CHESAPEAKE MONITORING COOPERATIVE

Chesapeake Monitoring Cooperative

2024

CASE STUDY: TRIBUTARY OF LIMESTONE BRANCH

A COMMUNITY'S RESPONSE TO WATER QUALITY AND HEALTH CONCERNS

A tributary of Limestone Branch that flows through the JK Black Oak Wildlife Sanctuary near Lucketts, Virginia, and less than four miles upstream from the Potomac River, became a focal point for environmental and public health concerns in 2021. Loudoun Wildlife Conservancy volunteers, through their diligent monitoring, discovered alarming levels of E. coli in the stream, raising questions about the impact on the local community's health and the environment.

The Izaak Walton League of America certifies volunteers to conduct benthic macroinvertebrate surveys and identify the macroinvertebrate community to order level. In May of 2021, certified monitors conducted baseline benthic macroinvertebrate surveys at two sites on the tributary located approximately a quarter mile apart on the JK Black Oak property. Monitoring benthic macroinvertebrates is crucial for assessing water quality because different organisms have varying levels of tolerance to pollution, thus their presence or absence provides valuable indicators of the environmental health of water bodies.

The survey at the upstream site resulted in a stream health score of 10 out of 12, indicating acceptable ecological conditions. The downstream site received a score of 5 out of 12, indicating unacceptable ecological conditions.

Concerned about the drastic difference in scores at sites so close to each other, volunteers walked the stream and discovered a neighboring wastewater treatment facility in between the two sites. Their findings prompted Loudoun Wildlife to collaborate with Friends of the Shenandoah River and the Potomac

A concerning level of E. coli prompted volunteers to investigate the cause.

Riverkeeper Network for further bacterial testing, revealing high concentrations of E. coli originating from this wastewater treatment facility.

The discovery was particularly troubling due to the karst topography, a landscape shaped by the dissolution of soluble rocks, creating features like sinkholes, caves, and underground rivers of the area. This meant that the surface water quality directly influenced the groundwater. This was a significant issue for Lucketts residents, who relied on well water sourced from these streams.

In response to these findings, Loudoun Wildlife Conservancy secured a $41,432 grant from the Tides Foundation, funded by Google Data Centers Grants Fund, in 2022 for a project titled "Securing Clean Drinking Water for the Lucketts Community." The project's objectives included: Assessing the extent of E. coli contamination in local streams, educating the community about water contamination and providing resources, and empowering residents with knowledge and solutions for potential drinking water contamination.

Volunteers undertook extensive testing, including 29 rounds of E. coli sampling at six stream sites and two wastewater treatment discharge pipes, as well as benthic macroinvertebrate surveys over the course of the year. The results were concerning, with over 70% of bacteria samples exceeding Virginia Department of Environmental Quality's (VA DEQ) safety thresholds for recreational water use. Notably, the wastewater treatment discharge samples frequently surpassed VA

Volunteers collect benthic sampling data.

A volunteer measures parameters of water health.

DEQ's permissible limits - sometimes with values over 192 times the permit limit.

Loudoun Wildlife worked with VA DEQ throughout this project to share E. coli data and observational data about sewage solid sediment build up in the receiving tributary of Limestone Branch. VA DEQ conducted followup investigations, the results of which were shared with the United States Environmental Protection Agency (US EPA). In March of 2023, the US EPA mandated that the owner of the malfunctioning wastewater treatment facility.

To raise awareness, Loudoun Wildlife organized a town hall meeting, developed a dedicated project webpage, and collaborated with local organizations for outreach. The town hall meeting at Lucketts Community Center featured experts discussing E. coli, well and septic maintenance, and the relationship between karst topography and water quality. Additional outreach materials provided to the community also stressed the importance of how individuals can help to reduce E. coli levels in streams by picking up after pets, installing livestock exclusion fencing, and proper septic system maintenance.

The project significantly aided local residents, especially in underserved minority communities. Loudoun Wildlife worked with a local church and nonprofit to reach out to residents in two Hispanic mobile home park communities about their water quality. Loudoun Wildlife also held an interpreter-assisted community meeting with these residents and learned that families were spending up to $3,600

a year on bottled water, as they believed their water wasn't safe to drink or cook with.

Using translated documents and the assistance of a native-speaking community leader, Loudoun Wildlife volunteers provided comprehensive drinking water assessments to 17 Latino families consisting of 65 individuals in these two communities. The assessments showed that their drinking water was completely safe to use, but was "very hard" with a high mineral content. Although hard water is not harmful to human health, it can affect the taste and smell of the water.

Although translated summaries of the results were provided to the families, they indicated that they did not trust the results and would continue to use bottled water. Loudoun Wildlife then purchased and helped install high quality countertop water filtration systems and electronic water descalers for the families to address the taste and smell issues. The families then felt safe consuming the treated water and agreed that they would no longer be purchasing bottled water. These filtration systems and descalers will save the communities nearly $250,000 over four years.

Community members attend a meeting.

A local family.

The Limestone Branch tributary case study highlights the critical role of community engagement and water monitoring in addressing environmental and public health concerns. It demonstrates how data-driven action can lead to meaningful improvements in both environmental conditions and the quality of life for local residents.

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