CMC
Chesapeake Monitoring Cooperative

Chesapeake Monitoring Cooperative

Diversity, Equity, Inclusion, & Justice

2024

Chesapeake Bay Program
Science. Restoration. Partnership.

ALLIANCE
for the Chesapeake Bay

THE IZAAK WALTON LEAGUE OF AMERICA

Alliance for Aquatic Resource Monitoring
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VIMS | WILLIAM & MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE

Dickinson

University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

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Introduction

Promoting Equity in Water Monitoring: Enhancing Community Science in the Chesapeake Bay Watershed

Volunteer water monitoring is a vital activity that, unfortunately, comes with inherent privileges that not all individuals can access. Recognizing the complexities and systemic barriers involved, the Chesapeake Monitoring Cooperative (CMC) has embarked on a focused initiative to democratize access to environmental science and enhance community advocacy through effective use of monitoring data.

The CMC is dedicated to increasing the engagement of underrepresented communities in environmental science. By providing resources, training, and expertise, we aim to empower these communities to participate actively in monitoring their local waterways. Our efforts go beyond logistical support; we are committed to tackling the systemic barriers that have limited participation in community science on a watershed scale. This commitment is outlined in our strategic framework, which serves as a blueprint for connecting community needs with actionable monitoring data.

Strategic Objectives and Achievements

- Equitable Access and Scientific Literacy: We strive to ensure that monitoring data is not only accessible but also understandable. Increasing scientific literacy is a cornerstone of our initiative, focusing on making data publicly available and conducting outreach to ensure communities are aware of and can use this data to drive local change.
- Data Utilization for Advocacy and Management: Our framework highlights areas where monitoring data can enhance advocacy efforts, contribute to regional watershed management decisions, and support restoration efforts across the watershed. We have built case studies to showcase the impact of data utilization by communities that did not collect the data themselves.

Process and Progress

- We have engaged with CMC service providers and conducted interviews with monitoring groups to identify and address barriers, tailor solutions, and pinpoint community interests and needs.
- We developed case studies that showcase the successes and tangible outcomes of volunteer water monitoring while also highlighting stories that impact underrepresented communities. These narratives illustrate how DEIJ tenets are connected to the work CMC is conducting.
- We created the Community Connection Chart, a tool designed to guide new organizations and individuals interested in water monitoring. This chart helps users determine which water parameters to monitor, aligning their efforts with specific community concerns in an accessible framework.

Moving Forward

- We have identified projects such as Salt Watch to offer more accessible datasets as starting points for community monitoring.
- We are building relationships with historically underrepresented groups, including collaborations with HBCUs and Virginia Indian Tribes, to pilot and refine our resource offerings.

The CMC reaffirms its commitment to fostering an inclusive environment where every community within the Chesapeake Bay watershed can contribute to and benefit from scientific knowledge.

Barriers to Monitoring

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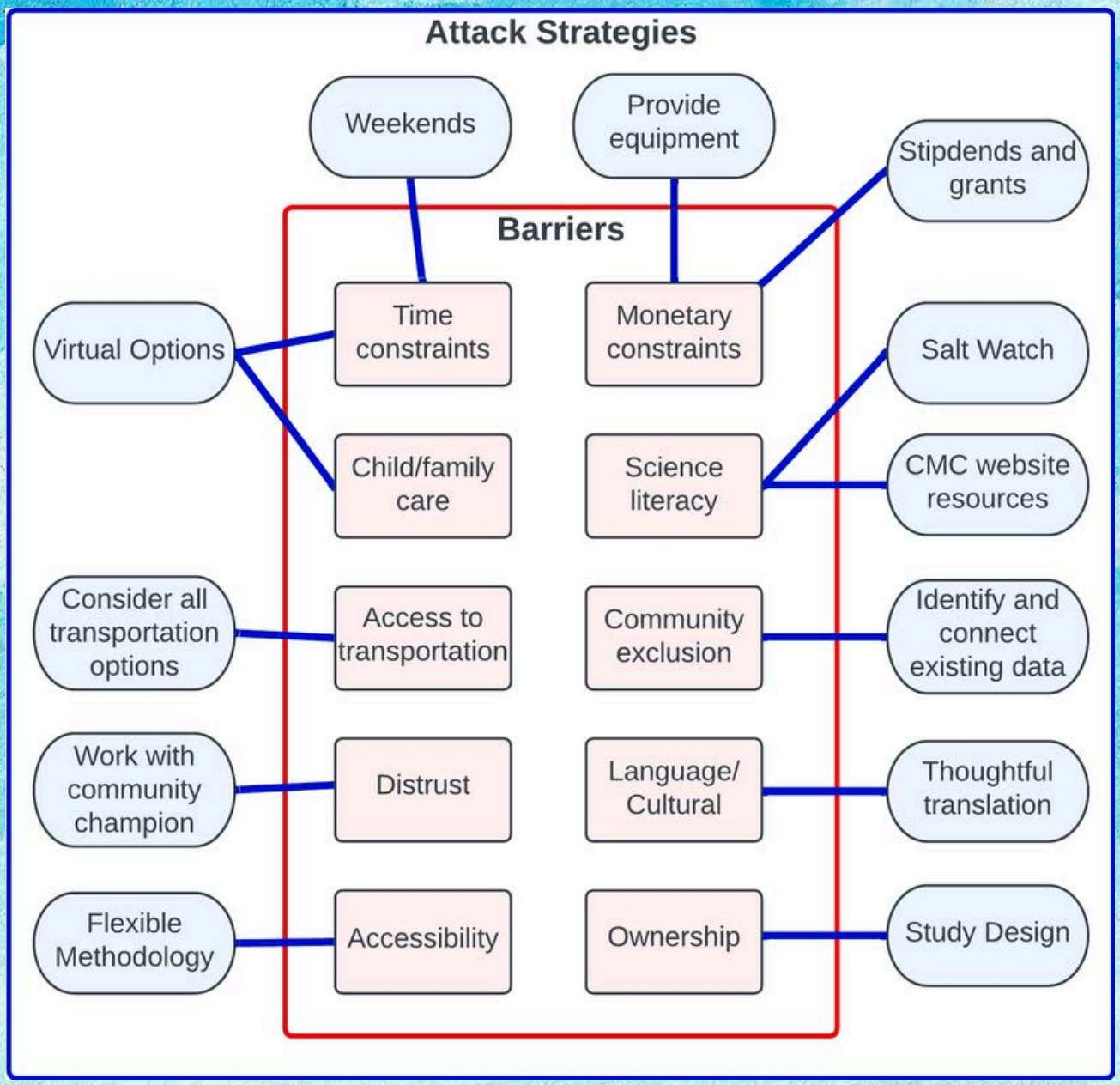
This diagram describes some of the basic barriers to volunteer monitoring and their potential strategies to overcoming them based on our initial engagement. Next steps include enhancing our toolkits and resources based on the strategies identified to break down or overcome these barriers. We will explore additional opportunities to expand community involvement in water quality monitoring and continue to foster relationships with communities eager to start monitoring programs.



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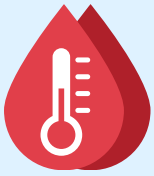
Connecting to Monitoring

Parameter	Explained
Benthic Macroinvertebrates 	These are small animals including: insects, mussels, and snails that live at the bottom of bodies of water, like rivers or streams. These animals have different abilities to deal with pollution allowing us to learn how clean the water is based on which animals are present.
Dissolved Oxygen 	This tells us the amount of oxygen gas mixed or dissolved into the water. Fish and other aquatic animals need this oxygen to breathe. When water has a lot of dissolved oxygen, it's a sign that it can support the animals living in that environment.
pH 	The pH of a stream tells the acidity or alkalinity of the water. It provides a measure of the aquatic life and habitat suitability of a stream. A pH level that is out of normal range for the stream will be harmful to plants and animals living there.
Temperature 	Water temperature tells us how hot or cold the water is. Temperature naturally goes up and down throughout the year but can be measured to understand trends in our climate. Temperature also directly affects dissolved oxygen levels.
Turbidity 	Turbidity tells us how clear or cloudy the water is. When there's a lot of dirt algae, or debris floating in the water, it becomes turbid or cloudy. High turbidity can block sunlight from aquatic plants and is cased by erosion, runoff, and excess algae.

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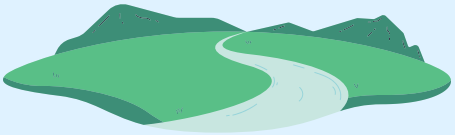
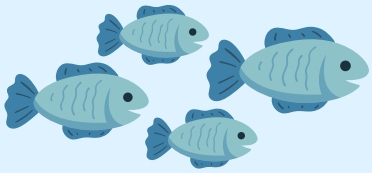
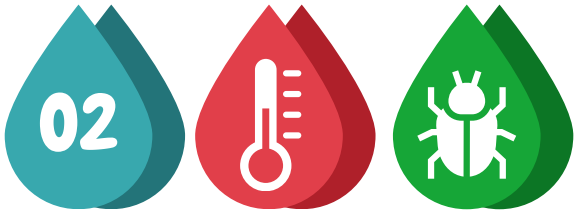
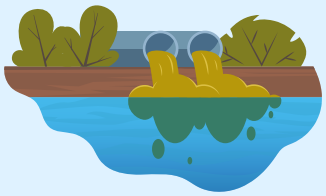
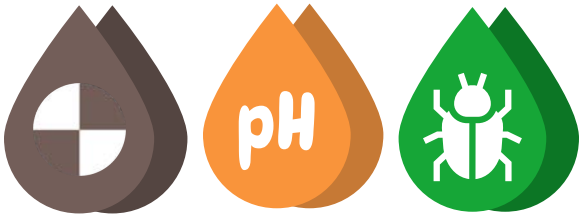
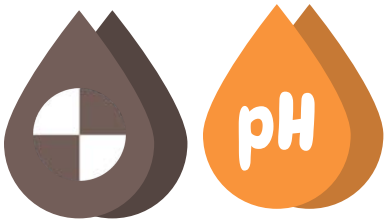
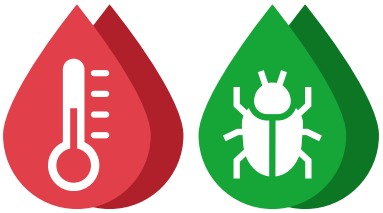
Connecting to Monitoring

Concerned About	Monitor This
Overall Stream Health 	
Fish and Aquatic Life 	
Pollutants 	
Erosion 	
Climate Change 	

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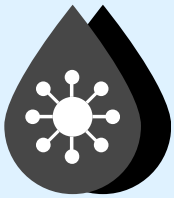
Connecting to Monitoring

Parameter	Explained
Bacteria 	Bacteria and viruses occur naturally in both fresh and saltwater. Most are harmless to humans and animals but some such as enterococci and E. coli, are dangerous to those using the water. High counts of these bacteria can indicate contamination by waste and are important to monitor.
Conductivity 	Conductivity measures water's ability to conduct electricity, influenced by the presence of dissolved inorganic solids like salts or minerals. Conductivity is affected by road salts, runoff, and pollution. Excessively high conductivity can make it hard for certain animals to survive and impact human health.
Nutrients 	Involves measuring the elements nitrogen and phosphorus, essential for plant growth. However, excess levels from sources like runoff can lead to oxygen depletion and harm aquatic life. Furthermore, excess nutrients such as nitrate in our drinking water is linked to human health concerns.
Total Dissolved Solids (TDS) 	TDS represents the total concentration of dissolved substances like salts, minerals, and trace elements. High TDS values can indicate pollution and negatively affect aquatic life and water taste.

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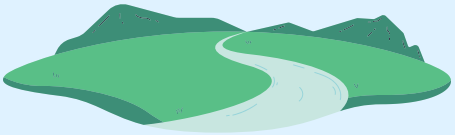
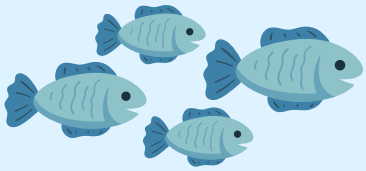
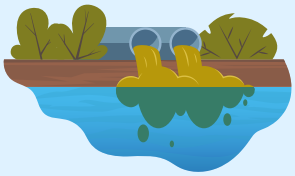
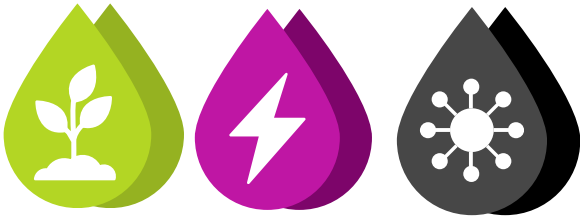
Connecting to Monitoring

Concerned About	Monitor This
Overall Stream Health 	
Fish and Aquatic Life 	
Pollutants 	
Erosion 	
Human Health 	

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Visual Monitoring

Type	Explained
Odor	Monitoring the odor of water helps identify pollution or contamination, such as sewage leaks or industrial discharges. Unusual smells can signal potential health risks and prompt further testing.
Water Color	Changes in water color can indicate the presence of pollutants, algae blooms, or sediment. Clear, colorless water generally suggests good quality, whereas unusual colors like rust or green may suggest contamination.
Stream Flow	Observing the flow of a stream can provide insights into water levels, speed, and the presence of blockages. Rapid changes in flow can indicate heavy rainfalls upstream or potential flooding conditions.
Weather	Weather conditions can significantly affect water quality and availability. For example, heavy rains can lead to runoff pollution, while droughts can concentrate pollutants in water bodies.
Tidal Conditions	Monitoring tidal conditions in coastal areas helps in understanding how tides affect water levels and the potential for flooding or erosion. Tides can also influence the concentration and dispersal of pollutants in the water.
Other Concerns	Monitoring for signs of invasive species, a fish kill, visible pollution, and other unusual sightings helps detect disruptions in our waterways.

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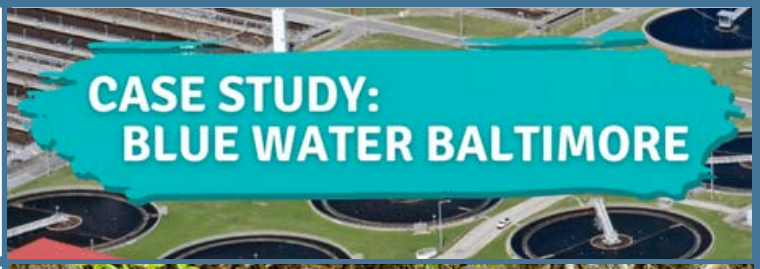
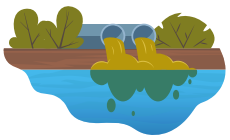
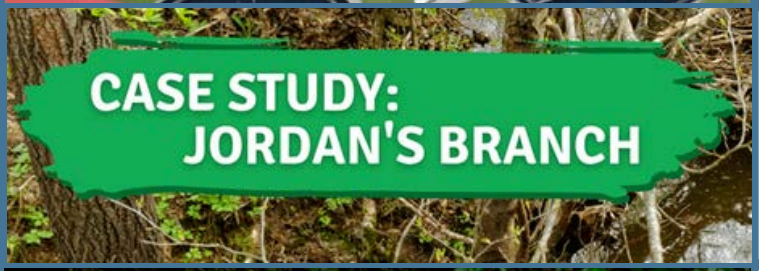
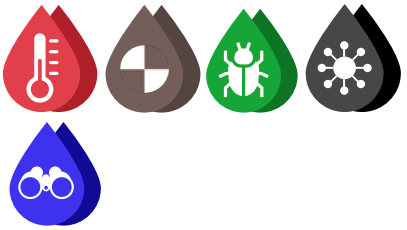
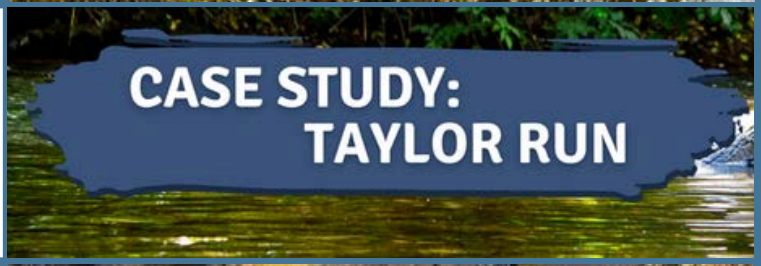
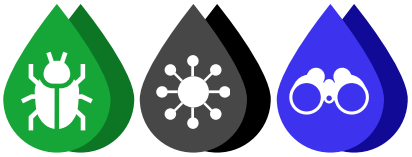
CMC Case Studies

Concern	Case Study	Parameters Monitored
Pollutants 		
Pollutants 		
Overall Stream Health 		
Pollutants 		
Human Health 		
Human Health