



CMC

Chesapeake Monitoring Cooperative



Agenda

- Introduction to the Chesapeake Monitoring Cooperative
- Monitoring Stations
 - ACB
 - ALLARM
 - IWLA
- Database
- Next Steps
- Q&A

Chesapeake Monitoring Cooperative

A partnership that aims to provide **technical, logistical, and outreach support** for the integration of volunteer-based and nontraditional water quality and benthic macroinvertebrate monitoring data into the Chesapeake Bay Program (CBP) partnership.

Cooperative Agreement

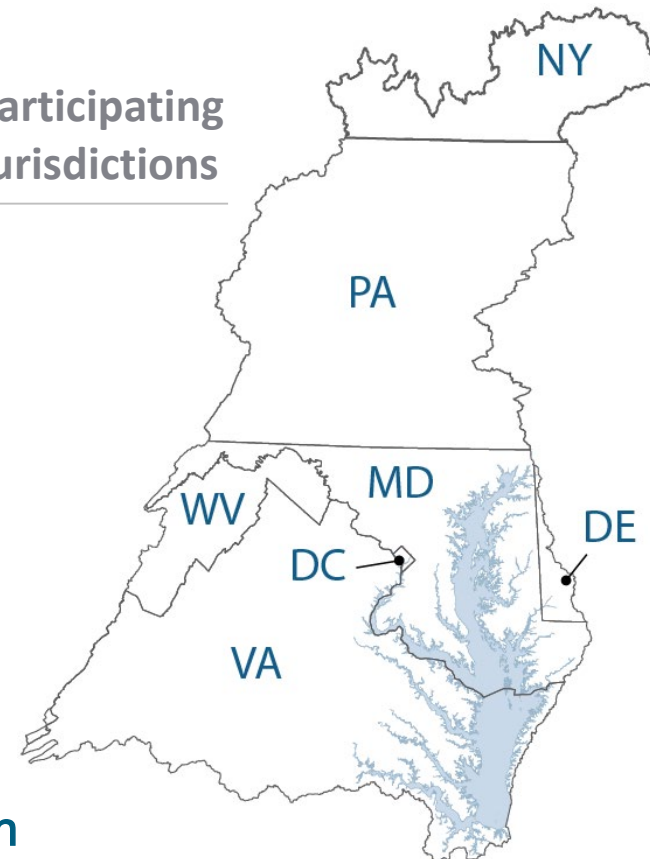


CMC development team partners & service providers



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

Participating Jurisdictions



Meet the CMC Team



Liz Chudoba (ACB)
Project Manager



Emily Bialowas (IWLA)
Project Coordinator



Danielle Donkersloot
(IWLA)



Julie Vastine
(ALLARM)



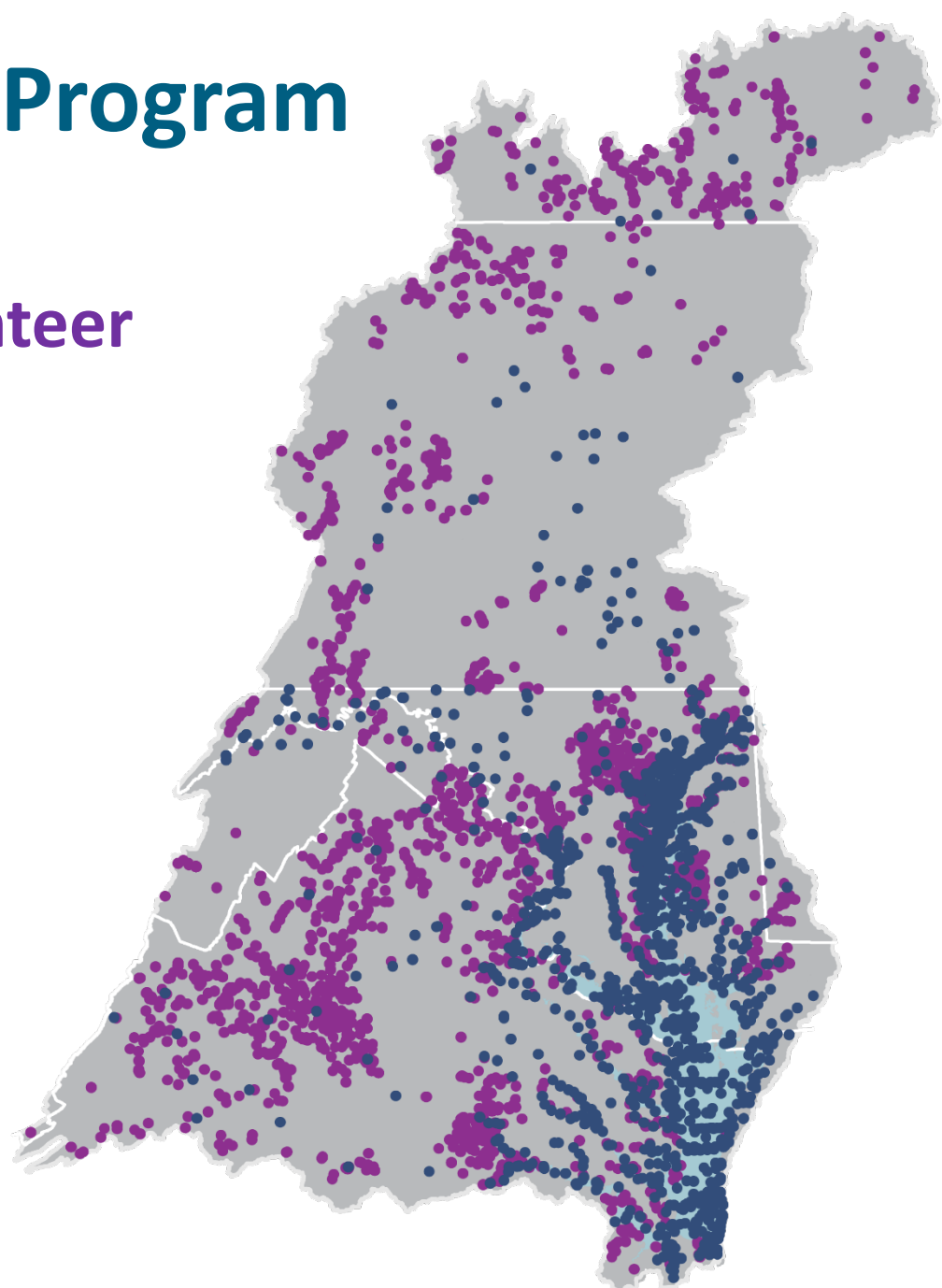
Helen Schlimm
(ALLARM)



Caroline Donovan
(UMCES)

Chesapeake Bay Program Monitoring Sites

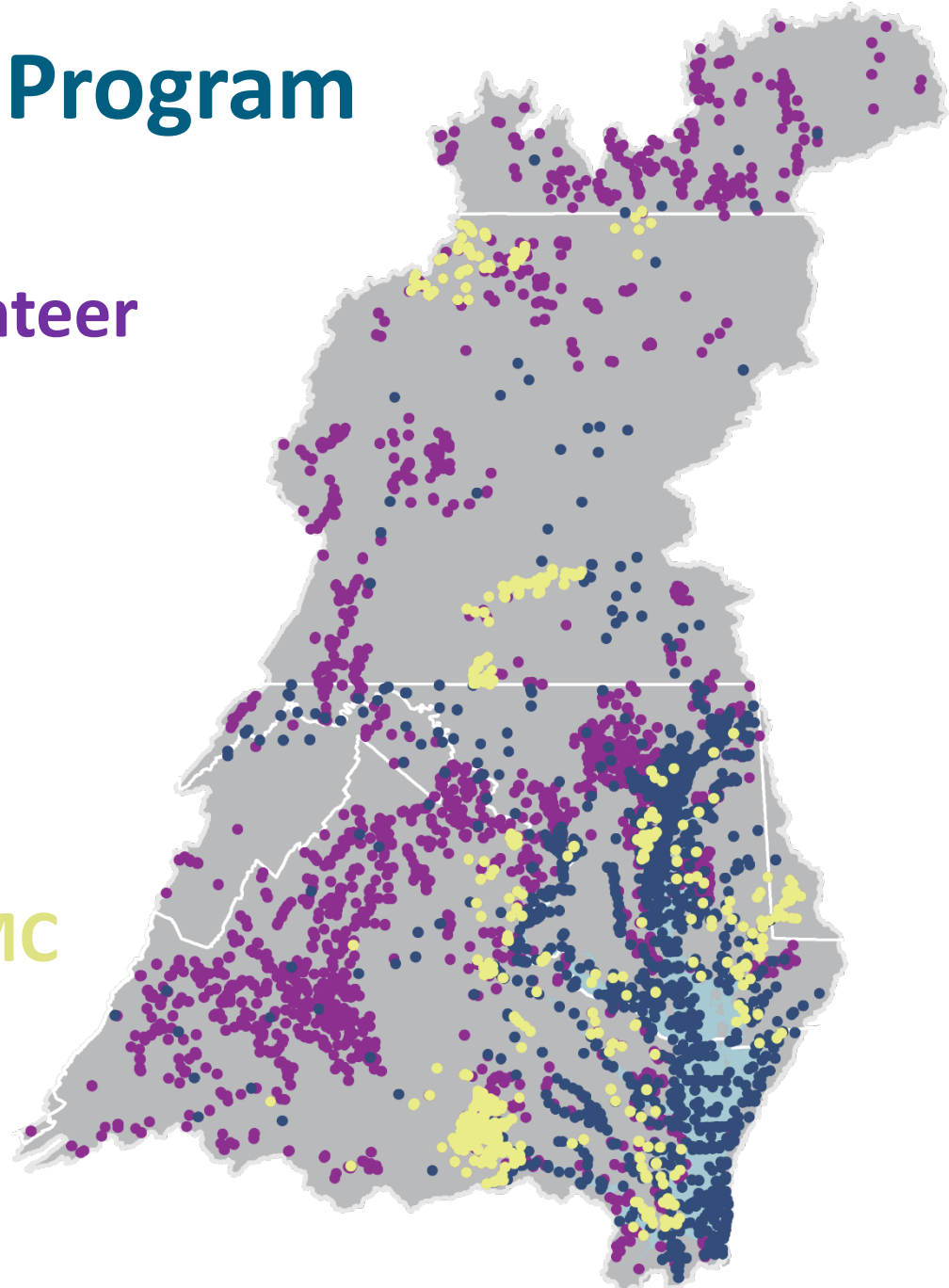
Chesapeake Bay Volunteer
and Nontraditional
Monitoring Sites



Chesapeake Bay Program Monitoring Sites

Chesapeake Bay Volunteer
and Nontraditional
Monitoring Sites

Chesapeake Bay
Volunteer and
Nontraditional
Monitoring Sites
Integrated into the CMC



Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

AMONG

The State of Delaware, the District of Columbia, the State of Maryland, the State of New York, the Commonwealth of Pennsylvania, the Commonwealth of Virginia, the State of West Virginia, the Interstate Commission on the Potomac River Basin, the Susquehanna River Basin Commission, the Metropolitan Washington Council of Governments, the United States Environmental Protection Agency, the United States Geological Survey, and the Chesapeake Bay Commission.

REGARDING

Using Citizen and Non-traditional Partner Monitoring Data to Assess Water Quality and Living Resource Status and Our Progress Toward Restoration of a Healthy Chesapeake Bay and Watershed

WHEREAS, the health of the Chesapeake Bay and its watershed depends on individual and community-based stewardship by the more than 18 million people who call this watershed home;

WHEREAS, the Chesapeake Bay Program is a leader in leveraging resources through a partnership approach;

WHEREAS, individuals, watershed groups, schools, local governments, and other organizations volunteer their time and talents by participating in environmental monitoring programs; and this *citizen science* represents a unique opportunity for advancing our knowledge while supporting education and community service;

WHEREAS, the cost of monitoring and assessment of tidal and non-tidal waters as well as other ecosystems in the Chesapeake Bay watershed exceeds the capabilities of individual partners and surpasses current funding within the jurisdictions, it is essential that all data sources of known quality be integrated into our monitoring networks;

WHEREAS, data resulting from volunteer and nontraditional partner monitoring, and citizen science efforts can inform impact assessments of local conservation actions as well as decisions that support targeting of management practices that will restore and sustain the health of habitats, living resources and communities across the Bay watershed;

WHEREAS, the Chesapeake Monitoring Cooperative (CMC) has created a framework to facilitate the collection and integration of volunteer and nontraditional partner monitoring efforts into the U.S. Environmental Protection Agency's Chesapeake Bay Program that represents a unique

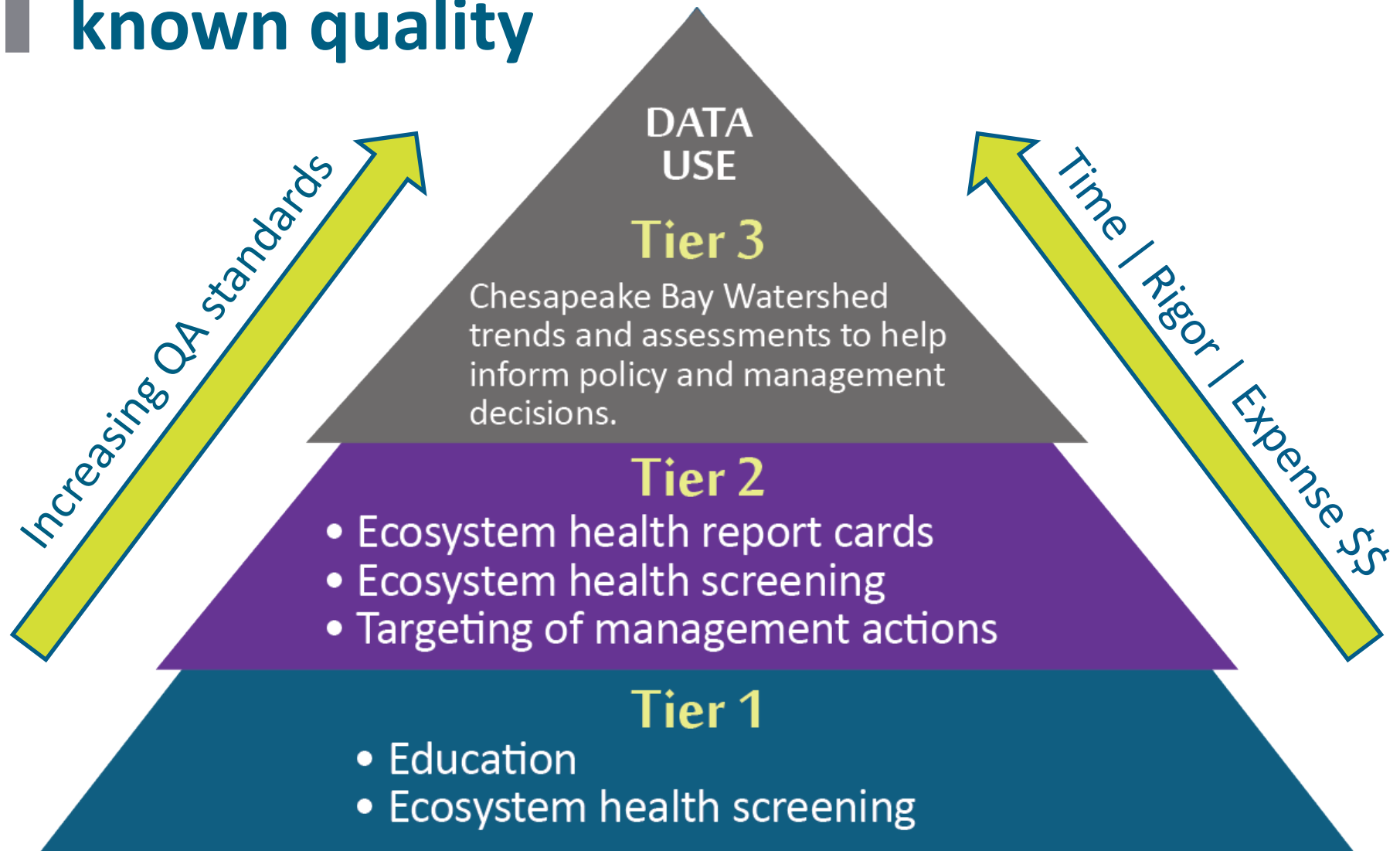
collaboration and network of monitoring groups across all six states and the District of Columbia;

NOW, THEREFORE, we, the undersigned representatives of the District, state, interstate, and federal entities with responsibility for monitoring the waters and resources of the Chesapeake Bay and its watershed agree that we will:

- Work cooperatively with the CMC and the Chesapeake Bay Program partnership to support and sustain a network of citizen science and non-traditional monitoring partners.
- Work to support an open-access clearinghouse of quality-assured environmental data generated by citizen scientists and nontraditional partners integrate this data into monitoring networks for educational, management, targeting and regulatory assessment applications.
- Promote the collection of water quality, benthic macroinvertebrate, and other monitoring data by non-traditional partners, such as, local and regional organizations, agencies, and/or educational institutions.
- Develop and adopt methods for data integration into regional monitoring and assessment strategies.
- Collaborate with the CMC in training of volunteer and non-traditional partner monitoring efforts.
- Support and actively contribute to the review and implementation of standard protocols and quality assurance programs to produce data of known and documented quality across all seven watershed jurisdictions.

Purpose is to forge a deeper understanding of and commitment to the use of citizen-based and other non-tradition partners' monitoring data in individual partners and shared partnership decision making.

Quality Assurance: to classify data of known quality



Tools and Resources: Method Manuals

TIDAL METHODS MANUAL



NON-TIDAL METHODS MANUAL



NONTIDAL BENTHIC MACROINVERTEBRATE METHODS MANUAL

LOWER WATERSHED



Tools and Resources: Indicator Fact Sheets

BACTERIA

What is bacteria?
Bacteria and salt are other ways to affect currents.

How are bacteria counted?
The bacteria water occurs in technique to a lab, bacteria counted, come from to human bacteria.

What are the health effects of bacteria?
Bacteria animals naturally humans broken illness in rainfall, in the Bay health of more info.

Top: High is closed off growing m

CHLOROPHYLL

What is Chlorophyll?
Chlorophyll convert the several predomina and saltwa measure o

How is Chlorophyll measured?
Chlorophyll sample col lab analys spectroph chromatog of pigment chlorophyll

What can Chlorophyll tell us?
Chlorophyll Bay. Algae of tidal eco Excess algae cause aest aquatic or concentr which fuel plants, agri level of chl the food w available H chlorophyll conclusion local water

Top: Sample collects chlor of varying ca

What are conductivity and salinity?
Conductivity is a pass an electrical dissolved in the dissolves, it bre ions. Conductivity which is the am the water. All org

How are they measured?
Conductivity (just conductivity pro the dissolved ion another. In orde opposite (positiv interaction, the dissolved solids

What can conductivity and salinity tell us?
Conductivity cha into ions when it freshwater. How specific types of most often cause treatment plants of conductivity d organisms, inclu can cause shifts the region. Incre the pH of the wa plants and fish.

Top: Conductivity (a the interactions bet conductivity (A. Frie

What is Salinity?
Salinity is water. Sa dissolved chloride. The conc water, me

How is Salinity measured?
Salinity is device ca probes (s are also i

What can Salinity tell us?
Salinity a may occu for exam than 10 p prefer co Salinity ve very high brackish water (0 Salinity a comb is used to the water temperat between oxygen-d

Top and Bo (Chesapeake readings (P

SILICATE

What is Silicate?
Silicate is (dissolved silicate m off the la

How is Silicate measured?
The amou in the wa To measu a bottle a spectroph

What can Silicate tell us?
Some typ dissolved cell walls. tributaries are fueled and phos because v available. decline. W decompo oxygen co organisms

Top: Collect ("Chesapeake

What is total water depth?

Measuring the depth of the water helps characterize a site. A site can be shallow, deep, or within a navigational channel. Tides affect total water depth, so the total depth of a site can change depending on when it is sampled. Knowing the depth is an important first step before taking any measurements. Total water depth is needed to determine where to start measuring dissolved oxygen using a probe—you do not want the probe to hit the bottom, which can disturb sediments and lead to incorrect measurements.

How is total water depth measured?

Total water depth is measured by lowering a weighted line into the water and reading the depth marking on the line when it hits bottom.

What can total water depth tell us about the Bay?

Total water depth of sampling sites is part of the physical characteristics of an ecosystem. Shallow sites respond differently to changing conditions than deeper sites. Total depth can help determine if sedimentation is a problem. Sediment runoff from farms, roads, and residential and commercial development can affect total water depth over time. The sediment settles to the bottom of tidal creeks, slowly filling in shallow waterways, smothering shellfish and seagrass, and leading to low oxygen conditions. Sedimentation can be tracked by measuring total water depth over time. Adjusting for tidal changes must occur to determine if total water depth is decreasing or increasing.

Total water depth is measured by lowering a weighted line into the water and recording the depth markings on the line (MD DNR).



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NITROGEN

What is Nitrogen?
Nitrogen is Earth. Bacteria atmospheric grow. Plants proteins and

What is pH?
pH is a meas provides a m body for aqua with 7 being water, and

What is Phosphorus?
Phospho growth a naturally by provid primary of phos

pH

PHOSPHORUS

DISSOLVED OXYGEN

What is dissolved oxygen?
Dissolved oxygen is present in water atmosphere and f oxygen during ph need adequate dis survive—even aqu water around the

How is dissolved oxygen measured?
Dissolved oxygen field using an elec kit can also be use level of a water se the surface or thr which creates a ve through the water

What can dissolved oxygen tell us?
Dissolved oxygen health, especially with low dissolve the summer due t water holds less o in the water colu be lower at grea less photosynthes decomposition of in the water, whic dissolved oxygen chemical balance

Dissolved oxygen can method (bottom) (UK and lead to fish kills)

Seasonal temperature chan (bottom, C. Donovan) affect water temperature can be Chesapeake Bay Program.

AIR & WATER TEMPERATURE

What are air and water temperature?

Temperature measures water are moving, or h Both air and water ten seasonal cycles—brigh and longer hours in the Because temperature necessary to measure site every time sample

How is temperature measured?

Air and water tempera an armored glass therm probe. Single measure can be taken at the sur profile of temperature temperature at differ

What can air and water temperature tell us about the Bay?

Temperature affects bo physical characteristics in temperature influen can survive in the Bay temperatures stimulat affects water chemist shallow freshwater str floats above the cold, s keeps these layers sep

WATER CLARITY & TURBIDITY

What are water clarity & turbidity?

Water clarity is a measure of how much light penetrates through the water column. Sediment, plankton, and other organic materials can become suspended in the water. These floating particles make the water less clear and block light from traveling through water. Turbidity is a measure of the cloudiness of the water itself.

How are they measured?

Water clarity (m) is measured in the field using a Secchi disk attached to a drop line. A transparency tube can be used to measure clarity when a sample site has a current that is too fast or a depth that is too shallow for a Secchi disk to function properly. Turbidity (ITU) is measured in the field, with a kit, by comparing the cloudiness of a water sample to a standardized amount of turbid water.

What can water clarity & turbidity tell us about the Bay?

Clear water is critical for the growth and survival of aquatic species. Aquatic grasses and other plants grow best in clear water because sunlight can pass through the water column to deeper depths and support photosynthesis. Fish, crabs, and other aquatic organisms also rely on clear water to see the environment, catch prey, and breathe.

Poor water clarity and high turbidity are usually caused by a combination of excess suspended sediments in the water, due to runoff from land, and growth of phytoplankton, which is fueled by nutrients.

A Secchi disk on a drop line (top) and a transparency tube (bottom) can be used to measure water clarity (M. Rath, UMCES). Middle: A Secchi disk is lowered into the water until the depth where the black and white disk can not be seen (A. Jones).

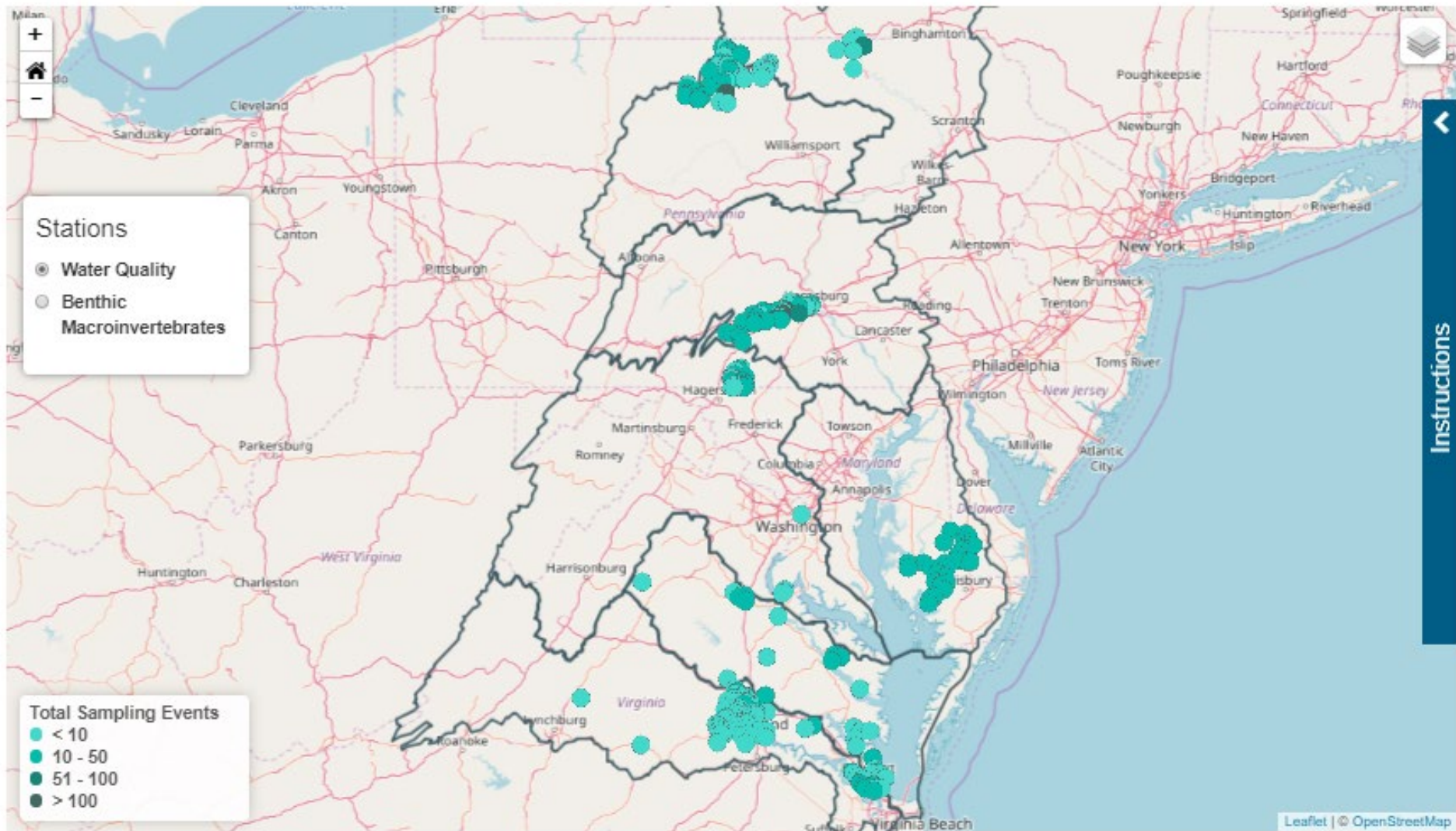


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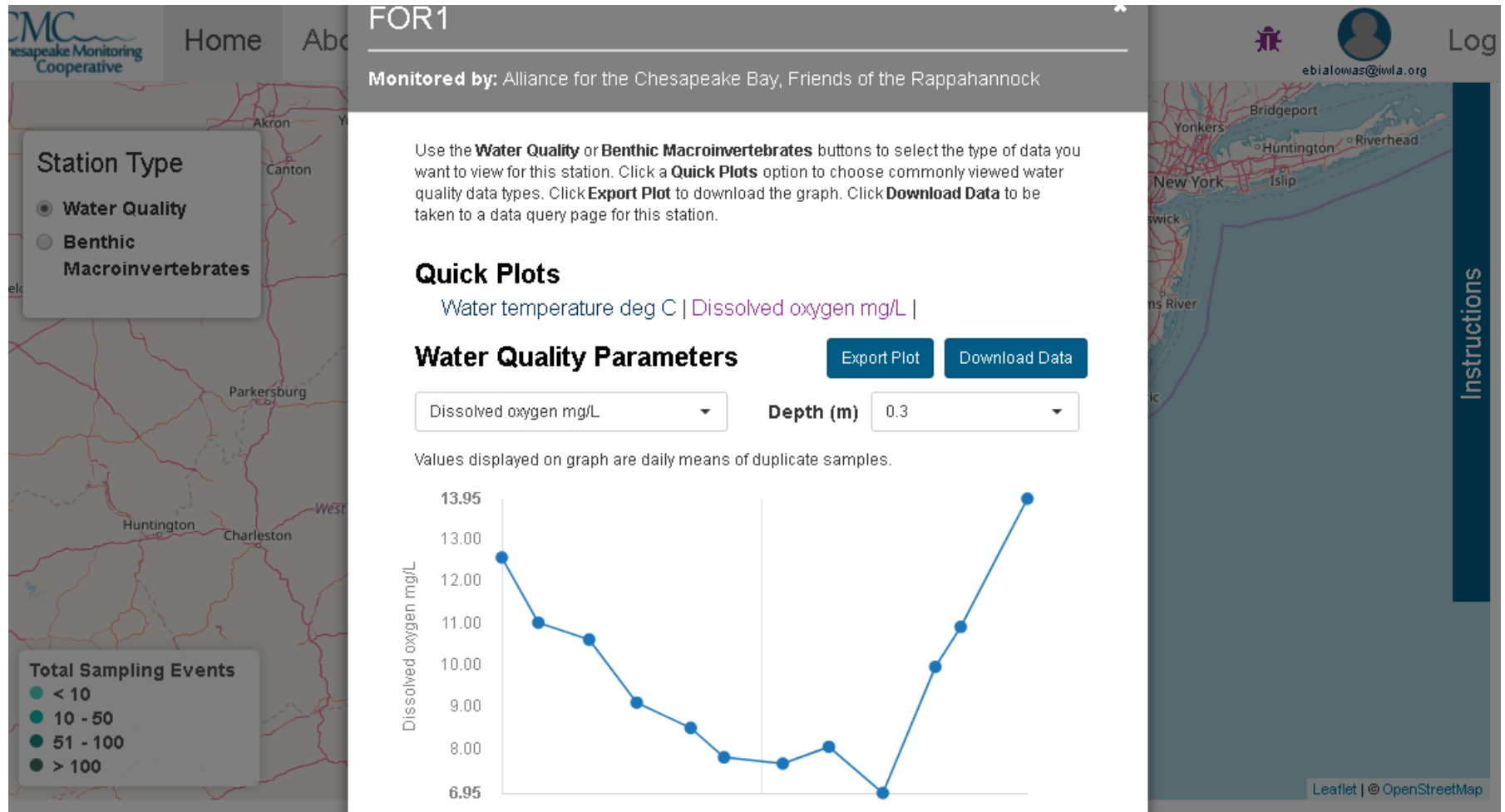
EXAMPLES **MONITORING TOOLKIT**

CHESAPEAKE DATA EXPLORER

Chesapeake Data Explorer



Chesapeake Data Explorer



Chesapeake Data Explorer

CMC Chesapeake Monitoring Cooperative

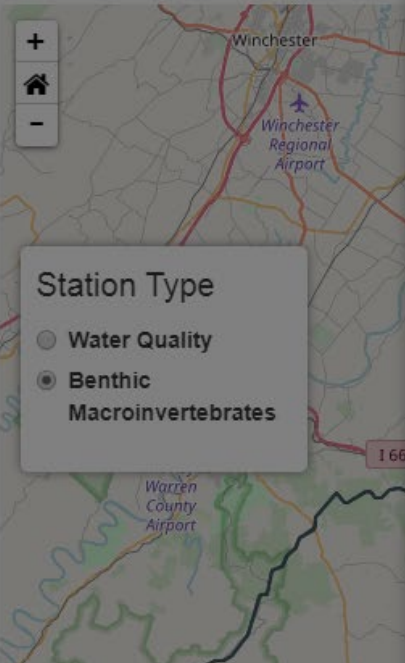
Home About

This is your gateway into data collected by a...
or to view Water Quality or Benthic Macroinvertebrates

Map Query

Station Type

- ☐ Water Quality
- ☒ Benthic Macroinvertebrates

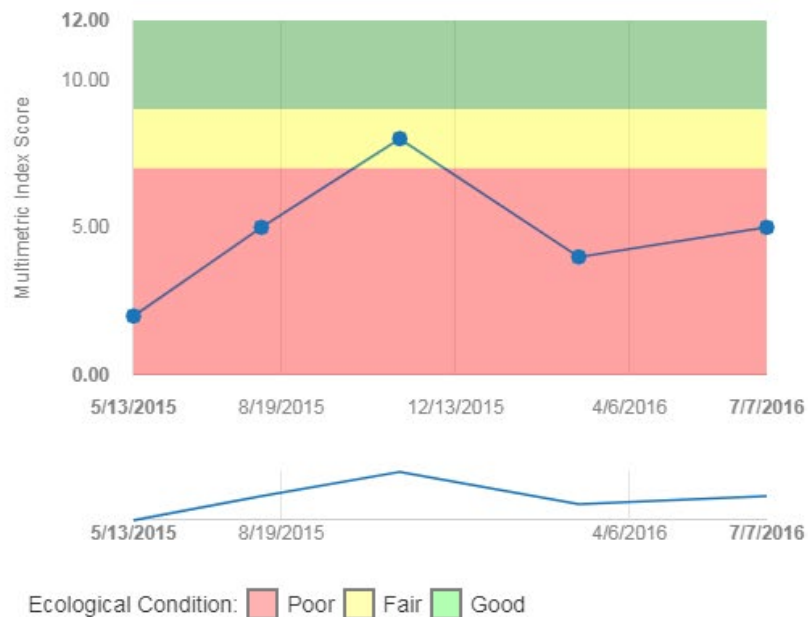


Use the **Water Quality** or **Benthic Macroinvertebrates** buttons to select the type of data you want to view for this station. Click a **Quick Plots** option to choose commonly viewed water quality data types. Click **Export Plot** to download the graph. Click **Download Data** to be taken to a data query page for this station.

Benthic Metrics

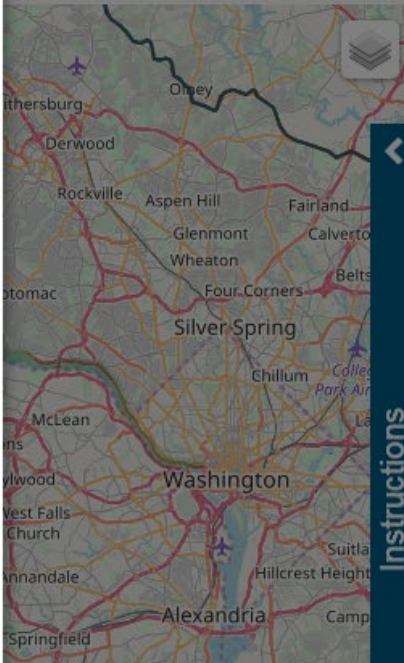
Export Plot

Download Data



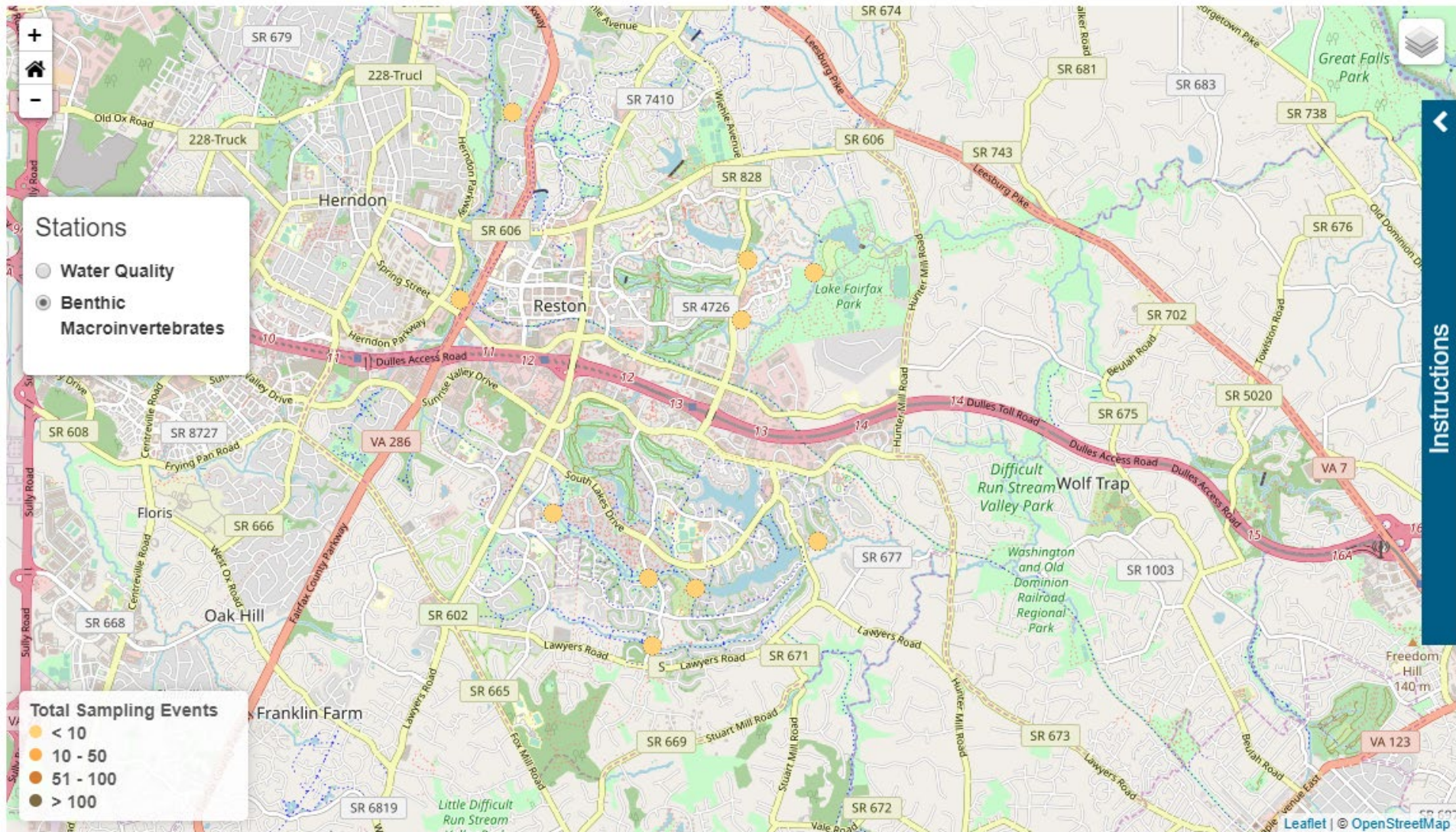
ebislowas@wla.org Log off

Investigate information about the database
our database.



Instructions

Chesapeake Data Explorer



Chesapeake Data Explorer



STEPS TO BECOME A CMC PARTNER

Application for Assistance

To apply for assistance:

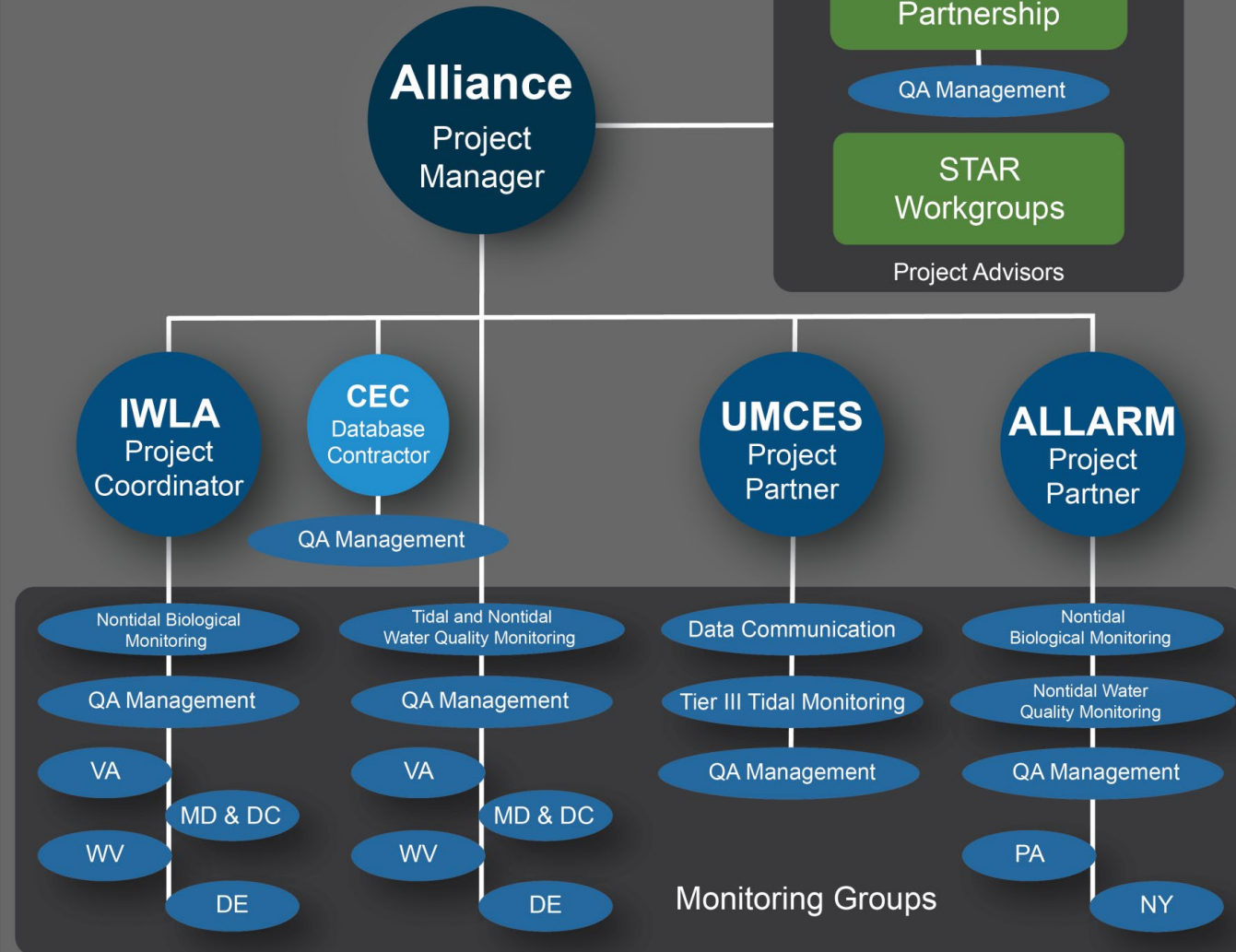
STEP 1

- 1) Complete the brief Application form.
 - i. Basic organizational and contact information
 - ii. Checklist of technical assistance needs
 - iii. Open-ended Q's about the purpose for technical assistance
 - iv. Identify service providers you've previously worked with
- 2) Email the completed form to Liz Chudoba at: lichudoba@allianceforthebay.org.

Connect with a CMC Service Provider

STEP 2

QA and Technical Support Services Organizational Chart



On Boarding

STEP 3

New Monitoring Groups – the CMC service provider works with each group to conduct a Study Design workshop, Training workshops and equipment selection.

OR

Existing Monitoring Groups – the CMC service provider works with each group to review current quality assurance and standard operating procedures to determine Tier level.

Technical Support **Services**

- Study Design Workshops
- Water Quality and Benthic Macroinvertebrate Monitoring Trainings, Certifications, and Re-certs
- Benthic Macroinvertebrate Order Level Identification
- Equipment and Equipment Suggestions
- QA trouble shooting
- Data Interpretation and Report Card Workshops
- Data Verification & Quality Control
- Support for Data Uploads

Enter Data into Chesapeake Data Explorer

STEP 4

Minimum eligibility requirements:

- GPS coordinates of your monitoring sites
- Documented methods
- Documented quality assurance procedures



Next Steps

- Sign up for our E-Newletter
- Come talk to us
- New Website
- Other sessions at the forum
 - Data Interpretation
 - Water Quality Monitoring 101



Questions?