CMC Chesapeake Monitoring Cooperative

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Partners

ALLIANCE for the Chesapeake Bay

University of Maryland Center for Environmental Science

CMC Chesapeake Monitoring Cooperative

The Izaak Walton League of America, Inc. — Defenders of Soil, Air, Woods, Waters and Wildlife

ALLARM — Alliance for Aquatic Resource Monitoring — est. 1986

Chesapeake Bay Program — Science. Restoration. Partnership.

Booz | Allen | Hamilton

WOMEN IN DATA SCIENCE

901 GREEN OFFICE TEAM — Booz | Allen | Hamilton

Hack the Bay Overview

Hack the Bay was a virtual hackathon designed to help solve some of the toughest challenges facing the Chesapeake Bay watershed.

- Aiding the first federally-supported citizen science water quality data initiative
- Collaboration between Booz Allen Hamilton & the Chesapeake Monitoring Cooperative (CMC)

August 3 – September 20, 2020

Hack the Bay Overview

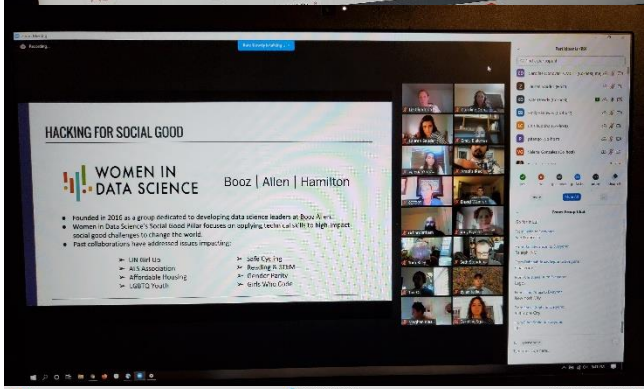
Goals:

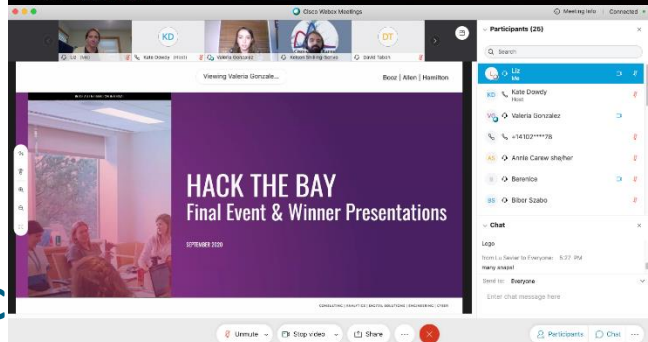
- Cultivate crowd-sourced solutions to challenges faced by the CMC
- Explore innovative approaches to problem solving with CMC data and other data sources
- Foster a collaborative environment for addressing complex social & environmental challenges

Hack the Bay Process

Over a year in the making!

- February 12th – Design-o-thon
  - April 18th – Original Hack the Bay date
- August 3rd – COVID-adjusted Kick off event for the virtual Hack the Bay
  - August 4th – Wrangling Geospatial Data Webinar
  - August 11th – Bay Issues Panel
  - August 18th – Environmental Justice Panel
- September 23rd -24th – Scoring entries
- September 29th – Winner presentation





Hack the Bay by the numbers

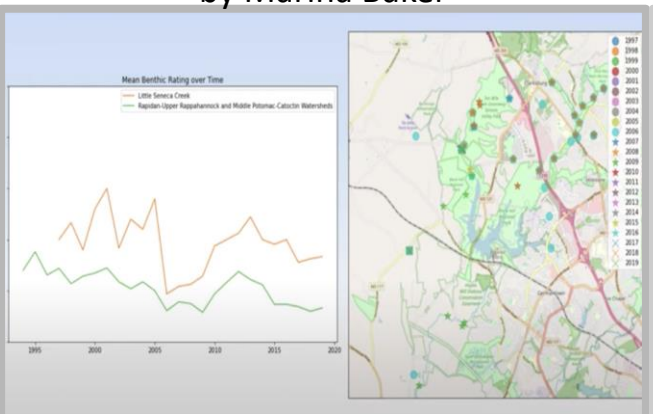
430	37	172	103	20
Participants	Countries	Cities	Universities	Team Submissions

Challenge Tracks

We received 20 projects total for the hackathon, which included 10 incredibly competitive, completed projects and 10 creative, partially scoped solutions.

- **Challenge 1: Develop a Restoration Case Study**
- **Challenge 2: Identify Data Gaps**
- **Challenge 3: Model Water Pollution**
- **Challenge 4: Design a Water Quality Report Card**

Locating Chesapeake Bay Water Quality Study Areas
by Marina Baker



A Potential Litho-Geochemical Predictor of Pollution Loads
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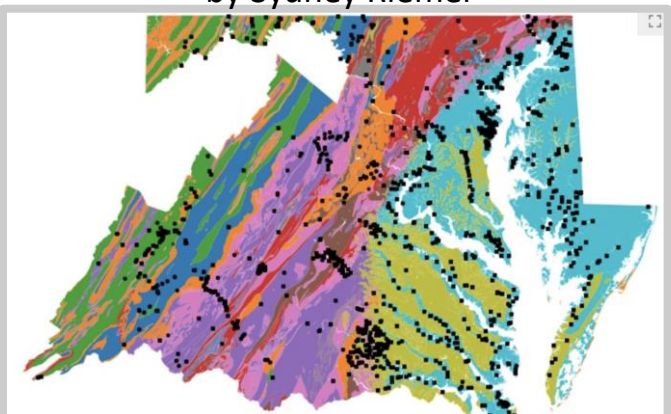
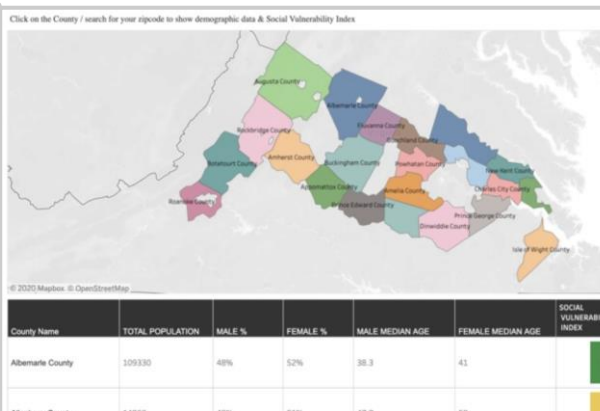


Water Quality Report Card
by Ranjani Chandran & Santhosh Kumar



Challenge 1 Overview

Using CMC, CBP, and/or other external datasets, tell a story about how water quality has changed over time in the Chesapeake Bay watershed.

Guiding Questions:

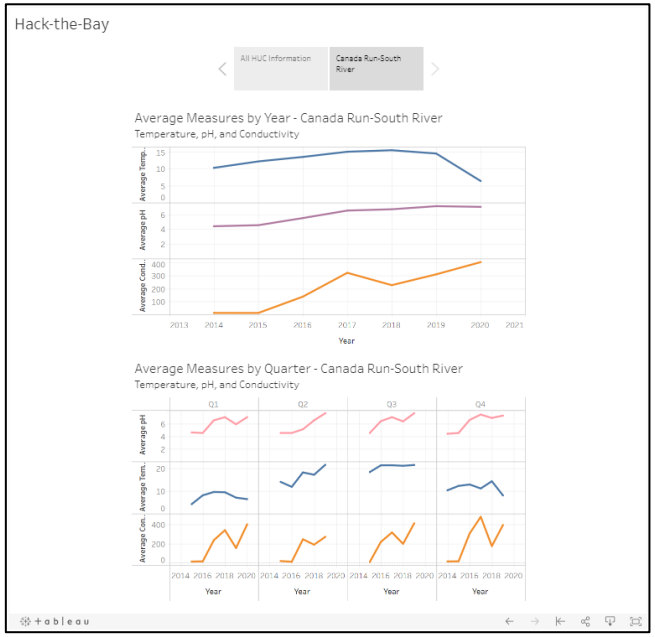
- Which indicators/regions support an analysis over time and can you see any changes?
- How does the pace of change at your area(s) of interest compare to our understanding of expected conditions in the watershed? In those specific regions of the watershed?
- How does CMC's data change or support the story (compared to an analysis on CBP data alone)?

Target Deliverables:

- Visualization(s) that tell a story about water quality trends and surrounding land use over time.

Challenge 1 Submissions

Hack the Bay
by Joseph Geglia, Jacob Hassinger and DavidTaboh



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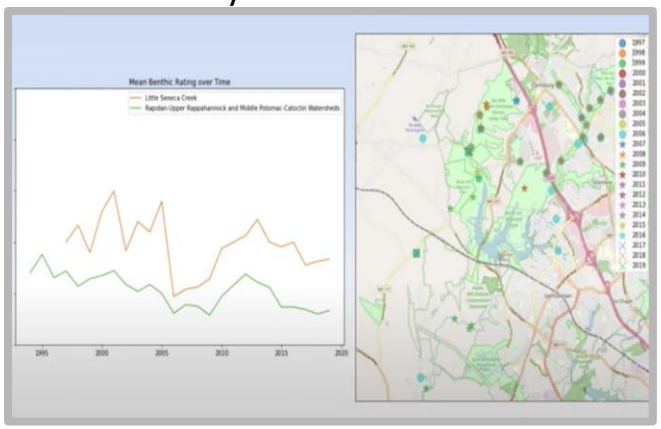
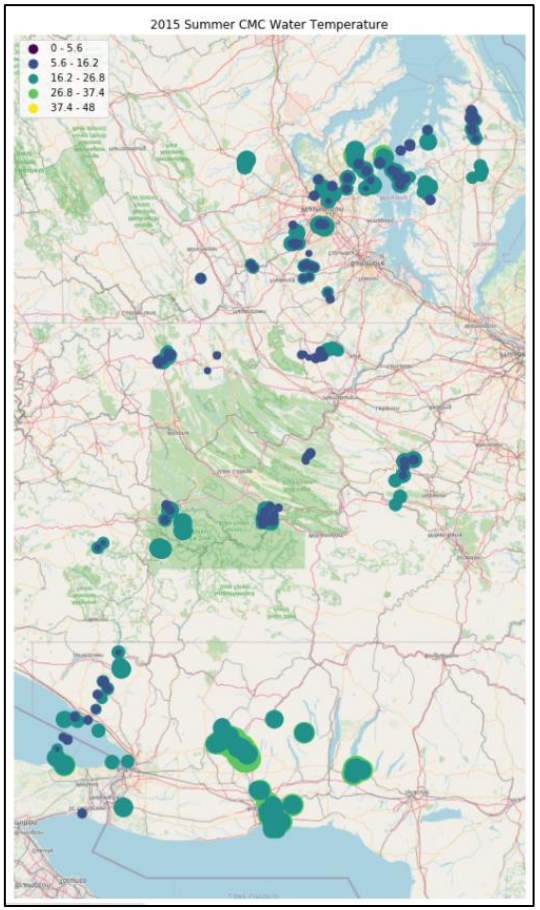


Chesapeake Bay Water Temperature
by Jen Chen



CMC

Chesapeakemonitoringcoop.org

Challenge 2 Overview

Demonstrate how and where CMC's data fills the gaps in the Chesapeake Bay Program's database, and where data gaps in the watershed still exist. Provide an analysis that recommends locations and parameters that CMC should prioritize for new data collection, and why.

Guiding Questions:

- Where are the geospatial gaps in data collection at a local, regional and watershed wide scale? What are the data gaps just with CMC data and compared to CBP data?
- If CMC could start monitoring an unmonitored part of the watershed, where should they recruit new volunteers and why?

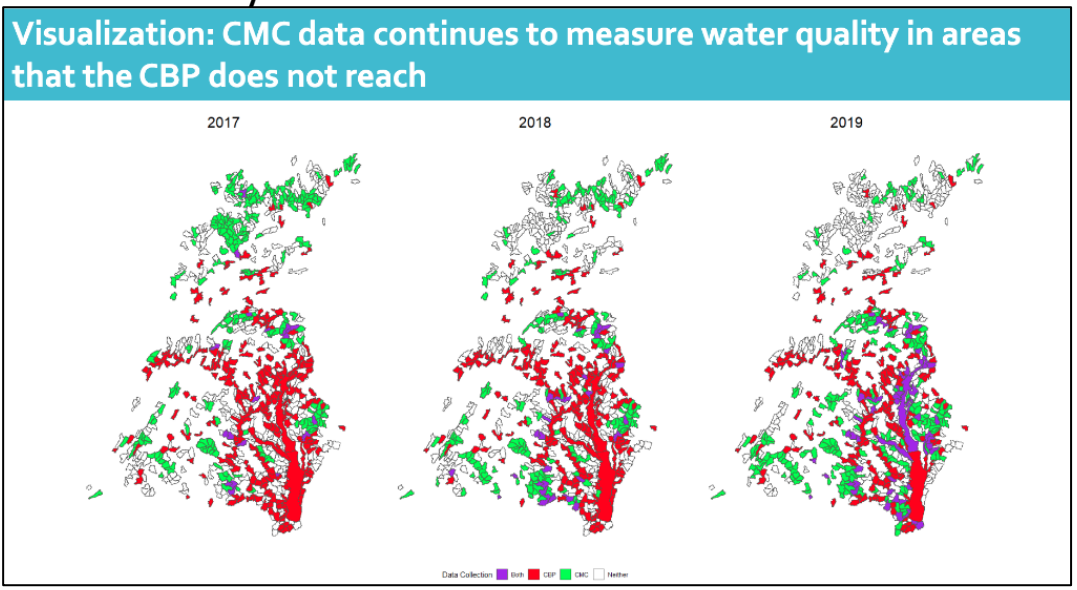
Target Deliverable:

- Visualization(s) that demonstrate data density (by location, parameter and/or time)

Challenge 2 Submissions

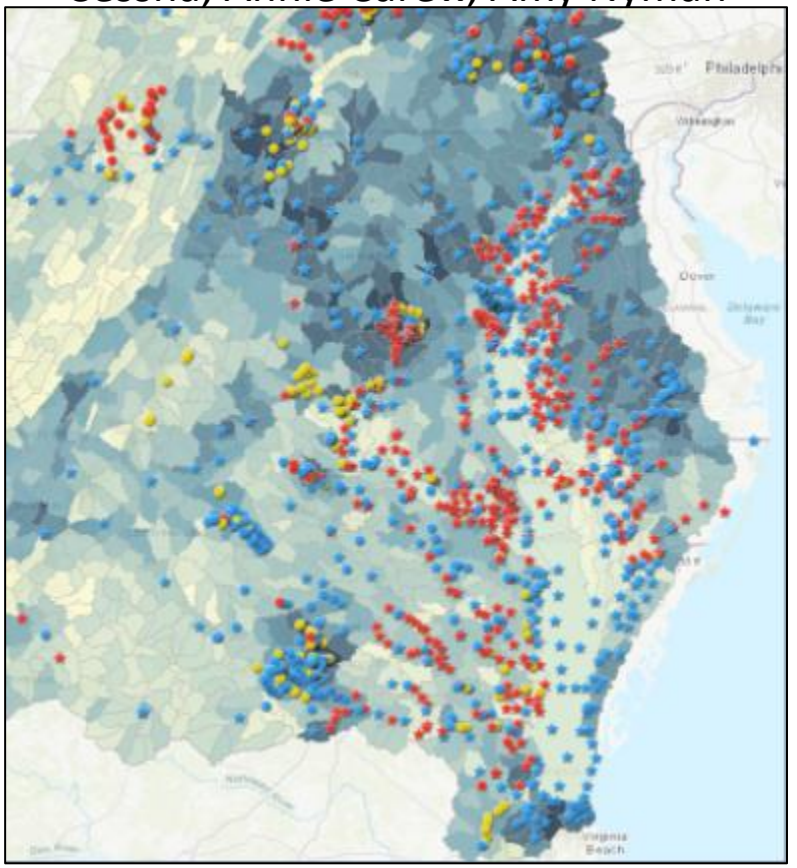
Dynamic Duo

by Lu Sevier and Richard Latham



Mind the Gap

by Kelson Shilling-Scrivo, Janice Cessna, Annie Carew, Amy Nyman



Challenge 3 Overview

CMC's water quality indicators can be linked to types of pollution and their sources in the tributaries of the Chesapeake Bay. Analyze potential causes for/ build a predictive model for pollution in a section of the Bay using CMC, CBP, and external geospatial datasets.

Guiding Questions:

- How does using CMC's data in an analysis of pollution patterns and indicator results impact our understanding of pollution sources and their effects on water quality (compared to an analysis on CBP data alone?)
- How does land cover, land use, and/or geology describe the selected region?

Target Deliverable:

- Predictive model and/or correlation analysis for explaining patterns found from condition measures expressed by water quality indicator(s) assessments in a part or all of the watershed

Challenge 3 Submissions

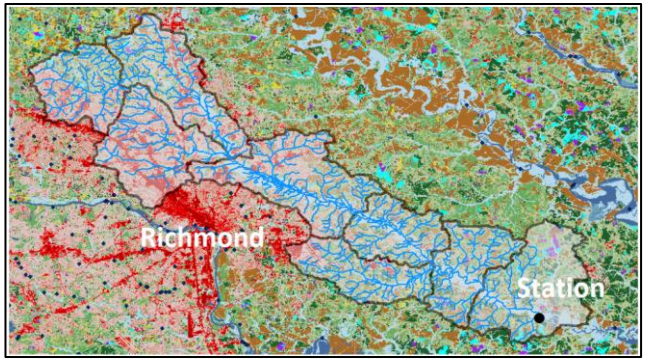
Shore is Fun

by Bryan Dickinson, Berenice Dethier, Justin Huang, Jen Wu, Tim Osburg

Challenge 3 Submissions

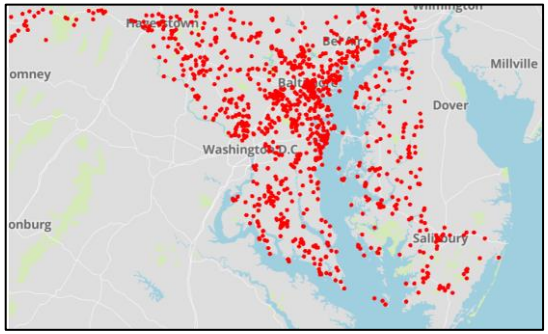
Effects of Land Cover on Pollution in the Chesapeake Bay Watershed

By Megan Maloney, Joe Barrow, Charlie E



Sean and Isaac Hack the Bay

by Sean Lim and Issac Tham



A Potential Litho-Geochemical Predictor of Pollution Loads

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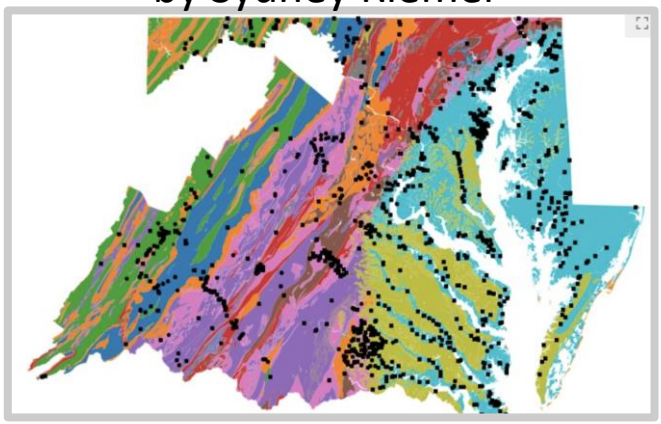
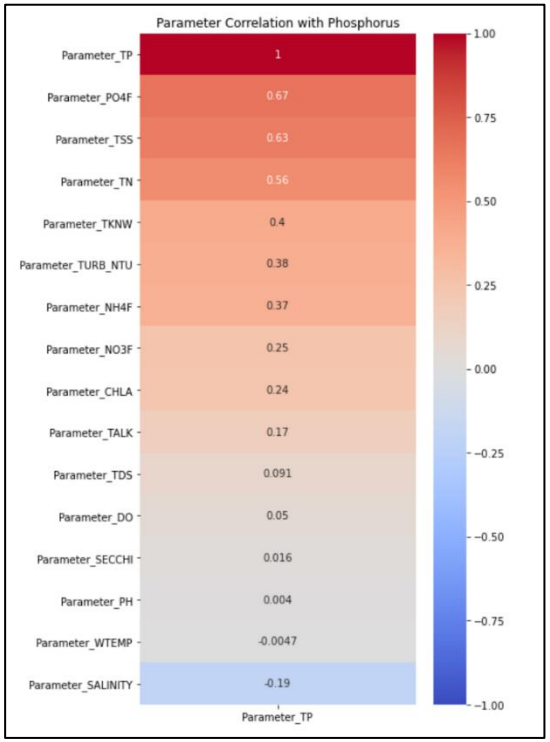


Modeling Toxic Phosphorus Levels in the Chesapeake Watershed

by Bibor Szabo, Clay Carson, Mike Blow



Challenge 4 Overview

Design a local or regional version of the Chesapeake Bay report card that ties water quality to local communities' values.

Guiding Questions:

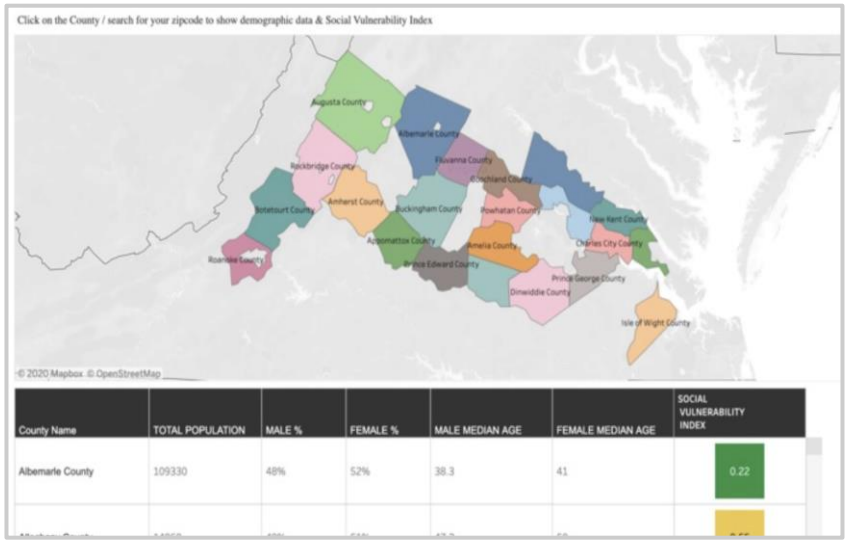
- Imagine a platform where users could input their zip code and retrieve key facts and status of their local streams. What would they want to know? How would you explain why knowing your local water quality is important to understand your community's health?
- How does water quality impact communities, in terms of recreation (public access, swimming), public health (swimming, eating fish), economic opportunity (fishing, local tourism)?

Target Deliverable:

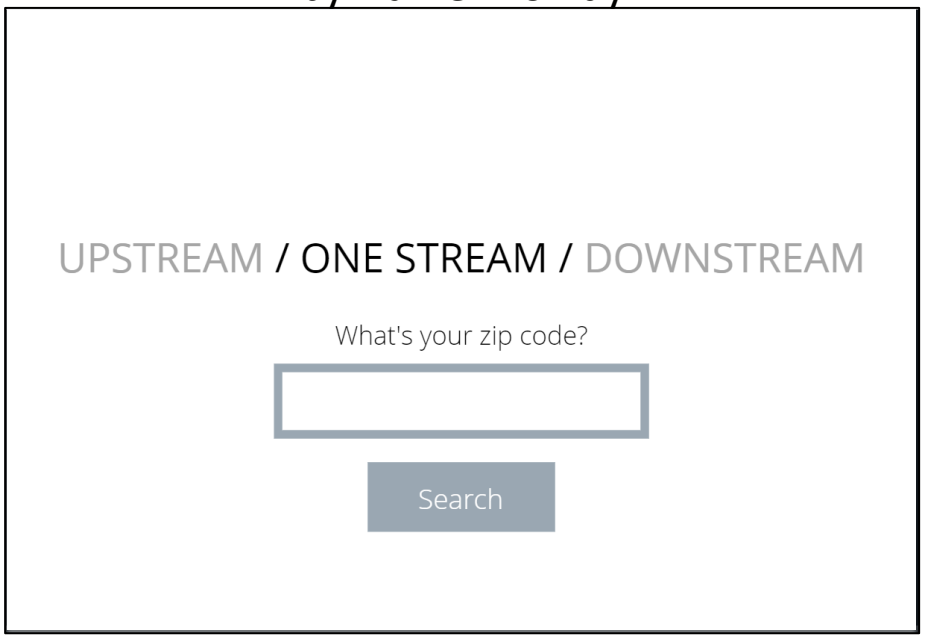
- A prototype of a customized water quality report based on the values for a resident of the watershed

Challenge 4 Submissions

Water Quality Report Card
by Ranjani Chandran & Santhosh Kumar



Upstream/One Stream/Downstream
by Daniel Dowdy



Lessons Learned

Overwhelming Success! We engaged over 4 times as many participants in this hackathon than their typical hackathons!

Benefits:

- Thorough projects
- Broader engagement
- Opportunities for education
- Found gaps and developed resources

Challenges

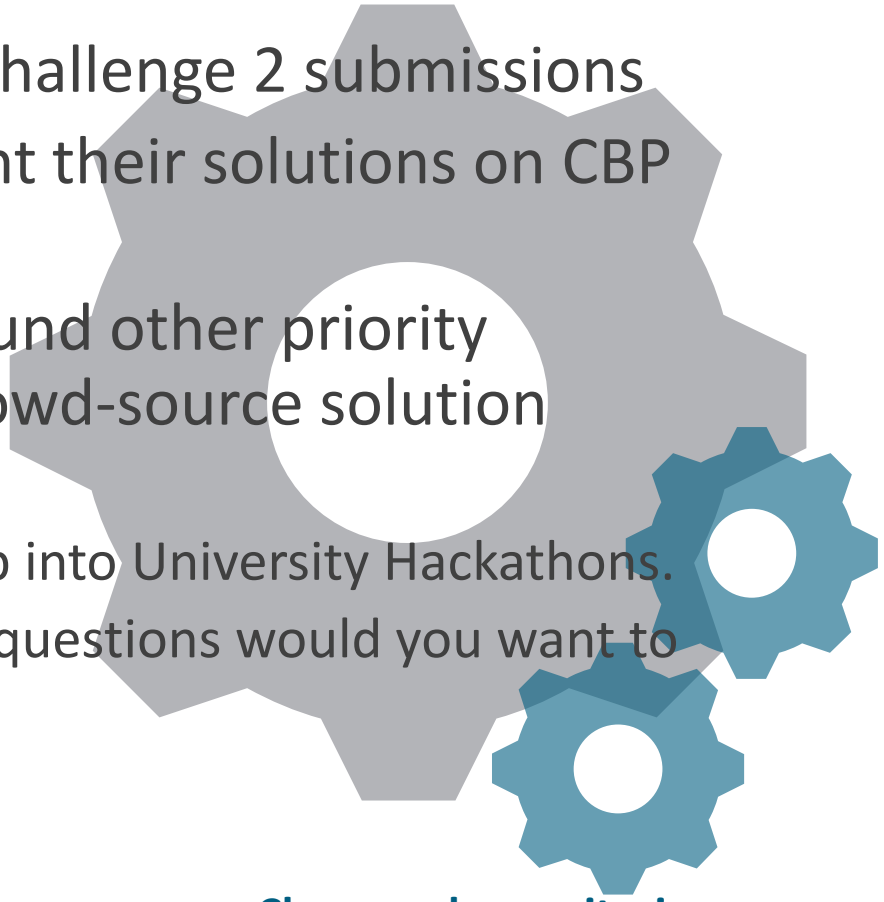
- Big learning curve
- Connectedness between the participants and the CMC team
- Structure

Lessons Learned:

- Need to be more specific with the questions
- Need to be clearer about what we already know
- Gap between data scientists and the citizen science data
- Should build out a schedule with benchmarks
- Encourage teamwork

Next Steps

- Need to create a centralized GitHub and link to all of the code from this hackathon – for now everything is posted on the CMC website
- Continue building out the Challenge 2 submissions
- Invite the winners to present their solutions on CBP workgroup calls
- Plan future hackathons around other priority questions amendable to crowd-source solution efforts.
  - Consider opportunities to tap into University Hackathons.
  - Future data needs and what questions would you want to have answered?



Thank you!

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Chesapeakemonitoringcoop.org/hackthebay/

https://hack-the-bay.devpost.com/

Credit: Chesapeake Bay Program