Electrofishing the Woonasquatucket:
Science, recovery, and community in action

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The farmhouse lingers, though averse to square
With the new city street it has to wear
A number in. But what about the brook
That held the house as in an elbow-crook?
I ask as one who knew the brook, its strength
And impulse, having dipped a finger length.

~ "A Brook in the City," Robert Frost

The question posed by Robert Frost, what happens to the brook when development reshapes the land still remains deeply relevant today. In Providence and its surrounding communities, that question finds a powerful answer in the work of the Woonasquatucket River Watershed Council (WRWC).

The Woonasquatucket River, designated an American Heritage River in 1998, begins in North Smithfield, Rhode Island, flows through the urban core of Providence, and empties into Narragansett Bay. Along its 19-mile journey, it tells a story of industrialization, pollution, resilience, and renewal. WRWC's mission is to restore this river and its watershed while strengthening community connections to the natural world by addressing not only environmental degradation, but also the sense of disconnection from nature that often accompanies urban life.

At the center of this work is education.

WRWC's education efforts began in the 1990s with a simple but urgent goal to create urban green spaces so local children would have a safe place to play. The post-industrial Woonasquatucket River and disused lands surrounding it were the perfect opportunity to turn dangerous neglected piles of rubble into thriving park spaces. At the time, many neighborhood youth swam and fished in the river for lack of anywhere else to go, unaware of contaminants such as dioxin. In response, WRWC launched outreach initiatives to teach river safety and awareness, first through a volunteer Junior River Rangers Camp Program and later through staff-led in-school and after-school programs like the "Dos and Don'ts of the Woonaquatucket River." Beyond the classroom, WRWC leads a wide range of programming, including community workshops, river cleanups, habitat restoration projects, greenway bike rides, environmental monitoring initiatives, and hands-on educational experiences in collaboration with the Rhode Island Department of Environmental Management (RIDEM).

Among WRWC's most impactful educational tools is electrofishing, a scientific method used to monitor the overall health of aquatic ecosystems, specifically in the Woonasquatucket Watershed.

Electrofishing is a widely used, non-lethal technique that allows researchers to assess fish populations in rivers and streams (Figure 1). By introducing a controlled electric current into the water, fish are attracted and temporarily stunned, netted, and collected so they can be identified, measured, and released unharmed.

Figure 1. Electrofishing the Woonasquatucket River

The process is carefully regulated and conducted by trained professionals to ensure both human and animal safety.

The equipment typically includes a backpack unit powered by a battery, which generates the electrical current, and a handheld rod that directs the current into the water. When used properly, electrofishing is one of the most efficient and minimally invasive ways to study fish communities.

For WRWC, electrofishing is more than a monitoring technique; it is an opportunity to engage the community directly in science.

On a hot summer day in August 2016, volunteers gathered along the river at Rising Sun Mills in Providence (Figure 2). Pulling on waders and gloves (Figure 3), they worked together to survey a 100-foot stretch of river using electrofishing equipment. Their goal was simple: document the types and numbers of fish in a historically polluted urban waterway.

As the in-water team moved upstream, carefully netting stunned fish, another team on shore identified and measured each catch (Figure 4 and 5). Fish were temporarily held in buckets to keep them cool before being released back into the river.

What they discovered was remarkable.

In that small stretch of river, the team recorded 176 fish, including two species identified as "Species of Greatest Conservation Need" by the Rhode Island Department of Environmental Management (RIDEM): the American eel and the blacknose dace. The presence of blacknose dace was especially significant, as it had rarely been documented in the Woonasquatucket River system.

This finding told a story of resilience and recovery. Even in a river long impacted by pollution, biodiversity was returning.

The survey also highlighted broader environmental challenges. Rising water temperatures, increased stormwater runoff, flooding, and drought all linked to climate change, continue to threaten aquatic ecosystems. Solutions such as planting trees, restoring riverbanks, and managing stormwater runoff are critical to protecting these fragile habitats.

Figure 2. Volunteers assisting with fish collection.

Figure 3. Waders ready to go.

Building on efforts like the 2016 survey, WRWC continues to integrate electrofishing into both research and education.

In 2025 alone, WRWC's Education Department led four electrofishing outings and 17 field trips, reaching more than 1,200 youth learners. Students participated in hands-on programs that included raising trout, studying bird ecology, and exploring the river through guided field experiences.

In October 2025, WRWC partnered with the Wheeler School to bring AP Environmental Science students into the field. Across multiple sites along the river, students conducted electrofishing surveys, collecting real-world data and observing how ecosystem health changes along the river's course.

Their findings mirrored broader ecological patterns. In upstream areas like Smithfield, students observed greater species diversity and larger numbers of fish, which is an indicator of healthier conditions. In more urban sections of Providence, species such as the American

Figure 4. Volunteers learning to use identification keys for fish species.

Figure 5. Taking a closer look at collected fish species.

eel and pollution-tolerant macroinvertebrates were more common, reflecting ongoing environmental pressures.

WRWC's work extends beyond data collection. In partnership with RIDEM and the United States Environmental Protection Agency (EPA), the organization contributes to long-term monitoring efforts while also leading restoration initiatives like planting vegetation, improving river access, reducing stormwater runoff, and helping migratory fish navigate past dams to access their native spawning grounds.

Equally important is the organization's commitment to community engagement. By involving residents, students, and volunteers in hands-on science, WRWC fosters a deeper connection between people and their environment.

Electrofishing, once a purely technical process, becomes something more, a shared experience that builds knowledge, curiosity, and care. Like the brook in Frost's poem, the Woonasquatucket River continues to flow – reshaped but not forgotten. And through the efforts of WRWC and its community, it is not only being restored, but reimagined as a living classroom, a shared resource, and a source of collective pride.

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