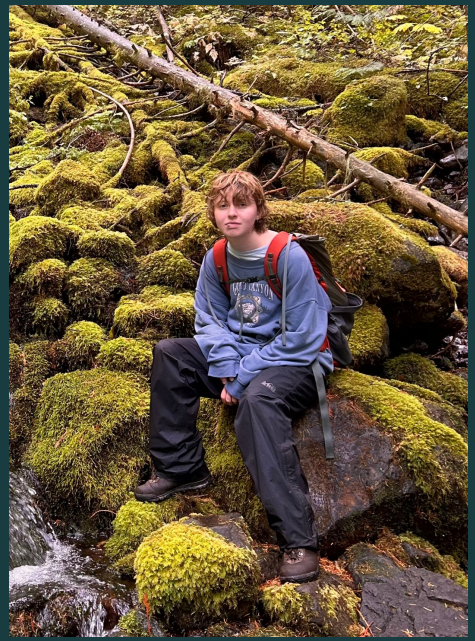
Tracking Trends in Bay Water Quality

Ezra Krantz

Photo of Potomac tributary by Will Parson, CBP



REED COLLEGE

Ezra Krantz

Tributary Basin Summary Fellow

- Rising junior (‘27) at Reed College in Portland, OR
- Environmental chemistry major
- Grew up in Washington, DC learning about Potomac and Anacostia River water quality
- Interested in GIS and scientific communication

Supported the Integrated Trends Analysis Team

- Improve understanding and communication of spatial and temporal patterns in water quality
  - 40 years of data!
- Combines efforts of CBP analysts with investigators in government, academic, and non-profit organizations to identify research synergies
- Worked out of Annapolis, MD and virtually

Geonarratives

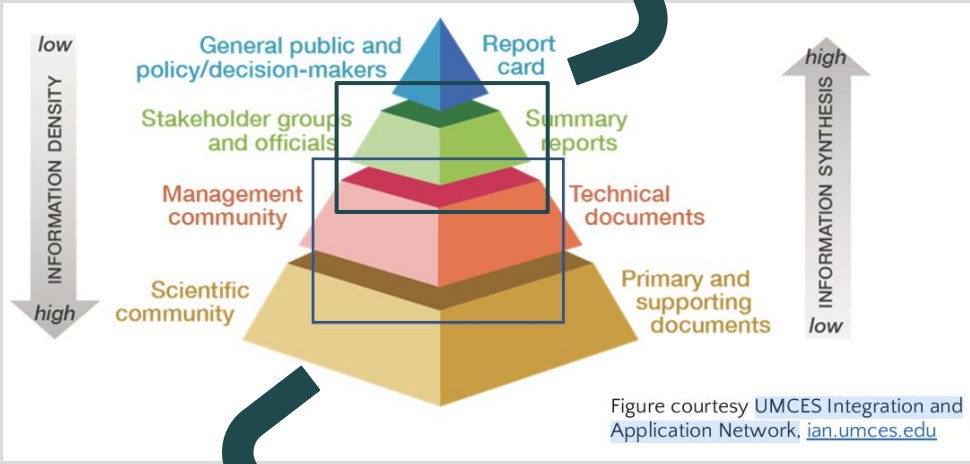
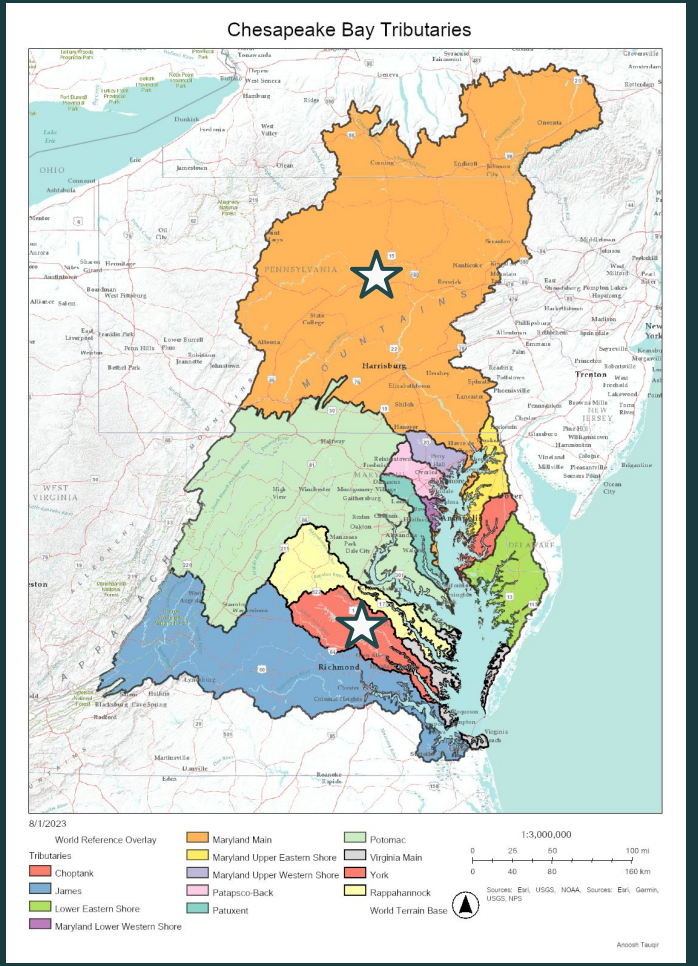


Figure courtesy UMCES Integration and Application Network, ian.umces.edu

Tributary Summary Reports

Tributary Summaries

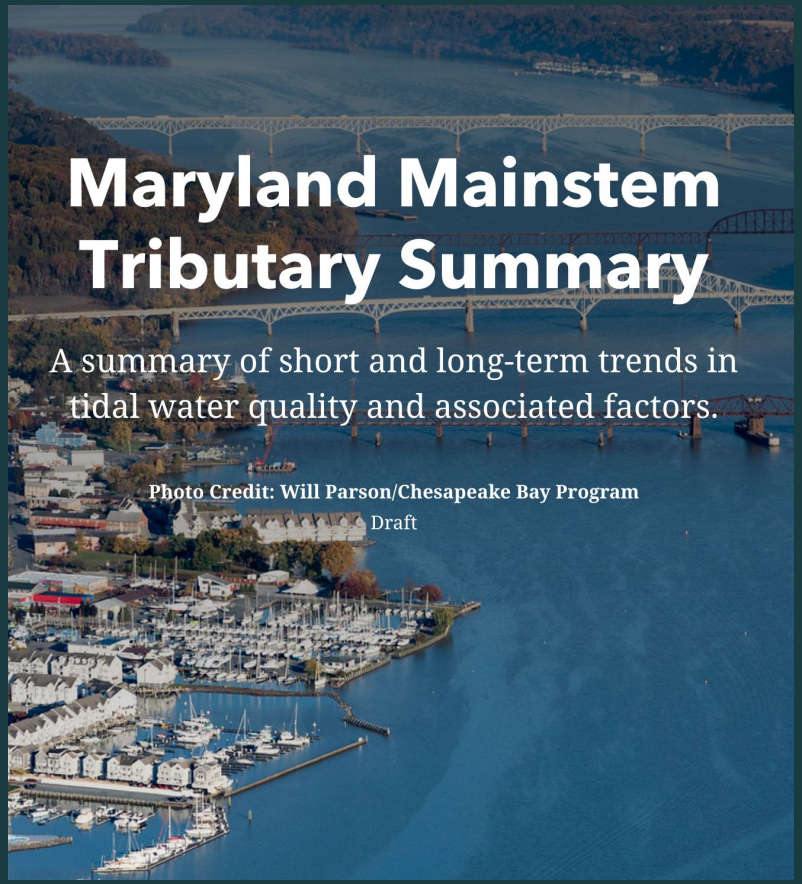
- Reports summarizing water quality in 12 major Bay tributaries
  - Tidal water quality trends
  - Factors influencing water quality change over time
  - Recent research about drivers of water quality
- Focus on updating Maryland Mainstem and York reports



Map by Anoosh Tauquir

Geonarratives

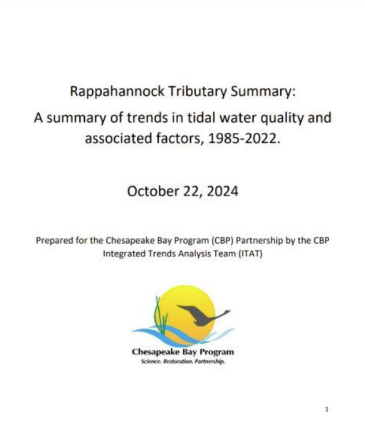
- Adapted contents of reports into StoryMap form
  - Created interactive maps
  - Summarized data
- Reached out to external partners to highlight local organizations
- Focus on creating York and Maryland Mainstem StoryMaps



ArcGIS StoryMaps

Methods

- Reviewing past tributary summaries and geonarratives
- Coordinating updates to maps, graphs, and tables
- Creating interactive maps in ArcGIS StoryMaps
- Outreach to community organizations



Rappahannock Tributary Summary:

A summary of trends in tidal water quality and associated factors, 1985-2022.

October 22, 2024

Prepared for the Chesapeake Bay Program (CBP) Partnership by the CBP Integrated Trends Analysis Team (ITAT)

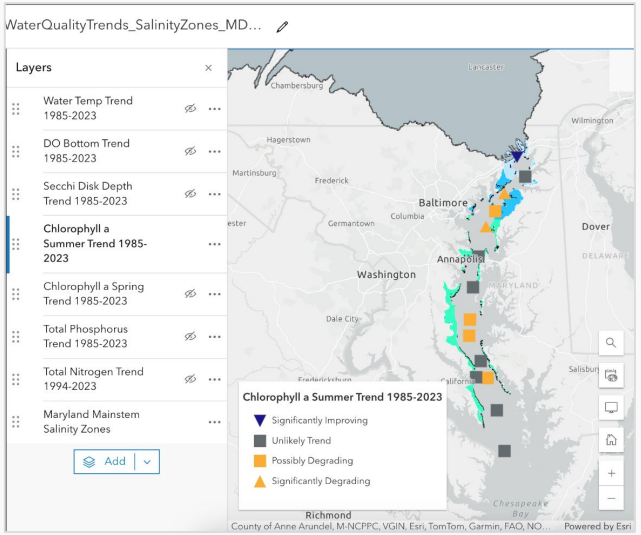
Chesapeake Bay Program

USGS Station ID	USGS Station Name	Trend start water year	Percent change in FN load, through water year 2023		
			TN	TP	SS
01671020	North Anna River nr Doswell, VA	1985	6.57		
		2013	-9.67	-14.4	-26.5
01671100	Little River nr Doswell, VA	2013	-10.4		
01673000	Pamunkey River nr Hanover, VA	1985	0.364	59	31.5
		2013	-2.28	-0.668	-16.6
01673800	PO River nr Spotsylvania, VA	1987	17.2		
		2013	4.89		
01674000	Mattaponi River nr Bowling Green, VA	1985	2.06		
		2013	-10	-2.83	-18.1
01674182	Polecat Creek nr Penola, VA	2013	4.74	4.25	-34.7
01674500	Mattaponi River nr Beulahville, VA	1985	-5.55	4.72	12.4
		2013	3.83	7.57	33.1

Decreasing trends listed in green, increasing trends listed in orange, results reported as "no trend" listed in black. TN = total nitrogen, TP = total phosphorus, SS = suspended sediment.

WATERSHED ALLIANCE OF YORK

SRBC
SUSQUEHANNA RIVER BASIN COMMISSION
NY ■ PA ■ MD ■ USA



Maryland Mainstem Tributary Summary

A summary of short and long-term trends in tidal water quality and associated factors.

Photo Credit: Will Parson/Chesapeake Bay Program

Draft

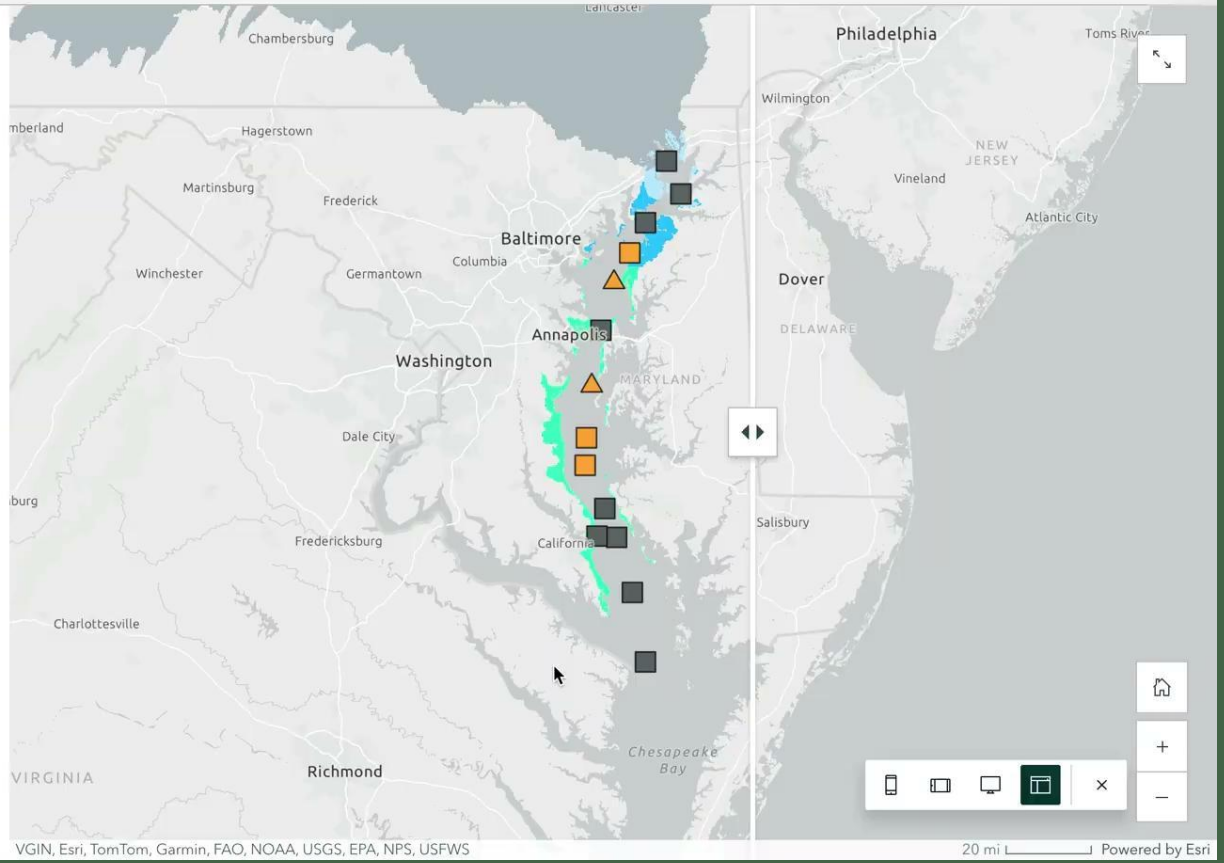
Surface Chlorophyll *a*: Spring

- Significantly Improving
- Possibly Improving
- Unlikely Trend
- Possibly Degrading
- Significantly Degrading

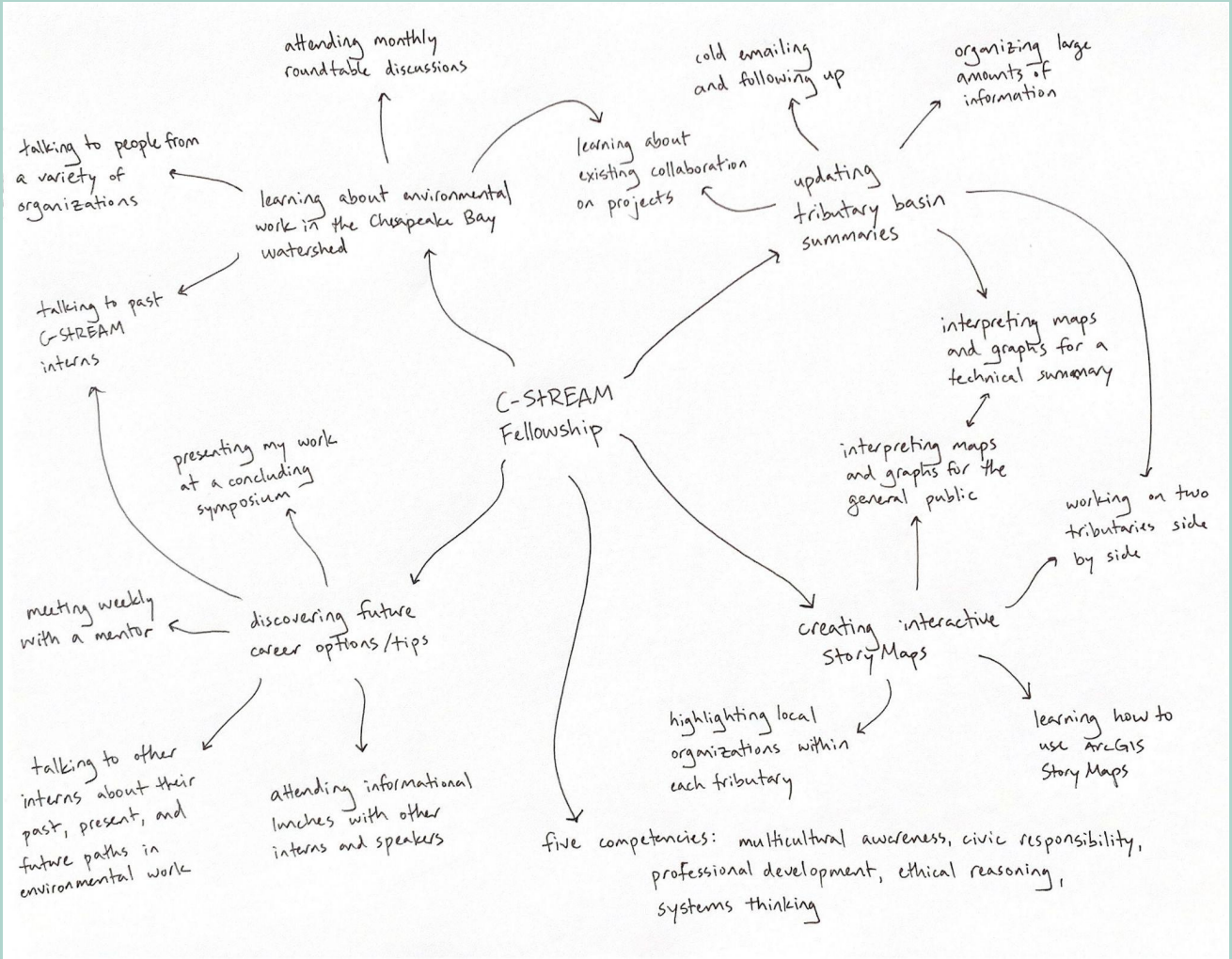
Maryland Mainstem Salinity Zones

- Tidal Fresh
- Oligohaline
- Mesohaline
- Maryland Mainstem Boundary

Decreasing Chlorophyll *a* Concentration = **Improving** Water Quality. **Increasing** Chlorophyll *a* Concentration = **Degrading** Water Quality

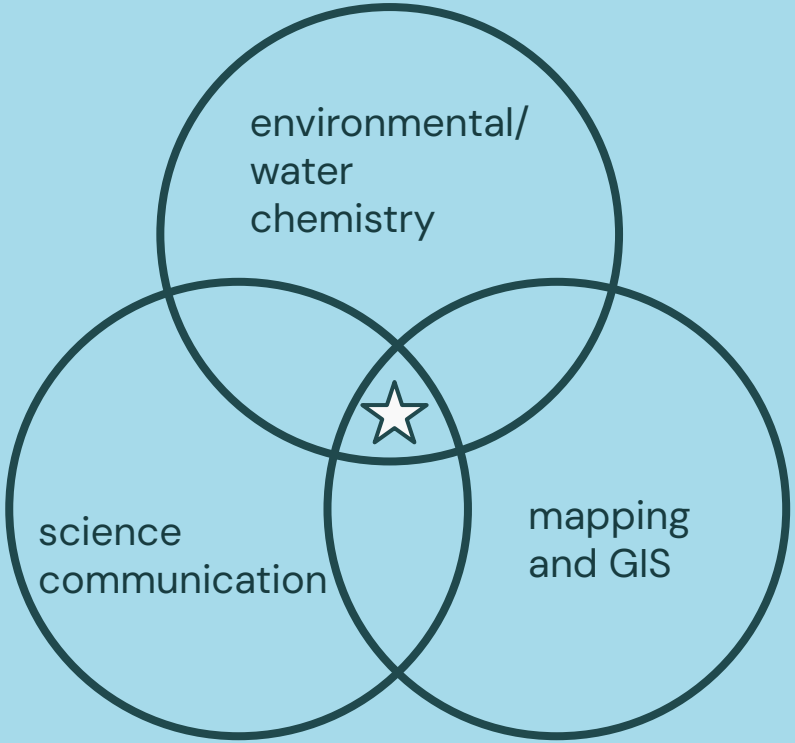


Measuring chlorophyll *a* in the Chesapeake Bay indicates the abundance of phytoplankton. In a balanced ecosystem, phytoplankton provide food for fish, crabs, oysters, and worms. When too many nutrients are available,


C-STREAM Fellowship
learning about environmental work in the Chesapeake Bay watershed
attending monthly roundtable discussions
talking to people from a variety of organizations
talking to past C-STREAM interns
updating tributary basin summaries
cold emailing and following up
organizing large amounts of information
learning about existing collaboration on projects
interpreting maps and graphics for a technical summary
interpreting maps and graphics for the general public
working on two tributaries side by side
creating interactive StoryMaps
highlighting local organizations within each tributary
learning how to use ArcGIS StoryMaps
discovering future career options/tips
presenting my work at a concluding symposium
meeting weekly with a mentor
talking to other interns about their past, present, and future paths in environmental work
attending informational lunches with other interns and speakers
five competencies: multicultural awareness, civic responsibility, professional development, ethical reasoning, systems thinking

Next Steps

- StoryMaps inspired me to learn more about environmental communication
- Publishing blog post for Chesapeake Bay Program website
- York and Maryland Mainstem tributary summaries and geonarratives released this fall



Thank you to Gabriel Duran, Breck Sullivan, Allison Welch, my mentor, Rebecca Murphy, and the rest of ITAT for teaching, supporting, and welcoming me into the Chesapeake Bay Program

Thank you!

Contact me at
krantze@chesapeake.org