

Participatory Science Data Management Case Studies

Chesapeake Monitoring Cooperative



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Improving Data Management for Participatory Science

CMC successfully integrates data across government and non-government organizations, including Participatory Science Groups, using a Tiered Quality Framework that allows participation by groups at different levels and helps inform the data's use.

Project Overview & Goals

The Chesapeake Monitoring Cooperative (CMC), funded by a grant from the EPA Chesapeake Bay Program (CBP) in 2015, participatory science initiatives across groups and regions to amplify voices and enhance understanding of the health of the Chesapeake Bay and its watershed. Monitoring groups collect chemical and benthic macroinvertebrate data, all of which are classified by the CMC Tiered Quality Framework to ensure consistent data quality across the region. CMC provides technical, programmatic, and outreach support to integrate participatory science monitoring data into a centralized data hub, the Chesapeake Data Explorer. Green Fin Studios and the Chesapeake Bay National Estuarine Research Reserve in Virginia at the Virginia Institute of Marine Science (CBNERR/VA-VIMS) developed the infrastructure for the Data Explorer continues to maintain and update the platform. The data are publicly available via the Data Explorer and are used by the Chesapeake Bay Program, state governments within the watershed (Delaware, District of Columbia, Maryland, New York, Pennsylvania, Virginia and West Virginia) and others to assess the health of the Bay and to make decisions regarding policy and remediation efforts.

Role of Project Participants

The CMC engages monitoring groups rather than individual project participants and

focuses on data sources and data aggregation. CMC's core partners (the Alliance for the Chesapeake Bay, the Izaak Walton League of America, Dickinson College's Alliance for Aquatic Resource Monitoring (ALLARM), the University of Maryland Center for Environmental Science, and the Chesapeake Bay National Estuarine Research Reserve in Virginia) act as service providers, organizing the monitoring groups in their areas, providing technical support and training, and performing QA. The monitoring groups focus on data collection. The responsibilities of the monitoring groups vary from group to group and state to state within the watershed depending on the group's needs.

Data Management

Central to CMC's data management is the CMC Data Explorer, a portal for all the data collected through the CMC and a suite of tools to search and visualize the data. Monitoring groups use the submission component of the Data Explorer to upload, manage, and share their water quality and benthic data. The groups can also view their data alongside data collected by other groups. All data are identified by source, collection method, and quality assurance tier level using the CMC Tiered Framework.

Issue:
Water Quality

Location:
Chesapeake Bay Watershed

Tools:
Varies

Contact:
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Data can be entered via group-specific templates or by bulk upload, which uses an Excel macro to create a vertical CSV template. When the data have been entered for the collection period, a coordinator (either at the CMC or a service provider) performs the final QA and publishes the data, which releases it to the Data Explorer for public and state use.

CMC does not provide or limit the equipment to be used. However, the equipment must meet the specifications for each parameter the group monitors as required by the group's QAPP and SOP. CMC took this approach to encourage participation by groups that had been collecting relevant water quality data for many years prior to the beginning of CMC. However, CMC encourages the use of a more limited list of equipment when new groups come on board.

Data Use

Data are publicly available and used by the CBP, state governments and other organizations to assess the health of the Chesapeake Bay and watershed and to make decisions regarding policy and remediation/restoration efforts. The data providers (individual monitoring groups or aggregators) own the data. Users agree to acknowledge the data owner in any downstream use or publication as part of the terms and conditions of use. Requirements for data citation and an example citation are provided on the Data Explorer.

Issues and Lessons Learned

In the beginning of the program, the biggest non-technical issue was engaging the existing monitoring groups and explaining

the goals of the CMC and the value that a network like the CMC can bring to individual monitoring programs. CMC was able to mitigate this issue by using the Tiered Framework which allowed groups to participate from where they are without making drastic changes that could affect long-term datasets. A major technical issue that has arisen during the on-boarding phase is providing technical support for the variety of equipment inherited from older monitoring projects. CMC encourages the use of standard equipment with new groups or when equipment needs to be replaced, but doesn't require standardized equipment in order to meet the needs and resources available to individual groups. The development of the Data Explorer was essential to building momentum among the groups. The Data Explorer provides groups with a pre-made data management system that automatically connects their data to key partners and allows groups to see their data alongside data from other users opening the door for broader connections.

Outcomes and Success Factors

A major success factor has been the development of the CMC Tiered Framework, which allows data from the various groups to be integrated and users to better understand data quality and appropriate uses. The Data Explorer provides an extensive toolkit for community groups to collect, validate, store, share and analyze data. A major CMC accomplishment is the use of CMC data for a CBP assessment in 2020. Since then, other areas of the CBP are beginning to show interest in using CMC data.

Opportunities

- Support and encourage standardization and data use across jurisdictional boundaries.
- A tiered framework might be a way to make a difference nationally but there are challenges in creating such a structure because the data needed for reporting differs by state and the way the data is used can vary widely between jurisdictions.
- Helping to create processes to help the states better use the data.
- Frameworks to help integrate the participatory science-based data with other datasets. Spaces for states to learn from one another.