Establishing Essential Building Blocks of the Chesapeake Monitoring Cooperative

Helen Schlimm
Alliance for Aquatic Resource Monitoring (ALLARM)
Dickinson College

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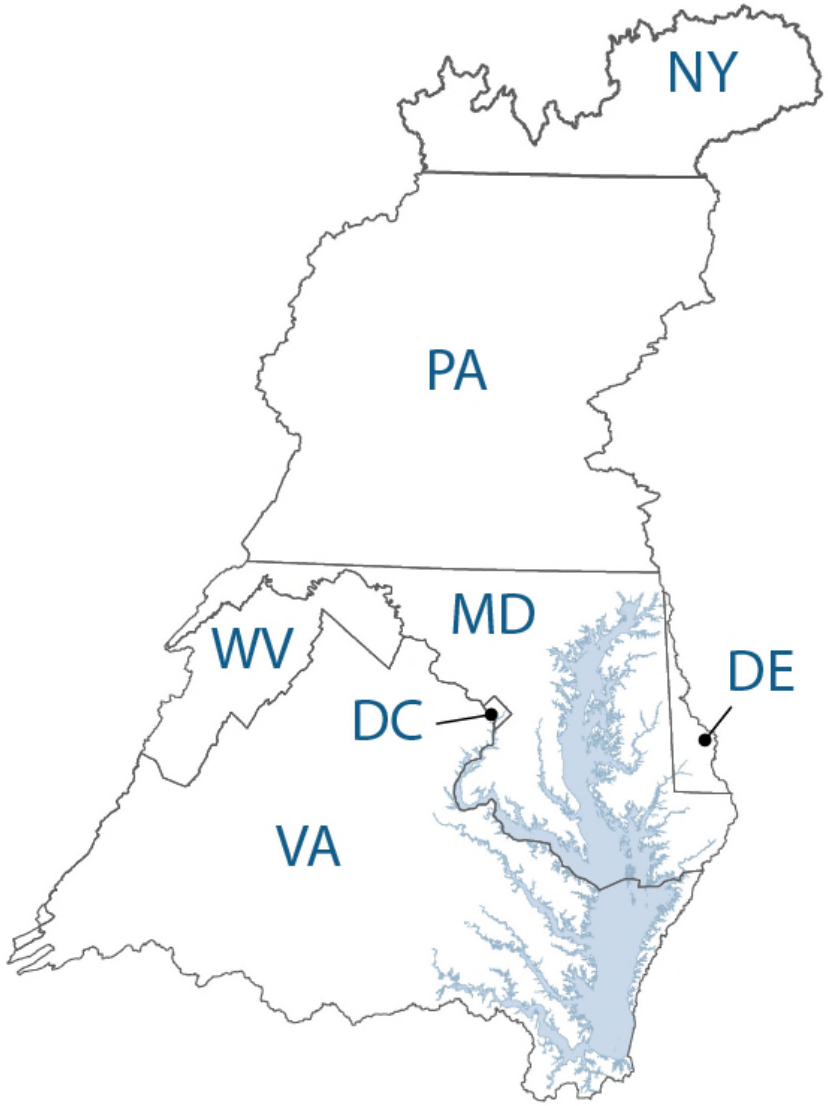
Outline

- Continuing the timeline
- Key Building Blocks:
  - Tiered Framework for data integration
  - Quality Assurance Project Plans (QAPPs)
  - Chesapeake Data Explorer
- Current status of project

CMC Chesapeake Monitoring Cooperative

Alliance for Aquatic Resource Monitoring ALLARM est. 1986

Dickinson



Timeline

- Post-prioritization process
- Years 1-3
  - Set up program framework
  - Establish key documents
  - Create process for data integration
- Years 3-4
  - Advertise resources and services
  - Start trainings!
  - Develop database
  - Integrated data

CMC Building Blocks

Data Integration tools:

- Tiered Framework
- Quality assurance plans
- Manuals and operating procedures
- Data classification rubric
- Data repository

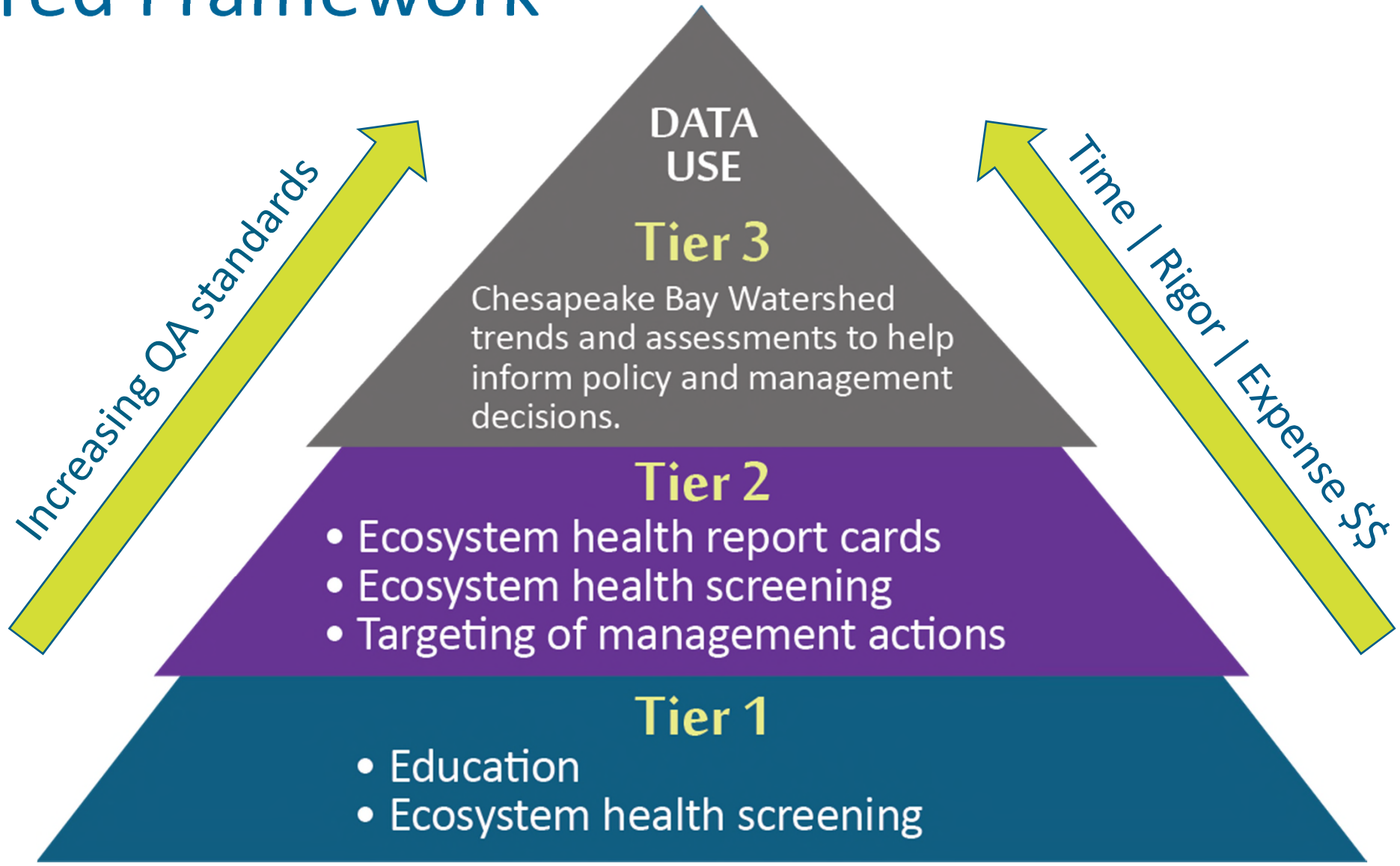
Metadata, metadata, metadata

Tiered Framework

- First non-traditional data integration project at the federal level
- Look to states for models of data integration (thank you Virginia, Missouri, Michigan, Alabama, and Indiana).

VWQM-C Meets Data Code 1 of the Methodology for the Development of the 2014 303(d) list in Missouri	Baseline information Notification of Possible Pollution Events Education Advocacy	Use of Missouri VWQM Program SOPs Use of Missouri VWQM Analytical Methods No minimum data requirement VWQM Introductory or higher training

Tiered Framework



Rubric for Assessing Data

1	**Tier Assessment of Current Non-Tidal Monitoring Groups**				
2					
3	Group Name:				
4	Contact Name:		Contact Email:		
5	Contact Phone:		State:		
6	**Programmatic**			**Notes or Comments**	**CDE Code**
7	Written Study Design?	Yes	Preferred, not required		
8		No			
9	Program Methods Manual	CMC	Tier I or II		
10		Non-CMC	Compare to CMC		
11		No	Do not include		
12	Program QAPP?	CMC	Tier I or II		
13		Non-CMC	Compare to CMC		
14		No	All data provisional		
15	Documented Site locations w/	Yes	Tier I or II		
16		No	Do not include		
17	**Sampling Location**				
18	Sampling Location	Boat mid channel	Tier II		
19		Wade in mid channel	Tier II		
20		Bridge/Dock mid channel	Tier II		
21		Shore line	Tier I		
22	**QA/QC**				
23	Field replicates (10%)	Yes	Tier II		
24		No (10%)	Tier I		
25	Lab Duplicate Sampling (10%)	Yes	Tier II		
26		No	Tier I		
27	Lab Field Blanks (10%)	Yes	Tier II		
28		No	Tier I		
29	**Field Parameters**				
30	Alkalinity	Titration Kit	Tier II		
31		Hanna Digital Checker	Tier I		
32		Hanna Digital Checker Standardized	Tier II		

Tidal | **Non-Tidal**

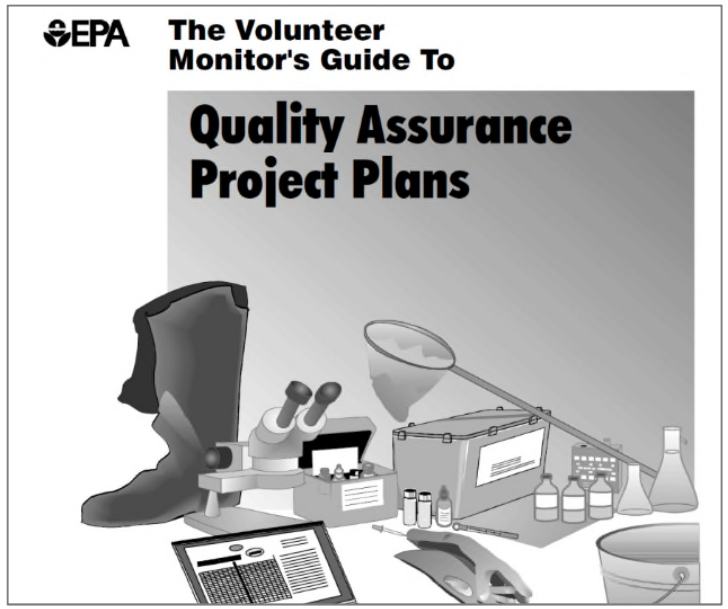
Tiers
P
P1
1
P2
2
P3
3

Monitoring Mantras

- All data of known quality have use
- Data must match quality with intended use

Quality Assurance Project Plans (QAPPs)

- Develop methodologies- data management, reporting
  - Tidal WQ
  - Non-tidal WQ
  - Macroinvertebrates
- Quality Management Plan
- Standard Operating Procedures
- Methods Manuals



Non-Tidal Monitoring Quality Assurance Project Plan
Alliance for the Chesapeake Bay
CB96334901 for Citizen-Based/Non-Traditional Monitoring Grant
Objective #2
Deliverable B: CBP and EPA approved Quality Management Plan and Quality Assurance Project Plan.

QUALITY ASSURANCE PROJECT PLAN

Integrating Citizen-based and Nontraditional Monitoring into the Chesapeake Bay Program Partnership:
Water Quality Monitoring in Non-Tidal Waters

Prepared for:

United States Environmental Protection Agency
Chesapeake Bay Program Office
Annapolis, Maryland
Grant #CB96334901

Prepared by:

Alliance for the Chesapeake Bay
Richmond, VA

Dickinson College's Alliance for Aquatic Resource Monitoring
Carlisle, PA

In Cooperation with:

University of Maryland Center for Environmental Science
Annapolis, MD

Izaak Walton League of America
Gaithersburg, MD

March 31, 2017

Table B2-1. Parameters, analytical methods, and equipment approved for use under this QAPP.

Parameter	Analytical Method	Equipment	Tier	Tier II Additional Requirements
Alkalinity	Kit; titration	LaMotte 4491-DR-01; LaMotte 4533-DR-01; LaMotte 3467-01	Tier II	
Alkalinity	Digital checker; colorimetric	Hanna HI 775	Tier II	Standardization
Ammonia-nitrogen	Laboratory	Lab-specific	Tier II	Lab analysis
Bacteria	E. coli	Coliscan Easygel	Tier I	
Bacteria	E. coli	Lab-specific	Tier II	Lab analysis
Conductivity	Meter	LaMotte 1749	Tier II	Calibration
Dissolved oxygen	Meter	Ex. LaMotte 1761	Tier II	Calibration
Dissolved oxygen	Kit; Winkler titration	LaMotte 5860	Tier II	Standardization
Nitrate-nitrogen	Colorimetric kit; cadmium reduction	Hach NI-14 14161 0; LaMotte 3110	Tier I	
Nitrate-nitrogen	Colorimetric kit; zinc reduction	LaMotte 3354	Tier I	
Nitrate-nitrogen	Colorimeter or spectrophotometer	Ex. Hach 9385100	Tier II	Known, Acid-wash glassware
Nitrate-nitrogen	Laboratory	Lab-specific	Tier II	Lab analysis
Nitrite-nitrate	Laboratory	Lab-specific	Tier II	Lab analysis
Orthophosphate	Colorimetric kit; ascorbic acid	Hach PO-19 224800; Hanna HI 38061	Tier I	
Orthophosphate	Digital checker; ascorbic acid	Hanna HI 713	Tier II	Known, Acid-wash glassware
Orthophosphate	Colorimeter or spectrophotometer	Ex. Hach 9385100	Tier II	Known, Acid-wash glassware
Orthophosphate	Laboratory	Lab-specific	Tier II	Lab analysis
pH	Strips	ColorpHast	Tier I	
pH	Meter	Ex. Hanna, LaMotte, Oakton, Extech	Tier II	Calibration

Data Integration Process

- Develop central repository for watershed-wide data input
- Coordinate with Bay Program- integrated monitoring system

Current data?

- Review monitoring program
- Study design/QAPP
- Review data/metadata
- Feedback & integration

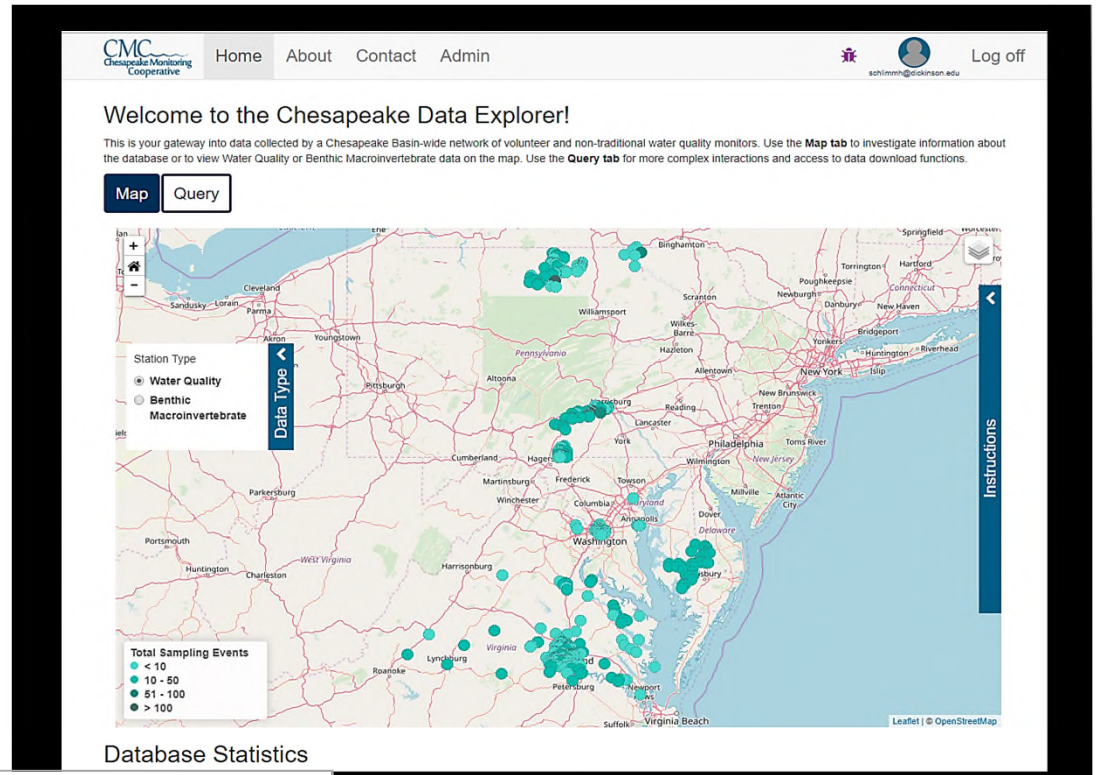
New program?

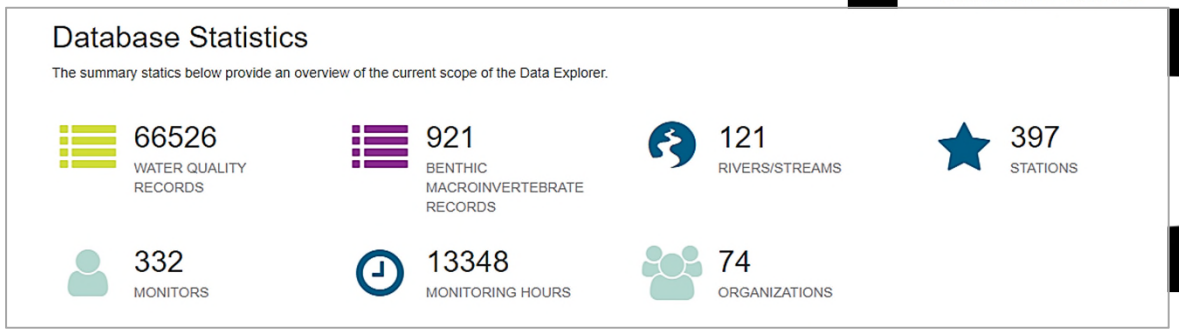
- Study design
- Monitoring trainings
- Data management
- Data integration

Developing a Database

Functionality

- Data input
- Data output and visualization
- Metadata management
- Record site locations
- Capture volunteer/group info





CEC
Chesapeake Environmental Communications

https://cmc.vims.edu

Chesapeake Data Explorer

CMC Chesapeake Monitoring Cooperative | Admin | Data | Profile | Manage | Log off

schlimmh@dickinson.edu

Parameters

+ Add New Parameter | Download Parameters

Name	Code	Units	Equipment	Tier	
Nitrogen	Filter Code	Filter Units	Filter Equipment	Filter Tier	
Ammonia-nitrogen	NH4N.1	mg/L	Specific to individual lab	2	View Details / Edit
Nitrate-nitrogen	NO3N.3	mg/L	Zinc reduction colorimetric kit (ex. LaMotte 3354)	1	View Details / Edit
Nitrate-nitrogen	NO3N.4	mg/L	Spectrophotometer; Colorimeter; Specific to individual lab	2	View Details / Edit
Nitrate-nitrogen	NO3N.1	mg/L	Cadmium reduction colorimetric kit (ex. Hach NI-14 1416100; LaMotte 3110)	1	View Details / Edit
Nitrate-nitrogen	NO3N.5	mg/L	Cadmium reduction colorimetric kit (ex. Hach NI-14 1416100; LaMotte 3110)	p1	View Details / Edit
Nitrate-nitrogen	NO3N.6	mg/L	Spectrophotometer; Colorimeter; Specific to individual lab	p2	View Details / Edit
Nitrate-nitrogen	NO3N.7	mg/L	Colorimeter (ex. Hach)	1	View Details / Edit

Orthophosphate (mg/L)

Enter Orthophosphate (mg/L)

pH Kit (SU)

Enter pH Kit (SU)

Turbidity Tube (cm)

Enter Turbidity Tube (cm)

Depth Profile

Use the fields in this section to enter samples. You can enter
data fields (referred to as "Water Quality Sample Sets"). If you

Sample Depth (m) Note: If surface sample, enter 0.3 for Sar

Enter Sample Depth (m)

Conductivity (uS/cm)

Enter Conductivity (uS/cm)

Nitrate-nitrogen (mg/L)

Enter Nitrate-nitrogen (mg/L)

Water temperature (deg C)

Enter Water temperature (deg C)

Add Sample Depth

Volunteer Hours

Use the field in this section to enter volunteer hours spent mo

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Home About Contact Admin

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Welcome to the Chesapeake Data Explorer!

This is your gateway into data collected by a Chesapeake Basin-wide network of volunteer and non-traditional water quality monitors. Use the **Map tab** to investigate information about the database or to view Water Quality or Benthic Macroinvertebrate data on the map. Use the **Query tab** for more complex interactions and access to data download functions.

Map | Query

On this page you can download data from the CMC Data Explorer database. Use the form below to build a query that will identify the specific data you want to download. As you step through the form, each selection will narrow down the possible options in subsequent steps. For example, if you choose James River from the "Watershed" selection box, then the subsequent selection boxes (sub-watershed, groups, stations, etc) will only show options available in the James River watershed. At the bottom of the form, use the check boxes to select the associated metadata you would like to include with your download. When you are finished making your selection, click **Get Results** to download your .csv file(s) of data.

Data Type Filter

Water Quality

Geographical Filter Type

Political Boundary

States (Pick all that apply)

All States

City/County (Pick all that apply)

All Cities and Counties

Groups (Pick all that apply)

All Groups

Stations (Pick all that apply)

All Stations

Parameters (Pick all that apply)

All Parameters

Start Date **End Date**

Choose Optional Metadata to Include With Download:

- Groups
- Parameters
- Stations
- Calibration Samples

Get Results | Clear All Filters

LT6 - LeTort Spring Run 4.05

Monitored by: LeTort Regional Authority

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.

Quick Plots

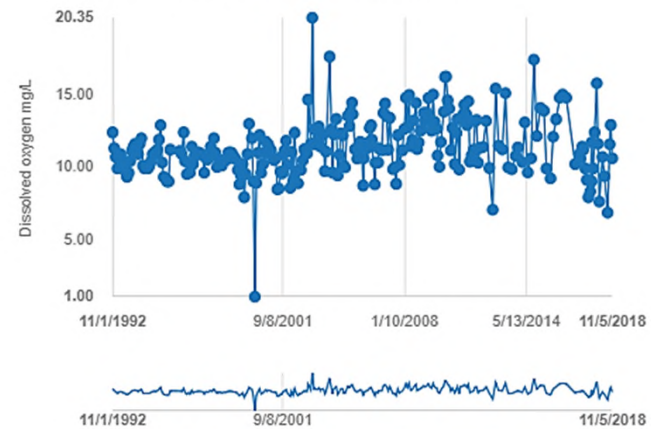
Dissolved oxygen mg/L | Water temperature deg C |

Water Quality Parameters

Export Plot | Download Data

Dissolved oxygen mg/L | Depth (m) 0.3

Values displayed on graph are daily means of duplicate samples.



Please note that parameters are consolidated in the plot where sampling methodologies may be different. Please click the "Show Details" button for more information.

+ Show Details

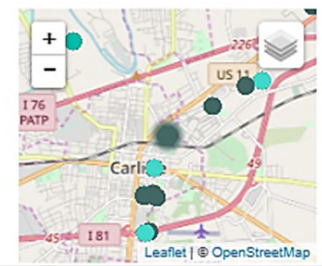
Station Profile

Description: LeTort Site 6

Location: 40.20792, -77.18104

First Sampled: November 1, 1992

Most Recent Sample: November 5, 2018



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Review

- Essential building blocks established in beginning years of project
- Put into practice and built on each other
  - Tiered Framework – QAPPs – SOPs – Methods Manuals – Rubric – Database

- Assessment and further development
  - Establish credibility
  - Ensure project sustainability
  - Publish and advertise services
  - Success stories

Questions?

Helen Schlimm
Alliance for Aquatic Resource Monitoring (ALLARM)
Dickinson College
schlimmh@dickinson.edu