

Spills at a Superfund Site Spark Dire Need for Community Science Data

RIVER WATCH OF COLORADO



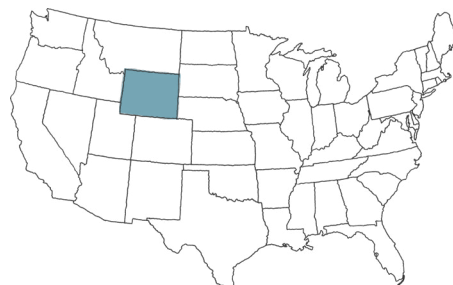
When excavating above an old adit at the Gold King Mine near Silverton, Colorado, a pressurized pipe burst, spilling three million gallons of polluted water into a tributary of the Animas River. Integral to the EPA response strategy - a collaboration with the impacted local communities, states, and tribes - was the contribution of baseline monitoring data collected by Colorado River Watch volunteers. This data set, begun in 1991, provided invaluable quantitative insight that illuminated not only responders' assessment of the disaster's extensiveness but also informed both mitigation and monitoring strategies for remediation.

How much did a toxic pipe burst impair the Animas River?

In the 1990s, Colorado lacked the resources necessary to identify issues, set standards, and target remediation goals for the legacy degraded landscapes across the state. Concerned citizens recognized that funding deficits left the state unable to monitor the baseline health of their water resources. Without oversight, abandoned mines, draining adits, and tailings piles would seep pollutants into waterways. The River Watch of Colorado, recognizing the intrinsic value in collecting baseline data, assembled a network of nonprofits, teachers, students, and community volunteers and trained them to collect monthly water quality samples as well as recording annual benthic and physical habitat data. By adhering to core standard practices, the River Watch demanded high but achievable data collection and management standards by all participants. To date, RW serves more than 140 groups across 500 rivers and has collected thirty years of baseline data.

The state perpetually lacks the financial and human resources to take ownership of this monitoring program; however, CWR's data set has provided invaluable information to make response, restoration, protection, and regulatory decisions.

In 2015, an accident at the Gold King Mine released lethal amounts of toxic pollutants into Colorado's Animas River. Any observer of the mustard yellow water would surmise that an environmental disaster had struck. While the US EPA had been at the scene to assess the on-going water releases, their sparse baseline data lacked the rigor and depth to assess the disaster response needs and monitor response efficacy. In effect, if left to their own resources the EPA would have been responding to the accident blindly. Thankfully, Colorado River Watch's existing dataset, dating back to 1991, rescued the response by filling the critical gaps and empowered state and federal agencies to assess remediation efforts to return water quality to pre-spill levels.



Role of the Monitoring Program in Addressing the Problem

River Watch provides training and capital to its network of participants in return for the contribution of their monitoring samples to the statewide data portal. Thankfully, River Watch identified the need to establish a monitoring site near Silverton, Colorado before disaster struck. From the outset of the spill, River Watch could easily retrieve their stored data because they had managed all collected data digitally. That monitoring data helped develop a treatment plan to remediate the spill and continue to monitor if the strategies to mitigate the impact successfully ameliorated harm.



About River Watch of Colorado

In 1989, the majority of water quality decisions were made with little to no data. Colorado has over 770,000 miles of rivers, many of which were not sampled or assessed. A clear data gap existed. River Watch was born to fill this data gap by leveraging the resources of Colorado Parks & Wildlife, citizens, teachers, and students to monitor the long term condition of our rivers. The program focuses on gathering high quality data for any citizen, agency or entity to use in their own decision processes to further protect water resources.

Nexus to WDC

River Watch filled state funding gaps by fundraising, training participants, and implementing the monitoring program autonomously. Similarly, River Watch filled state data gaps in order to help them meet their required response to meet Clean Water Act enforcement. Finally, River Watch's network of monitoring groups maintained the necessary capacity to collect local data and share their information with the intent to use the data continuously.



Grant Funding



Network of
Networks

photo credit: Monitoring at the Spill by Jerry McBride via Durango Herald

Use Case Summarized by

Barb Horn, Water Quality Monitoring Expert
WDC Steering Committee Member



WATER DATA COLLABORATIVE

SEE WHAT YOU WANT TO SEE - AND EVERYONE WANTS TO SEE THE DATA

RE SOURCES



The City of Bellingham is only required to monitor 12% of their stormwater outfalls per year which means finding an illicit discharge is unlikely unless the violation is so egregious that it is reported by a community member. Yet harmful bacteria and chemicals degrade the coastal waters and threaten public health from both maritime activities and inland toxic-producing industries. Re-Sources's staff-lead monitoring program has begun filling in critical gaps in the regional data knowledge by creating a publicly-available database and reporting all recorded exceedances to Washington State's Ecology's Emergency Response Tracking System. With the guidance and support of local and state agencies, the monitoring data has both expanded and leveled the playing field in getting data into the hands of all stakeholders on water quality issues.

Is water meeting minimum requirements for coastal ecosystem and public health quality?

Stormwater is one of the biggest threats to the health and livelihood of communities along the Salish Sea. Inland, industries making or utilizing toxic chemicals discharge their pollutants at a high cost to the health of the public and the local environment. Their pollutants make their way to the coast via pipelines and outflows. The City of Bellingham has installed stormwater management practices, such as parks, greenways, and vegetation barriers, however the distribution of these has overlooked lower-income neighborhoods and left them vulnerable to pollution. Too much pollution is poisoning marine species, making many unsafe to consume. This disproportionately affects communities whose diet relies on local seafood, such as tribal nations and asian communities.

To fill critical monitoring gaps in the City of Bellingham's stormwater monitoring program, RE Sources staff scientists monitor stormwater outfalls that ultimately track about 140,000 linear feet of stormwater pipe discharging stormwater via outflows into Bellingham Bay. The staff scientists takes to the water to paddle to eleven sites on a monthly basis. Her data helps pinpoint irregularities and illicit discharges. At the

request of the state of Washington, all exceedances are reported to the Department of Ecology's Emergency Response Tracking System, which helps alert multiple stakeholders to possible pollution permit violations. The Re-Sources staff then coordinate further investigation and response with government agencies while continuing to build the baseline dataset.

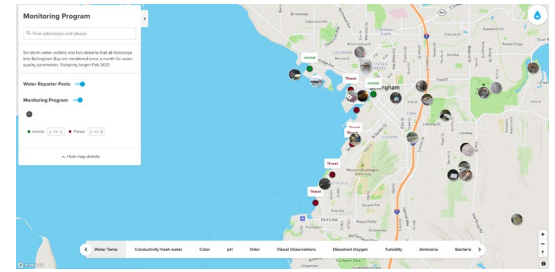
During the year long program, enlightening discoveries have already been made. For example, bacteria exceedances are more frequently registered than was previously surmised. Also, unidentifiable growth has been discovered in an area that also has a strong sulfur odor. While more research into the species must be made, scientists believe that a marine-based sulfur eating microbe has arrived in tidal waters.



photo credit: Kirsten McDade via Water Reporter

Role of the Monitoring Program

The monitoring program collects critical baseline data along Bellingham Bay to help keep a pulse on water quality. The information has created a lateral distribution of data, collected on a monthly basis and stored in Water Reporter for easy analysis and portability. The data collected by the monitoring program has triggered multiple cases to the WA Department of Ecology and City of Bellingham as well as interest from media and funders. Without the monitoring program, local community members would have 90% less knowledge about the state of their waterways.



About the Organization

Founded in 1982, RE Sources is a nonprofit organization working to protect the environment and communities of the central Salish Sea region and our climate. We catalyze community action to build a lasting legacy for all of us — clean water, protected shorelines, an end to dangerous fossil fuel projects, and recovery for orcas and salmon.

As a team of trusted and time-tested environmental advocates, educators and scientists, RE Sources gives people practical ways to make a real difference for the planet, from passing stronger laws that protect the environment and empowering youth voices, to holding corporate polluters accountable, reducing waste and our own carbon footprint. They do this through smart policy, grassroots mobilization, hands-on science and environmental education.

Their deep roots and broad connections in our region allow them to inspire and mobilize history-making numbers of people to protect the beauty and bounty of the region.



Nexus to WDC

A strong study design and commitment to clean data management from the first day of data collection has powered the RE Sources Monitoring Program. The Program, sanctioned by local and state agencies, delivers data-driven details to multiple stakeholders through a Water Reporter map, available data downloads, and sharing to the state Emergency Response Tracking System. By using Water Reporter, Re-Sources can spend more time collecting samples and tracking down pollution sources and less time building databases, scrubbing data, or updating public-facing maps.



Distributed Data
Management



Grant Funding

photo credit: photo for upperright corner

Use Case Summarized by

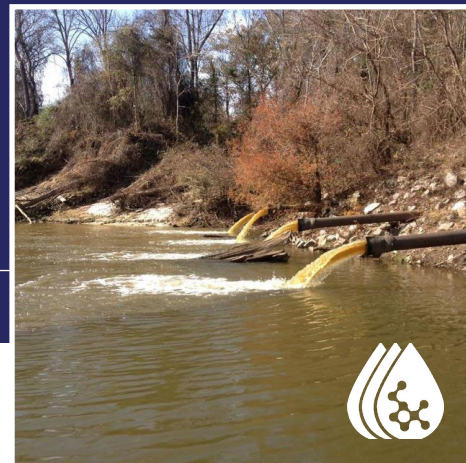
Erin Hofmann, Project Strategy & Application Lead
The Commons WDC Steering Committee Member



WATER DATA COLLABORATIVE

IMPROVING WATER QUALITY BY INCREASING MILES OF MONITORED WATERWAYS

PEARL RIVERKEEPER



The state of Mississippi may or may not have an impaired rivers problem - the quality of 89% of the state's perennial rivers and streams is currently unknown. Pearl Riverkeeper, desiring to bring that percentage down as far as possible, collaborated with Alabama Waters Watch and Mississippi State Extension to create and implement a community-science monitoring program. The inaugural program engages dozens of Pearl Riverkeeper-trained volunteers to conduct weekly testing on chemical and bacterial parameters. The results are displayed on an interactive website and all exceedances are reported to Mississippi's Department of Environmental Quality. The program continues to expand in terms of both number of monitoring sites and number of volunteers.

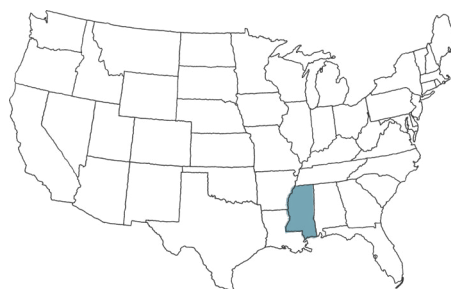
What will chemicals and bacteria will we find, and at what levels, in MS perennial waterways?

The state of Mississippi has over 26,000 miles of perennial streams and rivers. For the 2016 Water Quality Assessment Report, Mississippi Department of Environmental Quality assessed only 11% of our waterways for one or more uses. According to the report, "The status of water quality on the remaining 89% (23,586 miles) of the state's perennial rivers and streams is unknown". Citizen science-based monitoring has stepped in to amplify and fill in the gaps of the government-led monitoring programs. Community, group and citizen observations can accelerate the identification of problem areas, provide data to determine waterway impairments, and contribute to a more complete knowledge of watershed health.

In order to develop a new water quality monitoring program, in 2017, Pearl Riverkeeper reached out to the very successful leader in the field of citizen science engagement, Alabama Water Watch. AWW provided Pearl Riverkeeper with the training needed to stand up our own EPA-approved citizen science water quality monitoring program. The success of Pearl Riverkeeper's program led to the development of the state-wide Mississippi Water Stewards monitoring program.

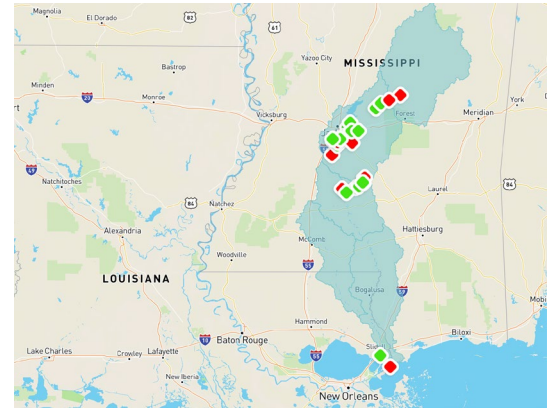
The Pearl Riverkeeper "Water Stewards", our Bacteriological and Water Chemistry monitoring program, follows the protocols and procedures developed by Alabama Water Watch in 1992 and certified by EPA Region 4 in 1999 and 2010. All of our Pearl Riverkeeper Water Stewards volunteers attend a one-day training course, are certified by Global Water Watch and follow a Quality Assurance/Quality Control program approved by the EPA. Our Water Stewards volunteers have collected over 400 water quality readings at 31 locations in the Pearl River watershed.

Pearl Riverkeeper publishes this data on our own website using the interactive Water Reporter map



Role of the Pearl Riverkeeper Water Stewards Program

The program provides citizens with timely information about whether or not it is safe to recreate in a particular location, provides baseline data to be able to determine trends over time and keeps citizens informed about the impact to water quality from various pollutants including sewage spills. The project has exceeded our expectations on the side of volunteer engagement. Pearl Riverkeeper volunteer monitors test 11 popular primary contact recreation locations around the watershed. This testing is conducted weekly in the summer and monthly in the winter. We also use an opt-in email notification system. Unusual trends or water quality problems are reported to our MDEQ state agency or to the agency responsible for the 33,000 acre Ross Barnett Reservoir.



About the Organization

Pearl Riverkeeper is a citizen-based, 501(c)(3) non-profit dedicated to improving the Pearl River watershed through restoration, advocacy and education. Pearl Riverkeeper began by engaging community members in pollution awareness and cleanup. The program quickly grew to include a Water Stewards monitoring program, River Guardian clean-up program, general engagement Clean-Sweep program, digital pollution and flooding documentation, and water trail development.

Nexus to WDC

The Pearl Riverkeeper's monitoring program demonstrates, beyond a doubt, that community scientists can align behind standard practices and fan out over a large area to fill critical gaps in baseline monitoring. As a Champion willing to build the relationships between government agencies, willing volunteers, study design experts, and technical service providers, Pearl Riverkeeper reversed the trend across the state of Mississippi of letting water flow past unmonitored. With the inaugural program established and gaining momentum along the Pearl River, the study design will be replicated and expanded to more waterways as more local groups gather the necessary resources to begin monitoring programs.



Champions



Distributed Data Management



Network of Networks

Use Case Summarized by

Erin Hofmann, Project Strategy & Application Lead
The Commons, WDC Steering Committee Member



Sampling Chloride Strips Spread Truth on Road Salt Application Impacts

IZAAK WALTON LEAGUE OF AMERICA



What impact does road salt application have on our streams and rivers? A growing number of citizen scientists armed with chloride test strips and geo-located photos have committed to documenting the connection across the northern half of the United States. To date, the national program spearheaded by the Izaak Walton League of America has collected data from hundreds of rivers in ten states, sparked government action in three states, and provided a simple but effective monitoring program for countless non-governmental organizations to collect and share data both locally and nationally on an important but overlooked issue: road salt application.

Can you quantify road salt application's impact on water quality?

In 2018, an Izaak Walton League Clean Water fellow observed a big pile of road salt at the entrance to the IWLA Headquarters. A Department of Transportation truck had dumped the load in such a way that it covered a storm drain that flows water directly into the local stream, which also happens to be a training site for IWLA on Save our Streams monitoring protocols.

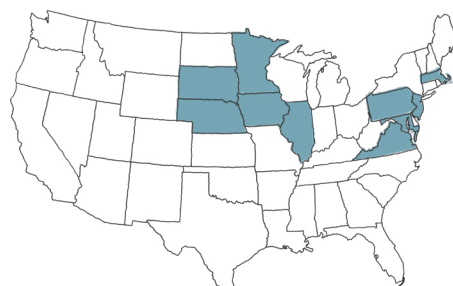
The pile of salt sat for days, causing internal red flags to the intern and doing little to improve road conditions for motorists. What impact was the salt having on the chloride levels in the stream? While he wanted to clean it up himself, that would have put him in the middle of a busy three lane throughway. Not all jobs should be left to volunteers.

Despite frantic calls to local county departments, a week passed before anyone took responsibility to remove the salt. As the salt seeped into the drain, the intern penned letters to the editor at both the Washington Post and in the local Olney Newspaper imploring someone to address the general issue of negligent road salt application. Through the experience, the intern realized that the world of road salt application is a complicated one with minimal research on hand to demonstrate the impact on our waterways and wildlife.

The Clean Water Team at IWLA asked the question, if this is one random point on a highway in a not-super wintery state, is road salt application a problem nationwide? Is there a network of people who care?

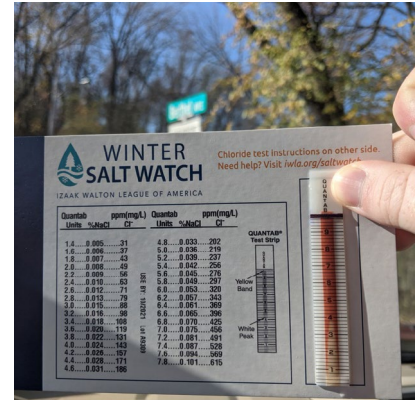
The Winter Salt Watch Program asks volunteers to monitor both road salt application and its impact on local creeks and streams across the upper half of the United States over the winter months.

Road salt is an emerging water quality issue. It is visible and relatable to a vast majority of residents in the northern half of the United States. The network of volunteers who participate in the program take samples at their local stream before winter weather hits, after storm events, and then again in the spring months. The data, sent to IWLA headquarter staff via geo-located images also makes its way into the hands of local and state officials responsible for implementing their winter road mitigation programs



Role of the Monitoring Program

The Chloride test strips used by participants give a rudimentary picture of the level of chlorides in the stream, but because the program has volunteers geo-locate and time stamp their test strips, the information is adequate enough to pique the interest of NGOs and governments tasked with actual road salt application or enforcement of the Clean Water Act. In Minnesota and Virginia, the existence of the Salt Watch Program has sparked conversations between agency officials and scientists about how to revise their dangerous winter road mitigation strategies to do less harm to their waterways. The simplicity and low cost of the program has inspired both individuals to participate as well as small community monitoring groups looking for cost-effective yet engaging opportunities for eager and new volunteers.



About Izaak Walton League of America

The Izaak Walton League's Save Our Streams program is the only nationwide program training volunteers to protect waterways from pollution and bring information about water quality to their communities.

The program began in 1969, when water pollution problems were easy to see – like massive oil spills and burning rivers. Early Save Our Streams volunteers cleaned up trash from their local waterways and reported problems like streams becoming clogged with silt.

In the 1980s, the League recognized that with the right training, volunteers could collect scientifically valid data to assess water quality in local streams – a conviction that has proven true. Ever since, the League has been teaching volunteers to study stream health and report their findings to decision-makers.

Nexus to Water Data Collaborative

The Salt Watch Program demonstrates how engaged communities are better educated and better equipped to understand the interconnectedness of development decisions and natural resource quality. By distributing the same kit to hundreds of volunteers across the country, IWLA built an unprecedented understanding of the impact of road salt application on northern waterways and the vulnerability of these waterways to spikes in chloride.



Champions



Distributed Data Management



Network of Networks

photo credit: Sam Carroll via Water Reporter

Use Case Summarized by

Erin Hofmann, Project Strategy and Outreach

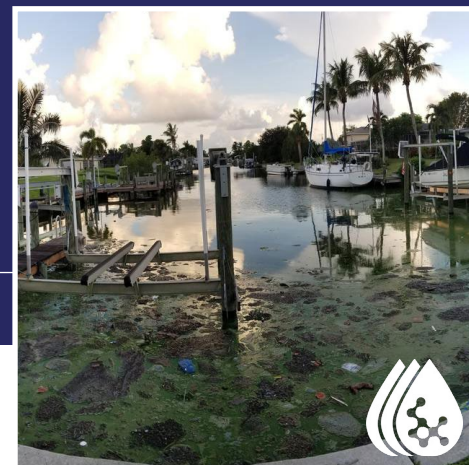
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WATER DATA COLLABORATIVE

Cataloging the Case for Intervention for Unprecedented Harmful Algal Blooms

CALUSA WATERKEEPER



Harmful algal blooms shuttered beaches, docked fishing boats, and triggered catastrophic fish kills and marine mammal stranding events in Southern Florida in 2018. While these blooms often happen naturally, a perfect storm of anthropogenic-driven activities had escalated the frequency and severity of these toxic events. Only with careful qualitative and quantitative monitoring can scientists confirm the relationship between the human activity and blooms. Calusa Waterkeeper has trained dozens of Rangers to traverse their waterways to document possible HABs and report repercussions of their presence. This information has been folded

Can community engagement through monitoring motivate legislative action to mitigate HABs?

In 2018 a perfect storm of conditions led to massive algae blooms across Florida, shuttering beaches and causing massive fish kills. HABs, a naturally occurring phenomenon, are exacerbated by agricultural and urban nutrient pollution, warming water from climate change, and poor water infrastructure management. The presence and frequency of HABs has skyrocketed at the same time as rapid urban development has doubled the local resident population.

The increased population density has strained the already stressed natural ecosystem through increased water consumption, destroyed habitat, and emptied more nutrient dense runoff into the Caloosahatchee River, creating a perfect storm for HAB occurrences.

This ecosystem is no stranger to human manipulation. The Army Corps of Engineers manages Lake Okeechobee levels - the main waterbody emptying into the Caloosahatchee River. Flow levels inevitably impact downstream ecosystem health and the Calusa Waterkeeper sued the Army Corps of Engineers in 2019 for neglecting the downstream effects on wildlife, public health, and even South Florida's economy.

Monitoring for algal blooms requires sampling for cyanobacteria and the dinoflagellate *Karenia brevis*, also known as red tide, two organisms that release toxins capable of killing wildlife and creating hazardous public health conditions. Community scientists volunteer to monitor the vast network of canals, lakes, and other water bodies, filling resource gaps across the monitoring network.

Using geo-located observational data, 82 Water Rangers documented potential harmful algal blooms, documented secchi depths, and provided qualitative information on the impact blooms have on the local ecosystem and economy. The collected data deepened the understanding of the issue and reinforced the conversations playing out in court about how to regulate use of local water resources.



Role of the Calusa Ranger Program

Volunteers with Calusa Waterkeeper attend a two day training session on how to monitor and the frequency with which they should head out to take their water quality samples. The monitoring program provides irrefutable visible evidence of potential harmful algal blooms and the repercussions of their presence in southern Florida. The monitoring program fills a critical gap by closing holes and broadening the monitoring network as well as building an atlas of verifiable data on the extent of the problem. Furthermore, the monitoring program engaged community members harmed by the presence of these HABs, giving them a sense of purpose for contributing to the solution to the preventable problem.



About Calusa Waterkeeper

Calusa Waterkeeper, Inc. is a non-profit organization dedicated to the protection of the Caloosahatchee River & Estuary, Lake Okeechobee, Nicodemus Slough, Charlotte Harbor, Estero Bay, the near-shore waters of Lee County, and their watersheds, through education and promotion of responsible use and enjoyment by all people.

Calusa Waterkeeper monitors the health of the regional waters – the Caloosahatchee River and Estuary, Estero Bay, Lake Okeechobee, Charlotte Harbor and our beaches in collaboration with dedicated volunteers. Government agencies fail to monitor adequately and address water quality issues. The data collected informs the public and government officials on water quality issues.

Nexus to WDC

Technical services produced for water monitoring efforts elevated the impact of the Calusa monitoring network. Volunteers using a geo-located application could feed their observations directly to the Calusa Waterkeeper as they also appeared immediately on a portable map. With less time coordinating the data management and collection of the data, the Waterkeeper could spend more time in Tallahassee and with partners using the data to advocate for better management of the lake and river flows.



Distributed Data
Management

photo credit: Ranger Monitoring by Bradley Quandt via Water Reporter

Use Case Summarized by

Erin Hofmann, Project Strategy & Outreach

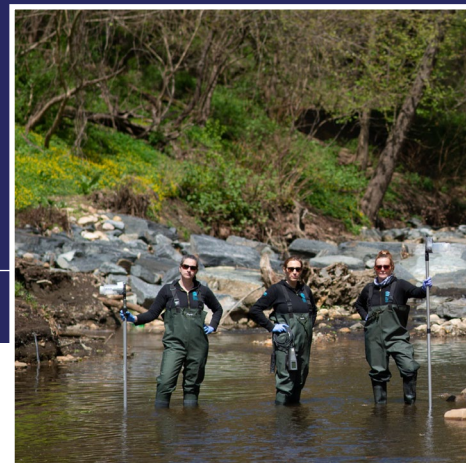
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WATER DATA COLLABORATIVE

Monitoring Data Plugs Waste Water Treatment Plant Violation Streak

BLUE WATER BALTIMORE



In 2021, two wastewater treatment plants in Baltimore County watersheds have operated in non-compliance to their Clean Water Act permits for more than a year. The Blue Water Baltimore's staff-scientist-led weekly monitoring program documented these exceedances and used the data to collaborate with Chesapeake Legal Alliance to file notices to sue with the City of Baltimore. The monitoring program's baseline data provided critical defensible evidence of the extent of the violations. BWB credits attributes their program's extensive reach and reliability not only to a strong study design but also reliable technical services that allows staff scientists to trade desk time

Will wastewater treatment plant non-compliance stop before legal action is taken?

In spring of 2021, Blue Water Baltimore's water quality monitoring program detected unusually high bacteria levels in the Harbor in the vicinity of the Patapsco Wastewater Treatment plant effluent discharge. BWB alerted the Maryland Department of the Environment which triggered site visits by enforcement officers.

These visits revealed ongoing, significant violations. For more than a year, Back River and Patapsco Wastewater Treatment Plants have been in significant non-compliance with their Clean Water Act permits, including many months of ongoing violations of fecal bacteria, nitrogen, phosphorus, and other water quality permit limits. These violations not only threaten public health but also put in jeopardy the state's ability to reach goals under the Chesapeake Bay cleanup agreement. The two plants are discharging, in some cases, over 400% of their allowed permit limits.

Thanks to baseline data collected during Blue Water Baltimore's ongoing monitoring program, the Chesapeake Legal Alliance delivered letters notifying Baltimore City and the Maryland Department of the Environment of their intent to bring a lawsuit to address the chronic violations of these plants if economically effective, sustainable solutions are not achieved. The

action was taken in order to protect the rights of all residents of Baltimore City under the federal Clean Water Act and to preserve the necessary legal options for ensuring public involvement and oversight in resolving violations.

BWB's monitoring program has prevented the further degradation of a water body that so many have worked so hard to restore. Their data-driven advocacy and litigation efforts demonstrate the power that investing in community science monitoring programs can have on connecting with the public while protecting our water resources.



Role of the Monitoring Program

Two critical components form the foundation for addressing this problem. First, without the rigorous, weekly monitoring performed by staff scientists at Blue Water Baltimore, the extent of the violations would lack verifiable, data-driven evidence, making the case harder to hold up in court. Second, the Clean Water Act's avenues to protect the water rights of all citizens provide multiple opportunities to utilize the data to ensure that valid remediation efforts are deployed to correct the discharges immediately.



About Blue Water Baltimore

Blue Water Baltimore, the home of the Baltimore Harbor Waterkeeper, developed an ambient water quality monitoring program to collect scientifically-rigorous and legally-defensible water-quality data using the Mid-Atlantic Tributary Assessment Coalition (MTAC) protocol. The administration and management of the monitoring program are the responsibility of the Baltimore Harbor Waterkeeper and the staff Water Quality Scientist

Blue Water Baltimore's mission is to restore the quality of Baltimore's rivers, streams, and Harbor to foster a healthy environment, a strong economy, and thriving communities. They work to protect and restore Baltimore Harbor and the greater Patapsco River and its tributaries through advocacy, enforcement, restoration, education, and engagement to make our waters suitable for fishing and swimming, improve public health, and improve the health of the river ecosystem.



Nexus to WDC

The team manages data in Water Reporter, a Water Data Collaborative sponsored software service platform that streamlines data collection, management, analysis, and visualization. The system not only promotes the portability of data sets that are machine readable and multi-stakeholder accessible but also analyzes data in real time. Thanks to the reliance on a cloud-based management system the staff scientists are able to collect data from more sites because they can spend less desk time sorting through raw data. Finally, because of the rigorous data management standards upheld by the BWB staff, they can monitor water quality in real time - resulting in faster discovery of violations and, ultimately, responses to address the issue because catastrophic crises arise.



Grant Funding



Distributed Data Management

photo credit: Will Parson, Chesapeake Bay Program

Use Case Summarized by
Erin Hofmann, Project Strategy & Application
The Commons, WDC Steering Committee Member

Stormwater Management and Monitoring Compete with Suburbanization

ARUNDEL RIVERS FEDERATION



Anne Arundel County residents benefit from their proximity to the idyllic Chesapeake Bay. Perhaps living near the Bay is too good to be true? Development has skyrocketed within the county as more people have looked to embrace the maritime lifestyle. Unfortunately, more houses, roads, buildings, and parking lots mean that the natural landscape has been replaced by acres and acres of non-pervious surfaces. Now, Arundel Rivers Federation races to keep pace with real estate developers by installing stormwater management practices such as rain gardens, bioswales, and riparian buffers along streams - all in the hopes of mitigating water quality degradation. To track their impact, share water quality data with local residents, and build a case for legislative action to protect the waters flowing into the Chesapeake Bay, the Federation also performs weekly water quality monitoring May to September and releases an annual scorecard.

Is it safe to swim? Can fish breathe? How dirty is it?

Intense suburbanization in Anne Arundel county has eroded the natural ecosystems' stormwater filtering capacity. Not only does removing forests and meadows with real estate increase runoff but replacing natural habitat with impervious surfaces such as roofs, roads, and parking lots increases the speed stormwater enters waterways and the runoff picks up nasty pollutants during its journey. Arundel Rivers Federation invests heavily in mitigating development through the installation of stormwater best management practices. Simultaneously, they host a community science monitoring program that keeps a beat on water quality and asks, in so many words, is the water "clean"?

Armed with the growing dataset and an easily accessible and interpretable visualization, Arundel Rivers Federation and their partners use the continuous monitoring data set to connect with state legislators on three key pieces of legislation: updating obsolete stormwater management regulations, increasing transparency of environmental enforcement efforts, and curtailing efforts by Homeowner Associations to avoid installing bay-friendly landscaping.

Specifically, Senate Bill 227 will update requirements for erosion and sediment control during construction, and stormwater management after construction, for buildings built after the bill's effective date.

Senate Bill 324 is bipartisan legislation designed to require the Departments of Environment and Natural Resources to publish enforcement efforts online and in annual reports detailing their work to enforce the State's environmental laws.

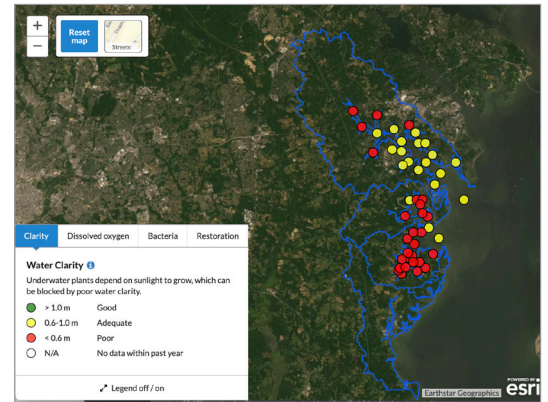
House Bill 322 would prevent a homeowners' association from requiring homeowners to maintain turfgrass, or increases costs for bay-friendly landscaping practices.



Role of the Monitoring Program

The Federation posts the data that they collect from the monitoring program on an interactive online application. The application has three major uses: first, it conveys data to the general public about water quality on a weekly basis with the intent of helping individuals make decisions about whether they can recreate on the water. Second, the application demonstrates trends in water quality over the past six years. Third, the application also indicates the water quality improvement sites around the watershed to demonstrate the relationship between water quality and restoration work.

Along with consolidating missions and resources the organization was able to aggregate their water quality monitoring data because all three organizations had maintained rigorous adherence to the Mid-Atlantic Tributary Assessment Coalition in their monitoring programs.



About Arundel Rivers Federation

Uses a science-driven, community-based approach to improve the water quality of our rivers – and we’re not afraid to get our boots muddy. The South, West, and Rhode Riverkeeper acts as the eyes, ears and voices for our local Rivers. The organization is wholly focused on achieving our vision of clean, healthy, sustaining waterways for our local communities.

Arundel Rivers Federation was created on January 2, 2019 and is the result of the consolidation of South River Federation and West Rhode Riverkeeper, Inc.



Nexus to WDC

Thanks to a robust study design, strong digital data management, and a strategic data analysis application, the Federation’s monitoring program delivers data-driven details to multiple stakeholder groups with interests in regional water quality. With the data structured in a machine readable format, Chesapeake Conservancy was able to create a web application for individuals to visit and access not only the data but observe real-time analysis of the results.



Grant Funding



Distributed Data Management



Network of Networks

Use Case Summarized by
 Emily Wiggins, Sr. GIS Analyst
 Chesapeake Conservancy, WDC Steering Committee Member

Multi-stakeholder Volunteer Water Quality Program Aims to Bring Swimming Back to the Nation's Capital

ANACOSTIA RIVERKEEPER



DC's primary surface waters serve as cultural centers and have been treasured by locals and visitors alike since the establishment of the city. Before many of the city's black residents could even legally enter a public pool, they were swimming along the banks of the Anacostia and Potomac Rivers. Despite this past history of recreation, and their classification as Class A waters by the federal government, swimming is banned throughout all District surface waters. This oxymoronic policy stance not only hurts local perception of the rivers, but devalues these waters and the communities who live, work, and play along their banks. Thankfully, due to collaboration between DC government and local NGOs, a nation's capital with swimmable urban waters is only a few years away.

Will DC Government ever feel that residents can safely swim in their waterways?

The District of Columbia sits in the cradle of three primary waterbodies: the Potomac River, Anacostia River, and Rock Creek. Despite all three of these surface waters being classified as Class A waters by the EPA, qualifying them safe for primary recreation, swimming has been illegal in District waters since the 1970s. High volumes of stormwater and combined sewage overflows serve as primary vectors for high bacteria loads in city waters, creating variable recreation conditions for DC's residents and visitors; however, due to recent investments in capital infrastructure and a heightened awareness of the city's natural resources, water quality in DC's surface waters has been improving.

Successful small scale water quality programs carried out by Anacostia Riverkeeper and other local NGOs demonstrated to District government that volunteer lead water quality programs not only promote community buy-in but also improve data transparency by making water quality data publicly available. In 2018 the District Department of Energy and Environment (DOEE) awarded a grant to Anacostia Riverkeeper to build a multi-stakeholder community-based water quality monitoring program; a program that has continued for three years into 2021.

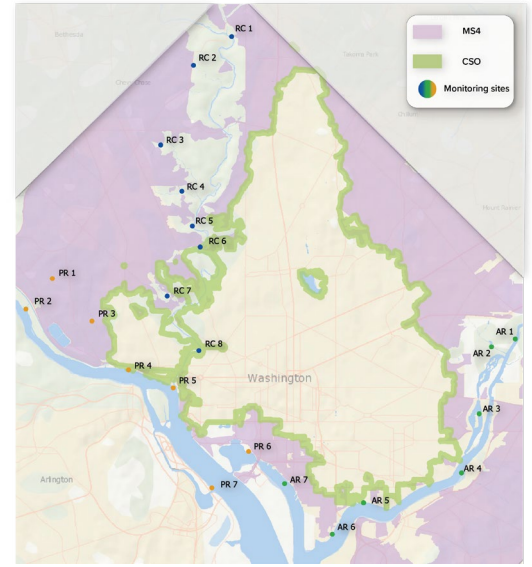
To date, the program has trained over 150 volunteers and collected over 1,500 samples across the nation's capital. Through the establishment of baseline recreational data this program continues to push the District government towards one day lifting the swim ban, with 2021 marking the most significant progress towards that goal through the passing of an emergency ruling making it easier to hold permitted swim events in the Potomac and Anacostia Rivers.



photo credit: Bob Fabia, Anacostia Riverkeeper Volunteer

Role of the Monitoring Program

This monitoring program establishes baseline recreational water quality readings in tandem with recent capital infrastructure projects to document where DC surface waters are improving and where poor water quality may persist. Having a volunteer-based monitoring program not only helps to build a cadre of dedicated river stewards, but also serves to educate the larger regional population through publicly available, well structured water data shared by trusted watershed partners, city government, and their own neighbors and friends. Through the elimination of a vertical, bottom up flow of data, this program follows WDC's goal of a collaborative horizontal infrastructure where municipalities, NGOs, and community members are all working together to collect the data and inform meaningful policy decisions about their local waters and streams.



About Anacostia Riverkeeper

The mission of Anacostia Riverkeeper is to protect and restore the Anacostia River for all who live, work, and play in the watershed; and to advocate for a clean, healthy river for all its communities. Anacostia Riverkeeper works in collaboration with local stakeholders, legal counsel, federal and local government officials, foundations, and community members to ensure well-written environmental laws, enforcement of the existing laws, public awareness of environmental and health issues, and the cleanup and prevention of pollution of the river and its tributaries. One main goal directs our work, to work toward a healthy, swimmable, fishable accessible Anacostia River in order to enhance the community life of DC and MD residents.



Nexus to WDC

Anacostia Riverkeeper's water quality program was one of the first of its kind in the District of Columbia, leveraging watershed partners, volunteers, and data sharing platforms to sample and share recreational water quality data across DC surface waters. The relationship between Anacostia Riverkeeper, the DC government, their partners, and the public at large is a prime example of the relationship building and collective action that the Water Data Collaborative seeks to spark. Furthermore, through organized resource building fostered by the WDC, programs like this can broaden their impact and serve as key examples for other NGOs and watershed groups who are looking to engage in similar monitoring initiatives.



Grant Funding



Distributed Data Management



Network of Networks

Use Case Summarized by

Robbie O'Donnell, Water Data Collaborative Coordinator
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WATER DATA COLLABORATIVE