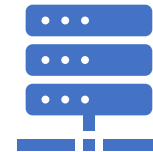


# Nontidal Network Overview

Kaylyn Gootman (EPA), Mark Nardi (USGS), and Breck Sullivan (USGS)



# Nontidal Network

## 2020 status

### EXPLANATION

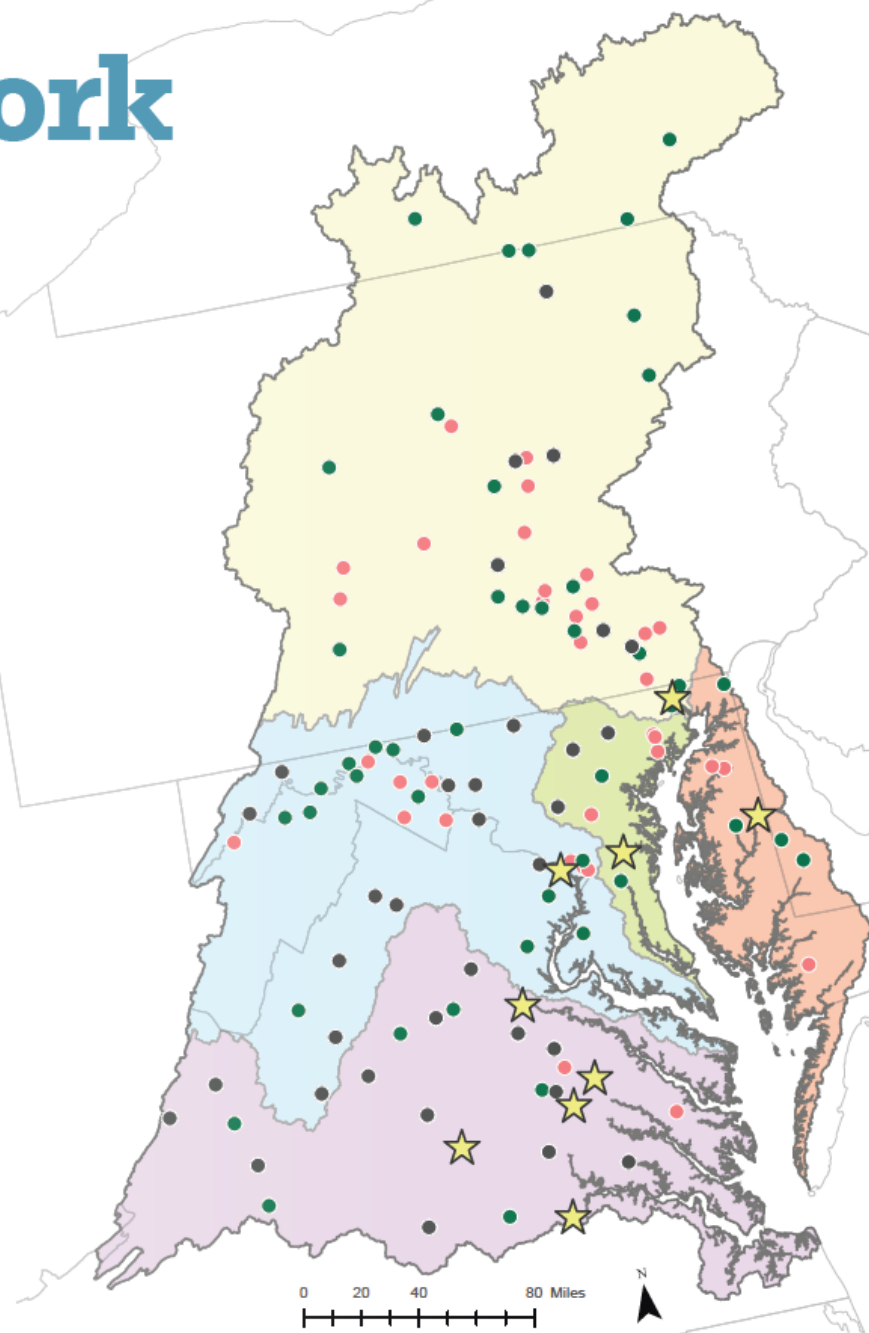
- Load-only Site
- Short-term Trend Site
- Long-term Trend Site
- ★ RIM Site

### Major Basins

- Eastern Shore
- Potomac
- Susquehanna
- Virginia
- Western Shore



BASIN	n Stations	TN Loads	TN Short	TP Loads	TP Short
SUSQUEHANNA	42	42	26	42	26
EASTERN SHORE	8	8	5	8	5
WESTERN SHORE	10	10	6	10	6
POTOMAC	37	37	28	34	22
VIRGINIA	26	26	24	16	11

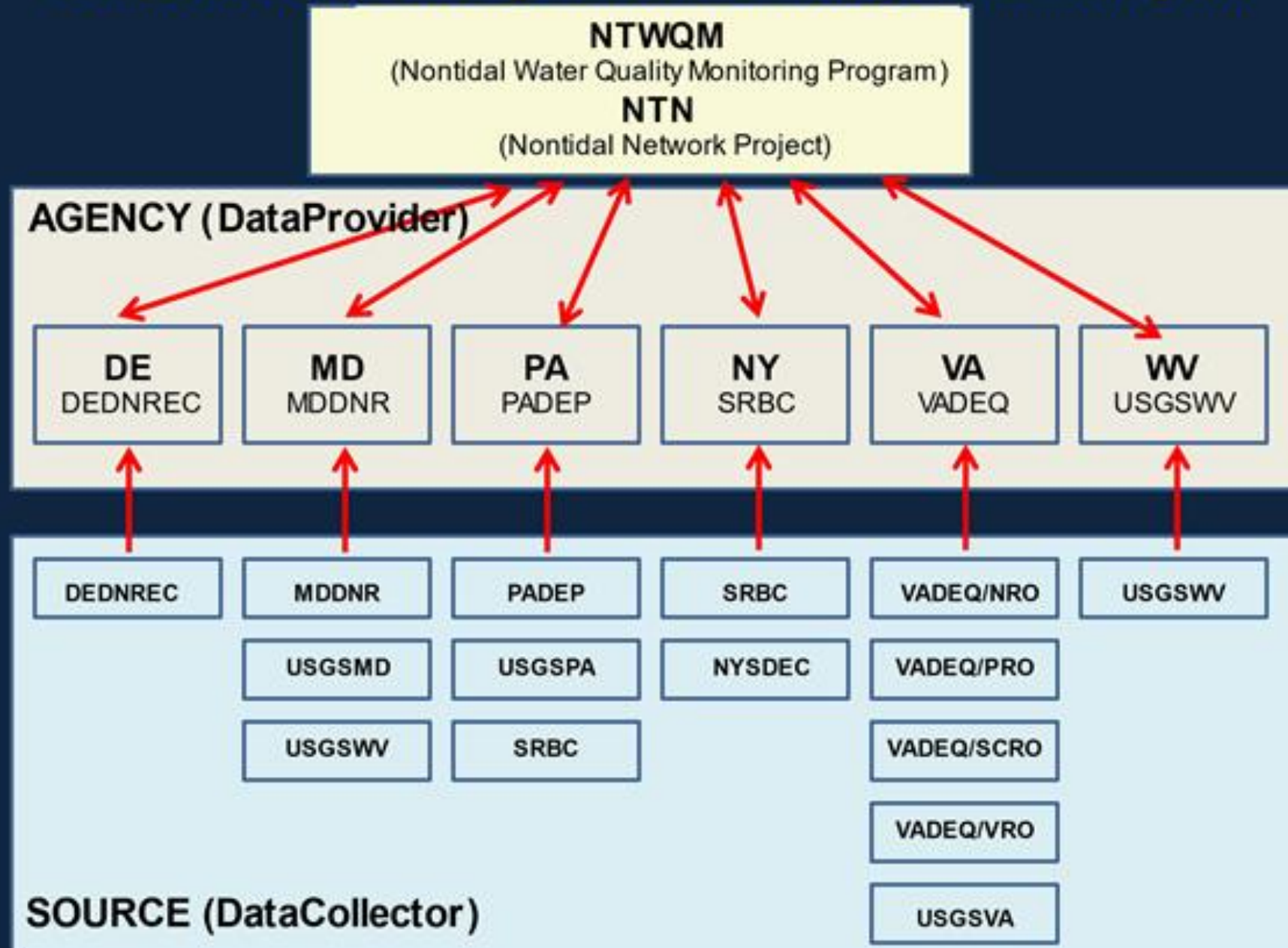


## Monitoring data provides the foundation to determine USGS load and trend results.

- Analyses are based on water-quality and stream-discharge measurements made across the NTN since 2004.
  - 123 Stations (and growing)
  - Includes 9 RIM Stations
  - > 2,400 water-quality samples collected annually
- Monitoring funding support is provided by a diverse set of federal and state partners.



## Data providers: The CBP Longterm non-tidal water quality monitoring data



Acronym Guide





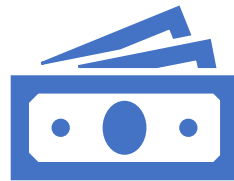
## Monitoring strengthens decision-making.

- NTN offers the most accurate representation of how CBW water-quality conditions are changing.
- Data inform CBP modeling tools.
  - Plan management activities
  - Forecast responses
- Monitoring-based insights will help explain how and why water quality is changing in the CBW.



Chesapeake Bay Program

# Current Funding of the Network

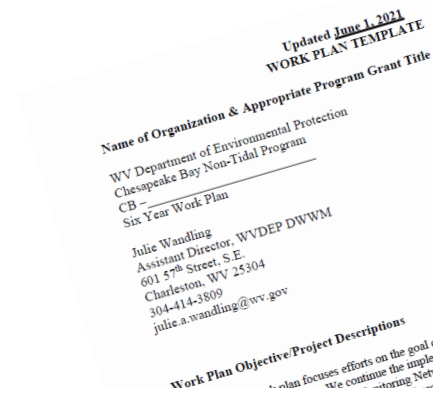


# What are we doing?

## Understanding Network Funding Relationships

We are compiling information from available documents (i.e., 117e SOWs and others) to create a relational database that can be used to understand:

- Starting with funding
- How \$s are leveraged to create and run the network
- Create easily understandable tables, charts, and maps that contain information on the site level about things like who is responsible for work components and how funding flows
- Create tables and charts that can be used to clearly communicate the complexity and cooperation required to run the network
- Aggregate information and make it available by themes like geography (watershed), funding source, political divisions, congressional district, etc.
- Can be expanded to track other non-fiscal items such as changes in analysis labs.



WORK PLAN  
Revised April 2019  
Revised May 2020  
Revised July/August 2020  
Revised April 2021  
Revised July 2022

### Name of Organization & Appropriate Program Grant Title

Maryland Department of Natural Resources Chesapeake Bay Mainstem, Shadepot  
Tidal Network Water Quality Monitoring Programs- 117(e) Technical Assistance  
Fiscal Years (FFY) 2018-2022 (July 1, 2018- June 30, 2023)

### Introduction

#### Background and History

Maryland Department of Natural Resources (DNR) is Maryland's natural resources management for the Chesapeake Bay, its tributaries, and the tidal network. DNR has been a partner with the Environmental Protection Agency (EPA) since 1982 and actively involved throughout CBP's management, work, resource analysis related committees. Within DNR, Resource Management is responsible for the State's monitoring and assessment and habitat quality and a lead role in living resource monitoring closely with other portions of DNR to complete the state's aquatic resources. DNR also works closely with 1) Maryland Department of the Environment (MDE) on regulatory aspects such as 303d listing and TMDL development and compliance monitoring; a

Name of Organization & Appropriate Program Grant Title  
VADEQ Chesapeake Bay Monitoring Program CWA 117 (e)(1)(B)  
Five Year Grant Workplan for 7/1/2020 – 6/30/2025

### Introduction

The work being conducted under this grant is a continuation of work conducted under previous grants with the goal of assisting management in tracking the effectiveness of point and non-point source programs aimed at restoring the Chesapeake Bay through nutrient and sediment reductions and in tracking progress toward the achievement of living resource, water quality, habitat goals and the Chesapeake Bay TMDL 2-year milestones.

The objectives of the Program are:

- 1) Characterize the present
- 2) Determine long-term trends
- 3) Achieve an understanding
- 4) Provide data for input

Overall quality assurance a  
Plan (Quality Management)

Estimated: \$2,211,000 - \$1,258,000

WORK PLAN TEMPLATE FOR CBPO ASSISTANCE AGREEMENTS	
Organization Name:	PA Department of Environmental Protection (PA-DEP)
Program/Grant Title:	Enhanced Monitoring to Improve the Assessment of Sediment and Nutrient Load Reductions to Support the Chesapeake Bay Program (CBP)
Grant #:	
Project Period:	7/1/22-6/30/27
Place of Performance:	Towanda, Pennsylvania(18848); Danville, Pennsylvania(17821); Marietta, Pennsylvania(17547); Wilkes-Barre, Pennsylvania(18701); Lewisburg, Pennsylvania(17837)
Strategic Plan Linkage:	2022-2026 Strategic Plan ( <a href="https://www.epa.gov/plannandbudget/strategicplan">https://www.epa.gov/plannandbudget/strategicplan</a> )
Goal 5 - Ensure Clean and Safe Water for All Communities	Objective 5.2: Protect and Restore Waterbodies and Watersheds

### Introduction

PADEP has been coordinating the collection of 41 Chesapeake Bay Non-Tidal Network (CBP-NTN) sites since 2005 or after. These 41 NTN sites form an integral component of the water-quality monitoring sites since 2005 or after. These 41 NTN sites are operated by a consortium of six state and federal agencies, US Geological Survey (USGS), and Susquehanna River Basin Commission (SRBC). Of the 41 sites PADEP coordinates, 34 are funded by this grant of which PADEP subcontracts with USGS for 8 sites to USGS. The other 7 sites are funded by sources other than this grant.

### SCOPE OF WORK

#### Monitoring Network Analysis and

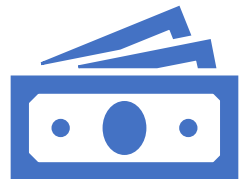
#### Period 10/1/2022-09/30/2023

#### Appropriated Funding

Overview	1
Annual Data Compilation and Enhanced Analysis, Delivery, and Interpretation of	3
Information from the CBP Nontidal Monitoring Network	6
District of Columbia Nontidal Monitoring Network	9
Maryland Nontidal Monitoring Network	12
Pennsylvania Nontidal Monitoring Network	14
Virginia Nontidal Monitoring Network	18
West Virginia Nontidal Monitoring Network	20
Appendix	

This SOW details work that will be accomplished by the USGS with EPA funding support from two EPA sources: 1) EPA Annual Appropriations and 2) Infrastructure Act and sub-sections. The amount funded under regular EPA annual appropriations is \$853,858.

The activities within this SOW are coordinated through the Chesapeake Bay Partnership's Science and Technical Analysis and Reporting group. The activities shown herein have been determined to be necessary for the successful implementation of the Chesapeake Bay Partnership's Science and Technical Analysis and Reporting group.

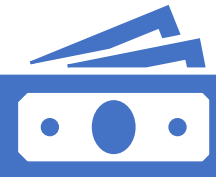
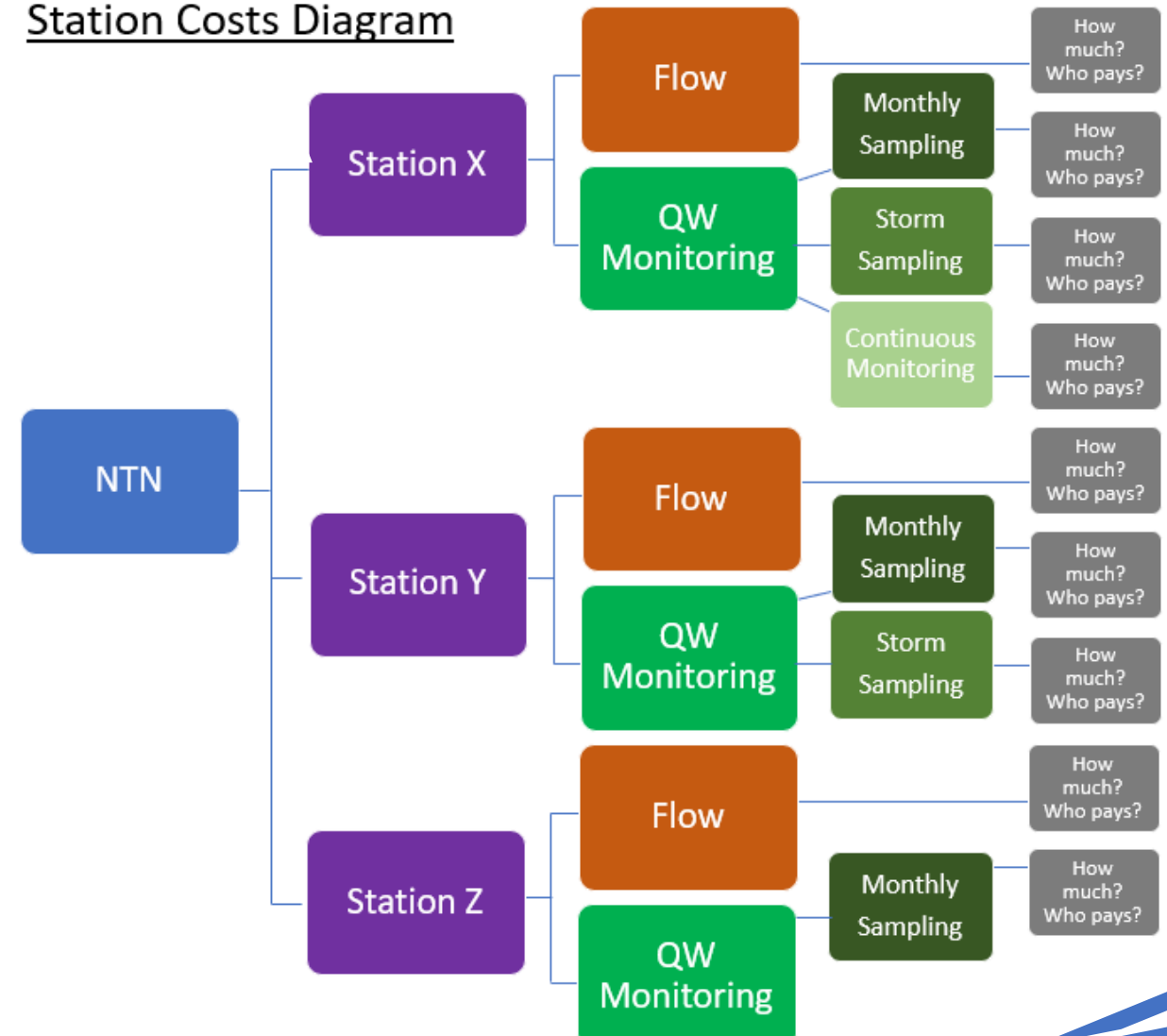


# Why Are We Doing This?

The information we're compiling will help us to:

- Demonstrate how \$ are leveraged
  - The NTN is really a network built on networks of funding
  - This leads to a situation where funding sources and importance of funders may be somewhat opaque
- Create communication tools that allow us to more easily and clearly talk about the importance of all partners to the sustaining the network
- Track, possibly forecast, and hopefully adjust for funding and responsibility changes that may befall the network

Station Costs Diagram

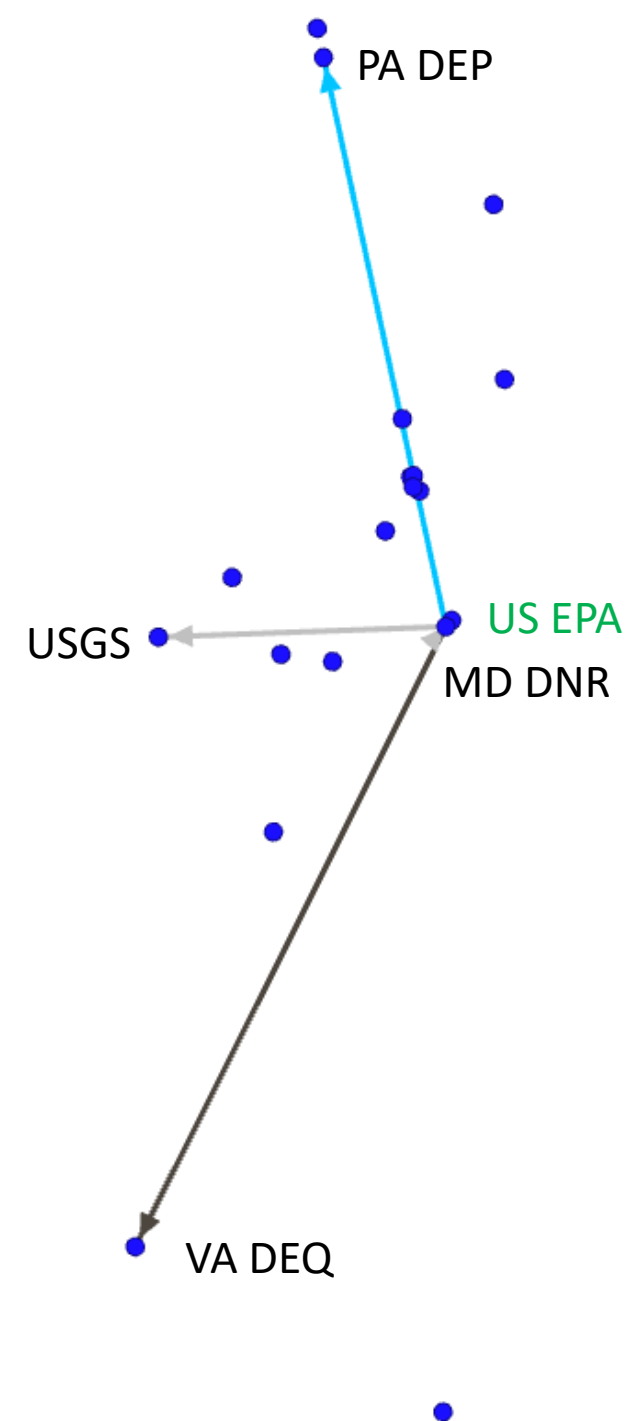




# Simple Funding Diagram

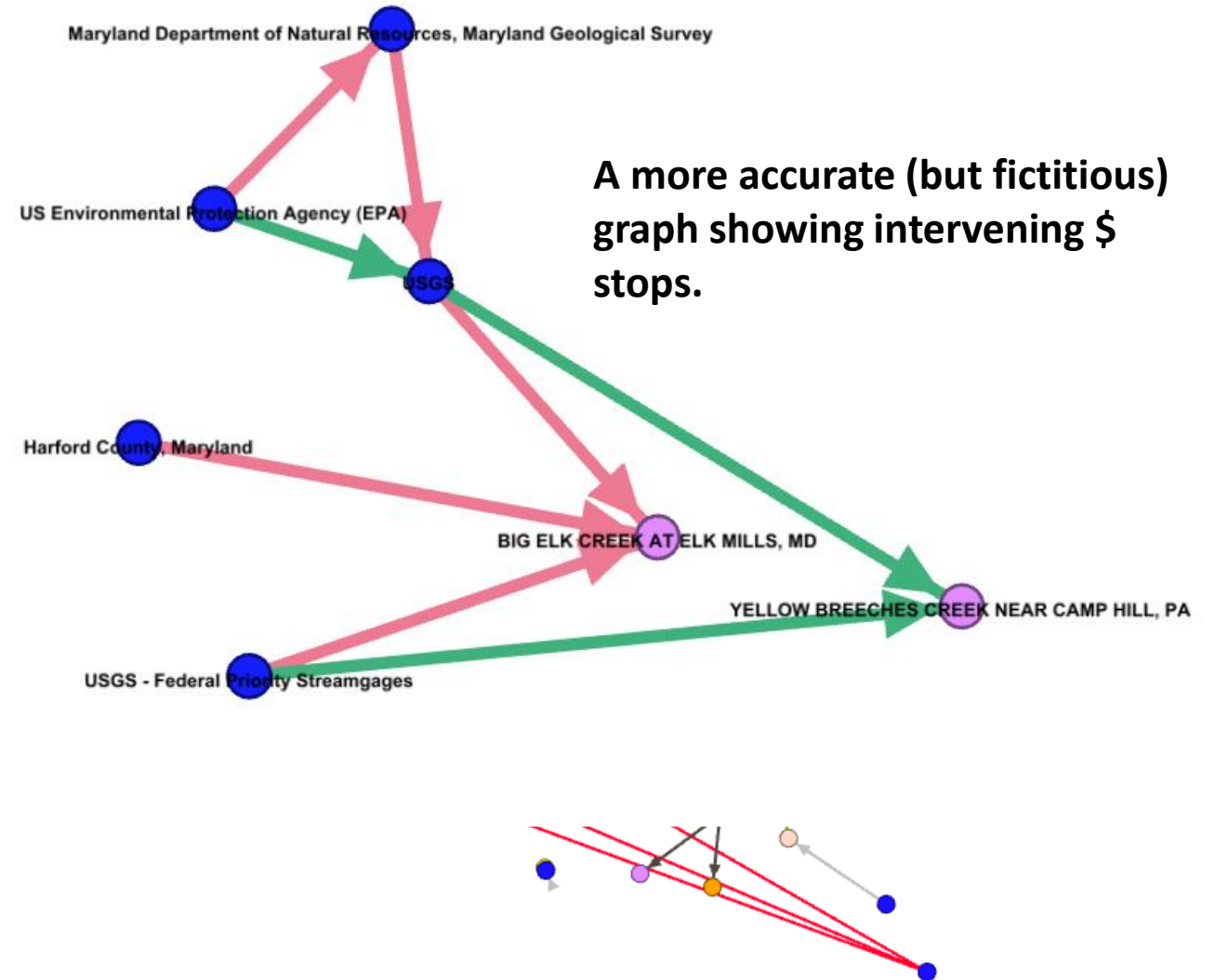
(Locations plotted using lat, longs)

- We're looking at using multiple ways to look at how funding money flows through the network to stations
  - Graphical
  - Tabular
- This simple example shows NTN monitoring funds moving from US EPA (green text) to IA grant recipients, in this case MD DNR, VA DEQ, PA DEP, and USGS
- The remaining blue dots represent other NTN funders (such as US Army Corps of Engineers - Norfolk District, Harford County MD, and the Town of Farmville, VA) that do not receive EPA funding for the NTN.



# Funding Diagram

- This graph shows entities that are involved in funding the NTN
- Arrows originate at the funding sources (blue points) and end at the stations they support (purple, yellow, orange, and taupe)
- Arrows are color coded by agency:
  - Orange – US EPA
  - Red – US ACE
  - Black – VA DEQ
  - Purple – USGS
  - Light Blue – PA DEP
  - Green – MD DNR
  - Additional colors that can't be seen well are for entities like counties and towns whose funding is more localized
- In order to easily see funding connections this is a simplified view of the funds flow and doesn't show intervening \$ stops (i.e. in reality USACE pays USGS for gear services).



# Prototype Reports

## 117e and NTN Sites - Funding Report Example

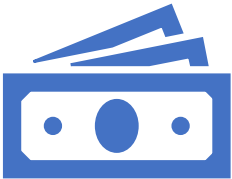
Funding Lines are From USGS SIFTA and Do Not Include Partner Information

STAID	Station Name	Customer Name	USGS CMF\$	USGS Approp\$	Cooperator\$	Data Collected
1570500	SUSQUEHANNA RIVER AT HARRISBURG, PA	Load	NTN			
QW Sampling: , Strm Flow: USGS, Cont. Montr: USGS						
Pennsylvania Department of Environmental Protection, Bureau of Clean Water			\$769	\$0	\$3,845	Water Quality, Continuous
Constellation Energy Generation, LLC			\$0	\$0	\$7,485	Full Range Streamflow Station
Pennsylvania Department of Environmental Protection, Bureau of Safe Drinking Water			\$2,100	\$0	\$4,725	Full Range Streamflow Station
USGS - Federal Priority Streamgages			\$0	\$4,770	\$0	Full Range Streamflow Station
Station Subtotals:			\$2,869	\$4,770	\$16,055	Station Total: \$23,694
1648010	ROCK CREEK AT JOYCE ROAD, WASHINGTON, DC	Load	NTN			
QW Sampling: USGS, Strm Flow: USGS, Cont. Montr: USGS						

### NTN Funding By Participant, Including Leveraged \$\$

Participant Name	Description	Sum of Cooperator \$s	Sum of USGS Match \$s	Sum of USGS Approp \$s
Baltimore County, Maryland				
	Full Range Streamflow Station	\$11,149.00	\$5,911.00	\$0.00
Brookfield Renewable Energy Group - Safe Harbor				
	Full Range Streamflow Station	\$8,395.00	\$0.00	\$0.00
Charles County				
	Water Quality, Measurement	\$52,840.00	\$26,240.00	\$0.00
City of Baltimore				
	Full Range Streamflow Station	\$17,060.00	\$0.00	\$0.00
City of Newport News, VA				
	Add Temp,Cond to gage	\$5,810.00	\$0.00	\$0.00
	Full Range Streamflow Station	\$12,100.00	\$4,100.00	\$0.00
Constellation Energy Generation, LLC				
	Full Range Streamflow Station	\$24,545.00	\$0.00	\$0.00
Department of Energy and Environment				
	Full Range Streamflow Station	\$11,140.00	\$5,920.00	\$0.00
	Periodic Sample Collection and Processing	\$124,400.00	\$0.00	\$0.00
Harford County, Maryland				
	Full Range Streamflow Station	\$49,056.00	\$2,124.00	\$0.00
	Periodic Sample Collection and Processing	\$160,055.45	\$11,829.55	\$0.00
	Water-Quality Monitor, Continuous (Two Bridges)	\$46,000.00	\$0.00	\$0.00

Montgomery County	\$0	\$0	\$17,060	Full Range Streamflow Station
US Environmental Protection Agency (EPA)	\$0	\$0	\$14,657	Periodic Sample Collection and Pro
Montgomery County	\$0	\$0	\$25,000	Water Quality, Continuous
Department of Energy and Environment	\$0	\$0	\$40,000	Periodic Sample Collection and Pro
Montgomery County	\$32,974	\$0	\$77,123	Periodic Sample Collection and Pro
Station Subtotals:	\$32,974	\$0	\$173,840	Station Total: \$206,814
	USGS CMF\$	USGS Approp\$	Reimburs\$	
Grand Totals:	\$319,858	\$641,340	\$2,061,132	



# An Example of Network Cooperative Funding Complexity

1673800 PO RIVER NEAR SPOTSYLVANIA, VA Load and trend NTN

QW Sampling: VA DEQ, Strm Flow: USGS, Cont. Montr:

Virginia Department of Environmental Quality	\$0	\$0	\$340	Discharge, Continuous, Furnished
Station Subtotals:	\$0	\$0	\$340	Station Total: \$340

2011500 BACK CREEK NEAR MOUNTAIN GROVE, VA Load and trend NTN

QW Sampling: VA DEQ, Strm Flow: USGS, Cont. Montr: USGS

US Army Corps of Engineers - Norfolk District - Data Gaging Program	\$0	\$0	\$3,010	Water Quality, Continuous
US Army Corps of Engineers - Norfolk District - Data Gaging Program	\$0	\$0	\$16,200	Full Range Streamflow Station
Station Subtotals:	\$0	\$0	\$19,210	Station Total: \$19,210

2) What will be accomplished during the current grant cycle?

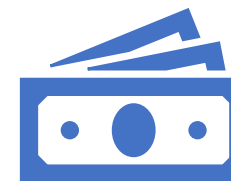
Table 1) RIM Sites

USGS STATION ID	DESCRIPTION	CBP Type
01668000	Rappahannock River at Fredericksburg, VA	Primary
01674500	Mattaponi River near Beulahville, VA	Primary
01673000	Pamunkey River near Hanover, VA	Primary
02037618	James River at Boulevard Bridge at Richmond, VA	Primary
02041650	Appomattox River at Matoaca, VA	Primary
02035000	James River near Cartersville, VA	Primary

Virginia Department of Environmental Quality (DEQ) maintains a collection of 35 NTN water-quality and streamflow monitoring sites throughout the state; of those 34 sites, 24 are operated as primary sites (both monthly samples, and targeted storm samples), and 11 are operated as secondary sites (monthly samples only). The network is jointly operated by DEQ with the USGS Virginia Water Science Center, and is an integral component of the larger CBP NTN operated by a large consortium of federal, state, and local partners. At the Primary sites each year, monthly samples are collected, as well as at least 8 storm samples. At the Secondary sites, only monthly samples are collected. Streamflow is collected continuously at all sites. In general, DEQ collects water-quality samples at the Secondary sites, and the USGS Virginia Water Science Center collects water-quality

Table 3) Remaining NTN Sites Sampled by DEQ (Secondary sites)

USGS STATION ID	DESCRIPTION	CBP Type
01626000	South River near Waynesboro, VA	Secondary
02011500	Back Cr. near Mountain Grove, VA	Secondary
02041000	Deep Cr. near Mannboro, VA	Secondary
02031000	Mechums River near White Hall, VA	Secondary
02024000	Maury River Near Buena Vista, VA	Secondary
01665500	Rapidan R. Rt. 29, VA	Secondary
01666500	Robinson River near Locust Dale, VA	Secondary
01671100	Little River near Doswell, VA	Secondary
01673800	Po River near Spotsylvania, VA	Secondary
02015700	Bullpasture River at Williamsville, VA	Secondary
02020500	Calfpasture River above Mill Cr. At Goshen, VA	Secondary

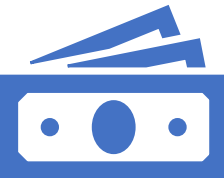




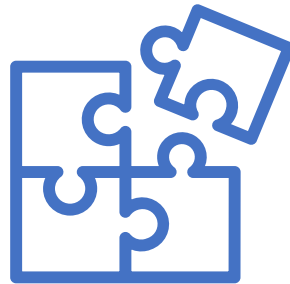
# What's Missing?

Information not contained in the 117e SOW and award documents (examples, there are more gaps than listed here):

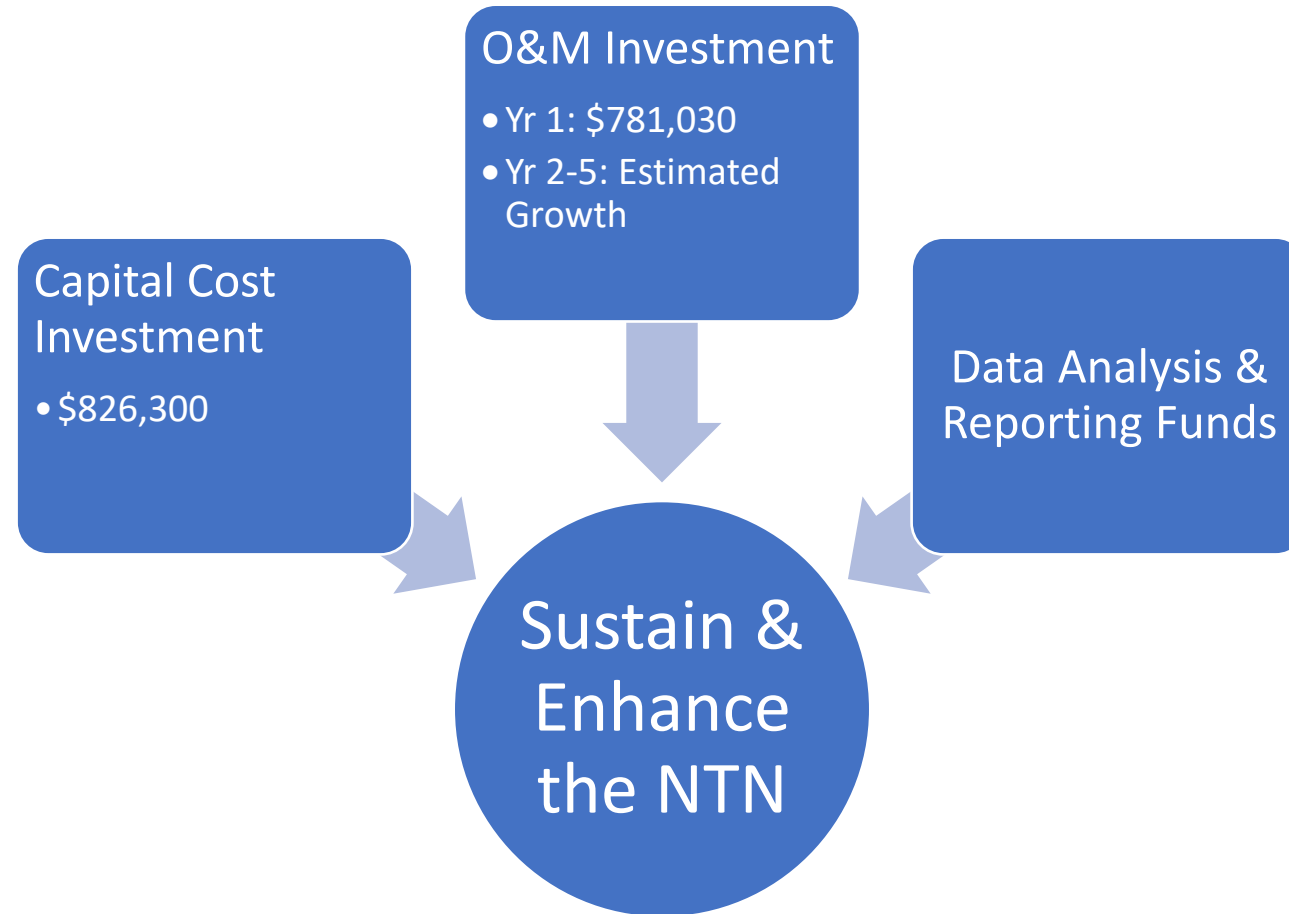
- States match contributions to the 117e agreements
- We don't know on a per station basis how much match is provided by the states
  - Maybe we'll never be able to tease this out. Might be possible to produce an estimate?
- 117e agreements don't track sub-allocation amounts. For instance, how much does PA DEP pay SRBC to maintain stations. Does SRBC contribute match?
- Do unrealized match opportunities exist?
- We'd like to work with the States to obtain as much of this type of missing information as possible



# Monitoring Recommendations



# Monitoring Report Recommendations



# New Monitoring Investments Provide Value-Add Information

CBP NETWORK	Project	CATEGORY	Award Entity	FUNDING				
				Year 1	Year 2	Year 3	Year 4	Year 5
NTN	6 Unique Projects	Operation & Maintenance	USGS, PA DEP	\$503,460	\$702,360	\$485,191	\$502,724	\$520,990
Funder				EPA, PA DEP	EPA, PA DEP	EPA	EPA	EPA
NTN	7 RIM Con-Mon sensor packages completes RIM	Infrastructure	USGS IA- MD	\$325,000				
Funder				EPA				
NTN	5 new Small Watershed ConMon locations. 6 sensor instrument	Infrastructure	USGS IA	\$375,000				
Funder				EPA				
NTN	3 Lower Susquehanna Reservoir input ConMons <i>PA USGS cost basis</i>	Infrastructure	NA	\$126,300				
Funder				PA DEP				

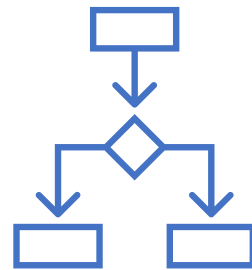


# New Monitoring Investments Provide Value-Add Information

CBP NETWORK	Project	CATEGORY	Award Entity	FUNDING				
				Year 1	Year 2	Year 3	Year 4	Year 5
NTN	6 Unique Projects	Operation & Maintenance	USGS, PA DEP	<u>Maintain Current Network</u> O&M Funds				
Funder								
NTN	7 RIM Con-Mon sensor packages completes RIM	Infrastructure	USGS IA- MD	\$325,000				
Funder				EPA				
NTN	5 new Small Watershed ConMon locations. 6 sensor instrument	Infrastructure	USGS IA	\$375,000				
Funder				EPA				
NTN	3 Lower Susquehanna Reservoir input ConMons <i>PA USGS cost basis</i>	Infrastructure	NA	\$126,300				
Funder				PA DEP				



# Other Outcomes



# This Level of Monitoring Network Analysis...



Builds transparent information for stakeholders



Provides tools to sustain and grow support for desired outcomes



Allows for leveraging and integrating resources to their full potential



Communicates the value of collaboration



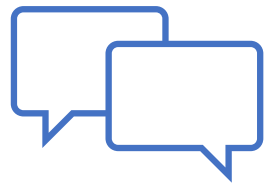
Supports data-driven decision making



Maintains and enhances (and sustains) the networks



# Discussion



# Discussion Questions

- Are any of the technical aspects of the recommendations unclear?
- Is there something else about the current funding you'd like to better understand?
- Which recommendations is your agency willing to partner on supporting? (Jamboard)
- Which CBP outcomes does your agency have interest in better coordinating monitoring or addressing other needs? (Jamboard)
- How can we sustain the networks when the infrastructure money goes away in 2025?
- Short discussion on ideas for next steps

[JAMBOARD LINK](#)

# What's Missing?

Information not contained in the 117e SOW and award documents (examples, there are more gaps than listed here):

- States match contributions to the 117e agreements
- We don't know on a per station basis how much match is provided by the states
  - Maybe we'll never be able to tease this out. Might be possible to produce an estimate?
- 117e agreements don't track sub-allocation amounts. For instance, how much does PA DEP pay SRBC to maintain stations. Does SRBC contribute match?
- Do unrealized match opportunities exist?
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