

2025 Loudoun Streams Report Card

A Loudoun Wildlife Conservancy Publication



Since 1995, Loudoun Wildlife Conservancy has worked to protect, preserve, and restore wildlife habitat through community science, advocacy, education, and habitat restoration. Our programs engage residents of all ages in meaningful experiences that inspire action and stewardship for Loudoun County, Virginia's natural resources.

Our Stream Monitoring Program is a key part of our work, integrating community science, educational outreach, and advocacy to improve water quality and watershed health. Trained volunteers monitor streams across the county, gathering data that helps inform local decisions while supporting science-based conservation. The program also engages residents in understanding stream issues and empowers them to take action through educational outreach programming, hands-on learning, and collaborative partnerships.

Together, we are shaping a Loudoun where people and wildlife thrive together. To learn more about the work Loudoun Wildlife does, please visit LoudounWildlife.org

Urbanization and Stream Health

Loudoun County is one of the fastest-growing areas in Virginia, and heavy development is putting pressure on our local streams. As more roads, buildings, and parking lots are built, rainwater can no longer soak into the ground. Instead, it runs quickly over hard surfaces, picking up oil, trash, lawn chemicals, and other pollutants that flow straight into nearby streams.

This runoff washes away stream banks, damages habitats for fish and insects, and reduces the clean water available underground. In areas with lots of development, streams are more likely to be in poor health, especially where trees and plants along the banks have been removed.

Loudoun Wildlife Conservancy uses data from our stream monitoring program to track stream health, raise community awareness, and advocate for better development practices. With planning and care, we can protect stream health as our county grows.

Biological Monitoring

Loudoun Wildlife Conservancy follows the Izaak Walton League of America's Virginia Save Our Streams (VASOS) protocol for biological surveys to ensure high-quality, standardized data. This community science effort, led by 32 certified monitors at 28 sites across the county, helps track stream conditions and invites people to explore nature while contributing to the protection of our local waterways.

Volunteers collect and identify benthic macroinvertebrates, small creatures that live in and on the stream bottom. Different species of macroinvertebrates tolerate varying levels of pollution—some are very sensitive while others can survive in polluted water.

A healthy stream supports a wide variety of these organisms, from sensitive species such as mayflies to tolerant ones such as black flies. This biodiversity tells the story of a stream's ability to support aquatic life. By monitoring the types and numbers of these organisms, we can track stream conditions and notice important changes.

Chemical Monitoring

Launched in 2023, Loudoun Wildlife Conservancy's Chemical Monitoring Program is a growing effort to better understand stream health by tracking water quality.

In partnership with the Alliance for the Chesapeake Bay's RiverTrends program, a team of 13 dedicated volunteers—affectionately known as our "Chem Crew"—conducts monthly monitoring along Tuscarora Creek and Town Branch in Leesburg. Benthic macroinvertebrate data have revealed ongoing water quality concerns in these two urban streams.

Each month, our Chem Crew measures water temperature, pH, conductivity, water clarity, chloride (road salt), nitrate, phosphate, and dissolved oxygen, along with physical site conditions like the presence of algae and sediment.

These data identify potential sources of pollution and provide deeper insights than benthic macroinvertebrate surveys alone. Together, this data paints a more complete picture of stream health, guiding local action to restore and protect our waterways.

Salt Watch

Launched in 2020 in partnership with the Izaak Walton League of America, LWC's Salt Watch program identifies salt pollution hotspots, highlights the connection between road salt and stream health, and advocates for smarter salt use.

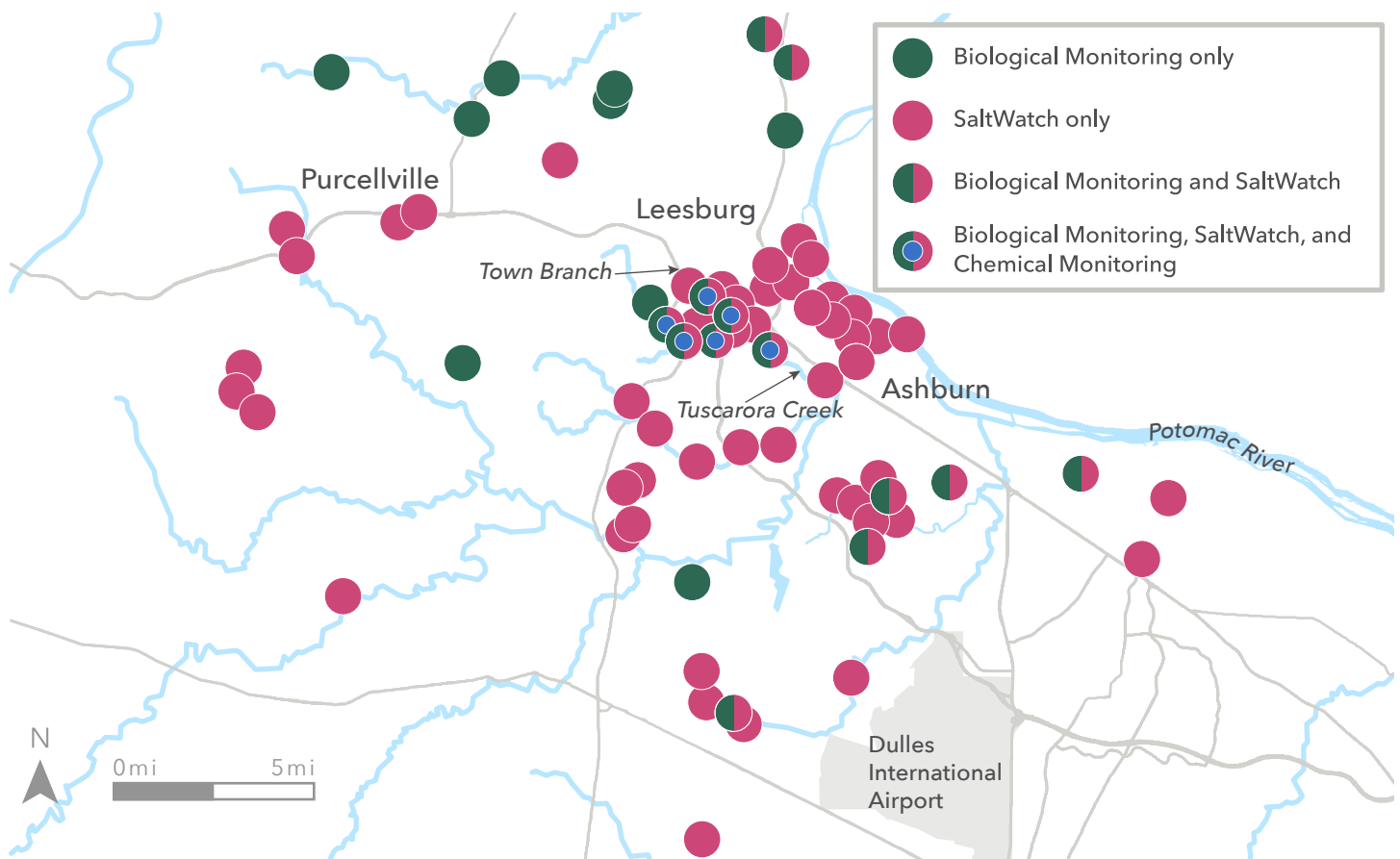
The program began with just 9 volunteers monitoring 14 sites around winter weather events. Now, in its fifth season, it has grown into a robust, year-round program with more than 100 volunteers testing chloride levels at over 70 sites across the county, twice a month and during winter weather events. All data is publicly shared on the Clean Water Hub.

Many Salt Watch volunteers also clean up trash and debris at monitoring sites and report sites with large amounts of trash. That information is shared with Keep Loudoun Beautiful, a valued partner that helps coordinate cleanups.

The dedication of our Salt Watch volunteers plays a vital role in protecting stream health and promoting sustainable winter practices throughout our community.



Where We Monitor



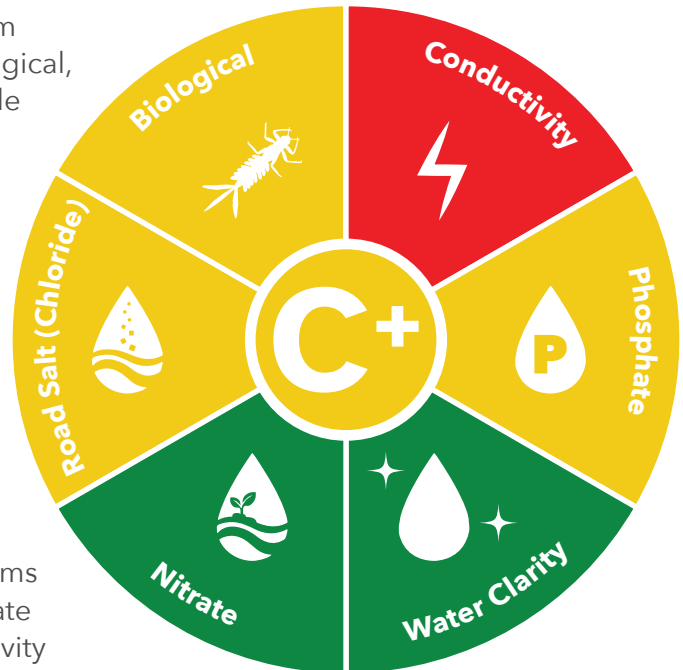
How Healthy Are Loudoun's Streams?

This is the first county-wide stream health report card from Loudoun Wildlife Conservancy, based on data from biological, chemical, and salt monitoring programs. The overall grade is C+ (58%), showing a mix of strengths and concerns.

Water clarity was very good (A, 92%); streams are generally clear and able to support aquatic life. Nitrate levels were also low (A-, 82%), a positive sign. Phosphate, however, scored worse (C+, 59%), reflecting nutrient pollution. Both nitrate and phosphate are nutrients, but they behave differently: nitrate dissolves in water and often flushes through quickly, while phosphate attaches to soil and lingers.

Biological monitoring indicated moderate benthic macroinvertebrate health (C, 52%). Fewer sensitive species and more pollution-tolerant ones show that streams are under pressure. Chloride (from road salt) was moderate (C, 46%), with higher levels in developed areas. Conductivity scored lowest (F, 15%), pointing to pollution from runoff. Together, these scores show that Loudoun's streams support life but are under pressure and need greater protection.

Salt Watch and Nitrate Watch are part of a national program led by the Izaak Walton League of America, connecting local results to a broader effort to track salt and nutrients.



Grade Scale

A	Very good (100%–80%)
B	Good (79%–60%)
C	Moderate (59%–40%)

D	Poor (39%–20%)
F	Very poor (19%–0%)

What We Monitor



Conductivity

Conductivity is water's ability to carry electricity. High conductivity levels mean the water contains too many dissolved pollutants from runoff, which can harm aquatic life.



Phosphate

Phosphate is a nutrient needed in small amounts. Excess phosphate causes algae blooms, low oxygen, and fish kills, which reduce stream health.



Biological Monitoring

This measures the health of benthic macroinvertebrates—the insects and small animals that live on the stream bottom. A healthy stream has a diverse community with sensitive species, while a loss of sensitive species shows the stream is under pressure.



Nitrate

Nitrate is a nutrient found in fertilizer and waste. Too much nitrate can contaminate drinking water and trigger algal blooms that harm fish.



Water Clarity

Clear water lets plants grow and animals thrive. Erosion and runoff cloud the water with sediment or particles, blocking sunlight and smothering aquatic life.



Road Salt (Chloride)

Road salt keeps winter roads safe, but when snow and ice melt, runoff carries salt into streams. Some soaks into groundwater, where it can be released year-round. This raises chloride levels, which at moderate levels can stress aquatic life and at high levels can kill many species.

Vital Signs

Three vital signs—dissolved oxygen, pH, and temperature—are key checks of stream health. Fish and insects need dissolved oxygen, and low levels often come from algae growth caused by too many nutrients. pH shows whether water is too acidic or basic, and extremes can harm aquatic life. Temperature changes with the season and time of day, but very high or low values can be dangerous for stream species. In Loudoun County, all three vital signs were in very good condition.

Driven by Volunteers

Loudoun Wildlife Conservancy's Stream Monitoring Program is powered entirely by volunteers—without them, none of this work would be possible. In recognition of their ongoing efforts, our volunteers received the first Environmental Excellence Award from Loudoun County's Environmental Commission in 2023. That strong foundation carried into 2024, when 150 dedicated individuals contributed 2,716 hours to collect stream health data, support educational outreach, and advance advocacy.



Strengthened by Partnerships

Our Stream Monitoring Program thrives thanks to strong community partnerships. We work with more than 40 schools, nonprofits, government agencies, businesses, and citizen groups to engage youth, train volunteers, expand data collection, and share findings with the public.

We are especially grateful to the Izaak Walton League of America (Salt/Nitrate Watch and Virginia Save Our Streams) and the Alliance for the Chesapeake Bay (RiverTrends) for their ongoing technical and equipment support, and to the University of Maryland Center for Environmental Science's Integration and Application Network (UMCES-IAN) for their data analysis and design support for this report.

Through these partnerships, students gain real-world conservation experience, volunteers strengthen their monitoring skills, and local decision-makers access reliable stream health data. Education, training, and scientific collaboration with our partners all help advance our vision for thriving Loudoun streams.



What You Can Do



Be a Smarter Salter. Shovel snow first, apply salt sparingly only if needed, sweep up excess to reuse later, and report salt piles left on roads or sidewalks to your town or county for cleanup.

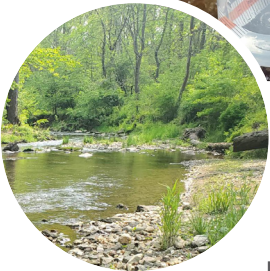
Join Loudoun Wildlife's Salt Watch. It's fun, easy, and free to test your local stream for chloride once a month, year-round.



Test soil before fertilizing. A simple test tells you if fertilizer is even needed, preventing unnecessary runoff into streams. Soil tests are available through the Virginia Cooperative Extension in Leesburg for \$10.

Apply pesticides carefully. Follow label directions and avoid using them before rain, when they are most likely to wash into waterways.

Protect streams with native vegetation. Plant or keep native trees, shrubs, and plants along streams. They filter runoff, reduce erosion, and provide habitat for wildlife.



Small steps at home add up to big protection for clean water and wildlife.

To get involved or learn more, contact Stream Monitoring Program Coordinator Amy Ulland at aulland@loudounwildlife.org.

Behind the Report Card

This report card was released in September 2025 by Loudoun Wildlife Conservancy in partnership with the University of Maryland Center for Environmental Science's Integration and Application Network (UMCES-IAN), with funding from the Chesapeake Monitoring Cooperative (CMC).

Loudoun Wildlife Conservancy volunteers collected the biological, chemical, and Salt and Nitrate Watch data used for this report card throughout 2024 and early 2025. Scores are calculated using the Mid-Atlantic Tributary Assessment Coalition's protocols for non-tidal stream indicators and are out of 100 points. As part of the CMC, these data are publicly available on the CMC Data Explorer (cmc.vims.edu/data-explorer). Biological and Salt Watch data are also available on the Clean Water Hub (cleanwaterhub.org).

Technical and equipment support was provided by the Izaak Walton League of America (Virginia Save Our Streams and Salt/Nitrate Watch) and the Alliance for the Chesapeake Bay (RiverTrends).

We deeply appreciate our Loudoun Wildlife Conservancy volunteers, members, donors, and partners—your dedication made this report possible. Data analysis and layout design by Annie Carew, Ann Foo, Katie May Laumann, and Alexandra Fries (UMCES-IAN). Photos courtesy of Loudoun Wildlife Conservancy.

Learn more and get involved:

Visit LoudounWildlife.org or connect with us on Facebook (facebook.com/loudounwildlife) and Instagram (@loudounwildlife).

