

What the Water Already Knew: A Joint Account of Community Science in the Port of Providence

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Introduction

If you've ever driven along I-95 through Providence, Rhode Island, you might've passed a strange sight without knowing what it was: a giant tarp, covering something the size of a small hill. Underneath is a pile of road salt stockpiled for winters across three states, sitting just off Public Street. Next to that is a metal recycling company, hosting piles of recycled scraps constantly sprayed with water to abate fire. If you cross Allens Ave you'll find the Narragansett Improvement Company, an asphalt institute paving the scalding hot roads of Providence.

Maysha:

I passed the mystery pile almost every week for a year, on my way to teach at the Met High School, and every time, one of my colleagues would mention the smell: a putrid, rotten-egg stench. It was there, working at that school, that I was introduced to one of the many plagues of the area. I didn't know then that I'd come back to that same street with a sonde in my hand, trying to measure what the neighborhood had already been telling us for years.

One of my first tasks was to research the TMDLs, the total maximum daily loads that were supposed to govern water quality around Providence, and to figure out how enforced those standards actually were. From there I moved into helping plan our first WaterSpeak event of the summer. It was the first time I'd felt that kind of responsibility, organizing people who held more

knowledge, more authority, and more history with this land than I did. In preparation, I mapped every known Leaking Underground Storage Tank and CERCLIS site in Rhode Island. It was incredible to see my hard work and stumbles with Google Earth Pro come to fruition as residents used that map to point out the smells and the concerns they thought mattered most.

The learning curve only got steeper once sampling started. We worked our way down the same stations over and over, IPP1 through IPP4 at India Point Park, then PS1 through PS3 at Public Street, until the numbers stopped being abstractions and started being places I could picture with my eyes closed. I remember standing at the water's edge trying to pull a clean filtered sample without taking an unnecessarily long amount of time, feeling less like a researcher and more like someone fumbling with a tool for the first time, which I was.

Our first boat survey on the upper Narragansett Bay tested that learning curve further. We were out for hours, measuring the same parameters except now from a boat instead of a shoreline. Partway through, the rain came down so hard we had to turn back before we'd finished. I sat there soaked, watching the readings blur on the screen, thinking this was not the kind of research I had pictured when I signed up for a summer in a lab. Another day, I joined a separate project along the Woonasquatucket River with another undergrad, driving in her car for hours, hitting more than ten sites in a single stretch, learning an entirely different piece of water in one long push while exploring parts of Rhode Island, my home for almost a year, I'd never been to.

Audrey:

I came into my research project this summer expecting to be doing lots of desk work. I knew I was going to be working in Python to make sense of preexisting data, creating posters and infographics for community events, and doing environmental policy and permit research. What I didn't realize was how involved and invested I would become in the communities and environments that were behind the data I was analyzing. What started as plotting data points on a graph turned into field sampling to collect new data in the Narragansett Bay which required me to get well acquainted with hip-high waders and different data collection methods. It also meant helping to lead community events throughout the summer. Those events led to unexpected connections with community members, from bonding with kids in Spanish to hearing directly from residents about their experiences with the water and any environmental concerns they wanted us to address.

My first task was to research the air and hazardous waste permits given to companies along the Port of Providence shoreline. This was primarily for the purpose of understanding what kinds of contaminants industrial sites were releasing into the air, soil, and water. I created a few infographics to condense the information and make it accessible to everyone. By the time we began shoreline sampling, I had spent so much time researching the industries surrounding these sites that I was eager to see what the actual water could tell us.

Sampling brought an entirely different set of challenges. Before we could collect anything, I had to learn how to properly calibrate our equipment and understand how easily a mistake in the field or during calibration could affect the data we later relied on. There was a real sense of responsibility that came from knowing who this data would impact and understanding that to get

reliable data for the community, we needed to be careful and intentional about getting our measurements. At the same time, the fieldwork required lots of trust in other team members and good communication. It meant being ready and willing to just get in the water and figure things out. After spending some time reading about the port from my computer, standing in the water and collecting new data felt even more important.

Maysha and Audrey

Neither of us expected to end up here. We didn't expect waders. We didn't expect a fishing site to become the address we thought of the most that summer. And we didn't expect the data, when it finally came in, to say what the neighborhood had been saying all along.

WaterSpeak: Community Engagement

WaterSpeak events were our bilingual community gatherings held in partnership with the People's Port Authority, a community organization in Providence dedicated to community-led environmental justice. These events were meant to create a space where community members could freely share their experiences with the shoreline, to help us understand what we were missing or what we needed to prioritize in our research. We opened the conversations to any and all concerns, from specific smells to industrial facilities in the area, to anything else they thought we should know. We had maps for community members to pinpoint places where they had smelled or seen something concerning, and we welcomed any changes they wanted to see in our project. Those conversations helped determine what we paid attention to. The goal was to make sure the people directly impacted by this issue were driving the research process, and that we were collecting information that would be useful to them.

At one of those events, an elderly man spoke up. He'd lived in the neighborhood for years and attended the May workshop at the Public Street Shoreline Access Point, sandwiched between the road salt pile, the asphalt company, and the metal recycling plant. As we surveyed for updates, he raised his hand immediately. Noting how after visiting the site, his throat had been itching and his head had ached for a week straight. He told us he'd fished in the Port for twenty years, and had stopped, not because he wanted to, but because he could no longer promise himself it was safe. His ritual, love, and livelihood were all sacrificed by the industries crowding the one public access point he had left. His story was exactly the knowledge Waterspeak was created to bring into our research.

WaterSpeak was also designed to make participating in our research as accessible as possible. Community members tested water samples alongside us, learning about the equipment we used and what different water quality parameters could tell us. Families were encouraged to bring their children, and free bilingual childcare was provided at every event, so parents wouldn't be kept away by not having anywhere for their kids to go. We had an art table set up every time for kids to draw or glue together their own experiences with the shoreline while their families talked to us. We asked them to make their own maps and draw what they associated with different places along the water. Some drew old metal fires they remembered seeing or hearing about at industrial facilities. Others drew stink lines coming out of the water to mark places they knew smelled bad. Seeing those maps was one of the most eye-opening moments of the summer. Even the youngest members of the community were already deeply aware of the environmental conditions around them.

Our Findings

Our team investigated water quality along public shorelines in the Port of Providence, sampling at India Point Park and at Public Street, a waterfront shaped by a long industrial history and home to residential communities that have raised concerns about water, soil, and air quality for years. The Port has a high concentration of industrial facilities and aging infrastructure, including several known leaking underground storage tanks (LUSTs). Using a YSI multiparameter sonde, we measured dissolved oxygen, chlorophyll, pH, and conductivity at sites the WaterSpeak community identified, sampling again after storms to catch short-term changes. Water quality shifted substantially over distances of just a few meters, and dissolved oxygen stayed persistently low near a site next to a known leaking tank at Public Street, the same site residents had flagged as a concern before we ever sampled it. Dissolved oxygen and chlorophyll were strongly correlated across all stations and dates ($r = 0.850$, $p < 0.001$), consistent with algae growth fueled by nutrient loading, an early signal of enrichment before more visible problems appear. There is a lot more shoreline to cover, and continued, community guided monitoring will be key to understanding the full scope of water quality concerns in this part of Providence. These findings are just a small step in the right direction.

Sitting With the Gap

What we found in Providence is not unique. Industry tends to concentrate where the people with the least power to resist it happen to live, and that pattern has a long history behind it. In the 1930s the federal government's Home Owners' Loan Corporation graded neighborhoods in roughly 200 American cities by lending risk, marking Black and immigrant neighborhoods in red to justify denying them loans and investment, a practice that shaped where poverty, race, and

pollution would sit together for generations. Brooklyn was one of those cities, and so was Providence. Research on this history has found that the neighborhoods graded lowest by HOLC still carry consistently higher exposure to air pollutants and hazardous emission sources today, with disparities in pollution that have persisted for decades without meaningfully closing relative to the highest-graded neighborhoods.

None of that is an accident of geography and that's what makes it worth sitting with. It's the long residue of policy still being enacted and still settling. The elderly man's twenty years fishing the Port, his itching throat, the headache that lasted a week, none of it is separate from that history.

Conclusions

Maysha:

I still drive past that pile sometimes. It looks the same as it always did, tarp pulled tight, sitting where it's always sat. But I know now what's underneath it, and what's behind the fence, the water, the readings, the residents who voiced their concerns and advocated for themselves long before we ever measured anything.

Audrey:

By the end of the summer, the data I worked with was no longer a set of numbers, but instead a collection of people, places, and experiences that had come to mean so much to me. I could have never expected how much this summer changed my perspective on what it means to do environmental research and it is something I will carry with me long after hanging up my hip-high waders.

Maysha and Audrey:

There's more shoreline than we could cover in one summer, more stations, more storms to sample after, more residents whose stories haven't made it into a dataset yet. That work isn't finished, and it was never going to be finished by us alone. What we can say is that the numbers caught up to something the neighborhood already knew, and that catching up matters, even if it shouldn't have taken this long. If nothing else, we hope this is one small piece of a much longer record where we keep listening to the people who live closest to the water.