



# Goose Creek Report Card

MARCH 2021





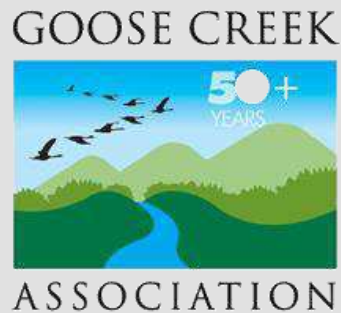
## Acknowledgments

This Report Card is the product of a partnership between Goose Creek Association, Friends of the Rappahannock and the PATH Foundation.

A special thank you to the PATH Foundation for supporting this project. Thank you to Holly Geary, Jeff Millington and the board of Goose Creek Association for their contributions, especially the many hours dedicated to stream monitoring. We would also like to acknowledge the members of the Friends of the Rappahannock team who were involved in the planning, production and review in preparing the document. The report author was Adam Lynch, assisted by Olivia Black for GIS analysis and mapmaking, Carleigh Starkston for design and production, and Daria Christian and Bryan Hofmann for strategic guidance.

*Photo credits: Front Cover photos credit Goose Creek Association, Town of Leesburg; Page 1 banner credit Chesapeake Bay Program; page 12 credit Virginia State Parks, Goose Creek Association; page 13 credit Goose Creek Association Rear Cover credit Friends of the Rappahannock*

March 2021



# PATH FOUNDATION

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Dear Neighbor,

Thank you for taking a moment to read this document and educate yourself about the health of our treasured Goose Creek.

In the following pages you'll learn that Goose Creek and its watershed earned a "C" grade in this Report Card. The data reveal that behind the pastoral landscapes of our countryside lies a difficult truth: our streams are sick. Bacteria and other pollutants pervade the river system, as they have for many years. The wide buffer of native trees that once protected these streams is too often absent. And a stubborn cycle of erosion and sedimentation degrades dozens of miles of aquatic habitat, weakening the foundation of the riverine ecosystem.

But the Report Card also revealed a silver lining. Thankfully, our streams are mostly devoid of the persistent industrial chemicals often found in larger waterbodies, meaning that Goose Creek can bounce back if given proper stewardship and time. A wall of permanently conserved farms and forests stands ready to extinguish creeping sprawl. An army of volunteers across Loudoun and Fauquier Counties dedicates their time to monitor and reforest the streams, with thousands of saplings in the ground across the watershed. Meanwhile Goose Creek Association and other partners are training the next generation of local students and young leaders, full of energy, awareness and urgency, to carry on this stewardship mission.

This watershed and this community are resilient. But the recovery of Goose Creek cannot succeed without the support and commitment of many citizens across our community. Please join Goose Creek Association as we raise the grade and build our watershed stronger for the future!



Florence "Lori"  
Keenan McGuinness  
Chair, Fauquier



Paul Lawrence  
Chair, Loudoun

## How to Use this Document

This Report Card produces a set of baseline data indicators that will help Goose Creek Association and other stakeholders monitor trends in water quality and watershed conditions over time. The grades incorporate watershed health fundamentals, especially current water quality conditions and land uses within the watershed, using data provided by state government agencies, especially the Department of Environmental Quality and the Department of Conservation and Recreation. *Water quality data collected by Goose Creek volunteers were not directly considered in the Report Card due to the difficulty of reconciling sample data with DEQ data.* The grades also address conservation status and land use regulations. The results of this document will help equip community leaders, policymakers and everyday citizens with the information they need to write policy and pursue targeted stewardship action on a local level.

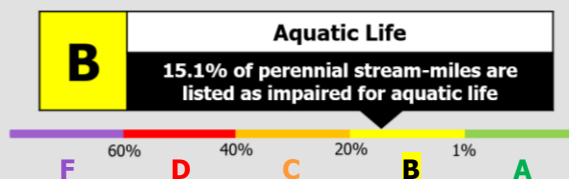
Goose Creek was evaluated using an average of 12 quantitative indicators of stream condition, which were grouped into the following categories:

- **Human Health** – four indicators that relate to the health and safety of community members who interact with the river
- **Land Use** – four indicators that assess the current land cover, land cover protections, and the use of best-management-practices (BMPs) to treat pollutants from nonpoint source runoff
- **Stream Ecology** – four indicators that evaluate the ecological health of the stream environment, including an assessment of land cover within 300 feet of perennial streams

Each indicator uses either a pass fail model:

Contaminated Sites	PASS	No active RCRA/Superfund sites found in watershed
	FAIL	One or more active RCRA or Superfund site

or a traditional grading scale:



Once the quantitative indicators were calculated, grade points were added up to create letter grades for each of the three categories, whose average was the overall grade for Goose Creek.

An additional **Community Action Plan** is included at the end of the report, with milestones that Goose Creek Association can build toward as it grows its watershed education, stewardship, and outreach programs.

The Report Card looks back at data over the past several years. It draws most heavily from the four year period of 2017-2020. To continue this interval, the Report Card should be repeated in 2025 to reflect the period from 2021-2024.

For more information about individual grading scales, methodology, and data sources, please see the document appendix which can be found at [goosecreek.org/stewardship/watershed-map](https://goosecreek.org/stewardship/watershed-map)



## Report Card Results

The results of the Goose Creek Report Card were as follows:

Report Card Grades by Indicator			
Human Health	Bacteria	C	Human Health: <b>C</b>
	Fish Consumption	B	
	Contaminated Sites	PASS	
	Recreational Health Risk	FAIL	
Land Use	Forest-Impervious Ratio	C	Land Use: <b>C+</b>
	Open Space Protection	A	
	Agricultural BMPs	C	
	Residential BMPs	C	
Stream Ecology	Aquatic Life	B	Stream Ecology: <b>C</b>
	Riparian Impervious Surfaces	B	
	Riparian Forest Canopy	F	
	Riparian Protection	C	

**C**

**Report Card  
Total Grade**

## Discussion and Conclusion

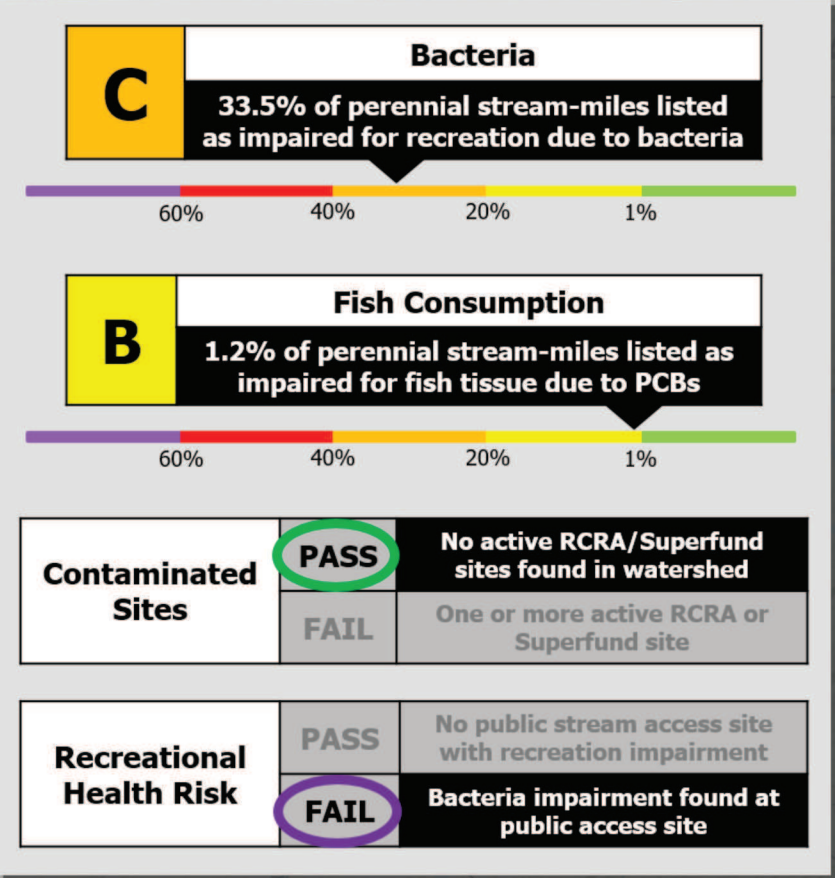
Goose Creek earned a “C” for its overall grade and was relatively consistent across the three categories that were analyzed. But the Report Card revealed a wide range of strong and poor results at the indicator level.

Goose Creek’s main strengths are in its exceptionally high levels of private land conservation and its historically rural and agricultural landscape. Goose Creek avoided the levels of industrialization that so altered larger rivers like the Potomac and James Rivers. As a result, it has low levels of heavy metals and industrial chemicals, as reflected in its low levels of fish tissue contamination and absence of state- or federally-listed contamination sites within the watershed. This rural character is also reflected in its low levels of impervious surfaces, especially near streams.

Unfortunately, Goose Creek’s rural agricultural character is also its greatest water quality weakness. Waterborne bacteria pollution is widespread across the watershed, attributed by Virginia DEQ primarily to runoff from livestock farming operations and septic systems in the countryside. Pasture and cropland too often intrude into sensitive areas near streams, earning Goose Creek its weakest grade, an “F” for riparian forest canopy cover. And the sheer acreage of farmland in Loudoun and Fauquier Counties makes water quality restoration a logistical challenge; high demand and volume strains the resources of the agencies tasked with administering the agricultural best-management practice installations designed to remedy rural water pollution.

Addressing water pollution in the Goose Creek watershed will require an “all of the above” strategy that combines local policy reforms, investments by many partners, and volunteer action focused especially on the most sensitive part of the river system: its riparian area.



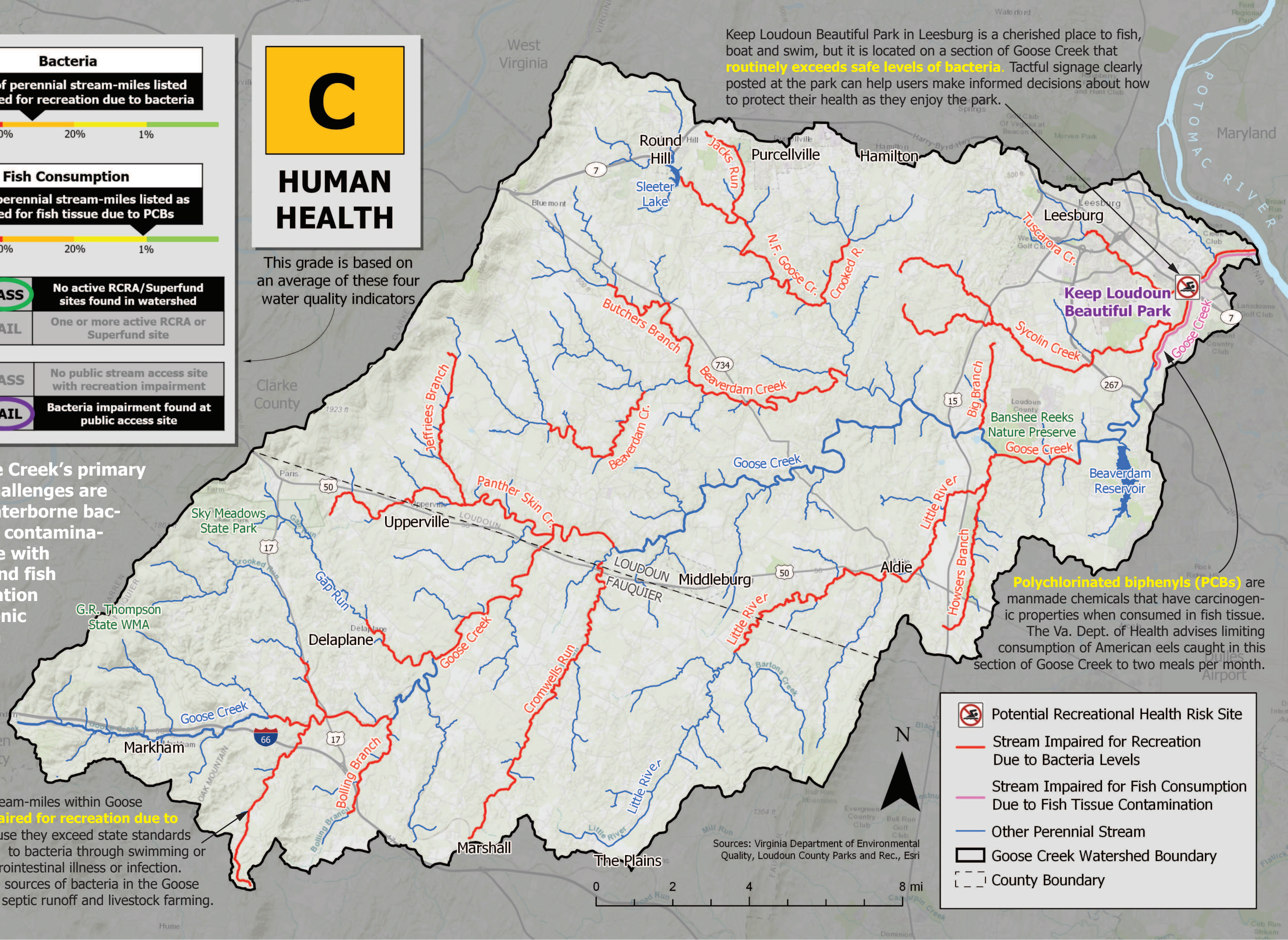


This grade is based on an average of these four water quality indicators

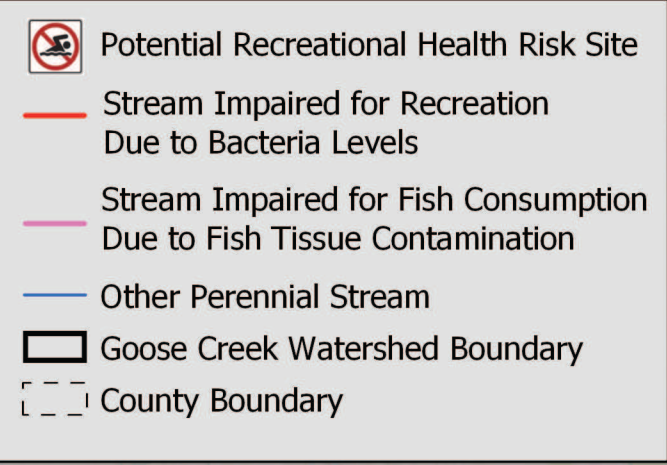
**Summary:** Goose Creek's primary human health challenges are high levels of waterborne bacteria and limited contamination of fish tissue with PCBs. Bacteria and fish tissue contamination can present chronic and acute health risks to the Goose Creek Community.

About 1/3 of perennial stream-miles within Goose Creek watershed are **impaired for recreation due to bacteria pollution** because they exceed state standards for safe contact. Exposure to bacteria through swimming or drinking can result in gastrointestinal illness or infection. VaDEQ identified the main sources of bacteria in the Goose Creek watershed as being septic runoff and livestock farming.

Keep Loudoun Beautiful Park in Leesburg is a cherished place to fish, boat and swim, but it is located on a section of Goose Creek that **routinely exceeds safe levels of bacteria**. Tactful signage clearly posted at the park can help users make informed decisions about how to protect their health as they enjoy the park.

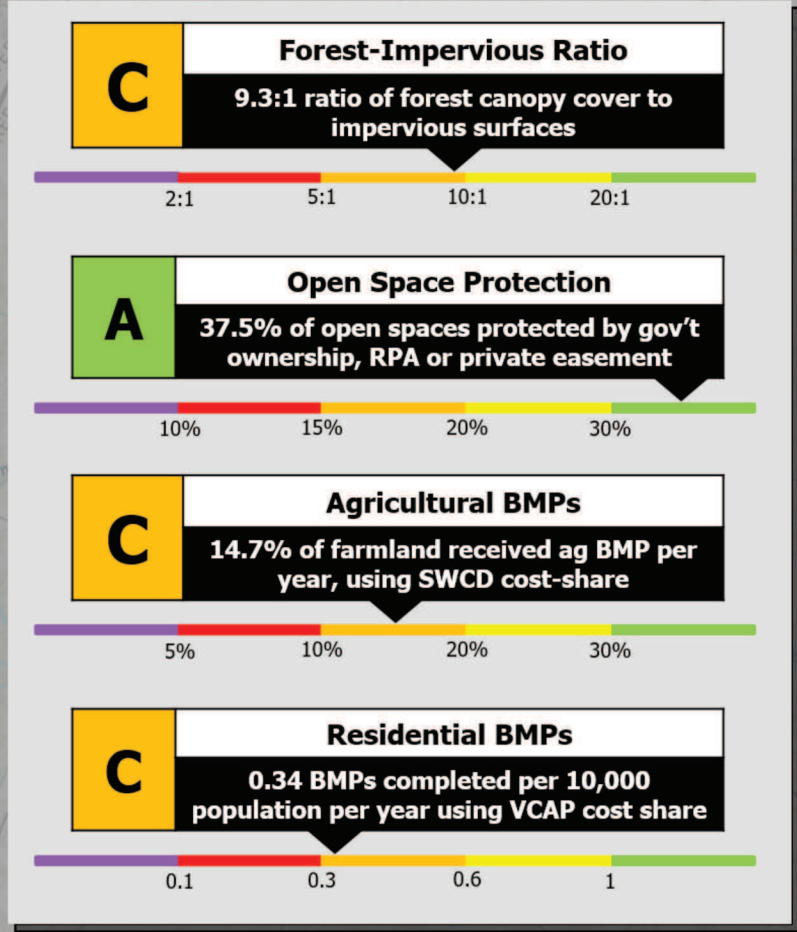


**Polychlorinated biphenyls (PCBs)** are manmade chemicals that have carcinogenic properties when consumed in fish tissue. The Va. Dept. of Health advises limiting consumption of American eels caught in this section of Goose Creek to two meals per month.



Sources: Virginia Department of Environmental Quality, Loudoun County Parks and Rec., Esri





**C+**

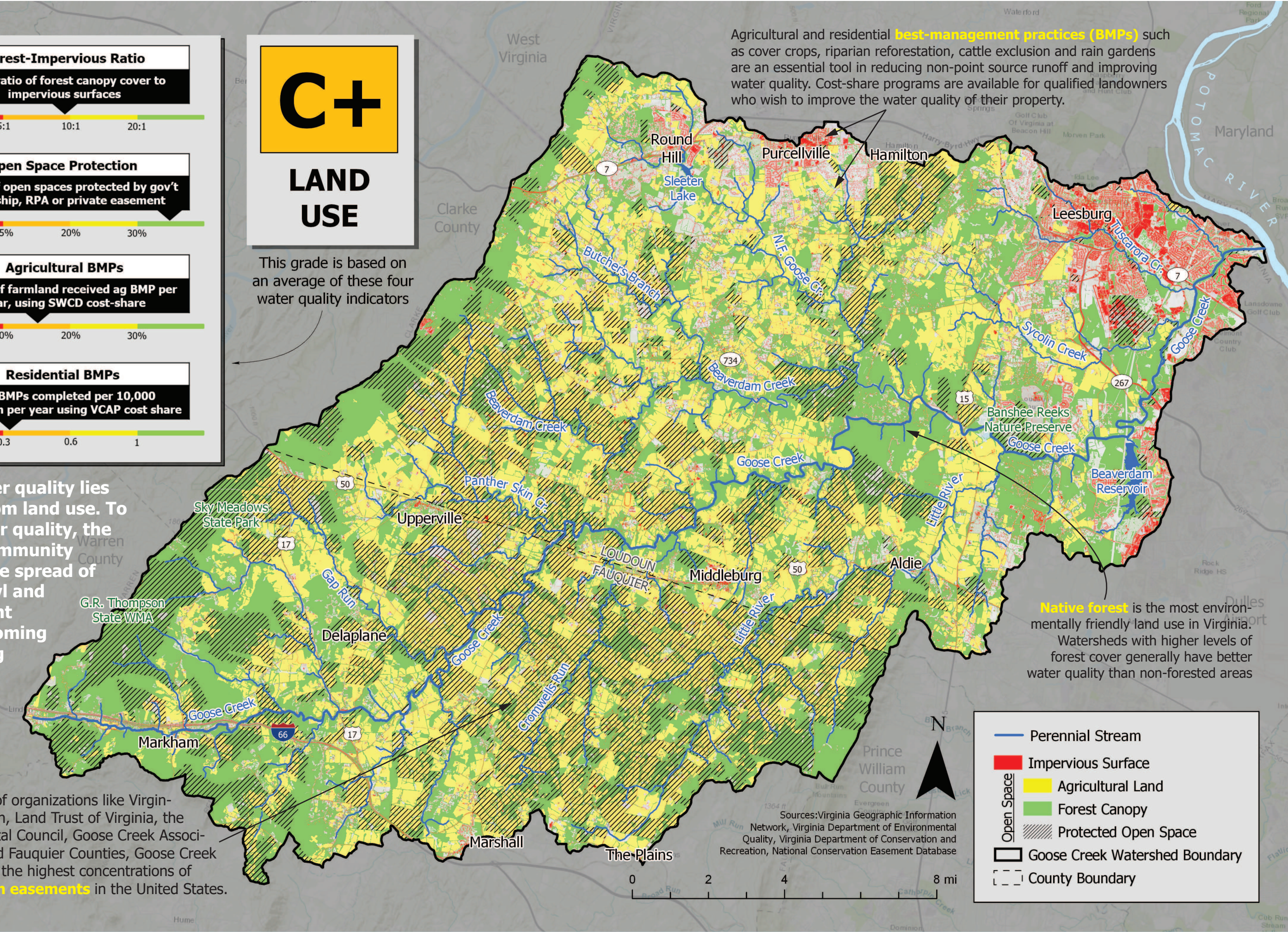
## LAND USE

This grade is based on an average of these four water quality indicators

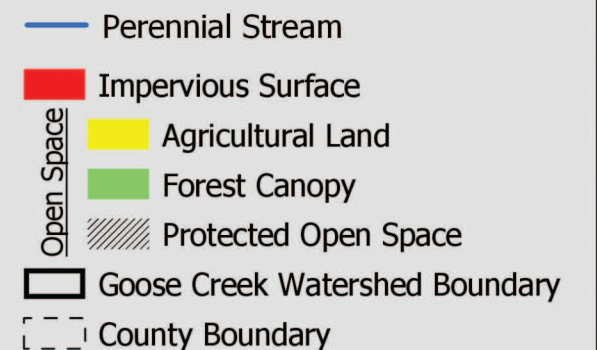
Agricultural and residential **best-management practices (BMPs)** such as cover crops, riparian reforestation, cattle exclusion and rain gardens are an essential tool in reducing non-point source runoff and improving water quality. Cost-share programs are available for qualified landowners who wish to improve the water quality of their property.

**Summary:** Water quality lies downstream from land use. To protect its water quality, the Goose Creek community must contain the spread of suburban sprawl and reduce non-point source runoff coming from its existing residential and agricultural areas.

Thanks to the efforts of organizations like Virginia Outdoors Foundation, Land Trust of Virginia, the Piedmont Environmental Council, Goose Creek Association and Loudoun and Fauquier Counties, Goose Creek watershed has among the highest concentrations of **private conservation easements** in the United States.

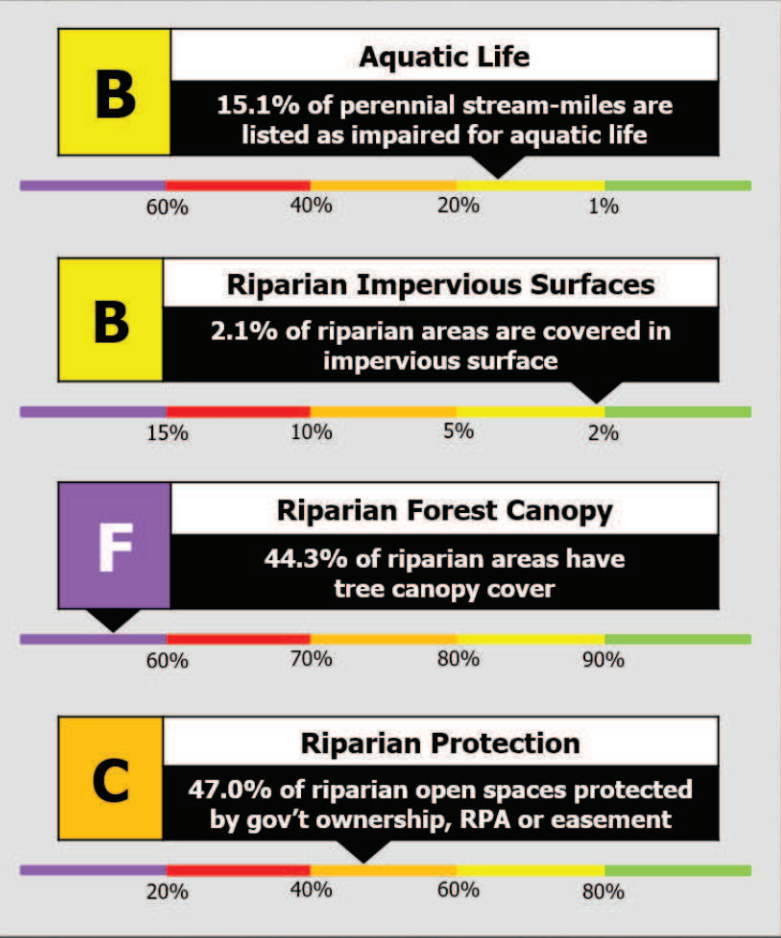


**Native forest** is the most environmentally friendly land use in Virginia. Watersheds with higher levels of forest cover generally have better water quality than non-forested areas



Sources: Virginia Geographic Information Network, Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, National Conservation Easement Database





**Summary:** The Goose Creek watershed contains more than 350 miles of perennial streams. Local communities can improve water quality by conserving and reforesting the sensitive lands within 300 feet of all waterbodies.

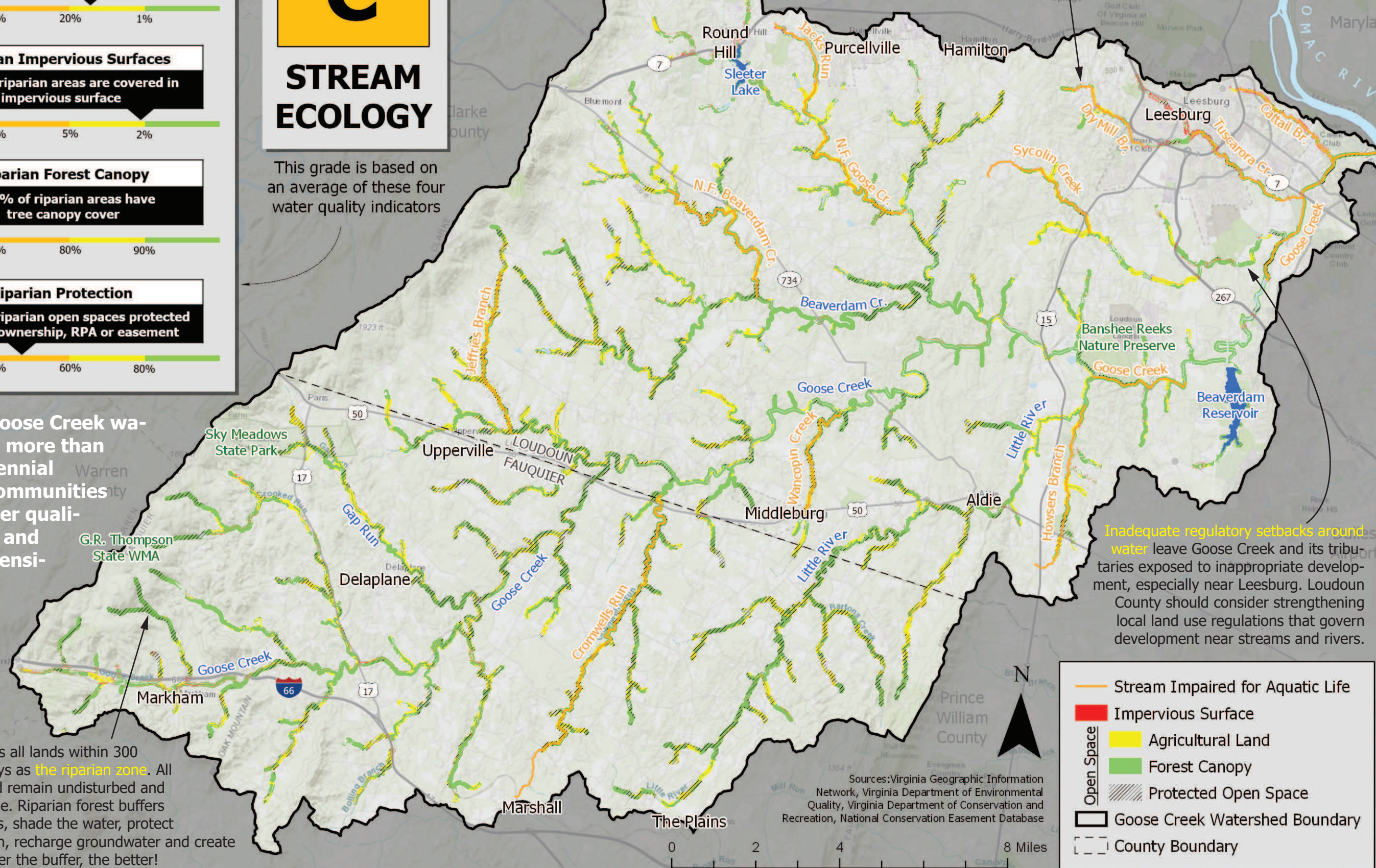
This Report Card considers all lands within 300 feet of perennial waterways as **the riparian zone**. All areas near streams should remain undisturbed and forested whenever possible. Riparian forest buffers naturally absorb pollutants, shade the water, protect stream banks from erosion, recharge groundwater and create wildlife corridors. The wider the buffer, the better!

# C

## STREAM ECOLOGY

This grade is based on an average of these four water quality indicators

Approximately 15 percent of all perennial stream-miles in the Goose Creek watershed are listed by VaDEQ as **"impaired" for aquatic life**, because they fail to meet state standards for a healthy aquatic ecosystem, based on surveys of aquatic insect communities. Common reasons for aquatic impairment include siltation and abnormal pH levels.










**Inadequate regulatory setbacks around water** leave Goose Creek and its tributaries exposed to inappropriate development, especially near Leesburg. Loudoun County should consider strengthening local land use regulations that govern development near streams and rivers.



# COMMUNITY PARTNERS

It takes a community to restore a watershed.  
Here are 4 ways that GCA and partners can help:

- **Expand** Public Access to Streams and Rivers
- **Install** 10 New Stream Marker Signs
- **Organize** More Community-led Litter Cleanups
- **Grow** Watershed Education in Local Schools

-  GCA Volunteer Sample Site, 2017-2020
-  Public Access / Potential Cleanup Site
-  Public K12 School
-  Unmarked Stream Crossing
-  Goose Creek Watershed
-  County Boundary
-  Perennial Stream

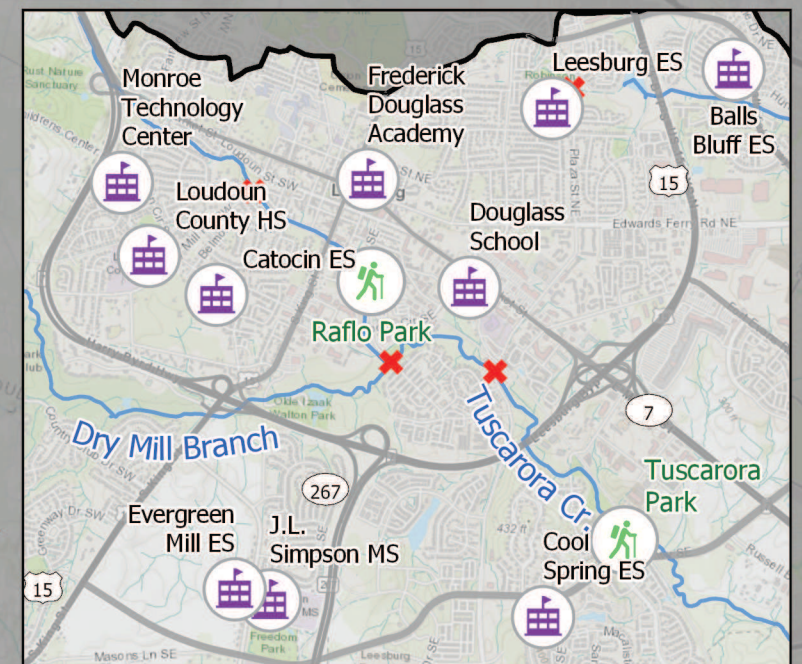
For many years, Goose Creek Association has coordinated a **citizen water quality monitoring program**, which trains volunteers to survey and record water quality data.

The Goose Creek watershed contains **29 K12 public schools**. Schools make great partners for service projects, providing volunteers and helping engage the next generation of river stewards.

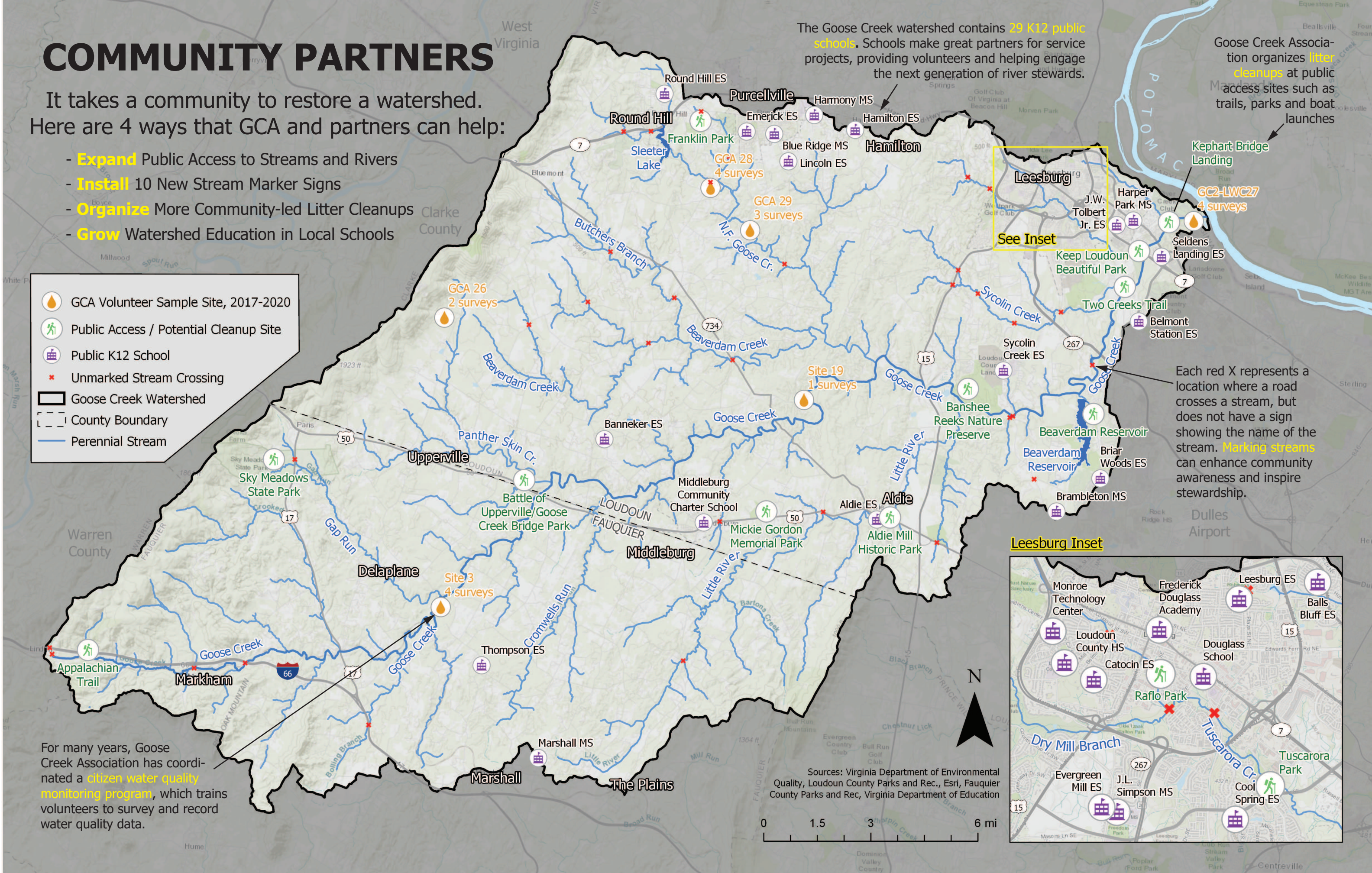
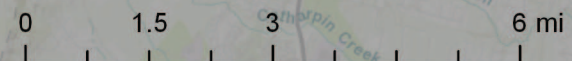
Goose Creek Association organizes **litter cleanups** at public access sites such as trails, parks and boat launches

Each red X represents a location where a road crosses a stream, but does not have a sign showing the name of the stream. **Marking streams** can enhance community awareness and inspire stewardship.

**Leesburg Inset**



Sources: Virginia Department of Environmental Quality, Loudoun County Parks and Rec., Esri, Fauquier County Parks and Rec, Virginia Department of Education





## Community Action Plan

Goose Creek has long-term pollution challenges that can only be remedied through sustained action by many partners. As Goose Creek Association grows its capacity and influence, it can maximize its impact by focusing on the following four goals:

### Goal: Expand Public Access to Goose Creek and its Tributaries

Public exposure to streams creates a natural constituency for conserving Goose Creek, and for environmental protection more broadly. Providing safe and friendly spaces for wildlife viewing, fishing and water play also helps remedy *biophobia*, the fear of living things and an aversion to nature. Close attention should be paid to the needs of historically underserved communities, who may lack safe access to and awareness of nature.

Increasing public access should be coordinated with local governments and carefully consider what the appropriate uses are at a given site. For example, encouraging water play in an area with swift or unpredictable currents may be inappropriate for safety reasons. Instead, perhaps a scenic trail overlook may be better. Public sites also create opportunities for local stewardship like volunteer litter cleanups.



### Goal: Enhance Awareness by Adding 10 New Stream Marker Signs



Adding signage with the name of a stream at road crossings is a low-cost and effective way to enhance community awareness of our waterbodies. Labeling a stream helps give it an identity and encourages local residents to take on more stewardship responsibility. The report card analysis found that 60% of major road crossings were not marked with the stream name. Adding just 10 more signs at road crossings would potentially inform thousands of drivers per day about local streams.

*NOTE: Stream marker signs should only be installed in coordination with local and state highway departments and should not be performed by volunteers.*

### Goal: Develop a Loaner Program for Community-led Litter Cleanups

Goose Creek Association already directs much-needed volunteer stream cleanups, and should continue doing so. But it can further improve its reach by creating a “organize your own cleanup” program. Materials such as litter grabbers, gloves, safety vests and trash bags may be purchased using grant funds and loaned out to partner organizations or local residents. Goose Creek Association staff and board members can also help volunteers select sites and arrange for removal of the litter after the event.





## Goal: Bring Meaningful Watershed Education to More Students

Permanent investment in Goose Creek's water quality requires that the next generation is well prepared to take stewardship responsibility. To achieve this, Goose Creek Association should seek to partner with local school districts to equip teachers and administrators with the tools they need to implement watershed education curricula in the classroom and in the field. Here are five milestones to help reach that goal:

### ☐ *Expand GCA's Meaningful Watershed Education Experience (MWEE) partnerships*

- Counties are required by state law to have watershed education at all public schools, but school districts often lack the resources to provide the program their students deserve
- Regular communication with the Loudoun County and Fauquier County school districts can create opportunities for mutually beneficial partnership and collaboration

### ☐ *Create a Menu of Offerings for distribution to schools and teachers*

- Offerings may include in-class lessons, trainings and field projects
- For maximum reach and transparency, publish the menu of offerings on [goosecreek.org](http://goosecreek.org)

### ☐ *Host at least three K12 student field service projects per semester*

- Examples may include a park cleanup, tree planting or citizen science project
- Keep records of the number of volunteers, volunteer-hours and other measurable results (volunteer time qualifies as match for many grants)

### ☐ *Provide watershed education training for Goose Creek Association staff and partners*

- Contact Friends of the Rappahannock to learn more about options for training and professional development programs in Virginia
- Host a teacher training for local educators from Loudoun and Fauquier County

### ☐ *Join the Virginia Association for Environmental Education (VAEE)*

- VAEE advances environmental literacy by promoting excellence, fostering collaboration, and inspiring community engagement
- Consider applying for a board position to maximize your engagement





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# Goose Creek Association

Protecting and preserving the  
natural resources, open spaces,  
historic heritage and rural quality of life  
within the Goose Creek watershed.

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