UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 3
CHESAPEAKE BAY PROGRAM OFFICE
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August 23, 2019

Dr. Brian Benham, Chair
Scientific and Technical Advisory Committee
Chesapeake Bay Program
645 Contees Wharf Road
P.O. Box 28
Edgewater, Maryland 21037

Dear Dr. Benham:

Thank you for the opportunity to respond to the Chesapeake Bay Program Scientific and Technical Advisory Committee's (STAC) report entitled *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries: 2017 Technical Addendum.* The STAC findings that the methods are generally appropriate and necessary leading to assessment of water quality attainment that is protective of aquatic life are valuable at this critical time for the 2017 Midpoint Assessment of the 2010 Chesapeake Bay TMDL. The partners recognize the STAC recommendations on areas for improvement provide important guidance for future work of the Chesapeake Bay Program's (CBP) Criteria Assessment Protocol Workgroup (CAP WG).

The document contains detailed responses to the STAC sponsored independent scientific peer review panel's report. The primary users of these approaches are the CBP's state agency partners. Based in large part on the STAC Review Panel's report, our final revision of the 2017 Technical Addendum was improved by incorporating updates in response to the panel's comments and recommendations, in particular:

- Providing clarity to the chapters regarding the new three segment volumes and the supporting details of the multi-metric water quality standards indicator;
- Improving the presentation of the decisions supporting water quality standards attainment and the use of conditional attainment as one option in the suite of methods available to address assessment of short-duration dissolved oxygen criteria; and
- Highlighting the differences in derivations of underwater bay grasses goal acreages.

Additional work recommended by the STAC Review Panel such as understanding baywide variability in dissolved oxygen attainment protection relationships between local, regional and baywide scales, and revisiting the approach to the assessment of impairment status for the aquatic life designated use using the Chesapeake Bay benthic Index Biotic Integrity through other research and techniques, are acknowledged as important. The CBP views these areas of interest as long-term tasks which will be considered after publication of the 2017 Technical Addendum.

On behalf of the Management Board, thank you for your timely recommendations. Please extend the gratitude of the CBP's CAP WG, the Scientific, Technical Assessment and Reporting Team (STAR), and our Management Board to the full STAC membership and review panel members for their commitment of time and effort involved in the review. We greatly appreciate the ongoing role of STAC in serving as an

independent scientific review body for the CBP helping to improve our individual and collective management of the Chesapeake Bay and watershed restoration efforts.

Sincerely,

Dana Aunkst,
Chair, Management Board

Ec. Management Board Members
Water Quality Goal Implementation Team
Scientific, Technical Assessment and Reporting Team
Criteria Assessment Protocols Work Group

Enclosure: Detailed Response to STAC Review of the *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries: 2017 Technical Addendum*

Detailed Response to STAC Criteria Addendum Review

We appreciate the time and effort of the STAC Review Panel for providing their thorough review of the 2017 Technical Addendum. Below we detail our responses in alignment with the independent scientific peer review panel's report. The CBP's work on a common set of shared water quality criteria assessment protocols, which started in the late 1990s, continues to move forward almost two decades later. We have used the comments from the panel to guide our revision of the *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries: 2017 Technical Addendum* while preparing it for publication by the United States Environmental Protection Agency (EPA) on behalf of jurisdictions and the larger CBP partnership.

Chapter II. Three proposed changes to the dissolved oxygen criteria attainment assessment.

FIRST PROPOSED CHANGE TO THE ASSESSMENT OF DISSOLVED OXYGEN CRITERIA

Overall Panel Comment: The CBP is proposing to assess the likelihood that high frequency (short-duration) dissolved oxygen criteria are being met using low frequency data. The concept is reasonable to allow a more complete assessment of water quality standards. The Review Team identified several concerns: 1) use of the procedure, 2) site specificity, 3) conditional attainment is improbable, 4) time and depth bias, and 5) disincentive for collecting high frequency data.

1) **Panel Comment: The document does not provide context for how the proposed assessment procedure will be used.**

Response: We made revisions to the Table II-6 on "Recommended methods for assessing attainment of the short-duration Chesapeake Bay dissolved oxygen criteria". The section of the chapter titled "Recent Evidence Demonstrating Conditional Attainment" provides a baywide example applied to a multiple-criteria-assessment scenario in one designated use as the recipe for how this approach performs considering different dissolved oxygen decision threshold options. The general context for using the dissolved oxygen criteria assessment approach is recognized by the state agency regulatory community who contributed to its development. The final details of the application of the approach, including the selection of decision thresholds that define habitat protection for a designated use, remains a collaboration between each of the States and EPA.

Additional background: The water quality standards attainment assessment community in the four Chesapeake Bay jurisdictions—Delaware, District of Columbia, Maryland and Virginia—has been aware of the need for addressing gaps in the criteria attainment assessment protocols for short-duration dissolved oxygen criteria since the 2003 publication of the *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries (Regional Criteria Guidance) April 2003* (U.S. EPA 2003a). However, the suggestion for using one temporal scale dissolved oxygen criterion to infer passing or failing of other temporal scale dissolved oxygen condition thresholds dates back nearly 30 years in the Chesapeake Bay scientific and management communities. A logistic regression approach was used to analyze relationships of mutual protections for dissolved oxygen water quality targets across multiple time scales based on seasonal mean measures (Jordan et al. 1992). Jordan et al. concluded that knowing the seasonal mean dissolved oxygen concentration for a given region of the Bay permitted "a good estimate of what proportion of actual dissolved oxygen observations are likely to meet, or fail to meet," target dissolved oxygen concentrations such as the instantaneous minimum.

This concept of using one scale of measurement to assess other unmeasured target thresholds for dissolved oxygen assessments continued with additional EPA guidance documents:

- U.S. EPA (2004a, Chapter 5) "Guidance for Attainment of Instantaneous Minimum and 7-day Mean Dissolved Oxygen Criteria";

- U.S. EPA (2007a, Appendix E) Logistic regression, and Application of Logistic Regression to Assess Short-Duration Dissolved Oxygen Criteria Components *in* "Potential Methods for Assessing Shorter Duration Dissolved Oxygen Criteria"

The approach has already been adopted and implemented by the CBP through water quality modeling for the development of the TMDL. The method remains in use in assessing the effect of management actions outlined in Phase I, II and III watershed implementation plans in order evaluate the ability of proposed management actions to meet water quality standards in the TMDL for dissolved oxygen:

- Shenk and Batiuk (2010) "Evaluation of the Most Protective Bay Dissolved Oxygen Criteria" (i.e., the Umbrella Criteria approach).

The thrust of putting this chapter into place in the 2017 Technical Addendum was to assemble the history of the proposed method and establish the new background in the EPA Chesapeake Bay ambient water quality criteria assessment literature that can serve as a method reference of what we now term a conditional probability assessment for Chesapeake Bay water quality monitoring data. This 2017 Technical Addendum documents the methodological support to overcome the long recognized gaps in: 1) monitoring efforts accounting for the reality of resource limitations; and 2) water quality criteria attainment assessment strategy options that address the short-duration dissolved oxygen criteria with available data under the structure of the existing Chesapeake Bay long term water quality monitoring program water quality assessments.

The second point of context focuses on what constitutes failure or success to meet standards. This decision is a function of the rules of the federal regulatory water quality standards attainment assessments. The authors of the 2017 Technical Addendum did not give explicit details on decision rules because final decision rules are developed between the States and EPA for each standard and are recorded in each state's respective water quality standards regulations. The technical basis guiding the creation of such decision rules has already been established and documented in one or more of the eight Chesapeake Bay water quality criteria addendum documents published since the 2003 *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries* (U.S. EPA 2003a). Therefore, a conditional probability assessment can be used accordingly to evaluate any or all of the applicable short-duration criteria for a given dissolved oxygen water quality standard where no approved protocol for supporting such decisions was available before after the decision-rules are agreed to between a State and EPA. Applying an assessment method that provides a State with an answer on whether measured water quality is passing or failing a standard while acknowledging uncertainties in the approach has been considered an improvement over the states inability to assess a standard.

2) **Panel Comment: The review panel is concerned about the site-specific nature of the relationships among short-term and long-term monitoring data upon which the approach is based.**

Response: The STAC Review Panel indicated the conditional attainment assessment approach may be based on site-specific nature of criterion relationships. The development of the Chesapeake Bay criteria assessment methods, however, have relied on a wide range of data including short and long duration dissolved oxygen time series from throughout the Chesapeake Bay and its tidal tributaries and embayments, across salinity zones, and data collected over several decades. The basis of recommendations for the use of the outputs of the conditional probability concept started with the findings published in U.S. EPA (2004a, Chapter 5) that were derived using a bay-wide distribution of long-term water quality monitoring station data. The breadth of monitoring stations (hundreds) and years (decades) across the entire Chesapeake Bay and tidal tributaries are listed in Table V-3 of U.S. EPA (2004a). The in-depth work between 2009 and 2017, reported in the 2017 Technical Addendum, represent a synthesis of work that was also derived from a wide range of stations across different salinity zones, different depths and varied State tidal waters as outlined in Appendix C "Chesapeake Bay Water Quality Data Supporting Development and Testing of Short-duration Dissolved Oxygen Criteria Attainment Assessments", Table C-1. That said, we acknowledge that the body of work is not exhaustive of all possible analyses.

Our management community always strives to use the best available science to support criteria assessment protocol development and in its decision-making support on making listing and delisting decisions on impaired waters. During the development of this and similar assessment methods, a hierarchy of scientific foundations for developing a basis for new approaches has generally followed a path of investigation from global to local focus. Prior to publication of the 2017 Technical Addendum, there was no accepted method in place to assess some of the short-duration dissolved oxygen criteria (e.g., 7-day, 1-day). The conditional attainment approach applied to the assessment of short-duration DO criteria has been demonstrated to be valid and protective and is based on monitoring data collected from across the Chesapeake Bay and its tidal tributaries and embayments. Options considered during the scientific investigations carried out between 2009 and 2017 supporting the development of the method were:

1. Are there relationships which have been developed in other systems and have been published which could serve as a foundation for our decision-making in Chesapeake Bay?

2. Is there a regional Chesapeake Bay-wide relationship that has been developed for the relationship of interest that can be used for effective decision-making?

3. And finally, are there locally-derived relationships more finely tuned to specific geographic regions or salinity zones or sites that can be used to support effective decision-making?

The authors see great value in, and support development of, site or tidal tributary-specific relationships to support the water quality criteria attainment assessments. The development and application of site-specific relationships are often a preferred basis for assessment if the information is available. The concept for site- or region-specific relationships applied to conducting water quality standards attainment assessment in tidal waters of Chesapeake Bay is already in practice (e.g., for assessing the States' underwater bay grasses restoration acreage criteria using an approach called water clarity acres assessments). Regional light attenuation coefficient (K_d) relationships were developed and are used to compute water clarity conditions from DATAFLOW data, all of which are in use now for Chesapeake Bay water quality criteria attainment assessments (see U.S. EPA 2008, Chapter 4).

At this time, we recognize that the conditional probability approach is derived from Chesapeake Bay monitoring data and not from other coastal ecosystems. The States and the District of Columbia may, therefore, use the Chesapeake Bay-derived relationships published here as a basis to advance their assessment capacity (consistent with #2 above), or they may pursue collecting and analyzing additional data to create locally-specific relationships to further support the creation of thresholds to use to support their management decisions (consistent with #3 above).

3) **Panel Comment: The panel finds conditional attainment is improbable.**

Response: Within this 2017 Technical Addendum document, we have tested and illustrated the use of the conditional attainment approach applied to the open water summer season 30-day mean to evaluate protection of the designated use for the 7-day mean criterion. The application of the method showed that: 1) it can be used effectively to support decisions of failing or passing a previously unassessed short-duration criterion (i.e., the 7-day mean), 2) that there remains a decision to be made about the 30-day mean threshold that should be used for making that assessment, and 3) there is recognized uncertainty associated with a chosen protection level, and that uncertainty changes at different values chosen for a decision-threshold. The selection of the decision-threshold is a decision to be negotiated between EPA and each of the States and District of Columbia as they propose amendments to their existing State water quality standards regulations. Those decisions on the decision-thresholds will ultimately determine what is or is not improbable. The STAC Review Panel's suggestion for clarity in the application of the method is again very relevant and was addressed with updated text throughout the chapter and revised explanatory text in Table II-6.

This is a tool anticipated to be used to its fullest capacity to improve decision-making where no methods have been previously available to the States. Where it falls short, we have proposed other methods for dissolved oxygen criteria assessment. More intensive monitoring strategies, for example, may need to be applied to complete all the necessary criteria assessments that would support an impairment decision regarding the water quality status of a segment with all applicable parameters, seasons, and designated uses.

4) **Panel Comment: The document is silent about the bias associated with the time of day on which samples are collected.**

Response: Since the development of the Umbrella Criteria (Shenk and Batiuk 2010), there has been recognition for dissolved oxygen patterns and sampling protocols in developing this conditional attainment approach. Early consideration about this issue is highlighted in previous protocol support documentation in the addendum series (see U.S. EPA 2004a, Chapter V, page 36). In the recent developments of the conditional probability approach, the evaluation of risk thresholds was explicitly aligned in the modeling work with the typical daily sampling protocols used by the State agencies. Appendix A, page 77, points to the work evaluating uncertainty from low sample sizes for creating monthly means as we do in the Chesapeake Bay Program long term water quality monitoring program. For example, the work notes that "a random selection of observations taken between 9:00 am and 3:00 pm was chosen as the point estimate. This simulation was repeated 20 times to obtain 20 monthly mean estimates for each station month." We acknowledge that the science and monitoring strategies can continue to evolve in tandem to improve our assessments.

5) **Panel Comment: There is a disincentive for collecting high frequency data.**

Response: Quite the opposite. For over 10 years the States have been working toward, and anxious to have, a set of approved methods available in order to fully assess the dissolved oxygen criteria that are listed in their State water quality standards. Assessment methods applying high frequency data provides the incentive to maintain their high frequency monitoring efforts in order to address a full assessment of dissolved oxygen standards that help them meet their characterization and reporting responsibilities to EPA.

SECOND PROPOSED CHANGE TO THE ASSESSMENT OF DISSOLVED OXYGEN CRITERIA

Overall Panel Comment: The Review Team identified two reservations about specific aspects of the sub-segmentation process 1) sub-segmenting in three Bay zones and 2) varying definitions of three Bay zones.

1) **Panel Comment: First, the STAC Review Panel asks why three (dissolved oxygen criteria assessment) zones are optimal over any other number of zones?**

Response: The presentation of three assessment zones is less about optimal zonation and more about what are defensible options for the States to consider to assist them in completing their water quality standards attainment assessments while being supported with the best available science. The "three zone" habitat delineation was considered a defensible compromise between the need to respect the diversity of tidal water habitats recognized within the open-water designated use and the need for practical monitoring designs with available resources. A three zone option is also complementary to options recommended and applied for management of U.S. tidal estuarine waters by the EPA 305(b) guidance (U.S. EPA 2003b). In this EPA national 305(b) guidance, estuarine habitats are divided to define monitoring site representativeness by open-water, sheltered bays and highly sheltered bays. In non-tidal waters, Virginia has already applied a three zone approach to habitat separation for assessment purposes (VADEQ 2014).

One and two zone management (i.e., sub-segmentation) has been agreed to between EPA and the Chesapeake Bay States for decades as it applies to managing water quality and the living resources of Chesapeake Bay and its tidal tributaries and embayments. Three zones, therefore, represents one more management option that might be considered by the States to conduct and complete a water quality standards attainment assessment. We did not come across any published science or a defensible case presented that use four or more habitat sub-segments to better support the objectives of a water quality criteria attainment assessment. If such work is published, the history of the CBP monitoring and assessment programming to work with the States and District of Columbia to review, adapt and adopt such scientific advances to support its work on assessing water quality standards. The current 2017 Technical Addendum, along with previously published EPA ambient water quality criteria documentation including all prior published addenda (U.S.EPA 2003b, 2004a, 2004b, 2004c, 2005, 2007a, 2007b, 2008, 2010), supports the States' use of one, two and three zone options for managing their estuarine habitats and completing their Clean Water Act-based water quality standards attainment assessments.

2) **Varying definitions of the three zones are expressed in the chapter**

Response. We agreed that the presentation of definitions for the multiple zones in this chapter was describing them in more than one way. Text was updated to correct this issue.

THIRD PROPOSED CHANGE TO THE ASSESSMENT OF DISSOLVED OXYGEN CRITERIA

Panel Comment: This panel proposed the need for further interpretative text on using the continuous monitoring data for assessment purposes, specifically with reference to Rule 2-A Alternate.

Response: The chapter text remained the same at this time.

Chapter III Addressing missing volumes for three Chesapeake Bay assessment segments.

Panel Comment: The document is concise and provides the needed information. The Panel indicated the need for minor edits on clarity of the messaging in the text and provide recommendations for improving the text.

Response: We adopted the STAC Review Panel suggestions for enhancing clarity of the text and have incorporated the Panel's recommended text edits. We further retooled tables and graphics in the respective Chapter III related appendices to improve the presentation of the information.

Chapter IV. The Water Quality Standards Indicator.

Panel Comment: The STAC Review Panel notes that there are text contradictions describing the surface area multiplication factors in the calculations.

Response: We improved the text to address this challenge.

Panel Comment: The relationship between the content in Chapter II versus Chapter IV was not clear, specifically, an understanding about "zones" or "isolated waters" and whether or not the authors were changing the definition of any of the designated uses with the proposed zones (e.g., is the zone described as "tributary of tributaries" a new designated use?).

Response: To be sure, there have been no changes made to the Chesapeake Bay designated uses. The term "isolated waters" was removed from the text as we discovered that beyond any confusion with other zone descriptions there is a legal definition associated with that term that was not applicable for our use of the term here. Finally, the zones described here are options to be considered for sub-segmenting a designated use for assessment purposes.

The final text of the 2017 Technical Addendum highlighted that the CBP partners have used various forms of a basic segmentation scheme to organize collection, analysis and presentation of environmental data for more than three decades. The *Chesapeake Bay Program Segmentation Scheme Revisions, Decisions and Rationales: 1983-2003* (U.S. EPA 2004b) provides documentation on the development and evolution of the spatial segmentation scheme of the Chesapeake Bay and its tidal tributaries. Segmentation has been used to compartmentalize the estuary into subunits based on selected criteria for setting boundaries and grouping regions having similar natural characteristics, so that differences in water quality and biological communities among similar segments can be identified and the source of their impacts elucidated (U.S. EPA 2004b). The text further highlights that there is a strong scientific rationale for further sub-segmenting the existing Chesapeake Bay segments from a water quality criteria assessment perspective. Sub-segments have been previously created for state-specific Chesapeake Bay water quality standards applications (U.S. EPA 2004c, 2007a).

Panel Comment: There appears to be some contradiction with interpreting the statements for Rules 2 and 3 in the indicator assessments.

Response: Upon further review, we find no contradiction regarding a deep channel assessment of instantaneous minimums and the statements in Rules 2 and 3. The deep-channel designated use criteria assessment has always been based on a sample by sample basis because the instantaneous minimum criterion is the only criterion that applies to this designated use. There is no use of the 30-day mean related to deep-channel designated use dissolved oxygen standard attainment assessment but has been applied for assessing the open water designated use and the deep water designated use that are separate from the deep channel designated use assessment.

Panel Comment: Figures IV-2 and IV-4 are considered redundant and confusing. Also, criteria documentation should be clarified here.

Response: A single figure has now replaced Figures IV-2 and IV-4. The single figure is supported by a more complete explanation of the criteria as they are measured and contribute to the assessment of the indicator scores in the revised text.

Chapter V. Documenting an update to the Chesapeake Bay underwater grasses restoration goal/alignment of the goal with the jurisdictions Chesapeake Bay water quality standards restoration acres.

Panel Comment: Table V-1 updates the justifications published in 2004 regarding differences between state and Chesapeake Bay Program restoration goals.

Response: Per this publication and the STAC Panel Review Team process, this table is now the most complete accounting of underwater grasses restoration goal justifications for the CBP. We updated text in the table and in the chapter to be the most accurate and complete accounting of the goal justifications.

Panel Comment: Model Attainability Issues – there were a few exceptions to the pattern of differences in state and CBP goal acreages. These important differences should be highlighted.

Response: The chapter text and Table V-1 now provide the most complete accounting of the underwater bay grasses restoration goal justifications that also highlights important differences where and when they occurred in the process. In setting the original underwater bay grasses goal restoration acreages, the Partnership reached agreement on a methodology for derivation of the acreages which was applied consistently across all Chesapeake Bay segments. In amending their state water quality standards regulations, Virginia made the decision in 2005 to adjust the underwater bay grasses restoration acreages for four segments—three in the tidal James River and one in the lower Rappahannock River based on attainability considerations using model simulated outcomes. This was not the standard approach, but rather an internal state decision specific to handful of tidal Bay segments. EPA supported Virginia decisions as they were made on the best available information at that time and reflected Virginia concerns about their ability to reduce nutrient and sediment pollutant loads down to levels necessary to restore underwater bay grasses to the restoration acreages based on historical coverage. Text has been added to Chapter V that

highlights the need to amend these specific segments' restoration goal acreages to directly reflect the actual underwater bay grasses acreages observed in the past. Applying this approach will ensure all states' segment-specific underwater bay grasses restoration acreage criteria are fully consistent with how the segment-specific underwater bay grasses restoration acreage criteria were set for the remaining Chesapeake Bay segments across all four jurisdictions and fully consistent the underwater bay grasses restoration acreage goals adopted by the Partnership.

Panel Comment: Include a statement about alternative underway bay grasses acreage goals and their derivations, specifically, reference to alternative methods that, if applied, could support a 206,000 acre bay-wide goal.

Response: The text in Chapter V has been edited and updated to incorporate the above recommended factual statement.

Panel Comment: The STAC Team suggests the need for an improved water clarity attainment monitoring effort be included in Chapter IV.

Response: The chapter focused specifically and concisely on underwater bay grasses and the derivation of the restoration acreage goals. We did not expand the work in this chapter to discuss and address assessment options. However, the topic is acknowledged as important and falls under long term future directions for the Partnership. In 2016 and 2017, members of the CAP WG and STAR have been exploring alternative support for monitoring options of water clarity (e.g., satellite image interpretation algorithms in partnership with NASA).

Chapter VI. An alternative method of classifying water bodies based on the B-IBI.

Panel Comment: The chapter identifies shortcomings of the existing methods. The Review Team agrees with taking a precautionary approach given uncertainties about the benthic index of biotic integrity (B-IBI) index and the proposed approach is a reasonable one.

Response: The CBP will adopt the approach recognizing the strengths and limitations of the existing methods as recognized by the review team.

Panel Comment: The document should identify and provide steps to a longer term solution.

Response: Given the recent investment in efforts to make improvements in the B-IBI, and the States and EPA accepting of the option to work with an interim assessment solution published in this chapter, we will consider additional options in the future. We provide some related details about such future directions in our next response below.

Panel Comment: The STAC Review Team finds flaws in the Appendix on the LLanso et al. 2016 effort toward improving the B-IBI.

Response: We contacted authors of the Appendix F work to discuss the STAC Review Panel findings. We learned that Chesapeake Bay B-IBI comparisons with alternative index development approaches (EMAP, AMBI, M-AMBI and other "European" approaches) has received attention, been explored and evaluated in the peer reviewed literature (e.g., A. Borja, D.M. Dauer, R. Diaz, R.J. Llanso, I. Muxika, J.G. Rodriguez , and L. Schaffner. 2008. Assessing estuarine benthic quality conditions in Chesapeake Bay: A comparison of three indices. Ecological Indicators 8:395-403). Additionally, they indicated there have also been three international symposia

resulting in three special issues of publications regarding the development, implementation and interpretation of indices of benthic and ecosystem functioning including the Chesapeake Bay B-IBI. Limitations of the Chesapeake B-IBI are recognized and understood (e.g., low salinity areas are some of the poorest performing regions for the index) but are noted to have been accounted for in the Impaired Waters Method applied to Chesapeake Bay assessments according to the authors. The need for additional work on improving the index is acknowledged but is considered a longer term priority for the CBP at this time.

In the shorter term, we recognize additional alternatives may be available to improving index performance. With the Impaired Waters Method of using the B-IBI, many Chesapeake Bay segments are excluded from aquatic life designated use impairment determinations because of small sample sizes. Therefore, rather than conducting additional work on the index, more monitoring data in a segment that boosts sample sizes that can play to the strengths of the index performance to discriminate failing or passing conditions is an alternative readily available to the States. Another alternative is to modify the present sampling design so that it is more tailored to assessments at the segment-level. Applying one or both of these options can support more robust and unambiguous assessments of segments throughout the bay and its tidal tributaries before research may lead to a more robust tool in the B-IBI. These options are recognized as important next step items for the CAP WG to consider in overcoming the challenges identified in addressing situations that led to interim rules for the segment assessments.

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