



University of Maryland  
CENTER FOR ENVIRONMENTAL SCIENCE  
INTEGRATION AND APPLICATION NETWORK

CMC  
Chesapeake Monitoring  
Cooperative

# Collaborative team science supports integrative research in the Chesapeake Bay

Science of Team Science Conference  
Galveston, Texas  
May 22, 2018



Suzi Spitzer  
*PhD student*



# Presentation Overview

- Background information
- My research objective
- Comparing goals
- Aligning needs and interests
- Where can we go from here?



# What makes the Chesapeake Bay special?

- Valuable natural resource
  - Culturally rich landscape
  - Significant human impacts
  - Complex management
  - Long research history
  - Environmental citizens
- 

# What is citizen science?

“Projects in which volunteers partner with scientists to answer real-world questions”

(Cornell Lab of Ornithology)





# Introducing: the Chesapeake Monitoring Cooperative

“Integration of Citizen-based Monitoring and Nontraditional Monitoring Partners into the Chesapeake Bay Program Partnership”



**Chesapeake Bay Program**  
*A Watershed Partnership*



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# Come one, come all!

To be successful, scientists must convince monitoring groups to join the Cooperative

How can scientists engage volunteers?



# Come one, come all!

To be successful, scientists must convince monitoring groups to join the Cooperative

How can scientists engage volunteers?

**People monitor for different reasons!**

Understand everyone's monitoring goals in order to engage volunteers



# Citizen scientists' goals

“Why do you monitor?”

- 93 free-response survey answers
- Coded into 9 distinct themes



# Citizen scientists' goals

30%

Learn about the environment and  
educate community members

- “Learn about our waters”
- “Create educational opportunity with students”
- “Promote community understanding of watershed”



# Citizen scientists' goals

30%

Learn and educate

27%

Monitor restoration progress

25%

Address general concern for habitat

22%

Establish baseline data

20%

Identify impaired waters



# Citizen scientists' goals

**30%**

Learn and educate

**27%**

Monitor restoration progress

**25%**

Address general concern for habitat

**22%**

Establish baseline data

**20%**

Identify impaired waters

**18%**

Monitor longitudinal trends

**16%**

Assess health and recreation risks

**16%**

Engage community

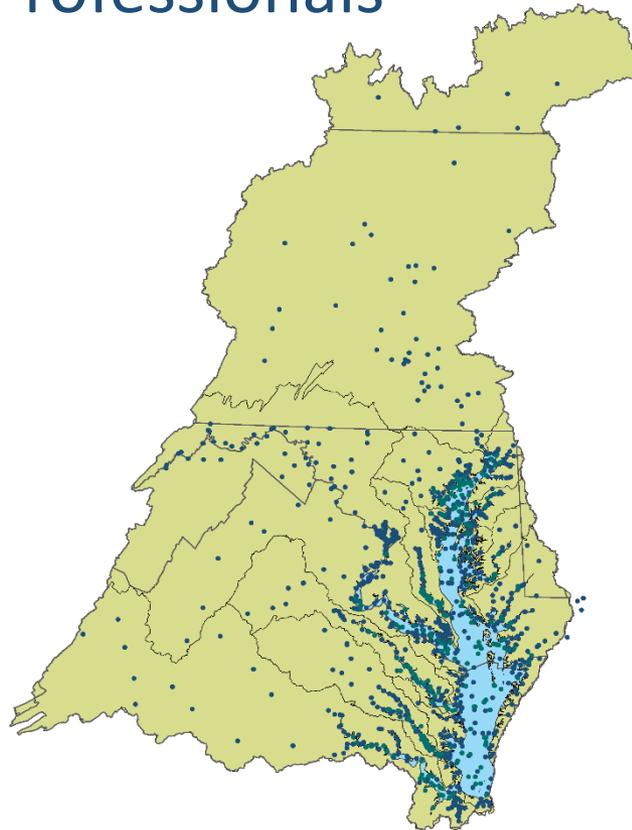
**12%**

Collect data for scientists

# Professional scientists' goals

Data collected by:

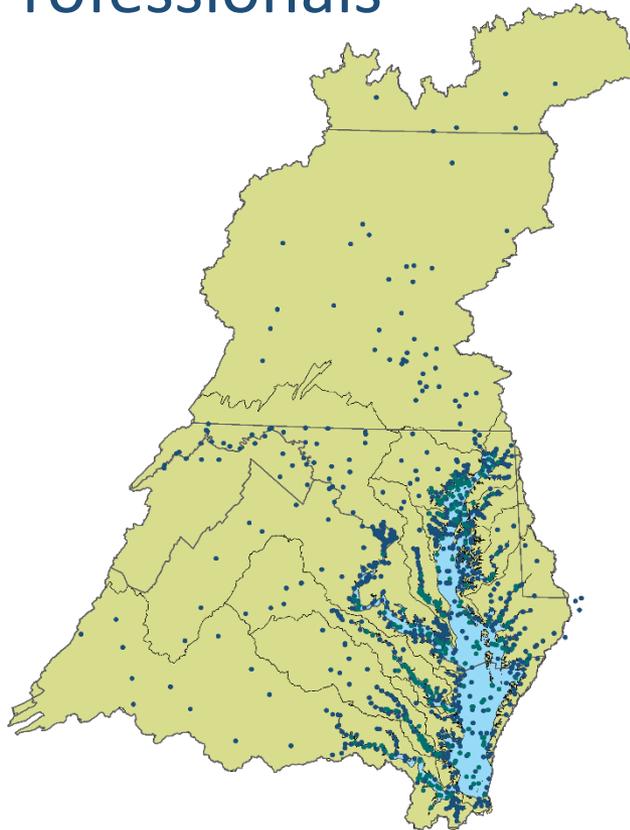
Professionals



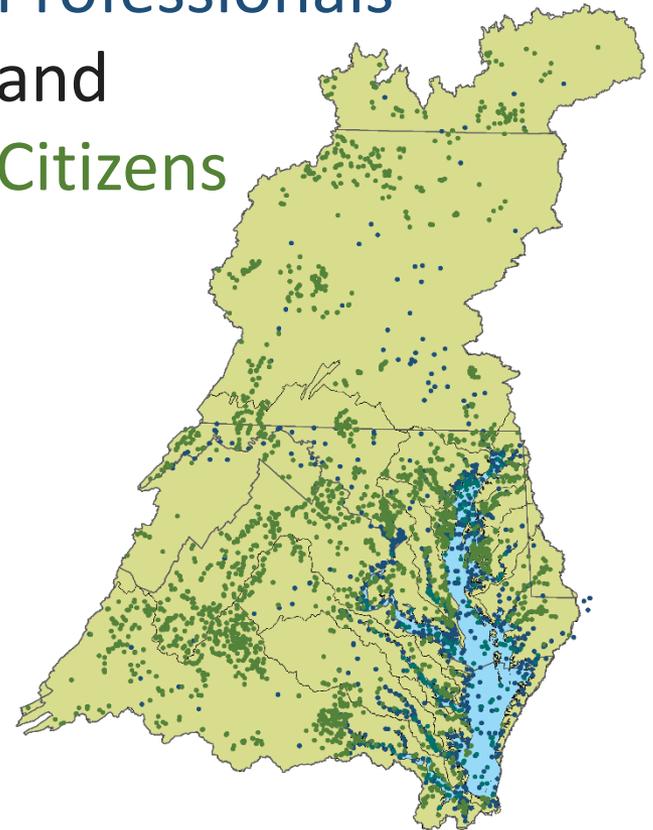
# Professional scientists' goals

Data collected by:

Professionals



Professionals  
and  
Citizens





# Professional scientists' goals

“Why do you monitor?”

- Inform management and policy
- Measure restoration progress
- Identify impaired waters
- Stimulate public action
- Protect environment for posterity



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**So, where do citizen scientists come in?**





# Professional scientists' goals

“Why do you work with citizen scientists?”

## Data

- “Expand the monitoring network”
- “Fill in gaps”
- “On-the-ground knowledge”

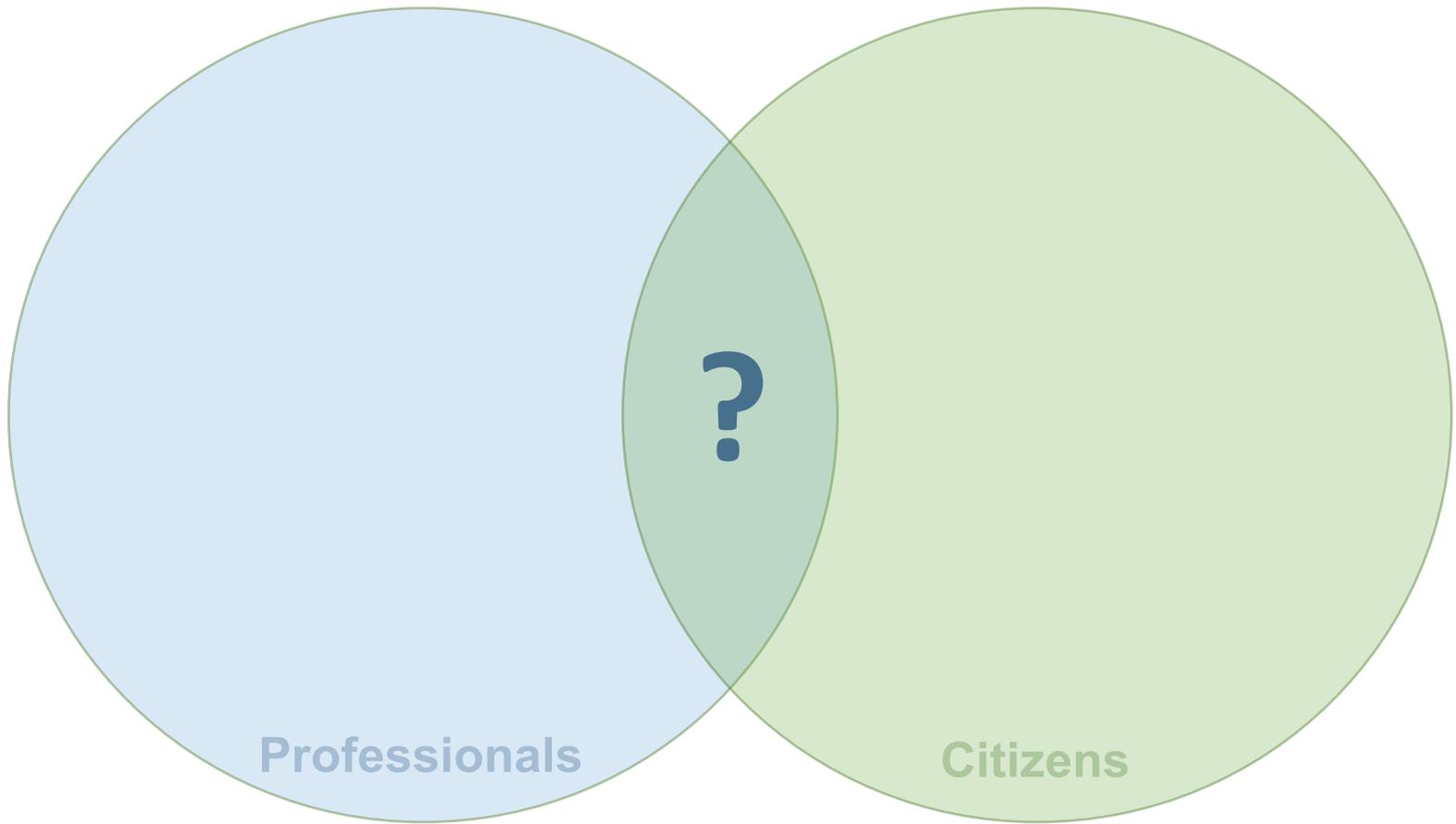
## Educate and Engage

- “Get people to learn”
- Teachers are “bang for your buck”
- Volunteers are “Effective partners”
- Promote “Connection with environment”



“It seems like there’s a logical progression from someone who **knows almost nothing** about their environment but **has an interest** in it... to **becoming a citizen scientist** and taking some action monitoring some bit of information, and then **once they have that knowledge** and data, then the volunteers- and their families and everybody they know- can **do something with what they learned.**

**Citizen science is really important.”**



**Professionals**

**Citizens**

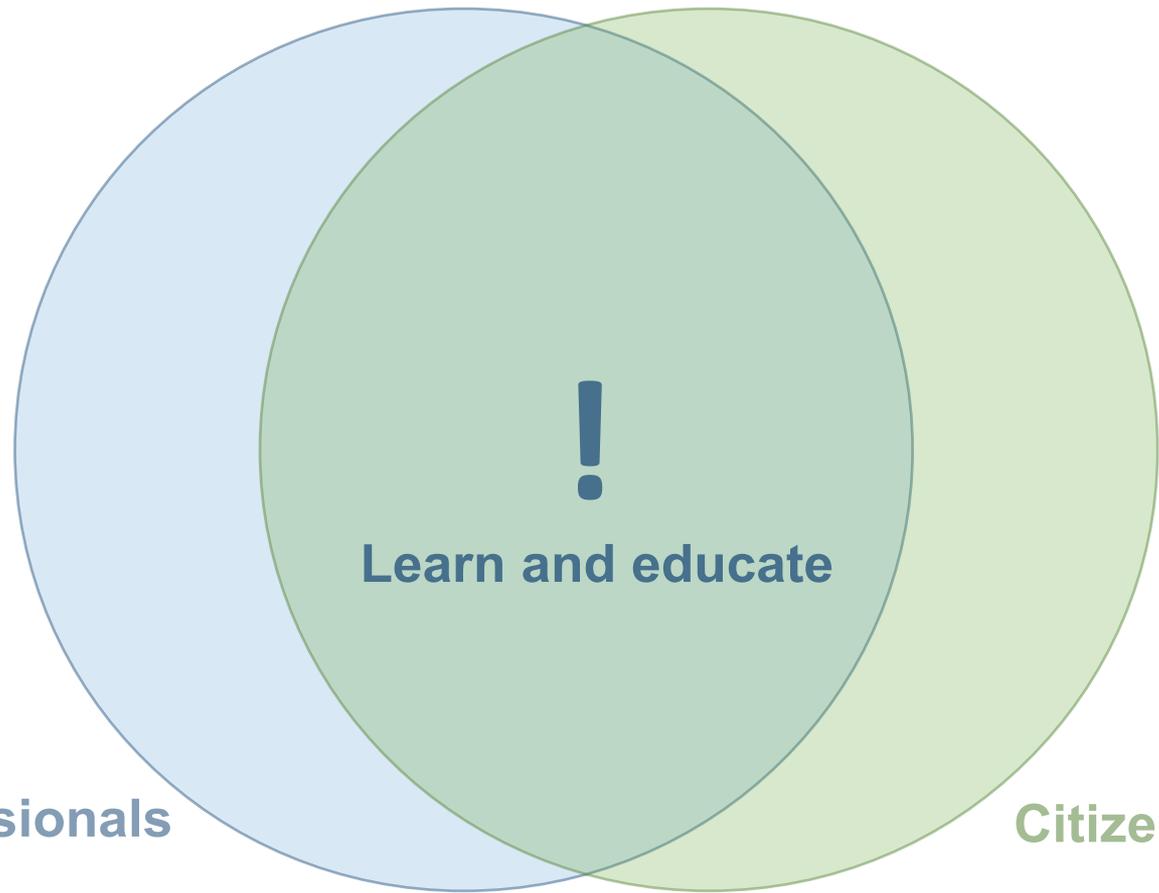
**?**



**Professionals**



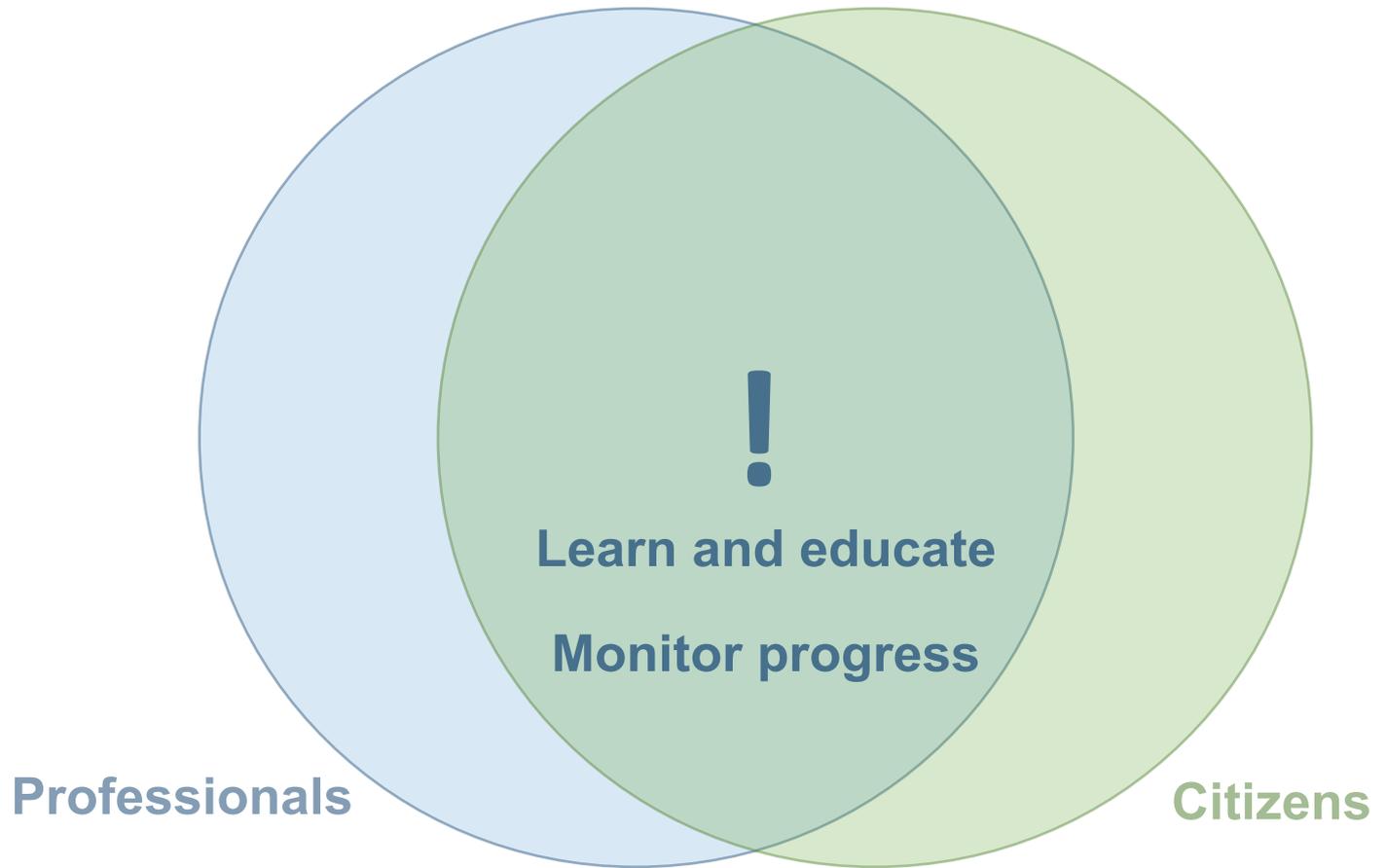
**Citizens**

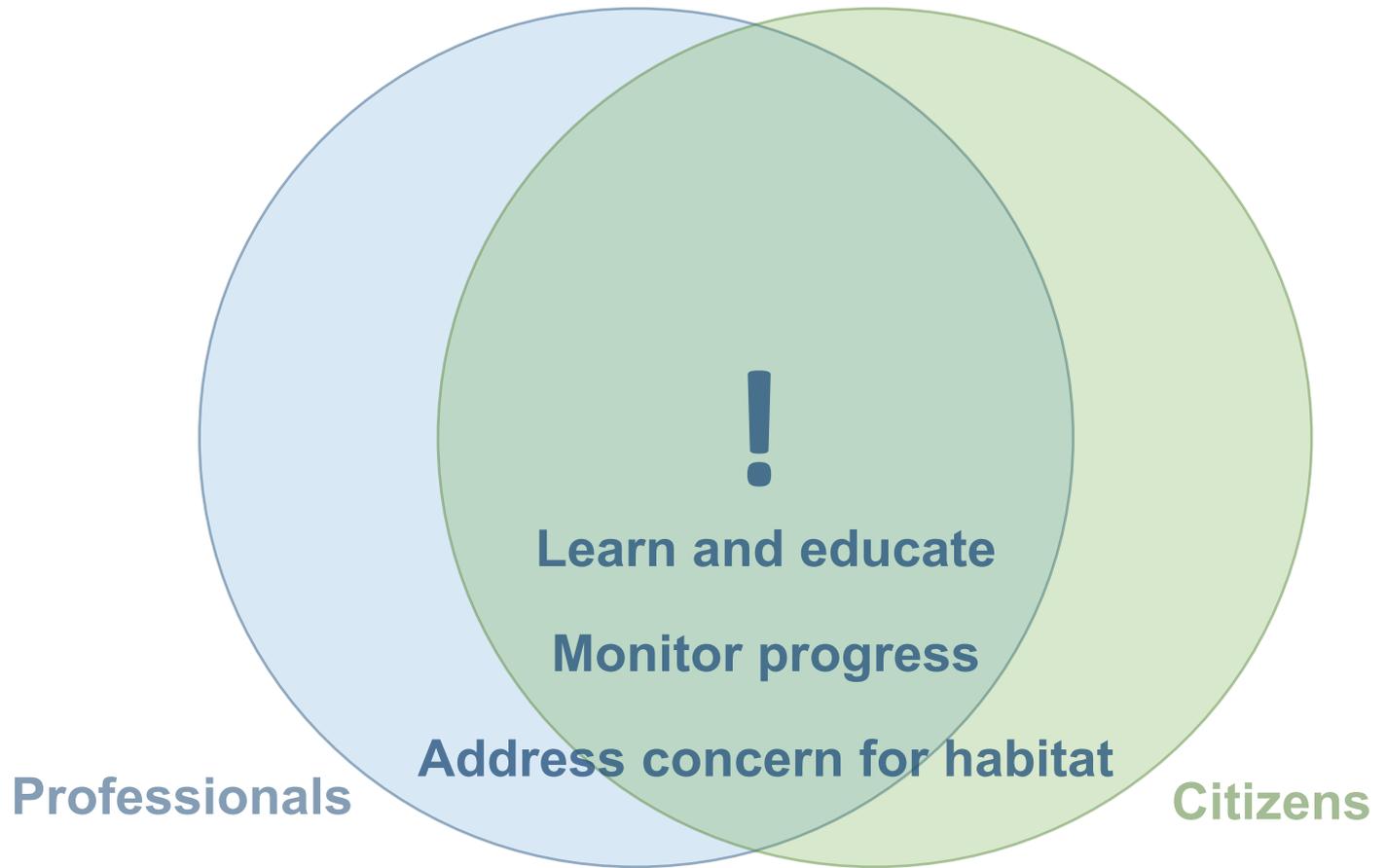


**Professionals**

**Citizens**

**Learn and educate**







**Citizen scientists and professional scientists have overlapping goals.**

Professionals

Citizens

How can we move forward from here?

# Identifying potential strategic partnerships

Key Action	Performance Target(s)	Participating Entity	Geographic Location	Timeline	Does CMC objective match key action and	Possible partners
1. Provide a valued forum for mutual learning and exploration	Continue meeting 2-4 times a year and at meetings continue hosting Case Study	Maintain Healthy Watersheds GIT	N/A	Jan 2016 - Dec 2017	No	
	Provide leadership as GIT Chair, Vice-Chair, Coordinator and Staff	TNC, MDP, USGS and CRC (respectively)	N/A		No	n/a
	Host Youth Fair for Environmental Education	DOEE, DCPS, DCPCS, Non-profits	Anacostia Park	May-16	No	Audubon Naturalist Society, Anacostia Watershed Society
	Continue to participate in the Bay Hold a PA Riparian Forest Buffer Summit	MDE, MDP, DNR DCNR and DEP	Statewide Bay-wide	Jul 2018 2016	No	PA groups
2. Develop information resources and support communications	Provide messages and resources to CBP Communications staff	Maintain Healthy Watersheds GIT			Yes	CMC project team
2. Develop information resources and support communications	Share presentations, slides, pictures, graphics, to help partner agency staff	Maintain Healthy Watersheds GIT			Yes	CMC project team
2. Develop information resources and support communications	RiverSmart Homes Flyer Distribution	DOEE	DC	current -	No	Audubon Naturalist Society, Anacostia Watershed Society
2. Develop information resources and support communications	Increase communication so that federal programs and agencies are more protective	MDE, DNR, MDP	Statewide		Yes	CMC project team
2. Develop information resources and support communications	Develop public outreach strategy that considers landowners' interests and values	DCNR and DEP	Statewide	2017	No	some groups

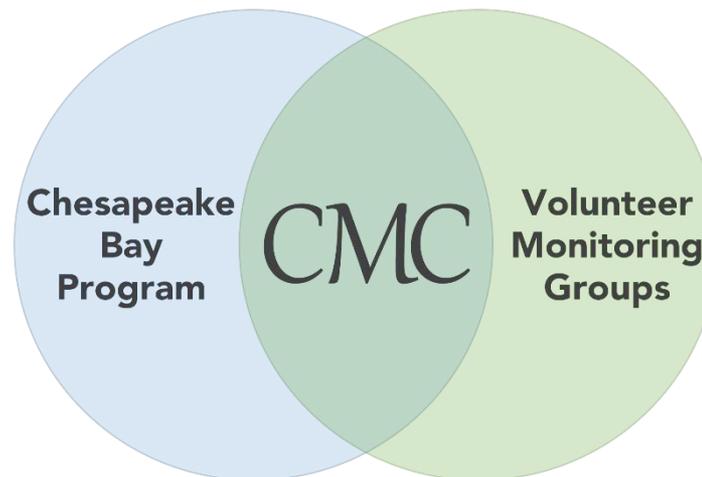
# What can the matrix do?

1. Understand scientists' research objectives and data needs.



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# What can the matrix do?

1. Understand scientists' research objectives and data needs.
2. Identify existing and potential areas of overlap in goals and data needs
3. Inspire additional monitoring to fill gaps



# How can scientists engage volunteers?

Short answer:

**Effective communication!**

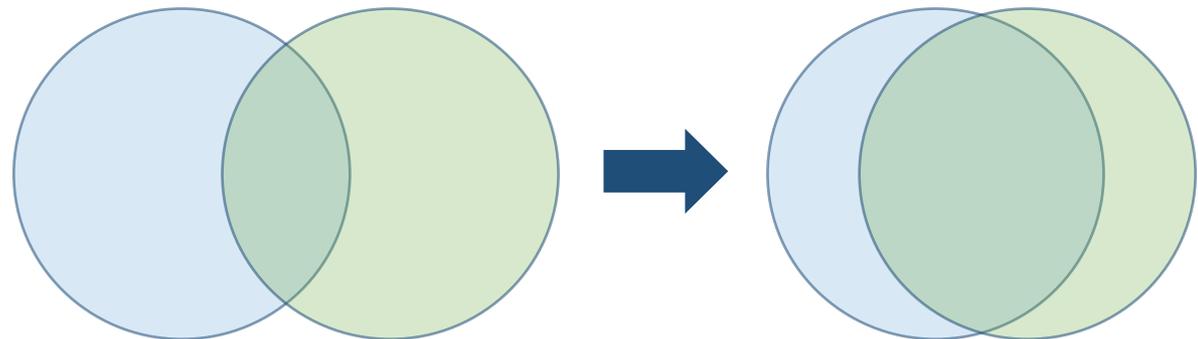


# How can scientists engage volunteers?

1. Listen to volunteers and encourage them to collect data to answer their questions.

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# How can scientists engage volunteers?

1. Listen to volunteers and encourage them to collect data to answer their questions.
2. Communicate scientific goals in a way that highlights consensus.
3. **Emphasize how the CMC supports volunteers in reaching their goals**

# How can scientists engage volunteers?

**AIR & WATER TEMPERATURE**

**What are air & water temperatures?**

Temperature measures how hot the water, soil, or air is. Water is cooling, or how much energy this has.

The development of this report was supported through a cooperative agreement with Chesapeake Bay Program AG2-070201911 - Clean and Nontraditional Methods.

**Prioritization Report: How volunteer and nontraditional monitoring**

**What is the Chesapeake Bay CMC?**

The Chesapeake Bay CMC is a program of leading environmental organizations and individuals that work together to monitor and improve the health of the Chesapeake Bay. The CMC is a public-private partnership that works to improve the health of the Chesapeake Bay. The CMC is a public-private partnership that works to improve the health of the Chesapeake Bay.

**Who can get involved?**

- Any group with a water quality interest
- Schools
- Churches
- Businesses
- Local and regional organizations
- State and federal agencies
- Non-profit organizations
- Individuals

**Why should you get involved?**

- Free water quality monitoring training
- Assistance in securing monitoring stations
- Technical support to establish and maintain a monitoring program
- Free data interpretation and report card development workshops
- Use of the user friendly database for storing and analyzing water quality data

**How can you get involved?**

Visit [www.chesapeakebay.net](http://www.chesapeakebay.net) to contact us or the Training for our newsletter and get information about trainings.

## What can the CMC provide for me?

- ✓ Educational materials
- ✓ Methods manuals
- ✓ Quality assurance plans
- ✓ Public database
- ✓ Training in:
  - ★ Data collection protocol
  - ★ Data management
  - ★ Science communication

**MACROINVERTEBRATE IDENTIFICATION**

Non-tidal Benthic Macroinvertebrates (NBM)      Tidal Macroinvertebrates (TM)

Common Nomenclature Caddisfly      Caddisfly

Major Caddisfly      Major Caddisfly

**Standard Operating Procedures for Non-tidal Monitoring (Tier I and Tier II)**

Integration of Citizen based and Nontraditional Monitoring into the Chesapeake Bay Program Partnership

Prepared by:

**NONTIDAL BENTHIC MACROINVERTEBRATE METHODS MANUAL**

3. Emphasize how the CMC supports volunteers in reaching their goals



CMC  
Chesapeake Monitoring  
Cooperative

Thank you!



Suzi Spitzer

[sspitzer@umces.edu](mailto:sspitzer@umces.edu)

[www.umces.edu/suzanne-spitzer](http://www.umces.edu/suzanne-spitzer)

[ian.umces.edu](http://ian.umces.edu)



# What is next?

## 1. Distribute a targeted survey

### *MOTIVATIONS AND REWARDS OF CITIZEN SCIENCE*

17. Why do you monitor? Consider your personal motivations for monitoring, or any goals you have regarding how you want your data to be used or how you would like your group to influence a broader audience. Please rank the following in order of importance to you, personally, with 1 being the highest priority or most important, and 9 being the lowest priority or least important.

- Establish baseline water quality data
- Collect longitudinal data and monitor trends over time
- Provide scientists and agencies with credible data for their work
- Address general concern for habitat and water quality
- Identify impaired waters to advocate for or assess compliance and influence policy
- Monitor restoration progress and conservation effectiveness or conduct an impact assessment
- Discover if public health and human recreation are safe (drinking, swimming, fishing)
- Learn about the environment, educate and communicate environmental issues to community members
- Promote stewardship and provide opportunities for community outreach and engagement

18. Why do you monitor? Consider your personal motivations for monitoring, or any goals you have regarding how you want your data to be used or how you would like your group to influence a broader audience. Please rank the following in order of importance to you, personally, with 1 being the highest priority or most important, and 9 being the lowest priority or least important.

- Establish baseline water quality data
- Collect data across multiple seasons or years and monitor trends over time
- Provide scientists and agencies with credible data for their work
- Address general concern for habitat and water quality
- Identify impaired waters to advocate for or assess compliance and influence policy
- Monitor restoration progress and conservation effectiveness or conduct an impact assessment
- Discover if public health and human recreation are safe (drinking, swimming, fishing)
- Learn about the environment, educate and communicate environmental issues to community members
- Promote stewardship and provide opportunities for community outreach and engagement

18. Who currently uses your data? Select all that apply.

- Our own group
- K-12 Education
- Local government
- State government
- Federal government
- Universities
- Watershed associations
- General public
- Other \_\_\_\_\_

19. As far as you are aware, do the following groups use your data? Select a response for each group.

- |               | YES | NO | DON'T KNOW |
|---------------|-----|----|------------|
| Our own group |     |    |            |

#### Suzi Spitzer

I replaced the word "longitudinal" here with a phrase that gets at the definition of the word. Though many of my respondents would be familiar with the term longitudinal, it is not such a common word that I should assume that everyone respondent will have a shared understanding of the word. I simplified the word choice in order to hopefully get more accurate and reliable data.

#### Suzi Spitzer

My cognitive interview respondent mentioned that he was not confident in his response to this question. I considered including a filter Q here but decided that I wanted to maximize the amount of responses I get here, even if the respondent is not completely informed on all the possibilities. I changed the format of the question so that respondents are instead asked to indicate, for each group, whether or not they use the monitoring data. This format will slow the respondent down so they have to spend a little more time looking at each of the options than they would have had to do with the original mark all that apply format. Also, I included a don't know option in order to

# What is next?

1. Distribute a rigorous survey
2. Interview more scientists



Maryland  
Department of  
the Environment



# What is next?

1. Distribute a rigorous survey
2. Interview more scientists
3. Talk with more volunteers

