CMC
Chesapeake Monitoring Cooperative

LGAC MEETING

December 2, 2022

Photo by Chesapeake Bay Program

DEVELOPMENT TEAM AND SERVICE PROVIDERS

ALLIANCE for the Chesapeake Bay

Chesapeake Bay Program
Science. Restoration. Partnership.

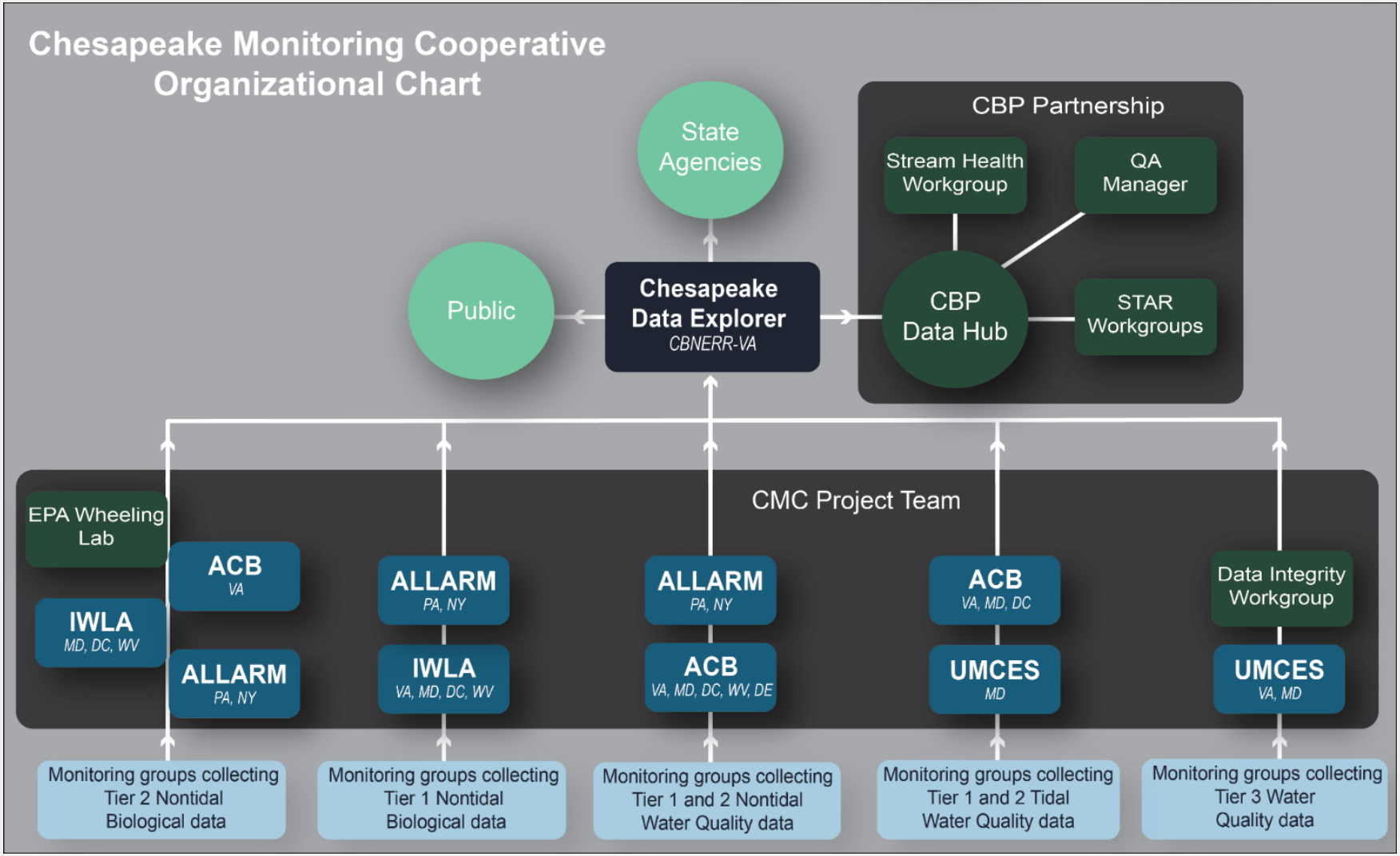
VIMS
Virginia Institute of Marine Science
Chesapeake Bay National Estuarine Research Reserve in Virginia

Izaak Walton League of America
1922 2022
A Century of Conservation Leadership

Alliance for Aquatic Resource Monitoring
ALLARM
est. 1986
Dickinson

University of Maryland
Center for Environmental Science

ORGANIZATIONAL STRUCTURE



CMC OVERVIEW

The evolution of the Chesapeake Monitoring Cooperative (CMC)

2015

The Chesapeake Bay Program (CBP) expanded their monitoring program to improve data density by using non-traditional data sources. The additional data are needed to better assess watershed health.

2016

The CMC team fostered relationships to establish a cohesive Bay-wide monitoring program. Database development began using tiered data classes based on collection method.

2017

The CMC hit its stride in 2017 as we shifted from foundational program development to on-boarding monitoring groups. Water quality and benthic monitoring trainings and data interpretation workshops were held throughout the year. The CMC began integrating data into the Chesapeake Data Explorer, the database developed for the CMC.

2018

In addition to continued efforts to onboard monitoring groups, the CMC team successfully built support within the Chesapeake Bay Program partnership for an unprecedented Memorandum of Understanding (MOU). This MOU marked an important milestone in forging a deeper understanding of, and commitment to, the use of citizen-based monitoring data in monitoring health and tracking restoration progress of the Chesapeake Bay and its watershed.

2019

The CMC continued to build momentum—new monitoring groups were formed in areas of the watershed previously lacking monitoring data and established monitoring groups were integrated into the CMC framework. The Chesapeake Data Explorer continued to grow, reaching 100,000 data points.

The CMC team had a strong presence at both the Citizen Science Association conference and the National Water Monitoring conference. This set the stage for national recognition of our successful model, while gaining new knowledge to bring back to the CMC community.

2020

Due to the COVID-19 pandemic, we had to quickly adjust our volunteer engagement strategies and monitoring support techniques to ensure the safety of all participants. Efforts focused on supporting established monitoring groups by creating virtual training videos and certification programs, and implementing new safety protocols for monitors in the field. The CMC partnered with Booz Allen Hamilton to host Hack the Bay, a hackathon to analyze data in the Chesapeake Data Explorer. By August 2020, there were over 250,000 data points available for use by hackathon teams.

Additionally, the CMC became a successful global case study and worked with organizations in the United Kingdom looking to better incorporate citizen science efforts in assessing waterway health.

Cooperative Agreement signed by partner organizations—the Chesapeake Monitoring Cooperative was formed!

Database contractor selected to begin work on the Chesapeake Data Explorer.

Collaborative stakeholder engagement via a prioritization process developed CMC priorities and building blocks.

Photo: CMC

CMC created umbrella Quality Assurance Project Plans to support existing and new data collection.

Monitoring training and onboarding groups began.

First data entered into the Chesapeake Data Explorer.

First Tier 3 tidal data (from Nanticoke Watershed Alliance) approved by CBP. https://www.chesapeakemonitoringcoop.org/tiered-framework/

Memorandum of Understanding signed in spring.

100,000 data points in the Chesapeake Data Explorer.

Launched Stream Team, a collaborative water quality monitoring program in Pennsylvania, that supports county watershed implementation plans and promotes monitoring where additional data are needed.

Virtual training videos and certification programs developed and implemented.

Booz Allen Hamilton's Hack the Bay—dozens of teams from around the world worked on four challenges using CMC data.

chesapeakemonitoringcoop.org

BUILDING PARTNERSHIPS

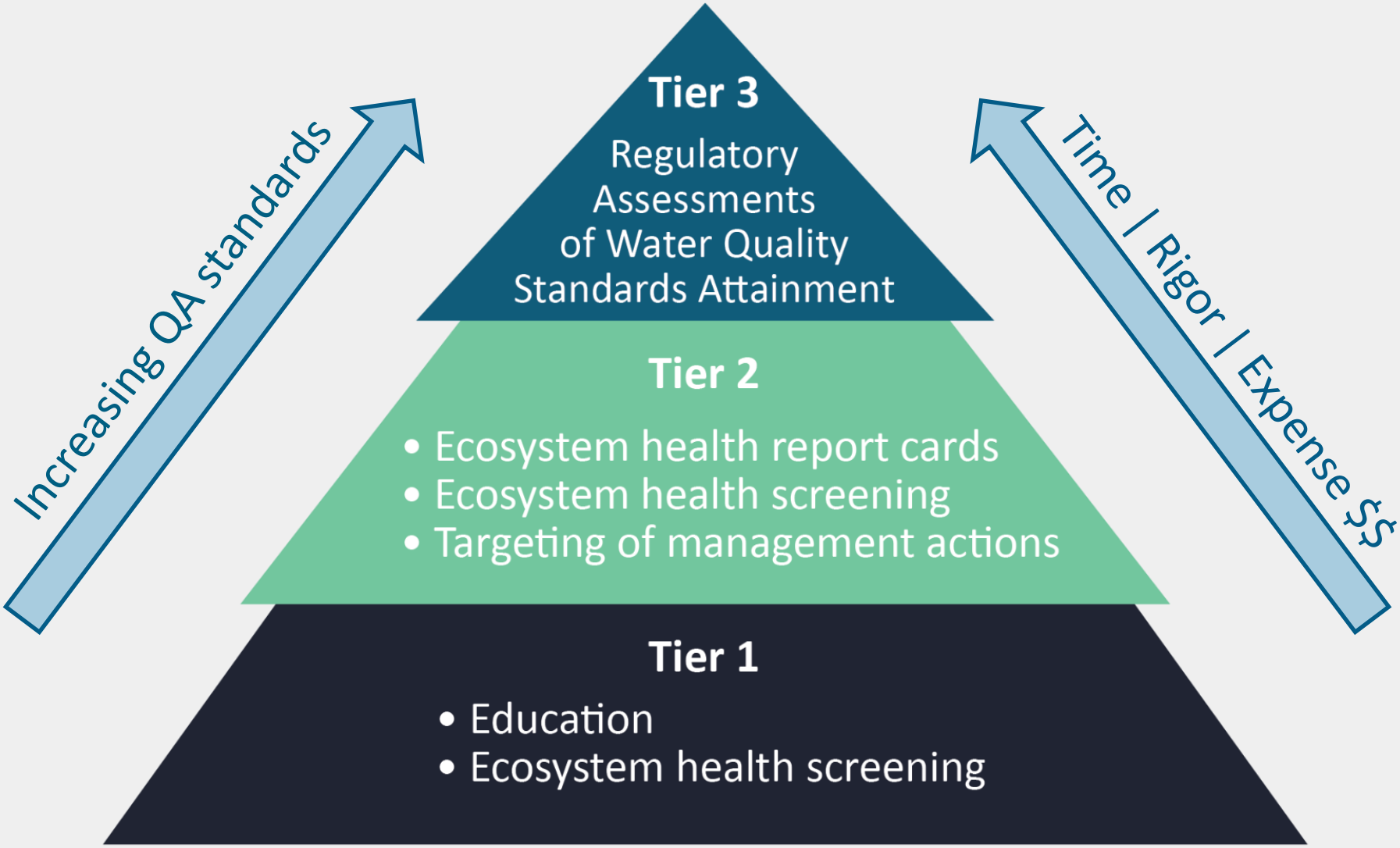
In 2020, the CMC team partnered with Booz Allen Hamilton and their Women in Data Science and 501 Green Team to host Hack the Bay, a six-week virtual hackathon aimed at answering questions about the health of the Chesapeake Bay watershed.

We had over 400 participants from around the world sign up for the event, resulting in 10 completed submissions and 10 creative, partially scoped solutions across four challenges:

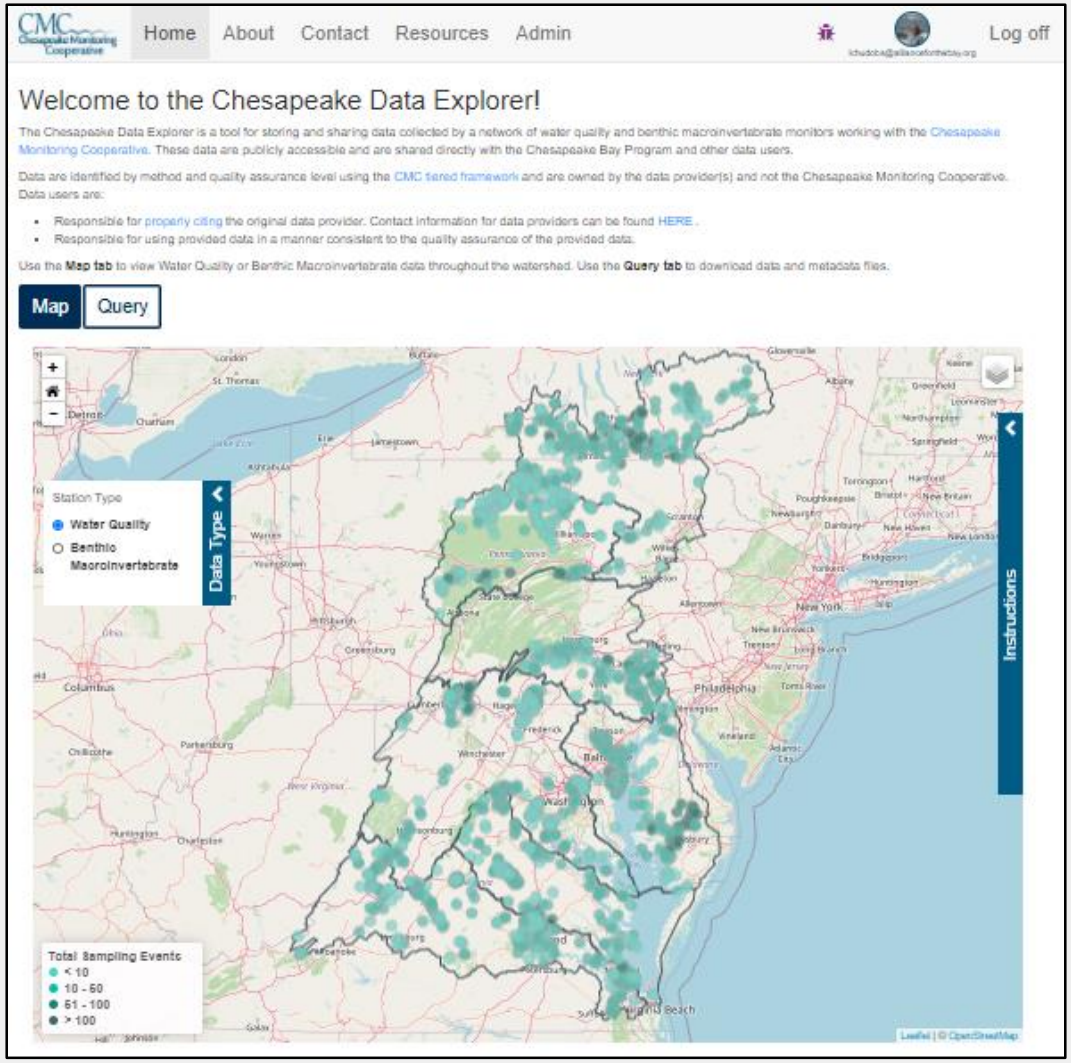
- Challenge 1: Develop a Restoration Case Study,
- Challenge 2: Identify Data Gaps,
- Challenge 3: Modeling Water Pollution, and,
- Challenge 4: Design a Water Quality Report Card.

The CMC team is incredibly grateful to everyone who participated and for all the hard work that went into completing each submission! By exploring the Chesapeake watershed's water quality and benthic observations and their intersection with other geospatial, temporal, environmental, and demographic data, we hope to further empower decision-making and inspire action for watershed restoration.

CLASSIFY DATA OF KNOWN QUALITY



CHESAPEAKE DATA EXPLORER



650,000 Data points

2,800 stations

7 Bay jurisdictions

117 Organizations

https://www.cmc.vims.edu

CMC FUTURE GOALS

- Update 3 CBP and EPA approved QAPPs and SOPs
- **Engage underrepresented communities in monitoring programs**
- Enhance Data Explorer homepage data visualizations
- **Tier II Benthic Macroinvertebrate Samples (100 total over 6 years)**
- Peer-to-Peer learning workshops
- Prioritization Report
- Coordination with Jurisdictional monitoring efforts

Photo Credit: Will Parson/Chesapeake Bay Program

CMC DATA SOURCES

Non-Tidal Monitoring

- Sample monthly year-round
- Surface samples
- Parameters: water temp, dissolved oxygen, pH, conductivity, turbidity, sometimes nutrients

Benthic Monitoring

- Sample once or twice annually (spring or fall)
- ALLARM – upper watershed
- VA SOS – lower watershed
- CBP Protocol – all states family level

Tidal Monitoring

- Sample weekly in the summer or biweekly/monthly year-round
- Surface samples or depth profile samples
- Parameters: water temp, dissolved oxygen, salinity, pH, conductivity, turbidity, nutrients

Photo: Nate Bacon

EXAMPLES OF GROUPS

RiverTrends

- Monthly parameters: dissolved oxygen, pH, Temperature, water clarity. Sometimes add conductivity, bacteria and salinity.
- 123 volunteers monitoring 100 sites, for 2-4 hours/month.
- 1.5 full time staff.

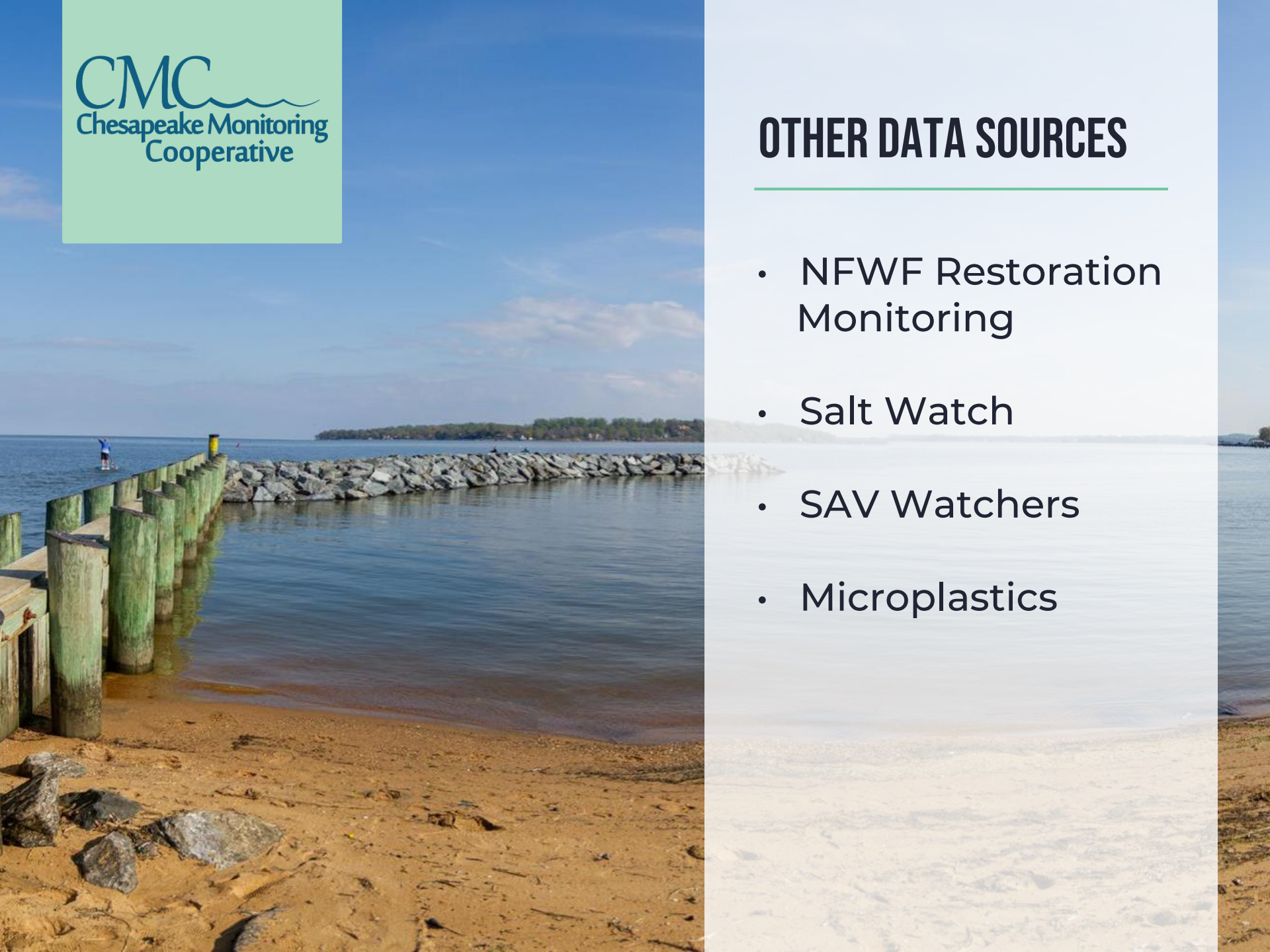
VASOS

- Biannual benthic macroinvertebrate monitoring (plus visual assessment and temperature)
- 270 active volunteers monitoring approximately 200 sites (8-10 hrs/site/yr)
- 1 paid IWLA staff coordinator plus 20 volunteer trainers in VA.

Stream Team

- Monthly parameters: Conductivity, Nitrate-nitrogen, pH, temperature, visual site characteristics, water clarity, stage.
- Biennial macroinvertebrates.
- 143 volunteers monitoring 77 sites, 2-4 hrs/month.
- 1.5 full time staff.

Photo: Nate Bacon



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OTHER DATA SOURCES

- NFWF Restoration Monitoring
- Salt Watch
- SAV Watchers
- Microplastics

DATA CONNECTIONS

CONNECTING DATA TO LOCAL NEEDS

- Bacteria Monitoring - assess illicit discharge
- Baseline Monitoring - identify unintended issues
- Stewardship and Engagement - volunteer hours counted
- Education - use real world data in the classroom



DISCUSSION

- Are there key data needs in your locality that could use community collected data?
    - What are the questions that you have about local water quality on the day to day basis?
    - Are there any data gaps in your local WIP or MS4 permit requirements?
- What tools and resources would be helpful to facilitate data use at a local level?



THANK YOU!

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ADD TITLE

- **Add text**
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GOALS OF PROTOCOL

- Assess the status of the intervention
- Document pre, during, post restoration site status
- Develop case studies
- Help NFWF document visual/physical impact of practices on streams
- Alert project managers to potential issues that need to be addressed
- Community accessible protocol

Report EPA, NRCS, USGS highlighting the need for a WQ restoration protocol

OVERVIEW

Primary question: What is the status of BMPs?					
	Pre (up to 2 years prior)	During	1-2 years	3-5 years	5+ years
Visual Assessment · **Temp** · **Water clarity** · **Water level**	Spring and fall in year prior. Minimum, 1 survey.	Use photos as surrogate	Spring/fall annually	Annual	Biennial
Pictures	With Visual Assessment	Immediately before and after intervention	With Visual Assessment	With Visual Assessment	With Visual Assessment
Macroinvertebrates	Spring (ideally two springs before)	N/A	Fall or Spring immediately following intervention, then spring annually.	Biennial	Once/5 years

Visual Assessment Categories

Channel condition – access to floodplain

BANK STABILITY

https://www.warrenswcd.com/streambank-erosion.html

https://teara.govt.nz/en/photograph/19792/streambank-erosion

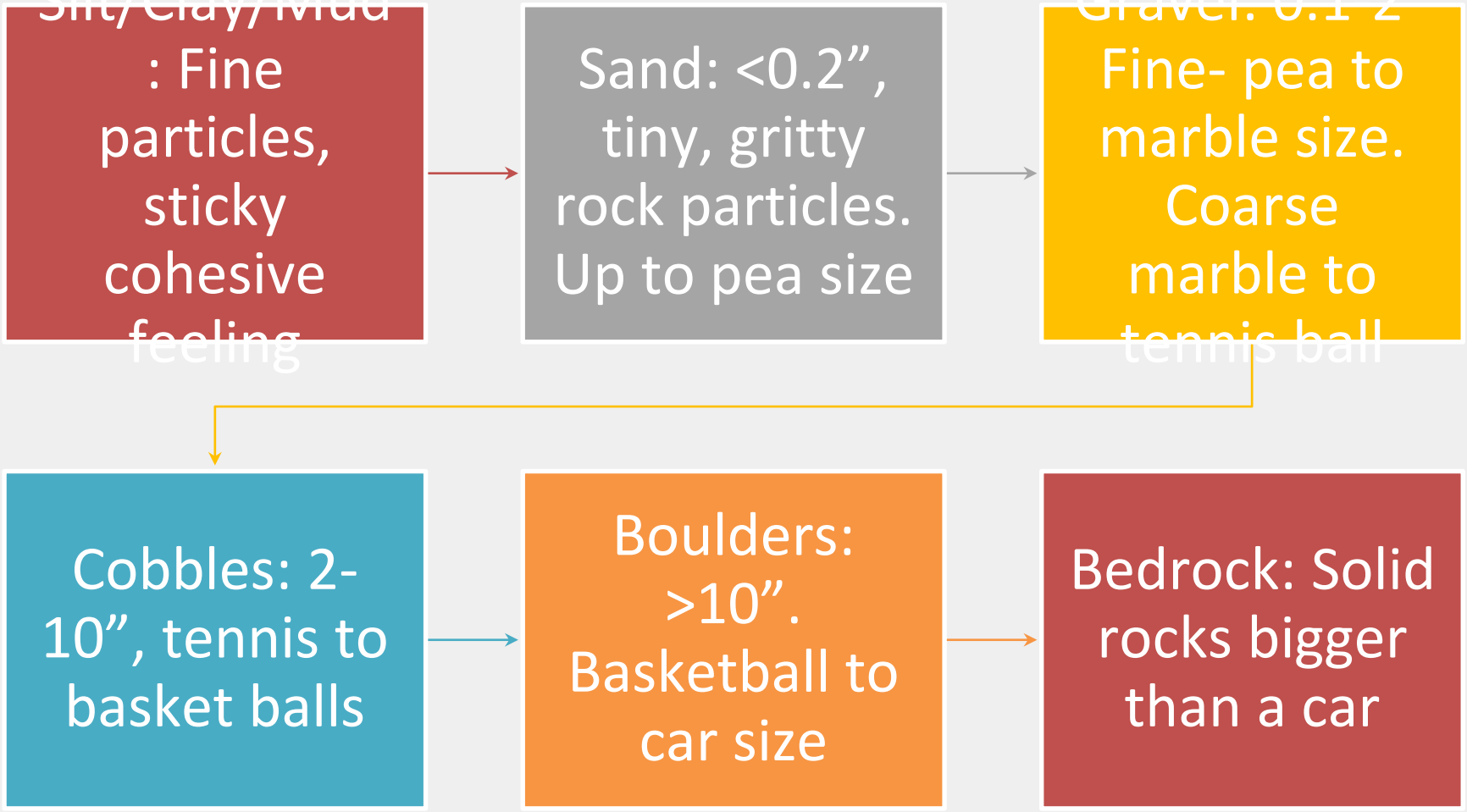
Riparian Zone

WATER COLOR AND WATER CLARITY

NUTRIENT ENRICHMENT

MACROINVERTEBRATE HABITAT & FISH HABITAT

STREAM SUBSTRATE MATERIAL



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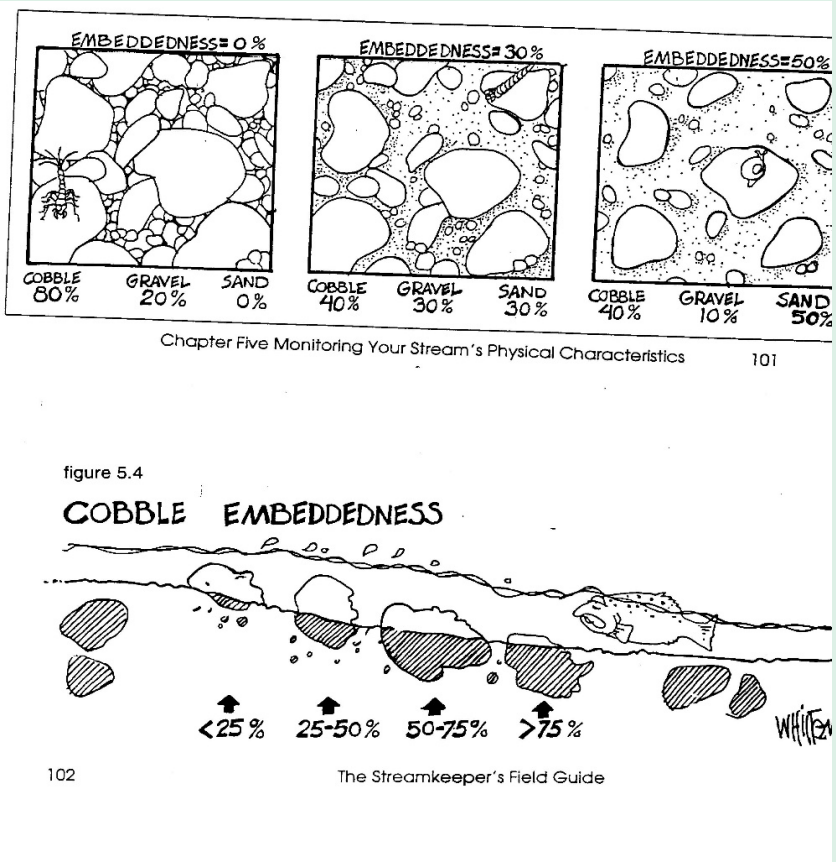

CANOPY COVER

This pertains to waterways where the channel is 100’ or less.