
Annual Report
2018
Alliance for Aquatic Resource Monitoring
ALLARM
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Our mission

The Alliance for Aquatic Resource Monitoring (ALLARM) is a community-based science organization housed at Dickinson College in Carlisle, PA.

ALLARM educates communities to use science as a tool to investigate the health of their streams and to use the data they generate for aquatic protection and

Cover: Volunteers in Otsego County, New York collect macroinvertebrates to assess stream health

This page: The LeTort Spring Run in Carlisle, Pennsylvania

Dickinson

Letter from the director

2018 was a year of reflection, connection, and innovation. Not to mention, it was also a year of immense precipitation, highlighting water quality challenges associated with non-point source runoff. Time and time again, we are amazed by the dedication of volunteers and community partners to water quality monitoring.

This past year, ALLARM went through a strategic planning process and reflected on our monitoring technical assistance programs to identify what we are doing well and what needs to be updated and changed. As a result of this, we launched a new approach to connecting with our Shale Gas monitors and developed a new monitoring program, Stream Team, to help target monitoring in priority Susquehanna River tributaries.

We cannot do any of our work at ALLARM without amazing community partners, volunteers, funders, and student and full-time staff. Thank you for being a part of our monitoring family. We are excited to see what 2019 has in store.

Happy monitoring!

Julie Vastine, Director

Volunteer monitoring and technical assistance

Watershed Coordinator Hayat Rasul '19 trains a new Stream Team monitor to test nitrate-nitrogen.

We supported 26 organizations across PA and NY.

We supported community partners and volunteers investigating water quality questions.

We ensured the quality of volunteer data.

ALLARM's lab team verified that volunteers are collecting credible data of known quality. ALLARM's Quality Control Program analyzed 258 water samples from 195 volunteers, using 17 different testing methods for a total of 2,106 tests run.

We led 14 water quality monitoring workshops that reached more than 220 community members.

These included 1 macroinvertebrate, 4 shale gas, and 3 chemical monitoring workshops. The macroinvertebrate workshop was with our first Chesapeake Monitoring Cooperative (CMC) partner in New York, Otsego County Conservation Association. Two of the workshops were pilot Stream Team trainings in York County PA.

We worked with 3 volunteer groups to help them interpret their data.

We met with two of the watershed associations (Conodoguinet Creek Watershed Association and Big Spring Watershed Association) that have been involved in the Conodoguinet Creek Watershed Snapshot. During these meetings, we reviewed the data that volunteers collected and worked with participants to find the stories in their data. We also published a report that summarized the findings from the first year of the Snapshot.

Carlisle and campus engagement

Watershed Coordinator Meredith Jones '20 (left) helps students in Professor Tynan's First Year Seminar collect water quality data

We presented in 5 Dickinson College classes and at 2 alumni events.

We presented in a range of classes, from political science to environmental studies, and shared our work with alumni interested in water quality issues during Alumni Weekend and the "Water Policy at Local, National, and International Scales" discussion. We reached more than 100 people through these events.

We engaged volunteers in the Carlisle community.

In collaboration with multiple community partners, we worked with more than 30 volunteers to assess the health of our local watershed through the Conodoguinet Creek Watershed Snapshot. Volunteers collected data throughout the watershed and brought samples to ALLARM's lab, where they analyzed three water quality parameters using our equipment. Due to its popularity, we extended the Snapshot program for another year.

We spread awareness of stormwater and local water quality issues.

ALLARM continues to collaborate with the Borough of Carlisle to achieve aspects of their MS4 stormwater permit. In collaboration with our Stormwater Steering Committee, ALLARM hosted several educational events promoting healthy lawn habits and our Adopt a Storm Drain campaign.

ALLARM student experiences

Watershed Coordinators Rachel Krewson '20 (left) and Shante Toledo '21 measure the pH of the Yellow Breeches Creek

Our students continued to build communication and collaboration skills through a number of events that helped them connect their work at ALLARM to the greater community.

"As a result of my ALLARM experience, I see community work differently. I now know how much work goes into preparing for each and every community event, and am thrilled to be part of an organization that is passionate about environmental issues." - Rachel Krewson '20

"Any interactions with volunteer monitors connect me to ALLARM's mission, because their energy and generosity are integral to it. The Snapshot, our calls with shale gas volunteers, and the Stream Team workshop [...] all fulfilled that." - Nick Long '19

"Facilitating the Stormwater Steering Committee, working on my factsheet and helping with workshops have connected me with ALLARM's mission of providing an experience for students to learn fundamental environmental, community engagement, science education, and nonprofit skills." - Shante Toledo '21

"Community volunteers are long-term monitors! It is great to see familiar faces at Snapshots and hear news about volunteers who have worked with us for years." - Xinyi Wu '19

Opportunities and updates

Watershed Coordinator Nick Long '19 trains community members how to monitor for potential shale gas impacts.

We started a new shale gas outreach program.

We stay in contact with our shale gas volunteers, who typically live 3-5 hours away from the ALLARM office, through bimonthly conference calls, monthly e-newsletters, and in-person follow-up meetings 1-2 times a year. In order to make sure that we are meeting volunteers' needs and maintaining relationships, we decided to create a new outreach program that entails individually calling volunteers to see what they need from ALLARM and if we can help answer their questions. Two student Watershed Coordinators helped implement this new program and were able to reconnect with volunteers that they trained at workshops this year.

We created our new Stream Team Program.

ALLARM developed a new Stream Team monitoring protocol to focus on water quality issues that are relevant to the Chesapeake Bay watershed. We are collaborating with Lower Susquehanna Riverkeeper Association (LSRA) and Middle Susquehanna Riverkeeper Association (MSRA) to engage community members and organize workshops. Our pilot workshops were with professors and students from York College of Pennsylvania, York County Master Watershed Stewards, and other interested community members. We are excited to continue launching Stream Team throughout the Susquehanna River tributaries in 2019!

Opportunities and updates

Waterkeepers identify macroinvertebrates at the Waterkeeper Alliance conference

We had another successful year as the PA and NY partner of the Chesapeake Monitoring Cooperative.

2018 marked another exciting year for the Chesapeake Monitoring Cooperative (CMC). ALLARM is the upper watershed partner. In addition to launching a new regional database, the Chesapeake Data Explorer, CMC was successful in facilitating the Memorandum of Understanding (MOU) that requires the use of volunteer data to evaluate Bay outcomes. This marks the first time a multi-state MOU has been passed that focuses on the use of community-collected data. We are excited to continue integrating data in 2019.

We collaborated with Waterkeeper Alliance.

Waterkeeper Alliance contracted ALLARM to help Waterkeepers from around the world learn how to develop monitoring study designs. ALLARM conducted two webinars, and was invited to their conference over the summer to lead a study design workshop for Waterkeepers from Latin America. ALLARM students not only translated study design materials into Spanish but also presented and facilitated hands-on activities in Spanish during the conference workshop.

We deepened our connection to the North American community science field.

We strive to be a national model for citizen science collaborations. This year ALLARM's director was elected to the Citizen Science Association (CSA) board, was an advisor to NOAA Sea Grant as they developed a 10-year citizen science vision/strategic plan, advised Alberta's Parks and Environment on their initiative to integrate community-collected data into agency goals, and was an invited participant to the National Science Foundation's (NSF) Informal STEM Learning in Rural Places conference.

Contributions to the field

Watershed Coordinator Angelo Tarzona '21 helps Chesapeake Watershed Forum attendees identify macroinvertebrates

We facilitated and led national webinars.

We led 1 National Water Quality Monitoring Conference webinar, "Volunteer Monitoring: Building Credibility" and moderated four additional webinars ranging in topics from bacteria to volunteer lake monitoring.

We attended 4 conferences and presented 5 times.

We attended the North Central Watershed Workshop to present about volunteer recruitment and retention. We hosted and presented about the Conodoguinet Creek Watershed Snapshot at the South Central Watershed Workshop. At the Waterkeeper Alliance conference, we shared information about the study design process (in English and Spanish) and helped Waterkeepers identify macroinvertebrates. At the Chesapeake Watershed Forum, we led a water quality monitoring 101 workshop and presented about cultivating a healthy and productive team.

Our publications reached a wide audience.

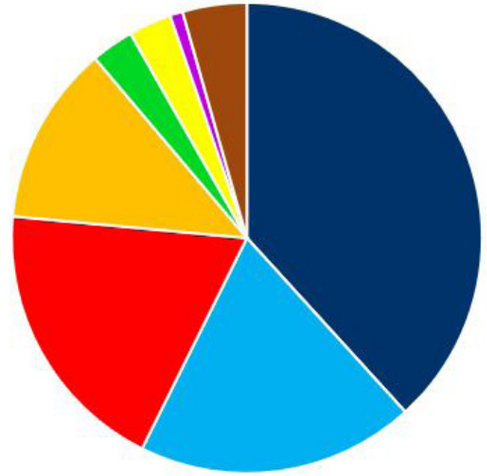
Our founder and science adviser is one of the authors of "Engaging Over Data on Fracking and Water Quality," published in *Science.* Our Community Science Specialist created a report summarizing the first year of the Conodoguinet Creek Snapshot's results. We completed our yearly student newsletter, *Stream of Consciousness*, where students showcase their research related to ALLARM and discuss topics relevant to our field. Plus, our publications on Dickinson Scholar were downloaded 2,221 times, were used by 389 institutions, and were viewed in 85 countries.

A look ahead

As we enter our 33rd year supporting community-based research, we look towards new projects and continued partnerships. We look forward to new opportunities for communities in PA and NY to engage in water quality monitoring. Thank you to all of our volunteers for bringing your questions, passion, and interests to our work. Thank you also to our partner organizations for your resources, expertise, and support!

Funding Sources

$130K	Dickinson College
$65K	Consortium for Scientific Assistance to Watersheds
$65K	Chesapeake Monitoring Cooperative
$42K	Individual Contributions
$15k	National Science Foundation
$10K	Foundation for Pennsylvania Watersheds
$10K	General Contracts
$3K	Mountain Watershed Association



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ALLARM also appreciates support from the Charles Merrill Kurtz Fund, established in memory of Charles M. Kurtz, class of 1907.

ALLARM's year by the numbers

1	Self study completed
1	Database developed
7	States visited (CA, NC, VA, MD, WV, ID, NY) and 1 Canadian province
12	Follow-up meetings with volunteer groups
22	Community events/workshops
26	Groups supported in Pennsylvania and New York
100	Dickinson students reached through classes
300	Volunteers reached
357	Water samples analyzed
497	Carlisle area K-12 students reached
3,723	Total water sample tests
5,533	Shale gas observations uploaded to ALLARMwater.org

The LeTort Falls, just upstream of the confluence with the Conodoguinet Creek.