcounty.gov/publicworks/trees/rules
[79] Chapter 122, Section 122-2-6: https://www.fairfaxcounty.gov/landdevelopment/codes-and-standards
[80] Chapter 12; https://www.fairfaxcounty.gov/landdevelopment/public-facilities-manual

disincentives for planting invasive tree species, to meet tree canopy requirements in all development projects.

- Mitigating the harmful effects of erosion and sediment during land-disturbing activities (Chapter 104, Erosion and Sediment Control[81])
- Floodplains and Environmental Quality Corridors (EQCs) for the conservation of stream valleys as well as the broader health of our contiguous natural properties (the Floodplain Ordinance is codified as part of the zoning ordinance[82]; EQC Policy[83])
- Grass or lawn areas located within Fairfax County for property other than those zoned for or active in farming operation (Chapter 119, Grass or Lawn Area[84])

[81] https://library.municode.com/va/fairfax_county/codes/code_of_ordinances?nodeId=THCOCOFAVI1976_CH104ERSECO
[82] https://www.fairfaxcounty.gov/planning-development/zoning-ordinance
[83] Objective 9 on p. 14: https://www.fairfaxcounty.gov/planning-development/sites/planning-development/files/assets/documents/comprehensiveplan/planhistoricpolicy/2013/environment/3-14-2017.pdf
[84] http://fairfaxcounty.elaws.us/code/coor_ch119

6. 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 will also continue to support attainment of air quality through regional planning and action."*[85]

INTRODUCTION

Climate change is an important worldwide problem as temperatures rise, precipitation patterns change, droughts and heat waves increase, wildfires become more prevalent, hurricanes become stronger and more intense, and sea level rises by one to four feet by 2100.[86] Fairfax County is joining governmental bodies within and outside the U.S. in taking steps to mitigate the impacts of greenhouse gases (GHGs) on climate. GHG emissions from human activities are largely a result of the combustion of fossil fuels, which can persist in the atmosphere for many years. Once GHGs reach the atmosphere, they capture the energy from sunlight that would otherwise radiate out into space. This heat is redirected back to the lower atmosphere raising the temperature of the earth's surface. Carbon dioxide concentrations have risen from an average of 280 parts per million (ppm) in the 1700's[87] to 417 ppm in 2021.[88]

Growing Impacts of Climate Change

The impact of carbon dioxide and other GHGs on the climate system relative to Fairfax County is most evident in terms of extreme heat and precipitation. As shown in Figure 6-1, the number of days at or above 95°F[89] and extended periods of extreme heat are expected to increase in Fairfax County. Projections indicate temperatures will be at or above 95°F for four to five weeks per year by 2050 and five to ten weeks per year by 2085. Rising temperatures are expected to impact health, the environment, and our economy. At the same time, seasonal patterns are shifting from snow to rain with increases in rainfall event durations and amounts that are associated with local flooding. Also, higher surface temperatures are expected to increase sea level rise, and thereby will inundate some coastal portions of the county.

[85] 2017 Fairfax County Environmental Vision, Section 2 F "Climate and Energy" https://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf#page=30
[86] NASA. 2018. Global Climate Change. https://climate.nasa.gov/effects/ (Referenced September 10, 2021)
[87] World Economic Forum. 2021. Future of the Environment: Met Office: Atmospheric CO2 now hitting 50% higher than pre-industrial levels. See: https://www.weforum.org/agenda/2021/03/met-office-atmospheric-co2-industrial-levels-environment-climate-change/ (Referenced November 6, 2023)
[88] National Oceanic and Atmospheric Administration. 2022. See: https://www.noaa.gov/news-release/greenhouse-gases-continued-to-increase-rapidly-in-2022. (Referenced June 2 22, 2023)
[89] Fairfax County. 2022. Resilient Fairfax, Climate Projections Report (Referenced October 26, 2022)

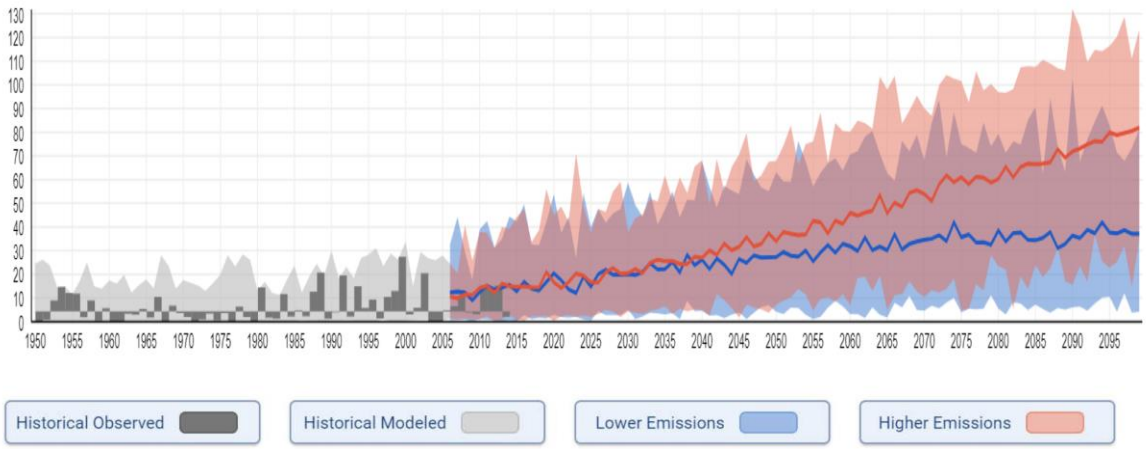

Figure 6-1. Number of NOAA Projected Days Over 95°F from 1950 to 2095[90]

Climate Resilience and the Community-Wide Energy and Climate Action Plan

Climate change is expected to have many impacts on private, commercial, and industrial activities, as well as on other governmental entities. For example, there are already areas that are at high risk of flooding that will be put at greater risk by rising sea levels. The Resilient Fairfax Plan[91] provides strategies to adapt to the effects of climate change to ensure the community is prepared while reducing the risks to climate related hazards. Plan implementation began once it was adopted in October 2022.

The Community-Wide Energy and Climate Action Plan (CECAP) sets a goal for the county to reach carbon neutrality by 2050. Table 6-1 shows actions that CECAP[92] has identified and the percentage reduction to be achieved by 2050 to reach zero GHGs countywide. As Table 6-1 shows, most emissions result from building energy needs and transportation. Building energy use will not contribute to GHGs if Dominion Energy provides carbon-free energy by 2045 as required in the Virginia Clean Economy Act (VCEA)[93]. However, reductions in building energy use should assist Dominion Energy in reaching that goal by lowering overall demand. Accordingly, EQAC supports adoption of "green" building code provisions that increase energy efficiency and conservation. The Clean Cars Act of 2021 calls for increasing levels of electric and advanced low-emission vehicles, which will be critical to reducing transportation emissions.[94]

[90] Metropolitan Washington Council of Governments. 2020. Metropolitan Washington 2030 Climate and Energy Action Plan. https://www.mwcog.org/file.aspx?D=XQ%2bLTXAHDDhrT9IWguhoj321QegQS2pO0UPGnLFR9Fk%3d&A=%2bg55rR8r7wL7gbRU27TqTylQzuHCFXynEz7FM9JtrLQ%3d (Ref verified on June 3, 2023)

[91] Resilient Fairfax Plan (October 2022) See: https://www.fairfaxcounty.gov/environment-energy-coordination/resilient-fairfax (Ref June 3, 2023).

[92] Community-Wide Energy and Climate Action Plan. 2022. Fairfax County CECAP Implementation Plan. See: https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/cecap/cecap%20implementation%20plan%201623_a-1a.pdf. (Referenced on June 27,2023).

[93] VA General Assembly. 2020. Virginia Clean Economy Act. See https://legiscan.com/VA/bill/HB1526/2020 (Referenced on June 3,2023).

[94] Virginia General Assembly. 2021. The Clean Cars Act. See: https://lis.virginia.gov/cgi-bin/legp604.exe?211+sum+HB1965. Referenced June 22, 2023)

Area	Action	% Reduction
Buildings	Energy Efficiency and Conservation	12.6
Buildings	Building Electrification	10.9
Buildings	Green Building Practices	1.2
Transportation	EV Adoption	19.4
Transportation	Reduce Vehicle Miles Traveled	3.7
Transportation	Increase fuel economy	9
Energy	Grid Renewables	13.2
Energy	On-Site Renewables	4.4
Energy	Resource Recovered Gas	7
Waste		2.4
Natural Resources		2.4

Table 6-1. Summary of Percentage Emissions Reductions Planned by 2050

There are multiple actions that can be taken to reduce emissions from transportation, which are addressed in greater detail in the Transportation chapter. However, one action that stands out as both feasible and critical to supporting the adoption of non-internal combustion engine vehicles is networking with the Virginia Association of Counties and the Northern Virginia Regional Commission to expand the network of charging stations for electric vehicles. As of the preparation of this chapter, Fairfax County is joining with other governmental agencies at the Metropolitan Washington Council of Governments to apply for a federal infrastructure grant for electric vehicle charging and alternative fueling stations. Assuming that the county is successful in this application, the funding should be a good beginning to ensuring that an adequate infrastructure is built for electric vehicle charging and alternative fueling.

To help businesses and residents install solar energy on their properties, the county promoted Solarize Fairfax County, which has evolved into Solarize Virginia, which is operated by the Local Energy Alliance Program (LEAP)—a regional program to support solar energy. In addition, there is also a new program available to county residents called the Capital Area Solar Switch. Participants in these programs can receive a free virtual assessment to determine if a home or business is well-suited for solar energy, gain access to a qualified solar installer, install battery storage for the solar system at a discount, and purchase and installation of EV charging stations within the solar purchase.[95]

The Inflation Reduction Act of 2022 provides federal income tax credits and incentives to encourage energy efficiency by homeowners, home builders and commercial building owners.[96] In particular, homeowners and commercial building owners can receive federal tax credits and deductions through 2032 to include up to 30 percent for installing renewable energy and upgrading the energy efficiency of their buildings.

Encouraging residents and businesses in Fairfax County to install solar and other alternative energy sources is a priority, which is included in CECAP. Rural counties are increasingly resistant to approving large solar installations, due to concerns over the loss of prime agricultural and forested land[97]. Siting

[95] Going Solar in Fairfax County: https://www.fairfaxcounty.gov/environment-energy-coordination/going-solar (Ref: 10/27/23).
[96] Energy Star: https://www.energystar.gov/about/federal_tax_credits (Ref 9/9/23).
[97] GreenHurlocker. 2021. More Virginia Counties Are seeking Solar Moratoriums, But Are They Legal? https://greenehurlocker.com/more-virginia-counties-are-seeking-solar-moratoriums-but-are-they-legal/ (Reference 11/6/23).

solar panels on buildings, parking lot roofs, parking lots, and other appropriate locations in urban and suburban areas is therefore increasingly important. We appreciate the installation of solar canopies above parking lots, such as Metro is doing in several locations. Siting solar farms on brownfields and abandoned mines, which are already environmentally impaired, is ideally suited to this purpose.

The county's Operational Energy Strategy[98] addresses Fairfax County government. County operations and Fairfax County Public School's direct operations constitute only about 5 percent of the county's total GHG emissions. The county's efforts will likely serve as a model for others as the county installs renewable energy, deploys electric vehicles and chargers, and prioritizes energy efficiency in new construction and major renovations.[99]

CURRENT STATUS AND CONCERNS

There are several county actions that address climate change addressed in other chapters. A list of these recommended actions is included below in Table 6-2 along with the status in terms of adoption.

Chapter	Recommendation	Status
Transportation	*2TRANS-2023.1.* Develop a formal plan to increase light- duty electric vehicle (EV) registrations to at least 15% of total registrations by 2030.	Making progress
Transportation	*2TRANS-2023.2.* Provide the resources and funding needed to complete and implement the Active Fairfax Transportation Plan in a timely manner, including the Safe Streets for All Program.	New
Ecological Resources	*5PER-2021.2.* Improving the land development process by prioritizing trees.	Closed[1]
Land Use	Update the State of the Plan and Concept for Future Development Map.	Making progress
Land Use	Improve processes to minimize ecological degradation from development.	Making progress
Land Use	Encourage private sector green building standards.	Making progress
Land Use	Conduct outreach to RPA and Tidal Wetlands Property Owners to convey the responsibility to protect these resources and obtain permits for modifications where required.	New

Table 6-2. Climate Related Recommendations from other Chapters and their Status in Terms of Adoption ([1] This prior recommendation is closed as requests for improving this process are being pursued by the Tree Commission.)

Several unique concerns are highlighted below.

Planning and Implementation

The county adopted both CECAP and Resilient Fairfax late last calendar year and while the overall plans are in place, additional studies will be needed before some actions to mitigate the impacts of climate changes or provide resilience are finalized and implemented. For example, as of the summer of 2023, the county is in the process of developing a plan to support the mitigation of flooding impacts. Moreover, this plan may also provide recommendations for reviewing regulations to address climate-related impacts.

[98] Fairfax County Operational Energy Strategy. https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/fairfax-county-operational-energy-strategy-2021.pdf. (Ref: 7/26/23).
[99] Fairfax County. https://www.fairfaxcounty.gov/environment-energy-coordination/county-energy-data (Ref 6/8/23).

In February 2023, the county posted the Climate Action Dashboard[100]. While the Climate Action Dashboard is a work in progress, it includes information on both CECAP and Resilient Fairfax. Priority programs like CECAP and Resilient Fairfax should provide specific information to the public so that progress is clear. EQAC believes that the county should include the assignment of responsibility, a budget (which might be expended over multiple years), performance metrics with time frames, and deliverables. Without these basic project management components, it is difficult to assess the extent to which a project is a sound expenditure of tax dollars. EQAC recommends that such information would be helpful for the public to see progress on county expenditures, especially for priority county projects like CECAP and Resilient Fairfax. EQAC has often said to county staff that it is not sufficient to do good work, it is important that the progress and completion and benefits of the county's work be shared with residents and businesses.

While the Climate Action Dashboard includes information on Resilient Fairfax, the most current information available to support this chapter is from the most recent presentation to the Board[101]. Based on this update, we are pleased to note that implementation work has begun on 16 of 18 prioritized Resilient Fairfax strategies and 19 of 30 of the additional Resilient Fairfax other strategies. Given that there is a disparity between the Climate Action Dashboard and the information in the Board presentation (which is not unique to any one program/activity), EQAC recommends that the county adopt a policy of updating website materials when new information is available or at least as soon as information is publicly released. The Climate Action Dashboard also describes how Resilient Fairfax is placing an emphasis on equity (see the Climate Action Dashboard for details). Thus, Resilient Fairfax has made progress in providing the public with important information.

As of the preparation of this chapter, CECAP project status is available in the 2022 CECAP report but not on the Climate Action Dashboard. Many CECAP actions are in early pilot phases or still being planned and significant funding will be needed to fund this work. While staff have shared their approach to considering environmental justice in CECAP implementation, information regarding CECAP actions to promote equity is not easy to obtain. Full implementation and success in meeting CECAP goals will require money and changes in county policies, regulations, and incentives. As a part of our review of the Dashboard, EQAC members have identified many issues, including:

- Inconsistent information on different parts of the county's website, which is more work to maintain and exhibited inconsistencies;
- Organization of the website, such as the placement of Resilient Fairfax, which appears to be a part of CECAP, which we expect is not the intent, and the need to provide information on the status of projects; and
- Many technical comments, such as dead links.

<u>Budget</u>

Historically, county staff prepared a document that provided responses to EQAC recommendations. Some recommendations were provided over multiple years with limited progress. In 2022, the Board directed county staff to work with EQAC to focus on a limited number, perhaps 3-5 priority projects, to improve progress. These priority projects focus on recommendations that will benefit from discussion to improve their efficient implementation. Other EQAC recommendations that require budgetary solutions continue to be directed to the Board.

[100] Fairfax County. 2023. Climate Action Dashboard. https://www.fairfaxcounty.gov/environment-energy-coordination/climate-action. [Ref verified on 7/17/23.]

[101] Fairfax County. 2023. July 18 2023. Staff Report on Climate Action Implementation. https://www.fairfaxcounty.gov/boardofsupervisors/sites/boardofsupervisors/files/assets/agenda%20item%205b_staff%20report%20on%20climate%20action%20implementation%20_a-1a.pdf. [Ref verified 8/1/2023]

To support *Recommendation 6CE2022.2*, EQAC recommends that the county develop a climate budget each year that addresses both funding and other needs for all components of CECAP and Resilient Fairfax. Prior to the Board adopting CECAP and Resilient Fairfax, many climate-related activities were funded through one-time, end-of-year allocations. Annual county budgets may not provide sufficient detail about what CECAP and Resilient Fairfax strategies are being funded. Explicit information about funding of each strategy should be provided to the Board and made accessible on the Climate Action Dashboard.

Community Engagement and Communications

Communications with communities, businesses and other stakeholders typically take one of two paths. First, outreach is important to disseminate information to the community. However, this one-way communication is often inadequate to help communities understand how decisions and policies will affect their lives. Second, community engagement is typically needed to obtain community support. Community engagement includes a meaningful dialogue with an exchange of ideas to build a common understanding. Community engagement is critical to building community support, cultivating community champions, and changing community attitudes. EQAC strongly supports community engagement. In the absence of a rich dialogue that provides an exchange of ideas, county funded initiatives will be less likely to have the rich support of county residents and businesses.

EQAC is pleased that the county has developed the Climate Action Dashboard and made it available for public view. While the dashboard is a work in progress, it promises to be a key source of information on the county's climate related work. At this stage in its development, the Dashboard can be a challenge to digest information from the state government, the Metropolitan Washington Council of Governments, and the county as data is reported in different ways. Information to explain the relationships between different figures/tables would be helpful. Moreover, the lack of specificity on the status of specific CECAP projects stands out. Information on timing, budget and progress would be helpful.

The engagement of Fairfax's business community is crucial in achieving community-wide GHG reductions. Some county businesses already employ strategies to cut their energy use, have deployed renewable energy and strengthened their resiliency to environmental stress. Fairfax County should seek out these business leaders to share their successes and inspire others. If the county can engage some of the business leaders in the county that have notable successes, these business leaders can help other businesses to adopt practices that reduce GHG emissions and identify barriers that should be addressed.

Supporting the Development of Electric Vehicles (EVs)

The county[102] is working with MWCOG[103] on a Regional EV Deployment workgroup. MWCOG also led the preparation and submittal of a Federal Charging and Fueling Infrastructure Grant that included installing EV charging stations at 25 Fairfax County facilities. In addition, the county launched the Charge Up Fairfax program that supports and incentivizes the installation of EV charging stations at multifamily residential properties.

[102] Fairfax County. 2023. Reports to the Environmental Committee. https://www.fairfaxcounty.gov/boardofsupervisors/board-supervisors-environmental-committee-meeting-july-18-2023. [Ref verified August 2, 2023]
[103] MWCOG. 2023. Regional Electric Vehicle Deployment Working Group. https://www.mwcog.org/committees/regional-electric-vehicle-deployment-working-group/. [Ref verified August 2,2023]

Data Centers

Data centers have been the subject of three recent EQAC memoranda to the Board[104] [105] [106]. Data centers can pose a threat to the stability of the electrical grid as they account for about 20 percent of Dominion Energy sales in Virginia[107] and they could pose a threat to both the county's water supply and water quality[108]. In 2022, Governor Younkin announced that Amazon Web Services alone plans to invest $35 billion in new data centers in Virginia. Although Loudoun County has the majority of data centers, Fairfax already has 11 and at least 5 more are planned.[109] Given that the Northern Virginia Technology Council estimates that northern Virginia data centers were responsible for nearly $174 million in state revenue and $1 billion in local tax revenue in 2021[110], some jurisdictions have sought to attract data centers to their counties only to find that site approval processes have often not addressed energy, noise, water and other issues (see Water Chapter for information on potential water impacts from data centers).

Over the past year, the data center community and northern Virginia have been surprised by reports from Dominion Energy that they may not be able to meet the energy needs of the region[111]. There are recent reports indicating that the substantial energy demands from data centers and energy needs of residents and businesses may result in brownouts or blackouts in high demand summer days and compromise Dominion Energy's ability to meet its VCEA requirement to reduce its carbon emissions to zero by 2045. Virginia is currently a net importer of energy and Virginia's ability to meet carbon neutrality goals will likely be dependent upon obtaining green energy, either within Virginia or from other states[112]. There are reports that some data centers are employing green power (e.g., solar) to support their operations, which may reduce this concern. As noted in EQAC's recommendation to the Board, the impacts associated with data centers (e.g., noise, energy) can be mitigated but mitigating these impacts will come at a cost.

In response to the concerns that EQAC has raised, the Board has asked county staff to provide recommendations on data centers by the end of the year. There are technologies to address noise, water, power and other problematic issues. Implementing these technologies could be costly to the data centers, perhaps discouraging their development in Fairfax.

RECOMMENDATIONS

The Scorecard for this ARE contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Incorporate adequate funding for both CECAP Implementation and Resilient Fairfax in the annual operations and CIP Budget.**
    a. *Recommendation: 6CE-2022.1 | Age: 2 years | Status: Making progress*

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[104] https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/eqac/data%20centers%20memo%20eqac%20final%20051122_a-1a.pdf
[105] https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/eqac/data%20centers%20memo%203%2013%202023%20final_a-1a.pdf
[106] https://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/eqac%202023%20data%20centers%206%2015%2023%20final%20ada_a-1a.pdf
[107] https://www.datacenterdynamics.com/en/news/dominion-virginia-power-use-hit-record-in-december-data-centers-account-for-20-of-sales/ (Ref verified on June 6, 2023).
[108] Pipkin, Whitney. 2023. Will data centers imperil drinking water in Northern Virginia. *Bay Journal.* https://www.bayjournal.com/news/pollution/will-data-centers-imperil-drinking-water-in-northern-virginia/article_a9121a34-f6e8-11ec-b5c7-e7dcc17f86bd.html [Ref verified July 28, 2023]
[109] Woosley, A. 2023. Data center boom prompts Fairfax County to take new look at rules, environmental impacts. https://www.ffxnow.com/2023/05/09/data-center-boom-prompts-fairfax-county-to-take-new-look-at-rules-environmental-impacts/ (Referenced June 22, 2023)
[110] Kidd, David. 2023. The Data Center Capital of the World is in Virginia. *Governing, the Future of States and Localities.* https://www.governing.com/infrastructure/the-data-center-capital-of-the-world-is-in-virginia [Ref verified July 28, 2023)
[111] Grey, Peter. 2023. Dominion scrambles to meet soaring power demand. *Fauquier Times*. https://www.fauquier.com/news/article_41838802-2753-11ee-9875-935ae47126fb.html [Ref verified July 29, 2023].
[112] Personal communication with Aaron Berryhill, Solar Program Manager *Virginia Energy,* June 5, 2023.

2. **Adopt a Climate Plan for public consumption that shows how CECAP, Resilient Fairfax and other climate related efforts, such as VCEA, are being implemented and the progress being made towards achieving goals.**
    a. *Recommendation: 6CE2022.2 | Age: 2 years | Status: Making progress*

3. **Seek the ongoing advice of business leaders on climate and energy issues.**
    a. *Recommendation 6CE-2021.4 | Age: 3 | Status: Making progress*

4. **Plan and implement an EV charging network so that residents of buildings without EV charging and travelers will have options for charging their EVs.**
    a. *Recommendation: 6CE-2021.5 | Age: 3 years | Status: Making progress*

5. **Collect energy consumption information on current and planned data centers in the county and determine the extent to which data centers obtain green energy in order meet the county's carbon neutrality targets.**
    a. *Recommendation: 6CE2023.1 | Status: New this year*

6. **Implement major Community Engagement and Educational campaign on the actions that businesses and residents can do to reduce GHG emissions.**
    a. *Recommendation: 6CE-2021.3 | Age: 3 years | Status: Making progress*

7. AIR QUALITY

Board of Supervisors Environmental Vision:
"*The county also will continue to support attainment of air quality through regional planning and action.*" [113]

INTRODUCTION

Fairfax County is part of a federal-state-regional-local partnership, which 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. region, air quality planning efforts have been focused on regional strategies to bring the area into attainment with federal air quality standards (i.e., the National Ambient Air Quality Standards, or NAAQS). The Metropolitan Washington Council of Governments (MWCOG), through the Metropolitan Washington Air Quality Committee (MWAQC), has coordinated, and continues to coordinate, these efforts.

The county's major responsibilities in the partnership involve participation and coordination with regional and state organizations on plans intended to reduce air pollution and improve air quality as well as the implementation of local programs that help to minimize or eliminate air pollution.

Over the past three decades, the region has made significant progress in improving air quality. All six pollutants (Ground-level Ozone, Fine Particulate Matter, Nitrogen Dioxide, Sulfur Dioxide, Carbon Monoxide, and Lead) regulated by the federal Clean Air Act have shown a downward trend in the region, and all are at or below federal air quality standards. Overall, the number of unhealthy air days has significantly decreased over the past 25 years, but the number of unhealthy air days for 2023 thus far is a cause for concern.

The region has made tremendous progress in its air quality thanks to actions at the federal, state, and local government levels, including new regulations to reduce emissions from power plants, passenger vehicles, and heavy-duty diesel engines as well as programs to improve energy efficiency and renewable energy use.

Fairfax County does not have an air quality monitoring program; it works with MWCOG to assess air quality in the region. The Virginia Department of Environmental Quality (DEQ) is responsible 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 https://www.deq.virginia.gov/our-programs/air/monitoring-assessments/air-quality-forecast.

CURRENT STATUS AND CONCERNS

The COVID-19 pandemic had an impact on air quality in 2020, with a number of the actions taken to limit virus transmission contributing to lower emissions. This resulted in fewer unhealthy air days, with just two such days being recorded in 2020. However, that decrease was temporary. As the region reopened, unofficial data from MWCOG registered eight unhealthy air days in 2021. While unofficial data from 2022 shows a decrease in unhealthy air days compared to 2021, that reduction was again short-

[113] 2017 Fairfax County Environmental Vision, Section 2 F, pg. 28: http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf#page=34

lived. As of this writing, the region has already recorded twelve (12) unhealthy air days in 2023, all coming in June 2023, with more unhealthy air days expected as the summer goes on.

Wildfire Smoke

The major source of air quality concern in 2023 has been wildfire smoke. Beginning in late spring 2023, Canadian wildfire smoke descended across the Midwestern and eastern regions of the United States, including the Washington, D.C. metropolitan region. This wildfire smoke brought the worst air quality seen in the region in more than a decade. Components of this wildfire smoke are small air particles, known as fine particulate matter.

Fine particulate matter ($PM_{2.5}$) is particulate matter that is **2.5 microns in diameter and less**. Fine particulate matter contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems, especially for people with respiratory conditions. Fine particles are also the main cause of reduced visibility (haze) in parts of the United States. This haze from the wildfire smoke was readily apparent in the Washington, D.C. metropolitan region on the unhealthy air days.

While wildfire smoke is an issue beyond the control of local leaders, these officials need to be aware that this issue may become a more common occurrence. In regions across the United States and Canada, wildfires are burning more land at higher intensity and prevailing weather patterns could push the smoke from these fires into the region more frequently.

Emissions from Motor Vehicles

There is extensive use of motor vehicles in Fairfax County and vehicle emissions are the largest single source of toxic and smog-forming air pollution in Northern Virginia. Vehicle emissions are a major contributor to ground-level ozone formation and greenhouse gas emissions in Fairfax County and those impacts, combined with climate change, presents a threat to the county's future air quality because rising temperatures speed up the formation of ground-level ozone.

Ground-level ozone, colloquially called "smog" can cause breathing problems for sensitive persons, especially those with asthma. It is formed by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOCs) as they combine in sunlight and heat. Ground-level ozone is considered a summertime pollutant.

Nitrogen dioxide (NO_2) is a gaseous pollutant formed during the high-temperature combustion of fuels in vehicle engines and industrial facilities (primarily electric generating power plants). NO_2 is also a factor in the production of ground-level ozone. It can irritate the lungs and lead to respiratory problems.

Vehicle exhaust also contains sulfur dioxide (SO_2), which is a gas that forms when sulfur-bearing fuels, mainly oil and coal, are burned. High concentrations of SO_2 can result in difficult breathing and respiratory illness. SO_2 can also have damaging effects on the foliage of trees and agricultural crops.

The Fairfax County Community-wide Energy and Climate Action Plan (CECAP) contains several climate action goals involving vehicle use in the county. These include increasing the use of electric vehicles in the county; reducing vehicle miles traveled; and increasing fuel economy and access to low-carbon fuels.

In addition, as an alternative to the use of motor vehicles, the Fairfax County Board of Supervisors (BOS) 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.

RECOMMENDATION

The Scorecard for this ARE contains the following recommendation pertaining to this chapter. Please see the Scorecard for details.

1. **County officials should continue efforts to strongly encourage people to telework where possible, take public transit, and use alternative forms of transit**.
Recommendation: 7AQ-2021.1 | AGE: 3 years | Status: Making progress

8. 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."[114]

INTRODUCTION

The Fairfax County Sustainability Initiatives[115] document provides good context about the need for active management of the county's ecological resources:

"Until a few decades ago, land management consisted of benign neglect, with areas left alone under the assumption that they were self-sustaining. Land management professionals now understand that there are tremendous pressures on remaining natural areas, that their conditions are declining, and that active management is necessary to restore their health.

Today, natural resources are considered natural capital… Natural capital is not self-sustaining; instead, deliberate care and investment are required to enhance, protect, and preserve it."

As with other natural capital, such as land, water, and vegetation, wildlife must also be actively managed to varying degrees to achieve and maintain sustainable population levels within a suburban landscape, which generally presents less suitable habitat that is more fragmented, has fewer natural predators for certain species, and has increased chances of negative human-wildlife interactions. Within the county, the two species that present the most significant challenges to attaining this sustainable balance are white-tailed deer and Canada geese, with uncontrolled deer populations by far posing the greatest risk. While both species are native to our region, the anthropogenic changes within a suburban landscape like Fairfax County result in a situation where each has the potential to cause significant negative impacts on the county's ecological resources and negatively impact public health and safety as well.

The Fairfax County Park Authority (FCPA) has a progressive, stepwise Wildlife Conflict Policy (Policy 202[116]) 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[117] and the Canada Geese Management Program[118].

CURRENT STATUS AND CONCERNS

Whitetail Deer Management

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

[114] 2017 Fairfax County Environmental Vision, Section 2 E, pg. 18, http://www.fairfaxcounty.gov/environment/sites/environment/files/assets/documents/pdf/environmental-vision-2017.pdf#page=24

[115] FY 2022 Fairfax County Sustainability Initiatives:, https://www.fairfaxcounty.gov/environment-energy-coordination/sustainability-initiativeshttps://www.fairfaxcounty.gov/environment-energy-coordination/sites/environment-energy-coordination/files/assets/documents/2022%20ff%20sustainability%20report_508.pdf#page=69

[116] www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/administrative/park-policy-manual.pdf

[117] http://www.fairfaxcounty.gov/wildlife/deer-management-program Accessed May 19, 2023.

[118] www.fairfaxcounty.gov/wildlife/geese-management-program Accessed May 19, 2023.

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 act 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. The county's Deer Management Program is only operated on FCPA properties, select parks and other open spaces. Given that these public lands constitute less than 20 percent of the total acreage within the county, it is acknowledged that the coordination of hunting on both public and private lands will be necessary to effectively reduce overall deer densities to more sustainable levels and to minimize instances of negative human-deer interactions.

Data Collection

EQAC encourages the FCPA and FCPD to continue to collect and integrate data into discussions about wildlife management. While estimates of population sizes and goals for deer reduction may be challenging to define, both the magnitude of the problem being addressed, and the effectiveness of the applied solutions can be better understood and communicated with data. Being able to present a strong base of information will be a benefit in bringing along stakeholders in the effort to grow various management programs, both in staffing and funding. As the county ultimately seeks to update its current Deer Management Plan or a Comprehensive Wildlife Management Plan, data will be a key component in supporting any proposed recommendations.

The Deer Management Program includes multiple different strategies to assess the current population of whitetail deer in Fairfax County and to manage deer populations. Harvest counts from the archery program is just one method of data collection. Deer Density Camera Surveys is another method utilized by staff to assess deer populations within the county. However, the camera survey method utilizes techniques that will not be permitted in future fiscal years due to the county being added to a Chronic Wasting Disease (CWD) Management Area 2 (DMA2) by the Department of Wildlife Resources (DWR) beginning in the 2023-2024 deer hunting season. More information on the positive identification and Chronic Wasting Disease can be found on the county's website[119]. With diminished opportunity of current methods of data collection, staff must be able to utilize other methods of data collection such as drone surveys like what is being done in Montgomery County, Maryland and Arlington County, Virginia[120]. EQAC supports the exploration of alternative survey methods such as drone surveys to establish humane methods of data collection that will be a key component in supporting any proposed recommendations to an updated Deer Management Plan or Comprehensive Wildlife Management Plan.

County Zoning Ordinance

With the inclusion of Fairfax County within the CWD DMA2 , restrictions on transporting deer carcasses, in particular brain and spinal cord parts, outside of the CWD management area present a new challenge for participants in the program. For residents of Fairfax County participating in the deer management program, this presents an issue of finding local meat processing establishments that are willing to process deer. This is already a niche service to find in the region. Because of the limited availability of this service, vendors that offer this service are typically inundated with a heavy demand reaching capacity and

[119] https://www.fairfaxcounty.gov/health/chronic-wasting-disease-confirmed-white-tailed-deer-fairfax-county. Accessed May 30, 2023.

[120] https://www.insidenova.com/headlines/drones-flying-over-arlington-to-measure-deer-population/article_3d64ce5a-90f3-11eb-86d9-c75323892a60.html. Accessed May 30, 2023

turning away customers. Compounding the issue is that Fairfax County code and zoning requirements limit the ability to establish a meat processing business to industrial-zoned areas. This situation could result in decrease of participation in the County's deer management program and lower deer harvest if hunters have nowhere convenient to take their deer and local processors are at capacity or shut down, coupled with the transport restrictions due to CWD. EQAC supports the County staff suggestion to reexamine county code and zoning requirements to determine if an exception can be granted for deer processing operations in Fairfax County to minimize impacts to deer management efforts and increase local donations of venison to those in need.

Public Outreach

County staff has established education material to inform county residents of concerns regarding the impacts of over-populated deer populations and the Deer Management Program. However, due to resource limitations of dedicated staff, the sharing of that information is limited to individuals who are seeking that information instead of utilizing an outreach approach. There is opportunity to increase this outreach to focus on all areas of the county, including areas with less access to natural resources.

The archery program is the largest contributor to managing the deer population in Fairfax County, accounting for approximately 94% of the total deer harvested in FY 2023 as shown in Figure 8-1.

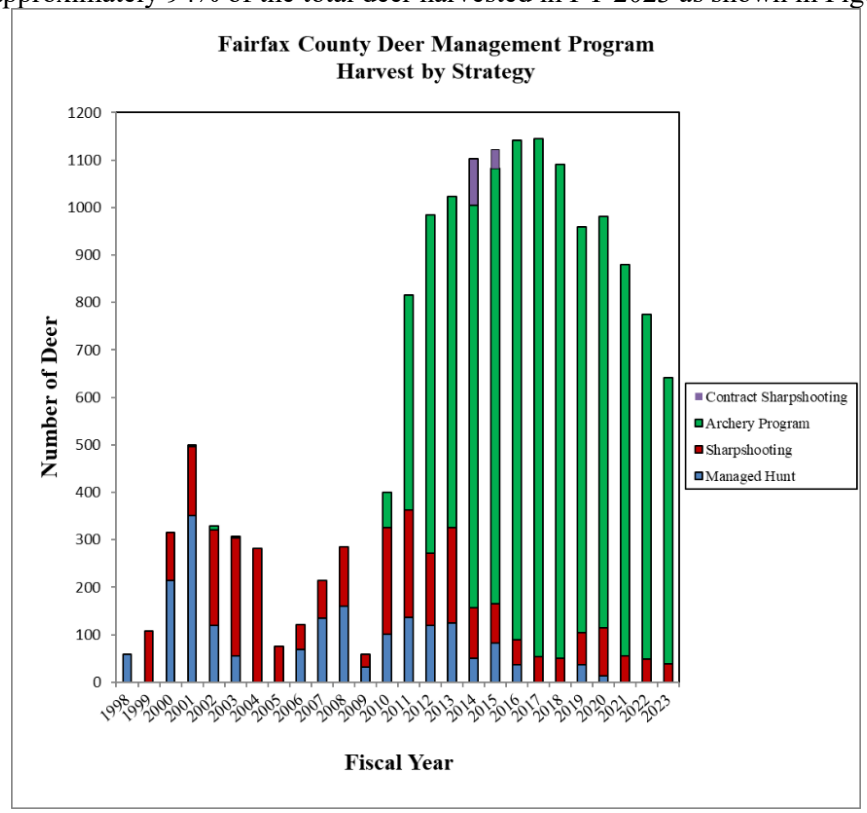


Figure 8-1: Fairfax County Deer Management Program Harvest by Strategy
Source: Dr. Katherine Edwards, Fairfax County Wildlife Biologist, May 2023

The success of the program relies on the willingness of qualified volunteers to participate. In the Summary Data of Archery Program Per Fiscal Year From 2015-2023 (Table 8-1), 521 volunteers participated in the program in FY 2023, contributing 32,832 hours, which is the lowest hunter effort since FY 2015.

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Volunteers	568	594	627	588	578	596	605	545	521
Total Volunteer Hours	31,329	37,071	44,881	43,688	42,735	40,105	47,413	37,778	32,832
Average Hours Per Volunteer	55	62	71	74	74	67	78	69	63
Deer Harvested	916	1,052	1,092	1,041	854	868	823	726	604
Percent Female Deer Harvested	75%	71%	65%	65%	68%	64%	64%	58%	59%
Average Hours Per Deer	34	29	41	38	45	42	50	45	47
Total Archery Clusters	24	22	18	18	18	18	18	18	18
Total Parks	56	81	97	98	99	102	104	103	111
Total Acres	13,680	16,084	19,125	19,359	19,385	19,931	21,013	21,236	21,528
Deer per miles squared harvest	43	42	37	34	28	28	25	22	18

Table 8-1. Summary Data of Archery Program Per Fiscal Year From 2015-2023 (Source*:* Dr. Katherine Edwards, Fairfax County Wildlife Biologist, May 2023)

For the program to remain successful, it must continue to encourage volunteers to participate and offer programs that can educate experienced and novice hunters on best management practices to harvest deer populations safely and humanely. EQAC supports the exploration of partnerships with state, federal, military, veteran, or sportsman agencies/organizations to determine opportunities for increasing hunter retention and recruitment and reaching underserved groups. This could include events such as novice deer hunter workshops, hunter skills workshops, field to fork initiatives, Women in the Outdoors, disabled veteran hunts, etc. Implementation of this recruitment strategy would align with the Countywide Strategic Plan through increasing opportunities for participation to a diverse population of residents.

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. For more information on these and other wildlife diseases, visit the Fairfax County website: https://www.fairfaxcounty.gov/wildlife/wildlife-diseases.

Tick-Borne Illnesses

Lyme disease, transmitted via the bite of an infected *Ixodes scapularis* (commonly known as a deer tick or blacklegged tick) is the most commonly reported vector-borne disease in Fairfax County. However, there are several other tick-borne illnesses to be aware of as well, such as Rocky Mountain Spotted Fever and Ehrlichiosis, both transmitted via an infected *Amblyomma americanum* (commonly known as a lone star tick). The most current information regarding tick-borne illnesses and the tick species that carry them can be found online here: www.fairfaxcounty.gov/health/fightthebite/tick-diseases.

There are preventative measures that can be taken to reduce the risk of tick-borne illnesses:

- The same repellents recommended for mosquitoes are also highly effective for ticks. See the insect repellent guidance in the *Choose the Right Repellent* section on Fairfax County's website: https://www.fairfaxcounty.gov/health/fightthebite/ticks.
- 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.
- Do a full-body tick check after returning from potentially tick- infested areas and shower. Use a hand-held or full-length mirror or have someone help you check parts of your body that are hard to see.

According to TickCheck.com which receives data from the Center for Disease Control and Prevention, reported cases of Lyme disease in Fairfax County have gradually decreased in recent years, from an average of 196 cases in the five-year period from 2011 – 2015 to an average of 139 cases over the five-year period from 2016 – 2020. Figure 8-2 is a graph of reported Lyme disease cases in Fairfax County for the period of 2000 to 2020. Due to the COVID pandemic, there is no additional data available for subsequent years posted.

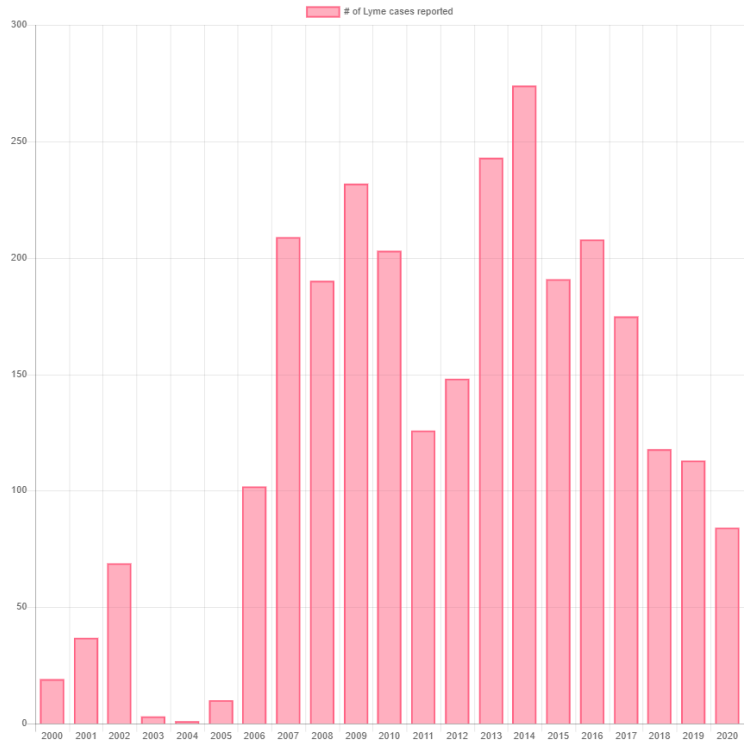


Figure 8-2: Reported Cases of Lyme Disease in Fairfax County from 2000 to 2020 (Source: https://www.tickcheck.com/stats/county/virginia/fairfax-county/lyme, October 10, 2023)

RECOMMENDATIONS

The Scorecard for this ARE contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Expand survey methods for deer population data collection.**
   Recommendation: 8WIL-2023.1 | Status: New this year

2. **Expand public outreach and education for the county's deer management program through partnerships and offer more equitable opportunities for participation.**
   Recommendation: 8WIL-2023.2 | Status: New this year

3. **Make changes to zoning codes to grant exceptions for deer processing operations in Fairfax County to minimize impacts on participation in the deer management program**.
   Recommendation: 8WIL-2023.3 | Status: New this year

This prior recommendation has been completed.

Hiring of part-time wildlife assistant.
Recommendation 8WIL-2021.2

9. TECHNOLOGY TO UNDERSTAND THE COUNTY

INTRODUCTION

Technology is critical to comprehending the complexities of Fairfax County's environment with its mix of land uses and population of over 1.1 million residents. Among the most important tools to assist county staff and the public in this pursuit is a Geographic Information System (GIS), which models and maps the built and natural environment. GIS facilitates planning and consensus building for environmental issues both macro and micro and is inclusive in the way it can provide public information broadly through public applications with easy-to-use tools. Geographic Information Systems and related information technologies are the focus of this chapter of the Annual Report on the Environment (ARE).

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 and numerous interactive mapping applications are offered to the public. One such general purpose application is the JADE viewer which provides public access to a variety of GIS data and some public purpose GIS tools.

Enterprise GIS is managed by the Geographic Information Systems and Mapping Services Division 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. Supported by this core of expertise, county agencies have been successfully integrating GIS into their business practices. 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 monitoring and studying pollution and environmental health hazards. Today, GIS is being used across the enterprise by essentially all technicians and professionals who work on environmental matters. GIS is now a mission critical asset for environmental management.

CURRENT STATUS AND CONCERNS

The Fairfax County GIS, like any, requires not just a platform but people, data, and access. To fully support environmental management all these elements of the system require training and investment. Some concerns with regards to GIS custodianship are detailed below.

Investment in Data

Environmental change whether degradation, restorative, or land use-based changes are monitored and seen through the temporal dimension. Therefore, key datasets need to be kept as current as possible to enable monitoring, detection, and change impact quantification. In the past few year's strides were made in this direction with planning and some direct investment. The county needs to continue to invest in its key GIS datasets or the usefulness of the GIS investment will be impeded, especially in the environmental lines of business. These datasets include, orthographic and oblique photography, planimetric data (roads,

streams, buildings, etc), LiDAR data, and Land Cover. Planimetric data in particular needs to be updated semi-annually in order to provide full benefit to operations.

	Sessions FY 2021	Sessions FY 2022	% Change
GEM (internal)	195733	258030	32%
JADE (public)	133154	283259	13%

Table 9-1. Sessions of GEM (internal) and JADE (public) in FY 2021 and FY 2022. GEM use increased by 32% and JADE 13%.

GIS Support, Licensing and Platform

Table 9-1 indicates GIS usage continues to experience a high rate of growth. While such high growth may present operational problems, it also presents opportunities both directly from efficiencies and indirectly from better public and private decisions. The county should ensure GIS resource availability so that ongoing work in environmental management can continue. New capabilities are emerging that will benefit these efforts as well. GIS Staff, infrastructure and software licensing are the key to further progress.

The county would benefit if it continued to grow GIS staff resources through the addition of positions to allow for the exploitation of the full GIS capacities to support public efforts at environmental management. Agency staff is key, but many smaller agencies rely on the GIS Division for direct project support for their business areas and cannot procure staff themselves. Today, staff available to help in these areas are strained. The county should consider ramping labor resources available for customer services in central services to meet the rising demands. Recommendation 9TECH-2021.2 is an ongoing recommendation and addresses staff shortages.

GIS usage continues to grow and more areas in environmental management will adopt additional uses. It is important that the county maintain the appropriate architecture so as to allow for the capabilities that will benefit this area. Additional licensing needs will emerge as more mobile and location tracking GIS is deployed and new tools that have not been procured yet will emerge that provide additional efficiency or capability the county will need to take advantage of.

Public Access to GIS

While difficult to quantify directly, public utilization of the GIS and its data have significant benefits for private affairs and when parties are dealing with the government for business. OpenData and a variety of GIS based web applications have been the primary avenues to obtain this data and the county should continue to build out its suite of applications and data availability. Access to information can eliminate controversy, save resources (e.g., by lowering the number of land use applications submitted that would be denied), and build consensus. The county should continue to move GIS into business areas that could benefit, to include making subsequent datasets and applications with this new data available to the public who would interact with these areas.

RECOMMENDATIONS

The Scorecard for this ARE contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

1. **Prepare a plan for fully staffing GIS support positions in FY 2024 and beyond, with particular attention to Spatial Analyst IV positions**.
   Recommendation: 9TECH-2021.2 | Age: 3 years | Status: Making progress

2. **Continue investments in aerial photography, LiDAR, multispectral imagery on a business-driven cycle.**
   Recommendation: 9TECH-2023.1 | Status: New this year
3. **Establish a yearly update cycle for planimetric data.**
   Recommendation: 9TECH 2023.2 | Status: New this year

These prior recommendations have been completed.

4. **Fund recapture of LiDAR data in 2022 to provide ongoing data for metrics on tree cover and stream erosion as well as other benefits.**
   Recommendation 9TECH-2021.1
5. **Examine planimetric data update cycle and determine a method to maintain the base map information.**
   Recommendation 9TECH 2022.1

APPENDIX A

SPOTLIGHT ON FAIRFAX COUNTY PUBLIC SCHOOLS

OVERVIEW

This Spotlight describes recent achievements by Fairfax County Public Schools (FCPS) and upcoming plans for Get2Green; energy; transportation; and potable water. As available, it identifies specific schools and facilities where achievements have taken place. The Spotlight does not include any recommendations for the Fairfax County Board of Supervisors.

FCPS is one of the largest school divisions in the United States, serving more than 181,000 students with 198 schools and centers. FCPS has multiple departments and offices that have activities relevant to environmental topics. These include Transportation Services; Food and Nutrition Services; Instructional Services; Office of Design and Construction Services; Office of Facilities Management; and Office of Safety and Security. In July 2021, the FCPS Board accepted recommendations from the Joint Environmental Task Force (JET) surrounding energy, transportation, waste reduction, and workforce development for the school division (https://www.fcps.edu/news/fairfax-county-school-board-sets-goal-carbon-neutral-energy-use-2040).

Recommendations accepted by the FCPS Board included:

- Commit to being energy carbon neutral by 2040.
- Achieve 50% emissions reductions by 2030, as compared to a 2019 baseline.
- Produce 25% of the county energy use from in-county renewable energy generation by 2030, and 50% by 2040, using 2019 energy use as the baseline.
- Decrease total energy usage from all county facilities by 25% by 2030, and 50% by 2040, as compared to the 2019 baseline.
- All new county buildings and major renovation projects beginning planning and design in 2021 and after must achieve Net Zero Energy (NZE) performance as defined below, unless county staff advises the Board prior to the 30% design phase why a project cannot meet the NZE standard. The JET defines an NZE building as one that is highly energy-efficient and produces onsite, or procures offsite as necessary, carbon-free renewable energy in an amount sufficient to offset the annual energy use associated with operations.
- Transition to electric or zero-carbon alternatives for school buses and eligible fleet vehicles by 2035; and to develop a plan to fuel the electric vehicles using non-carbon emitting fuels and carbon offsets with a complete transition to 100% clean fuel by 2030.
- Achieve zero waste in county and school operations by 2030.

Get2Green

Get2Green is the environmental stewardship program for Fairfax County Public Schools. It supports division-level policies and projects that complement school-based sustainability work based on a foundation of equity. Get2Green offers guidance and resources for classes and eco-teams implementing hands-on environmental action in their school and community. Get2Green's website

(https://get2green.fcps.edu/index.html) provides a variety of dashboards with school-specific and county-level data on energy use and recycling (see examples in Figure A-1). FCPS staff launched a new dashboard for "Recycling and Trash" in December 2022 and is working on a new garden guide for the 2023-24 school year.

In the 2023-24 school year, Get2Green will have one staff member in Facilities and seven in Instructional Services after the addition of two staff members in FY 2023 and four in FY 2024. A new Get2Green Leader extra-duty contract will also be offered at every school to guide student-driven environmental stewardship activities. The Leaders will receive a salary supplement and support from the Get2Green staff. The Get2Green staff collaborates with county and community partners, serves on committees supporting sustainability in FCPS and across Fairfax County including the joint County and Schools Zero Waste team, applies for and manages grants to support schools, and hosts programs such as Earth Week to expand engagement in environmental stewardship. Get2Green also provides professional development opportunities for educators and administrators to ensure all students have opportunities to develop as ethical and global citizens.

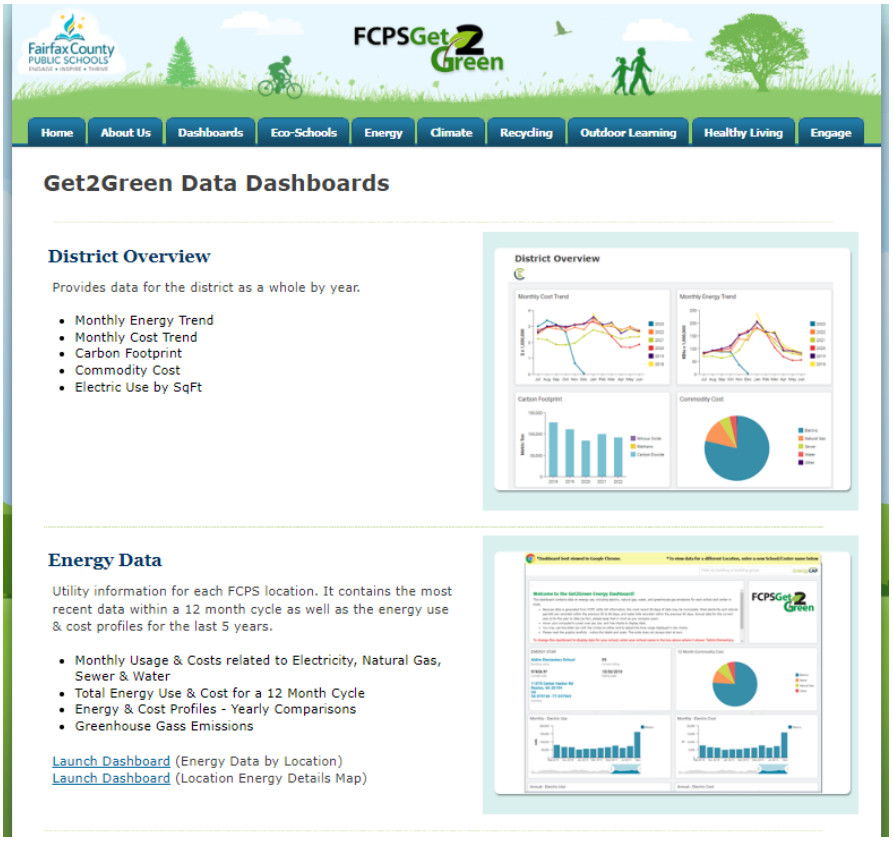
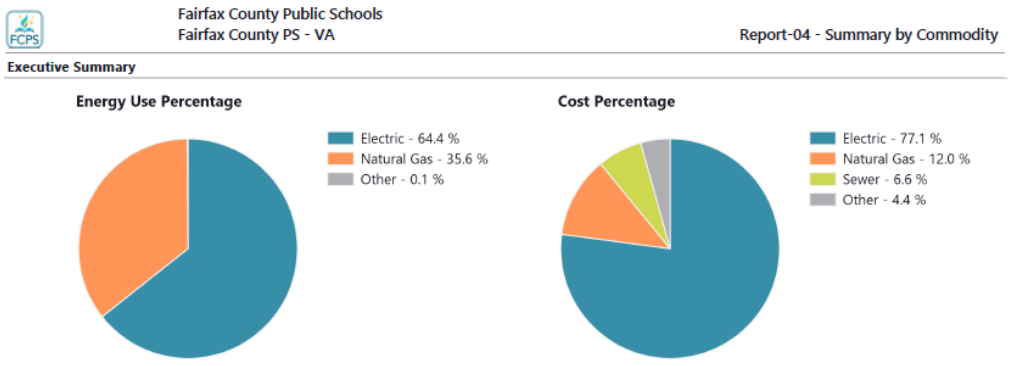


Figure A-1. Example Dashboards from Get2Green. (Source: https://get2green.fcps.edu/dashboards.html; downloaded June 12, 2023.)

Energy

The FCPS Energy Education Team includes all students, staff, parents, and other community members who make up the totality of individuals who use FCPS sites. Energy Education Specialists are the FCPS employees tasked with involving all members of the FCPS Energy Education Team and focusing team member's efforts towards accomplishing their goals. FCPS has 10 full-time and four hourly Energy Education Specialists to perform energy management, conservation, and educational services.

In FY 2022, FCPS spent nearly $35,000,000 on its electric, oil, gas, and water utilities. Figure A-2 shows a breakdown of use and cost for each of the commodities comprising this total. The Office of Facilities Management is tasked with keeping this bill as low as possible through development and implementation of conservation programs. To contribute to enhancing the pace of energy-related improvements at existing FCPS schools and other facilities, the Office of Facilities Management is in the process of planning Energy Savings Performance Contracts. Such contracts will enable the completion of urgently needed energy improvement projects that have been unfunded due to budget constraints including replacing inefficient HVAC equipment still in use beyond its useful life (e.g., chillers and boilers), old inefficient structural components (e.g., single pane, metal framed windows with no thermal breaks), and inefficient and poor-quality fluorescent and High Intensity Discharge lighting. FCPS is currently not using Energy Savings Performance Contracting. Should this change, FCPS will use the Virginia Department of Energy Contract found at the following URL: https://www.energy.virginia.gov/energy-efficiency/performancecontracting.shtml.



	Commodity Use		Energy Use		Cost
	Use	Unit Cost	Use	Unit Cost	Cost
Electric	263,482,328 kWh	$0.101/kWh	899,001,704 KBtu	$0.030/KBtu	$26,696,777
Natural Gas	4,968,634 THERM	$0.833/THERM	496,863,440 KBtu	$0.008/KBtu	$4,139,523
Sewer	237,112 Kgal	$9.656/Kgal	0 KBtu	$0.000/KBtu	$2,289,578
Water	299,035 Kgal	$5.037/Kgal	0 KBtu	$0.000/KBtu	$1,506,216
Propane	957 Gal	$1.312/Gal	87,520 KBtu	$0.014/KBtu	$1,255
Oil #2	6,430 Gal	$0.000/Gal	891,777 KBtu	$0.000/KBtu	$0
Total			1,396,844,441 KBtu		$34,633,349

Figure A-2. Breakdown of Use and Cost for Commodities Used by FCPS in Fiscal Year 2022.
Source: E-mail from Ali Culhane, FCPS Coordinator, Get2Green, May 31, 2023.

Solar Power Purchase Agreements (PPAs)

FCPS is continuing the process of pursuing solar PPAs. No PPA infrastructure has yet to be installed, but two agreements have been signed: one at Mason Crest Elementary School with Sun Tribe, and one at Annandale High School with Ipsun Solar. Dominion Energy Virginia interconnect requirements are stopping projects due to economic infeasibility all around the state including the FCPS project at Mason Crest. Vendor requests to modify the agreement have delayed the FCPS project at Annandale HS – it has not yet met the interconnect requirements problem due to contract negotiations. There is a challenge to the interconnection rules before the State Corporation Commission (SCC) that is contributing to this delay as well.

FCPS Facilities

FCPS maintains approximately 28 million square feet of occupied space for education, support, and administration functions. As shown on Figure A-3, greenhouse gas (GHG) emissions per unit of occupied

space has generally decreased for FCPS over the past 13-year period, with an uptick in 2021 (i.e., the most recent year with available data). This uptick may be due to the impacts of the COVID-19 pandemic which greatly reduced school usage in 2020. As of 2021, FCPS had GHG equivalent emissions (CO2e) of approximately 148,000 metric tons, the majority of which were due to indirect emissions from electricity use.

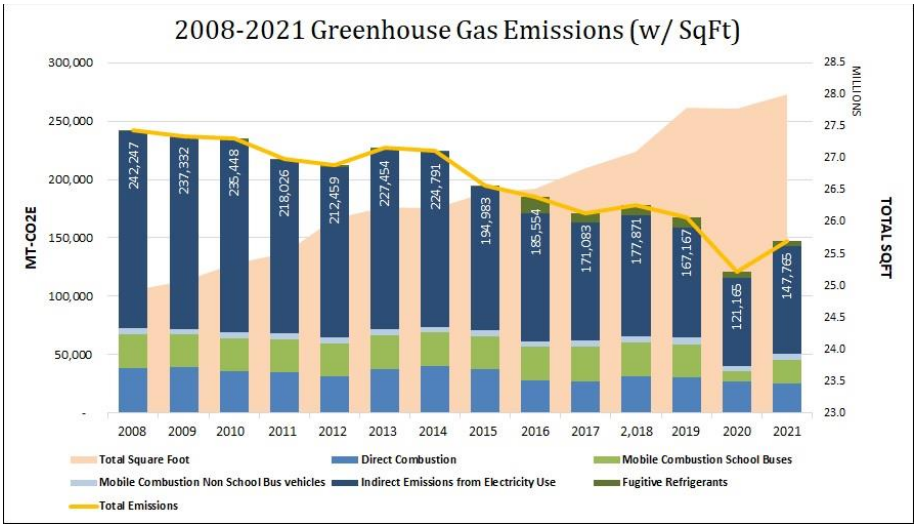


Figure A-3. Greenhouse Gas Emissions and Occupied Space in FCPS Facilities (Source: E-mail from Ali Culhane, FCPS Coordinator, Get2Green, June 12, 2023.)

Energy Use Intensity (EUI), the energy use of a building per square foot, has generally been declining across all FCPS facilities over the past 14 years, as shown in Figure A-4. In FY 2022, the EUI of FCPS was approximately 50 kilo British thermal units per square foot (KBtu/SF), compared to 72 KBtu in FY 2008, a 30 percent reduction. These energy reductions (total and per square foot) have been achieved despite the addition of school building space to accommodate increasing student membership. As with Figure A-3, the uptick in FY 2022 may be due to the impacts of the COVID-19 pandemic.

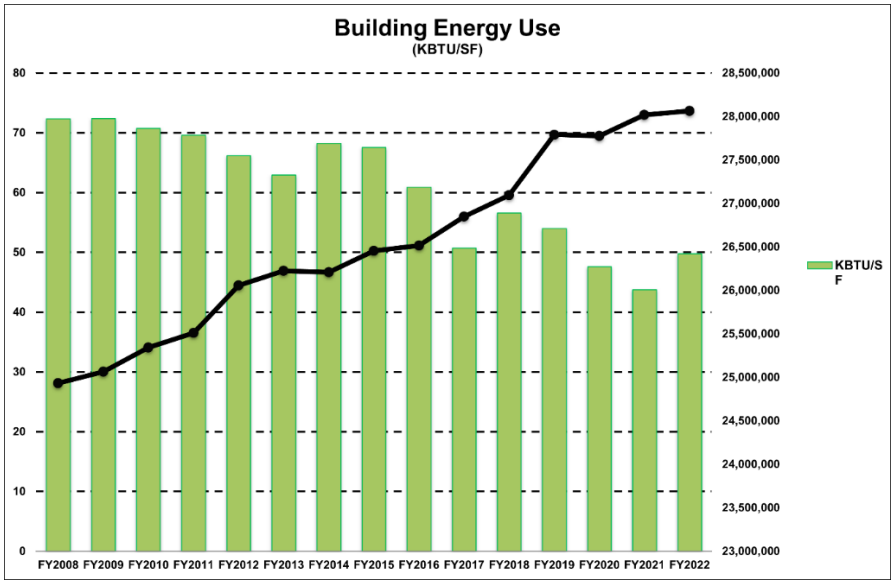


Figure A-4. FCPS Energy Use per Square Foot and Number of Square Feet. (Source: E-mail from Ali Culhane, FCPS Coordinator, Get2Green, May 31, 2023.)

As required by School Board Policy 8542 (Environmental Stewardship), FCPS has prepared an annual GHG Inventory report; the most recent report is for 2021 (reports for years 2013 through 2021 are available at https://www.fcps.edu/about-fcps/performance-and-accountability/energy-management-program/greenhouse-gas-inventory). Policy makers use GHG inventories to track emission trends, develop strategies and policies, and assess progress. Operations managers use GHG inventories to evaluate a program's impact and prioritize projects. Scientists use GHG inventories as inputs to atmospheric and economic models.

Transportation

FCPS has a fleet of 1,625 diesel buses, each with an average age of 18 years at the time of replacement. As of May 2021, there were 555 buses within five years of the average replacement age. In addition to the bus fleet, the school division has 816 non-bus vehicles, including large service trucks. The average age for a non-bus vehicle replacement is 12 years; 419 non-bus vehicles were within five years of the average replacement age. FCPS currently has 18 electric buses with an additional ten on order and expected to arrive in summer 2023. EQAC notes that the extent to which FCPS is on track for meeting its objective (i.e., to transition to electric or zero-carbon alternatives for school buses and eligible fleet vehicles by 2035) is unclear.

Potable Water

FCPS' Office of Safety and Security (OSS) anticipates completion of the first round of testing for lead (all drinkable sources in each school tested at least once) by the end of the school year in 2023; Virginia code was amended in July 2020 to require notification to parents when results of 10 parts per billion (ppb) or greater are obtained. From 2019 through the spring of 2023, FCPS has tested fixtures at 160 schools. Of the 10,011 fixtures sampled, a total of 125 (1.2%) yielded results above 10 ppb, requiring notification. Twenty-seven (27) of those fixtures with elevated results were science faucets fitted with backflow prevention devices. If correcting for the science-based fixtures (which should not be used as drinking water sources), the total number of potable water sources with results above 10 ppb drops to 98 (0.97%). OSS pays particular attention to the evaluation and mitigation of lead in drinking water at elementary schools since children aged 6 and younger are at greater risk of health effects from lead exposure. Of the 160 school buildings evaluated to date, 120 of them are elementary schools. Of the 7,497 fixtures sampled at elementary schools, 73 (0.97%) yielded lead in water results greater than 10 ppb, requiring notification. FCPS conducts fixture and/or connecting pipe replacement at outlets where samples yield lead in water concentrations of 10 ppb or greater (a threshold 33% below the Environmental Protection Agency (EPA)/Virginia Department of Health (VDH) requirement for remediation at locations yielding concentrations of 15 ppb or greater).