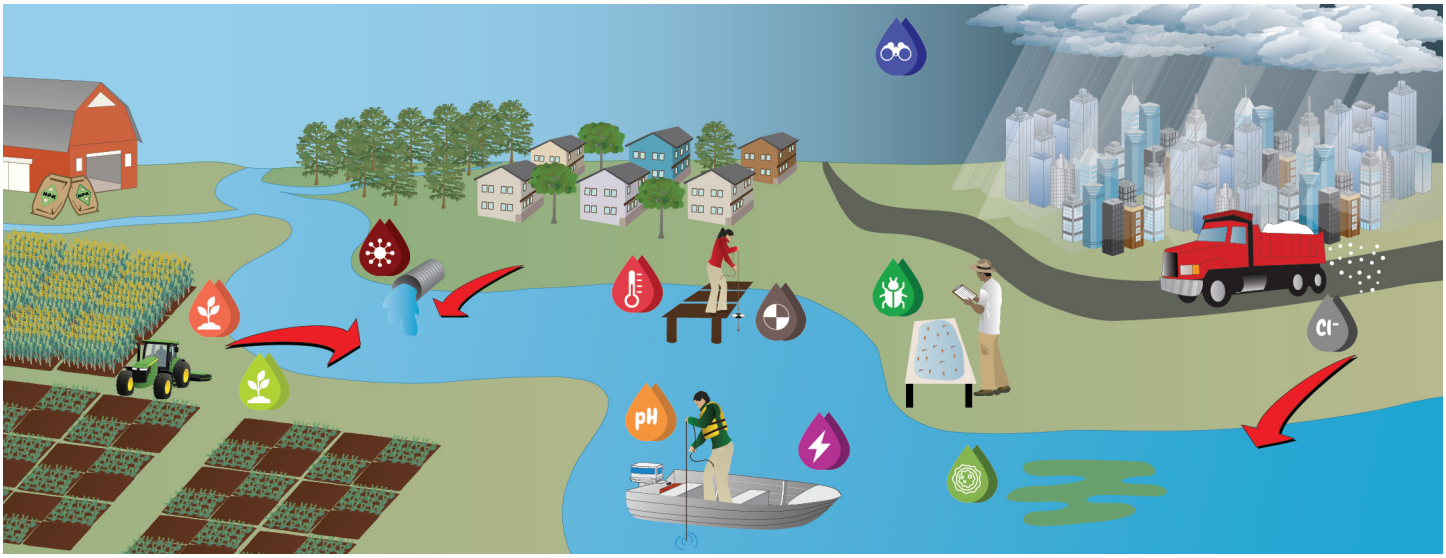
Maryland Water Monitoring Council

DATA TO DECISIONS WORKSHOP

On October 8, 2025, the Maryland Water Monitoring Council Community Science Committee hosted the Data to Decisions: Why Your Data Matter workshop at the UMBC Technology Center in Halethorpe, Maryland, marking the first workshop of its kind held by the committee since 2016. The workshop convened community science monitoring groups alongside state, federal, and nonprofit partners to explore how community-collected data are used in decision-making processes across Maryland and the Chesapeake Bay watershed. Through facilitated discussion and shared examples, participants examined common barriers to data use, including capacity, funding, volunteer support, and navigating data quality expectations, while highlighting successful pathways where community science data inform regulatory reporting, restoration planning, trend analysis, and public communication. The workshop emphasized the importance of data transparency, standardization, metadata, and collaboration, with a particular focus on connecting community monitoring efforts to broader management and policy decisions.

Volunteers are monitoring a variety of parameters across Maryland



Bacteria · Temperature · Phosphorus · pH · Nitrogen · Chlorophyll

Benthic Macroinvertebrates · Site Conditions · Conductivity · Salinity · Turbidity

Monitoring data contribute to management actions

Volunteer water monitoring data can be used in many ways, from community engagement and education to regulatory decision-making and enforcement. In Maryland, volunteer monitoring data has played a meaningful role across several of these categories, like the listing or delisting of waters on the state's Integrated Report. Additionally, these data have been vital to identifying waters that require follow-up monitoring by the Maryland Department of the Environment (MDE) and have served as an early warning system by notifying agencies of possible pollution events. More broadly, volunteer monitoring efforts have contributed to assessments of the general condition of surface waters across Maryland, demonstrating the significant value that community-based monitoring programs bring to the state's water quality management efforts.

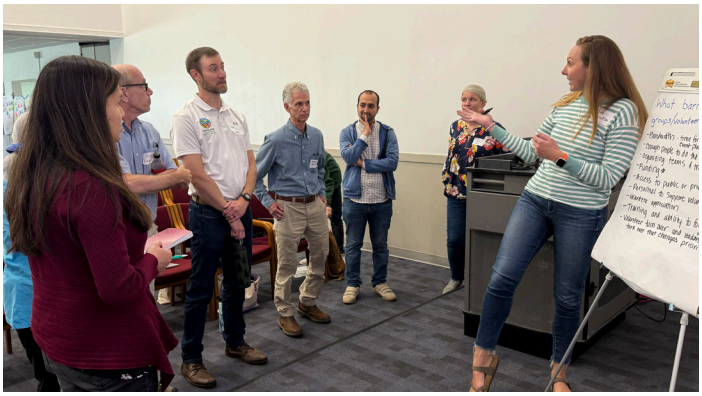
SEEKING TO IMPROVE WATER MONITORING

Monitoring programs need consistency and support

Participants envisioned a “dream” monitoring program that combines strong stewardship values with modern efficiency and broad community engagement. At its core, the vision centers on clean water, education, and fostering environmental responsibility through a larger and younger volunteer base supported by sustainable funding, trained staff, and reliable resources, like equipment and access. Attendees emphasized the importance of standardized protocols to strengthen consistency and credibility, alongside innovations such as automated Quality Assurance/Quality Control (QA/QC) processes, improved data management systems, faster data turnaround, and real-time results.

These elements reflect a shared aspiration for well-resourced, technologically equipped monitoring programs that empower volunteers and deliver timely, trusted data to support meaningful environmental action.

Participants brainstormed potential components of an ideal monitoring program.



Participants identified monitoring barriers.

Despite barriers, groups see pathways forward

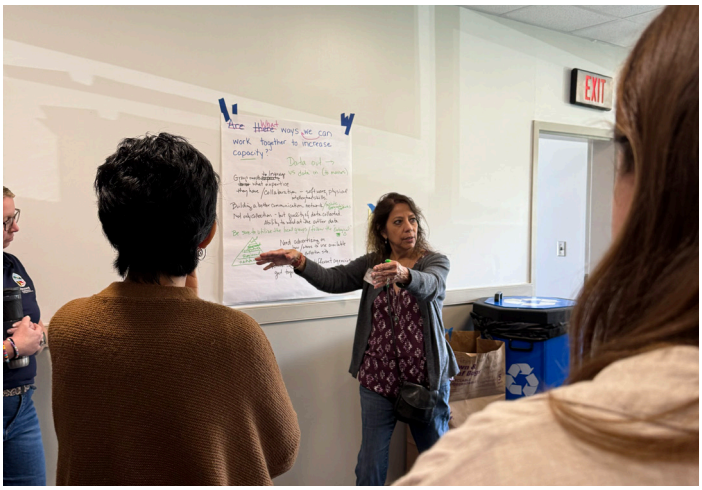
Volunteer water monitoring programs across Maryland identified several challenges that limit their ability to sustain and grow their impact. Many organizations operate with constraints in staffing, time, and funding while balancing sampling, volunteer engagement, and program coordination. Additional barriers include access to public and private monitoring sites, volunteer and leadership turnover, shifting organizational priorities, and maintaining engagement when environmental conditions do not visibly change.

Training and capacity building, particularly for technical skills such as benthic macroinvertebrate identification, remain ongoing needs, along with stronger institutional support and improved infrastructure for equipment storage and data management. Participants also highlighted pathways forward, including leadership development, stable funding opportunities such as those provided by the Chesapeake Bay Trust, stronger partnerships with peer organizations and land trusts, dedicated staff to support volunteers, improved volunteer recognition and retention efforts, and greater transparency around data standards. Together, these strategies can help strengthen coordination, sustain volunteer engagement, and support the long-term impact of Maryland’s community water monitoring programs.

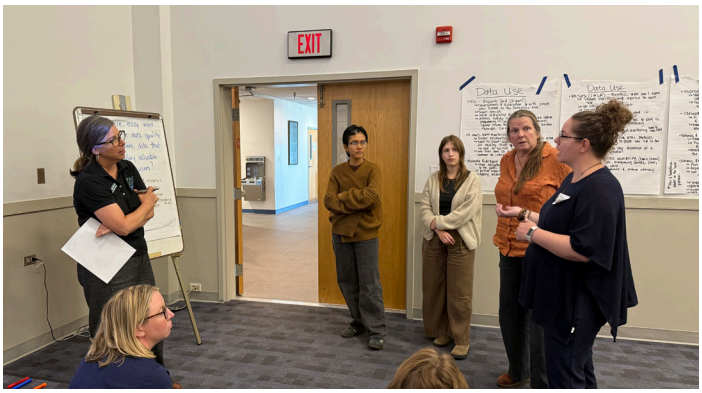
Partnerships are key to increasing capacity

Participants emphasized that increasing capacity across volunteer monitoring groups in the Chesapeake Bay watershed begins with a shared purpose and stronger collaboration. Discussions highlighted the need to move beyond simply collecting data ("data in") toward making data more accessible and useful ("data out") for partners and the public. Attendees noted opportunities to leverage expertise across organizations, strengthen communication networks, and align expectations around QA/QC standards, thresholds, and reporting formats. Improving metadata, using standardized operating procedures (SOPs), and connecting data portals were identified as practical steps to make datasets easier to integrate across agencies and organizations. Other tools such as unique dataset identifiers could help address duplicate data management issues.

Participants also stressed the importance of incorporating local ecological knowledge and communicating results in ways that resonate with the public, particularly by connecting monitoring outcomes to drinking water safety, human health, and pet health. These efforts could increase collaboration, improve data usability, and expand the impact of community-collected monitoring data.



Participants considered ways to increase capacity.



Participants discussed ways to improve data quality.

Incremental changes can improve data quality and use

Participants discussed both the opportunities and challenges associated with elevating community science data for broader use. While distinctions exist between data quality and intended use, requirements often vary by parameter, financial constraints, QA/QC costs, staffing, and equipment. Rather than viewing data quality advances as an all-or-nothing step, incremental improvements could be made through stronger SOPs, documentation, and Quality Assurance Project Plans (QAPPs).

Other strategies included selecting appropriate methods and equipment, comparing results with nearby United States Geological Survey (USGS) monitoring stations, partnering with universities or interns to assist with QA/QC, and learning from analyses of data issues. Participants also highlighted the importance of accessible training, volunteer auditing, thorough metadata and calibration records, and standardized reporting formats with quality flags. A combination of these approaches can build confidence in community science data while keeping monitoring programs practical and sustainable for volunteers.

NEXT STEPS FOR DATA USE

Increased resources can provide multiple benefits

As we look ahead to the future of monitoring in Maryland there are many opportunities for growth but also many challenges to overcome. Community scientists and non-traditional monitoring programs provide numerous benefits including important data and engagement with local communities. However, capacity issues remain an area where improvement could be seen in the future. The key focus areas are to:

- Improve communication of monitoring results to the public and decision-makers,
- Make the connection between water quality monitoring data and issues humans care about like drinking water, swimmability, human health, and economic issues,

Monitoring water quality benefits people. Photo credit: Patapsco Heritage Greenway.

- Incentivize people on the ground working in monitoring to continue and grow the programs,
- Support standardization of data to reduce duplication and multiple databases between community groups, local, state, and federal agencies,
- Increase data quality incrementally by establishing SOPs, QAPPs, and metadata step-by-step in a manageable way.

Overall, a plan needs to be developed to work on these issues and prioritize and allocate resources accordingly.

Thank you to all the participants!

Thank you to all of the participants who attended in person: Karen Andersen, Troy Bernier, Robert Bokulic, Dylan Burgevin, Jeffery Campbell, Jason Chase, Liz Chudoba, Ben Daniels, Brad Deardorff, Amanda DeLeo, Adriana Deluca, Maggie Dombroski, Christine Dunathan, Bruce Fall, Grace Filson, Alexandra Fries, Sophia Geary, Becky Golden, Paul Goldenberg, Kaylyn Gootman, Andrew Grosko, Thomas Guay, Katherine Hanna, Phil Herndon, Sarah Holter, George Kaplan, Amr Keshta, Najma Khokhar, Matthew Kierce, Lolita Kiorpes, Ha Mang, Phillip Mariscal, Sabine Miller, Maureen Mitchell, Becky Monahan, Alan Pflugrad, Brock Reggi, Janet Reimer, William H. Roberts Jr., Rupert Rossetti, Alexi Sanchez de Boado, Kaitlin Scowen, Jillian Seagraves, Mark Southerland, Mellisa Stefun, Mark Stewart, Matt Stover, Rachel Terracina, Gregg Trilling, Angel Valdez, Anna Van Dongen, Jay White, Lisa Wu, and Natalie Yee. We also appreciate participants who joined us online.

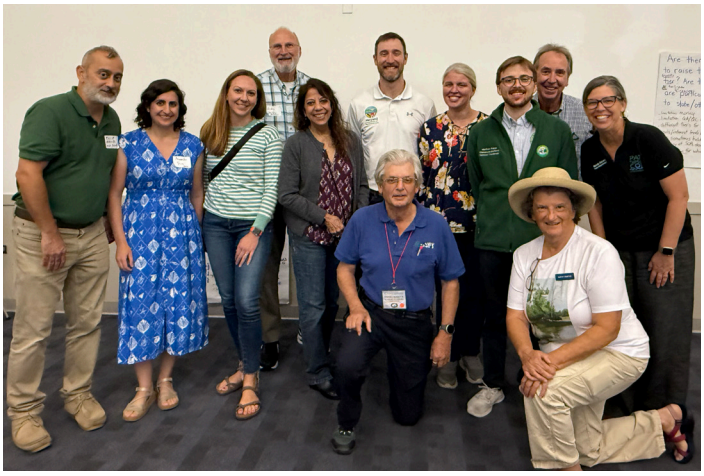


Photo of workshop facilitators.

All photos courtesy of the Chesapeake Monitoring Cooperative unless otherwise indicated. Symbols courtesy of the University of Maryland Center for Environmental Science Integration and Application Network and the Izaak Walton League of America.

MWMC maryland water monitoring council

Chesapeake Monitoring Cooperative