Chlorophyll a Criteria Assessment: Protocol Review and Developing Recommendations for Amending the Criteria Assessment Protocols

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CAP WG Chair

Meeting 1 of 3

August 8, 2016

USGS MD-DC-DE Water Science Center

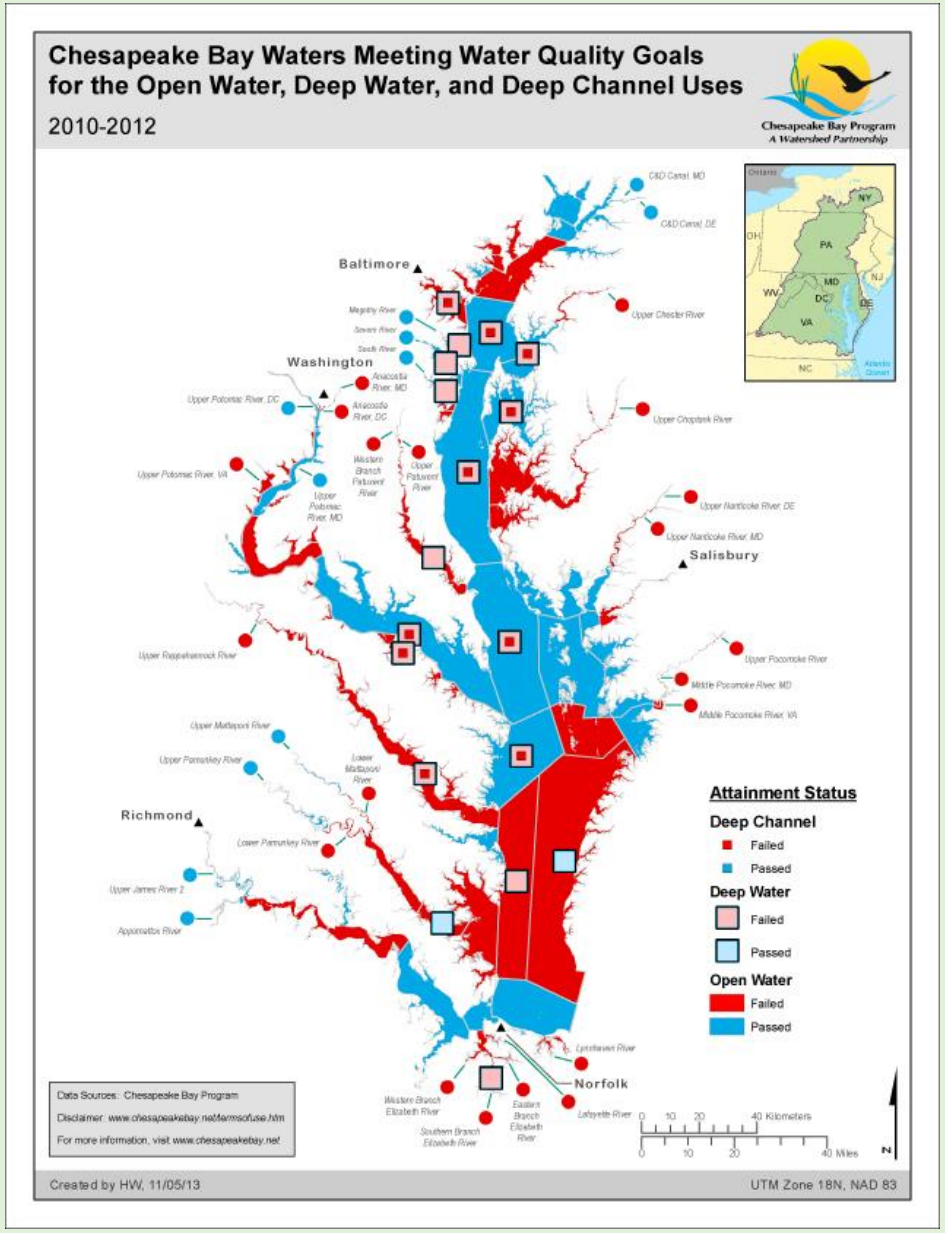
CAP WG Reconvenes

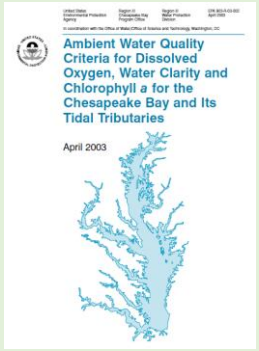
- The Chesapeake Bay Program (CBP) has recently charged the CBP Scientific Technical Assessment and Reporting Team (STAR) for reconvening the CAP WG with the short-term task of 1) critically reviewing the existing tidal waters chlorophyll *a* assessment procedures and 2) providing consensus recommendations on any alternatives to consider in revision of the existing procedures by **mid-September 2016**.

Charge to the CAP WG

- *"These recommended procedures would need to be presented to Virginia DEQ's James River Chlorophyll Criteria Re-evaluation Regulatory Advisory Panel (RAP) at their September meeting. Virginia is following regulatory promulgation process which has strict deadlines within a clearly defined overall schedule. In order for Virginia DEQ to make needed decisions by the December timeframe, there is a need for their RAP membership to hear the CAP Workgroup's recommendations in September*."

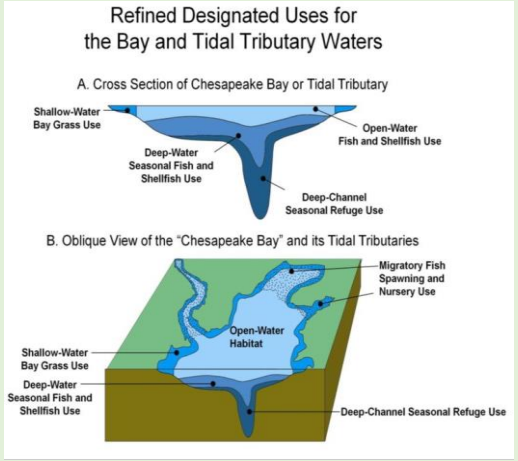
Our work supports the assessment of Water quality standards attainment for The tidal waters of Chesapeake Bay



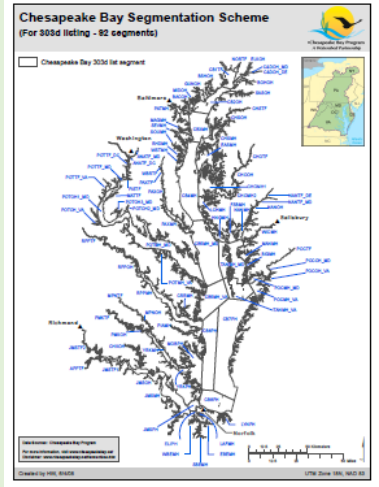


Established Water Quality Criteria, Assessment Framework and Protocols with updates. 2003-2016.

- USEPA 2003 October: Tech support for identification of five water designated uses to be protected
- USEPA 2004b, 2005, 2010 DU refinements

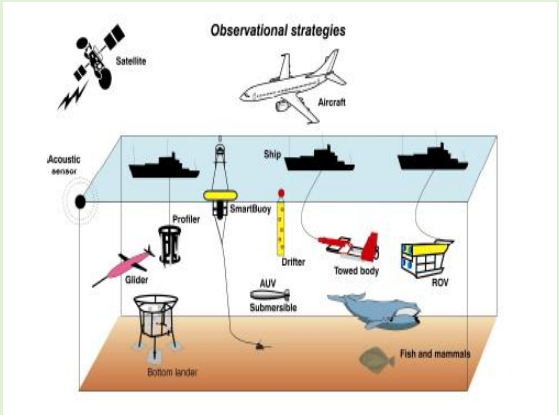


- USEPA 2004b, 2005, 2008. Bay segmentation described and updated



- USEPA 2004a, 2007a, 2008, 2010:

Criteria attainment assessment procedures and updates



- USEPA 2007b, 2008, 2010:

Numerical Chlorophyll *a* Criteria and updates

USGS science for a changing world

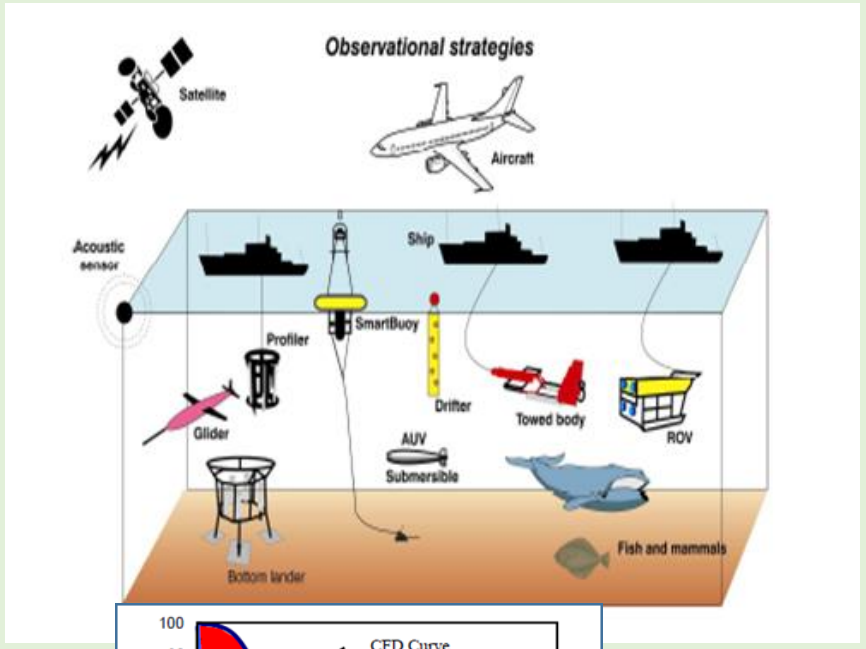
First Meeting – Today.
Laying the Groundwork.

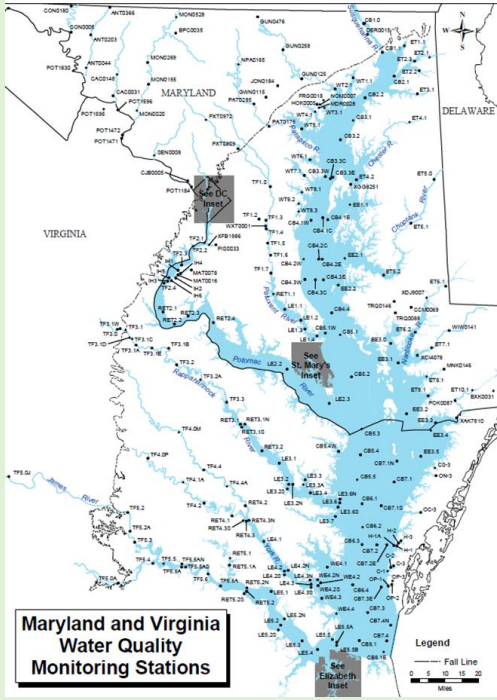
- **First meeting** – lay out the playing field. Not all jurisdictions have numerical criteria to assess, however, all may eventually adopt numerical criteria with reference to assessment procedures. Therefore, meeting one will need:

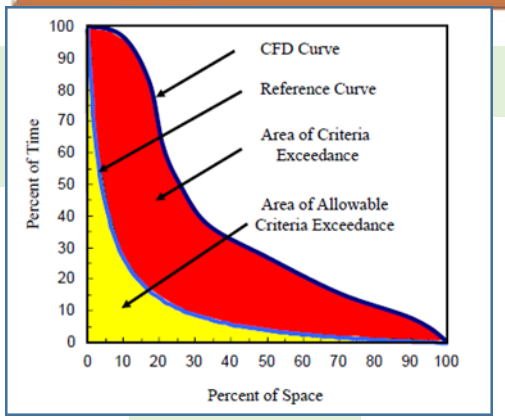
- to review the existing procedures for assessment.
- highlight what issues in the procedures we are targeting for revision and why
- provide some overview of the critical issues that have received review
- highlight any additional issues that may have been in the background, that need discussion and evaluation, and evaluate if they can be addressed in the time allotted

Focus topics

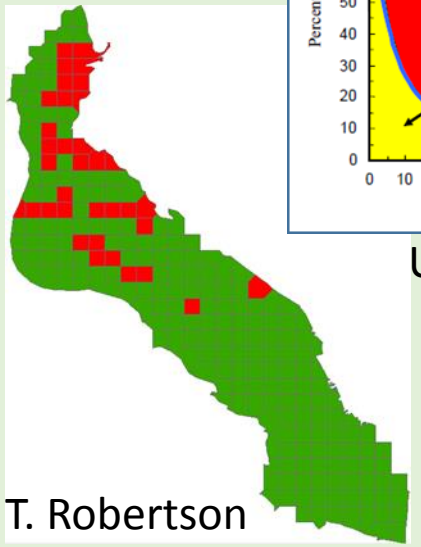
- i. the sampling protocols supporting chla assessments
- ii. the averaging period for the data collections in the assessment,
- iii. the interpolator operations,
- iv. the application of the CFD for supporting attainment decisions
- v. decision rule(s) on impairment status







USEPA 2003



T. Robertson

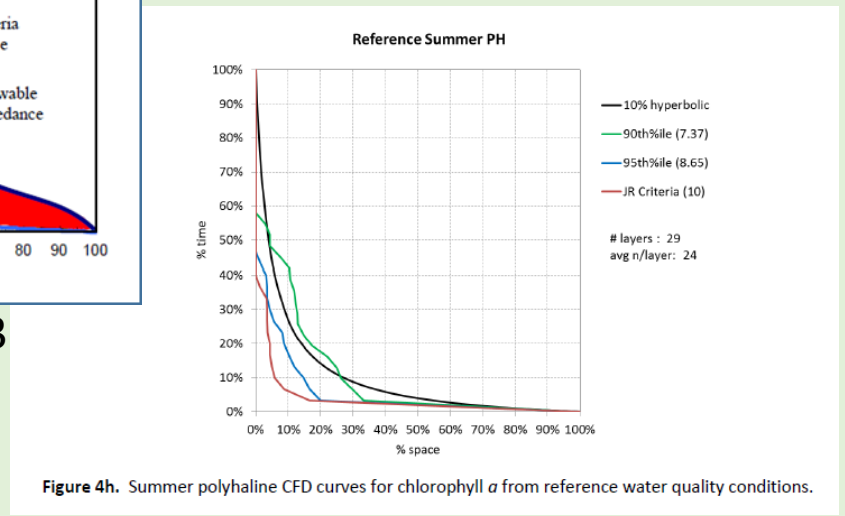


Figure 4h. Summer polyhaline CFD curves for chlorophyll *a* from reference water quality conditions.

T. Robertson and C. Buchanan

The sampling protocols supporting chla assessments.

- 1. Long term fixed site only?
- 2. DATAFLOW?
- 3. modified DATAFLOW?
- 4. use of fixed-station ConMon?
- 5. Citizen Monitoring support?
- 6. Surface vs. Depth integrated

The averaging period for the data collections in the assessment

- 1. 3-year assessments versus some other assessment period?
- 2. Stay with seasonal average, move to monthly average, instantaneous?

The interpolator operations

- 1. IDW has default settings.
  - a. Interpolations with only 2 stations in a segment do not appear to average anything but assign one value or the other to an interpolation cell. Problem?
  - Alternatively, with DATAFLOW/modified DATAFLOW, there appears to be is a decision-rule to use the 4 closest data points, apparently it is no matter their distribution in space. Is this the kind of weighting that best represents the values for an unmeasured location?
- 2. IDW has an octant option to distribute the search for data points limiting the influence of all data coming from one tangent. Is this a more appropriate option for interpolations?
- 3. Is there another alternative interpolation approach to consider?

The application of the CFD for supporting attainment decisions

- CFD application pending the sampling protocol.
- a. Pros and cons of CFD with fixed station long term monitoring.
- b. Pros and cons of CFD with higher spatial resolution sampling.

- Discuss
- i. Any progress on confidence intervals for the CFD assessment?
- ii. Any option to bias correct for small sample size effects?
- iii. Do we consider including a flow-adjusted method of assessment?
- iv. Do we consider the effect of different averaging periods or instantaneous level assessment?

Decision rule(s) on impairment status

- 1. Is there a CFD breakdown point used with seasonal means creating only a 3-sample assessment?
  - a. Does a waterway have a status associated with insufficient information if we have to depend on the long term fixed station network for CHLA assessment?
- 2. CFD has the 10% allowable exceedance
  - a. Bioreference curve developments versus the 10% curve for assessment?
- 3. If we recommend an option other than the CFD, what is the decision-rule for attainment associated with that option?

In conclusion (Borrowing from Tish):
It is important that the new-and-improved protocol…

- produces more accurate assessment results compared to what we are currently generating.
- has fewer untested/untestable assumptions than the current framework.
- does not require a monitoring design that is especially burdensome and is compatible with EPA's "all existing and readily available water quality data" mandate.
- can be used to process model output for TMDL/attainability analyses.

Overall Schedule

- Meeting today – lay groundwork for understanding existing protocol and discuss directions we can use to develop recommendations for effective alternatives, adjustments to the existing procedures

- Between Meeting 1 and Meeting 2 – time for work group members to do homework on any particular issues they hear in meeting 1 and want to recommend for building consensus on with the procedures.
  - CBPO will summarize meeting one and begin identifying directions warranting more or less consideration

- Meeting 2. Late August – honing draft recommendations.

- After meeting 2, consolidate our suggestions, include supporting materials on why the method is a step forward and why we eliminated other options on particular issues.

- Meeting 3 – Conf call – review the recommendations, highlight any issues that are undecided by the workgroup to ask for direction forward on those items.

- September – WQGIT presentation, VA RAP presentation