

P7 Update: 4D Assessment Tool and Criteria Assessment Monitoring Advances

February 5, 2023 Office Hours Meeting

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USGS, UMCES, USGS, CRC

Where we are heading: Assessment of all Bay oxygen water quality criteria in beyond-2025

A new analysis system, built on an expanded data collection effort, is envisioned that will allow assessment of all water quality criteria. Figure 1 shows the flow of information in the proposed system.

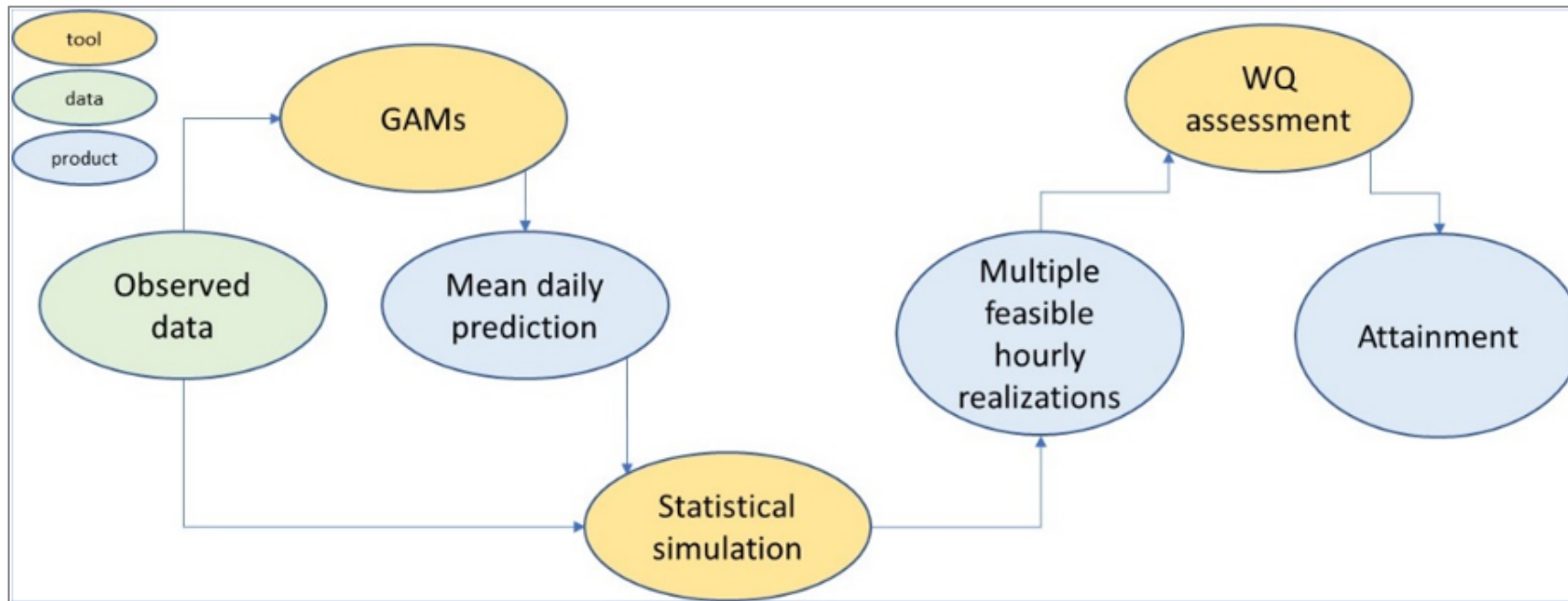


Figure 1: Interpolation and attainment assessment system

4D progress for interpolating dissolved oxygen concentrations (2022-early 2023)

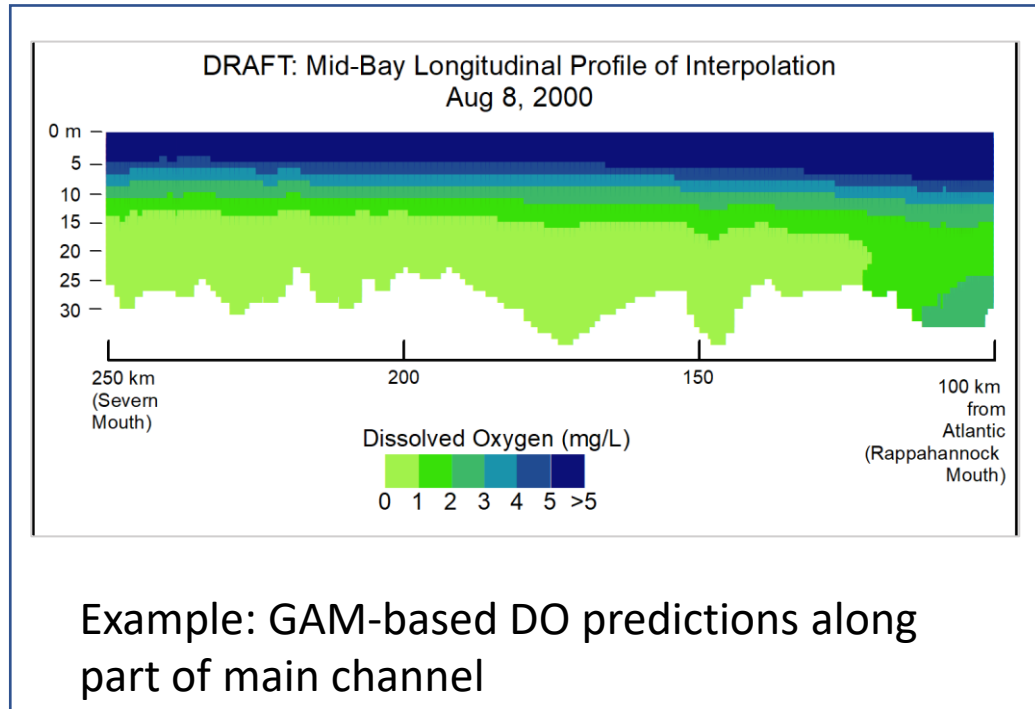
Where we were April 2023...

A **coordinate system** has been proposed underpinning the tool (Angie Wei, GIS)

Success on having a working *daily average* **prototype using Generalized Additive Models (GAMs)** for a large chunk of the mainstem bay. (Elgin Perry and Rebecca Murphy)

- Work ahead further calibrating and verifying its performance

Successful application of *daily average* **prototype to the tidal Patuxent River** (Rebecca Murphy)



4D progress for interpolating dissolved oxygen concentrations (through Jan 2024)

A coordinate system has been proposed underpinning the tool (Angie Wei, GIS)

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Stable use of coordinate system for the 4D tool

Tetra Tech building full bay structure to apply **GAMs across the tidal waters for daily DO interpolation**. Structure is flexible for future developments.

Most historic high frequency data has been processed and analyzed for sub-daily cycles.

Sub-daily dissolved oxygen estimation has been piloted at one station with focus on development in 2024.

Nearshore dissolved oxygen estimation is being informed by ORISE Fellow Ph.D. work

Plan as of February 2024

2024: Continued development on daily and hourly interpolation

2025: Additional development and linking to criteria evaluation

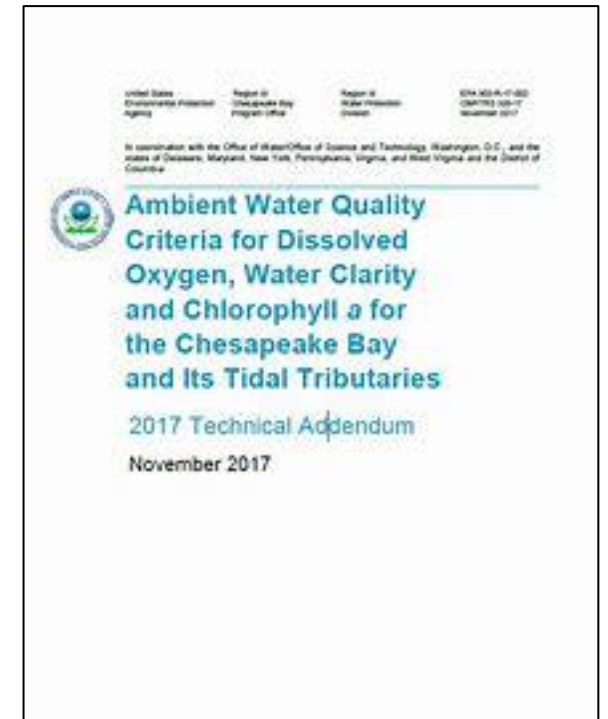
2026: Review year

2027: Operational

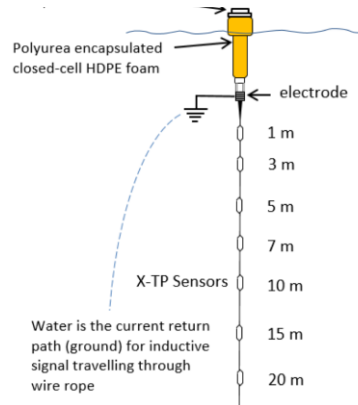
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Documentation

- Creating a new EPA Technical Document supporting
 - Dissolved oxygen chapters needed include
 - Development underpinnings of the new 4D tool
 - Updates on dissolved oxygen assessment protocols
- Outline shared among team for review



2023 Habitat assessment update: New infrastructure Dissolved Oxygen, Salinity, Temperature

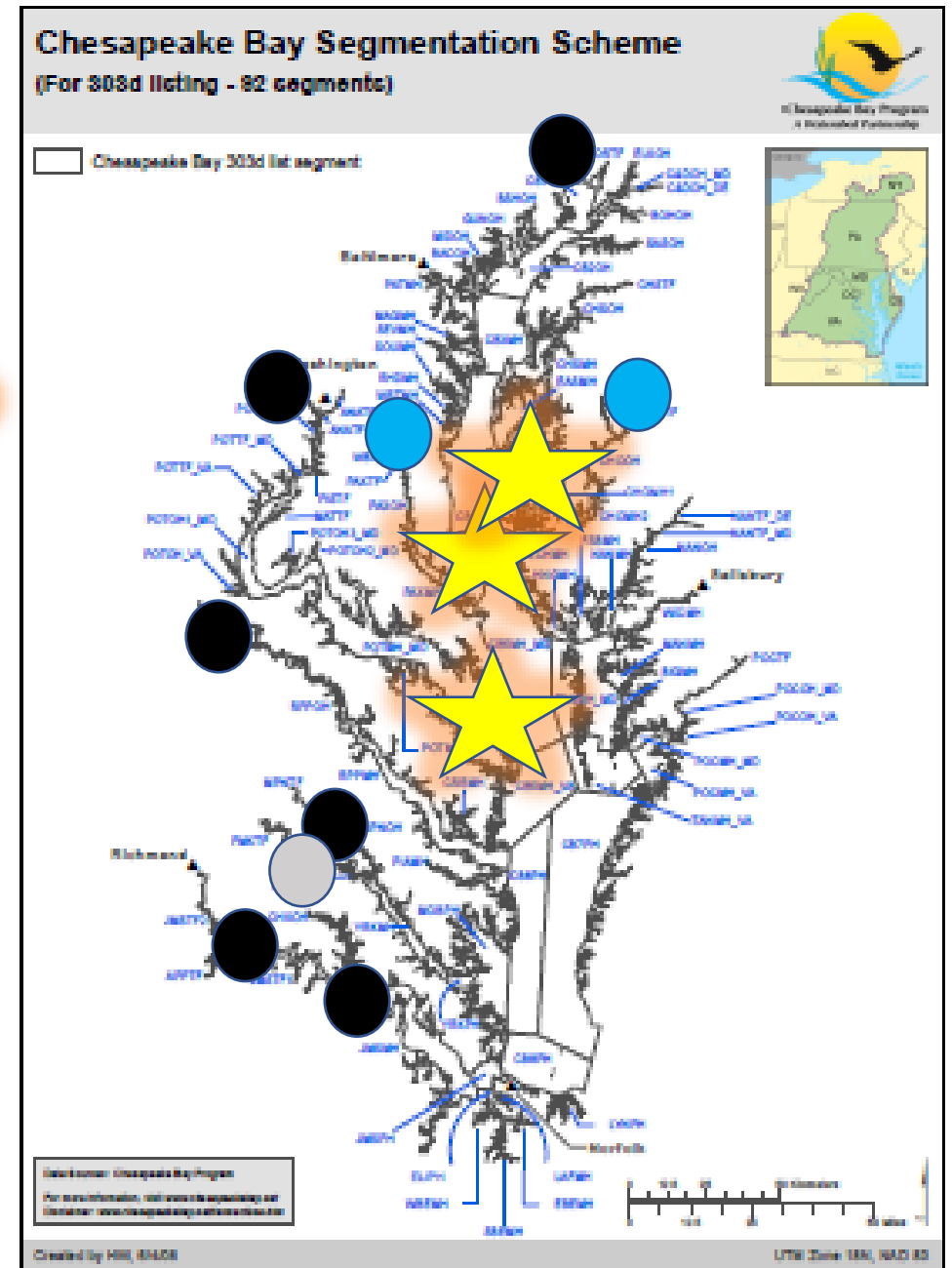


NOAA Deployments of 3 vertical arrays:
Lower Potomac
Mainstem Bay
Lower Choptank River

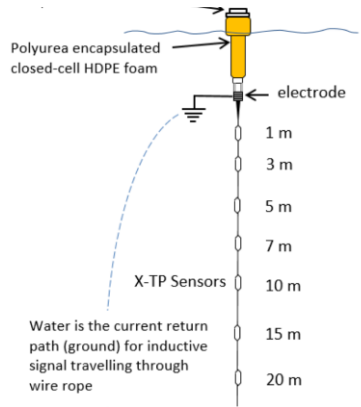


*Conowingo Dam, MD
One of 9 RIM sites*

- River input monitoring sites
 - 2023: 2 new deployments - river input water quality continuous monitoring sites (Patuxent, Choptank)
 - VA Appomattox online now too



2024 Habitat assessment update: New infrastructure Dissolved Oxygen, Salinity, Temperature



- NOAA Deployments of [5-7](#) vertical arrays:
Proposed locations
Lower Potomac
Mainstem Bay
Lower Choptank River



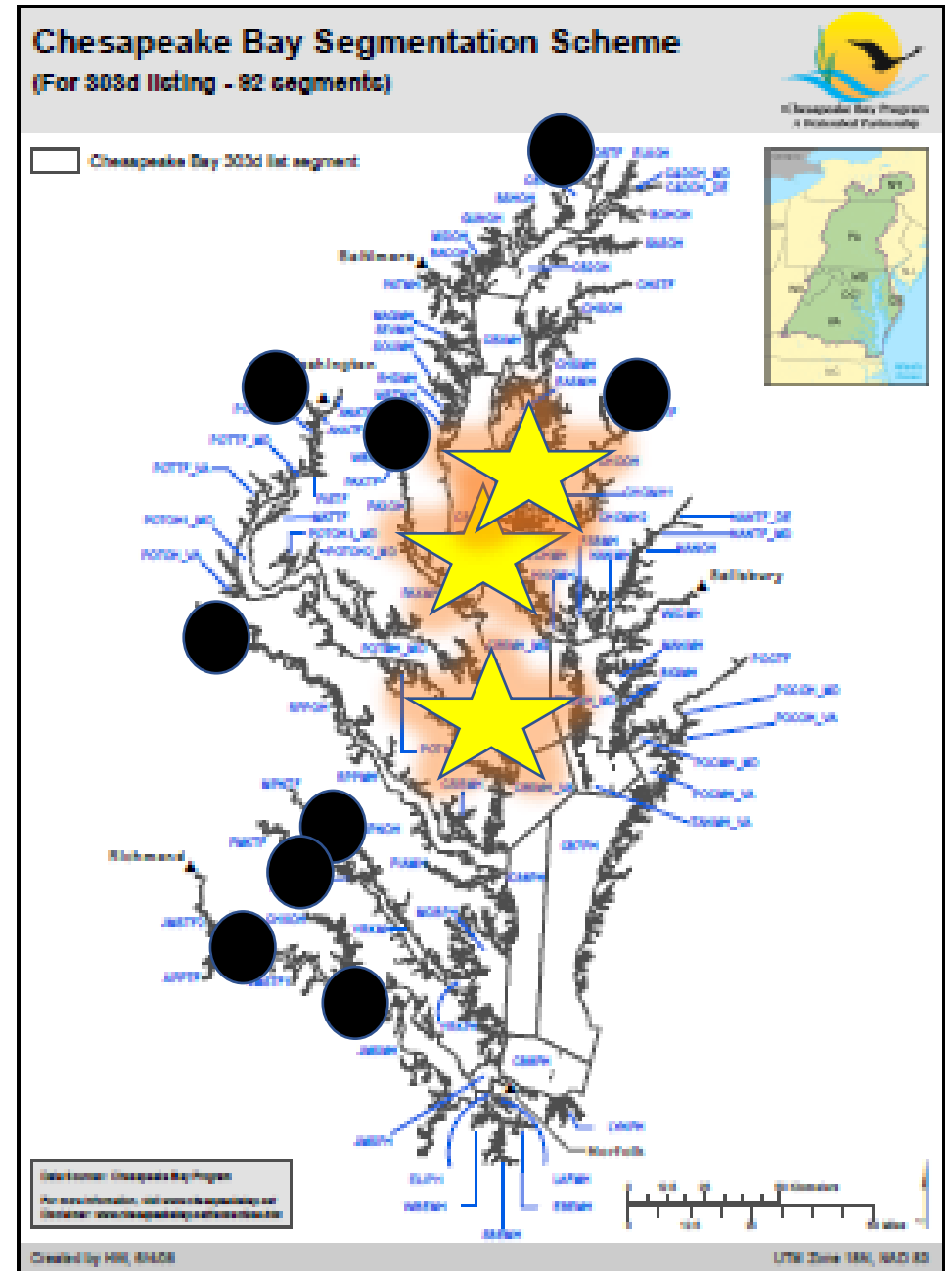
Guidance being developed to States to consider alignment with shallow water monitoring

GIT funding proposal development for model-based monitoring design support

- River input monitoring sites
 - 2024: 9 continuous monitoring sites



Conowingo Dam, MD
One of 9 RIM sites



Satellite-assessment of SAV in Chesapeake Bay

- 2023 – EPA is providing support for work to address **2021 PSC Monitoring Review Report recommendations** regarding the developing of satellite-based SAV monitoring programming capacity.



Satellite-assessment of SAV in Chesapeake Bay



- 2023 – EPA is providing support for work to address **2021 PSC Monitoring Review Report recommendations** regarding the developing of satellite-based SAV monitoring programming capacity.
- 2024 – RFA developed, competed, and awarded in 2023.
 - Workplan finalized February 2024 with awardee





Thank you ☺