



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stefanie K. Taillon
Acting Secretary of Natural and Historic Resources

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Director

Meeting Minutes

**Regulatory Advisory Panel for the Triennial Review 2024 Rulemaking Meeting #3
August 28, 2025**

The Virginia Department of Environmental Quality (DEQ) held a Regulatory Advisory Panel (RAP) meeting on August 28, 2025, at 9:30 am at the DEQ Piedmont Regional Office located at 4949-A Cox Road, Glen Allen, VA 23060 for the triennial review of the Virginia Water Quality Standards (WQS) (VAC25-260)

The following RAP members attended the meeting:

- JoAnn Banda, US Fish and Wildlife Service
- Tom Dunlap, James River Association
- K.C. Filipino, Hampton Roads Planning District Commission
- Carl Friedrichs, VA Institute of Marine Science
- Mike Gerel, Chesapeake Bay Foundation
- Darryl Glover, Virginia Department of Conservation & Recreation
- Jamie Heisig-Mitchell, Virginia Association of Municipal Wastewater Agencies (VAMWA)
- Danielle Schools (Alternate), Virginia Department of Health (VDH) Shellfish Division
- Jake Tabor (Alternate), Virginia Farm Bureau
- Jim Taylor, Virginia Manufacturers Association (VMA)

The following members of the RAP were absent:

- Kaylyn Gootman, EPA Chesapeake Bay Program
- Julie Henderson, VDH Office of Environmental Health Services
- Martha Moore, VA Farm Bureau Federation
- Dwayne Roadcap, VDH Drinking Water
- Hannah Schul, Virginia Department of Wildlife Resources
- David Sligh, Wild Virginia
- Juan Vincenty-Gonzalez, EPA Region 3

The following interested members of the public attended the meeting:

- Dick Sedgley, VAMWA

The following DEQ staff attended the meeting:

- Jaimie Lynn B. Robb, Deputy Director, Piedmont Regional Office
- Connor Brogan, Water Quality Modeler, Office of Water Supply
- Sam Jasinski, Analyst, Policy Division
- Joseph Bryan, VPDES Permits Manager, Office of VPDES permits
- Anthony Cario, Regulatory Analyst, Water Division
- Sandy Meuller, Manager Water Monitoring and Assessment Program Manager
- Amanda Shaver, WQ Assessment/CB Monitoring Team Lead
- Tish Robertson, Water Quality Monitoring and Assessment Scientist, Office of Ecology

DEQ staff welcomed participants, outlined the group's purpose, and reviewed advisory panel guidelines. Topics included public meeting definitions, Freedom of Information Act (FOIA) requirements, and guidelines for RAP participants.

RAP members were asked to submit feedback on the draft minutes from the August 15, 2025 meeting by September 3, 2025. DEQ then reviewed the day's agenda and RAP members introduced themselves.

DEQ staff revisited topics introduced during the August 15, 2025, RAP meeting to solicit additional comments and gauge consensus where necessary.

Chesapeake Bay Dissolved Oxygen and Significant Figures: DEQ summarized the proposal for revising dissolved oxygen (DO) criteria in the Chesapeake Bay to add a decimal place to improve precision. After RAP input and review of 2003 EPA Chesapeake Bay Program document recommending the criteria values, DEQ revised its proposal to keep the Deep channel criterion (Instantaneous minimum ≥ 1) unchanged as this time, not adding the decimal place. The added decimal place is still proposed for the remaining Chesapeake Bay DO criteria expressed as a whole number. A RAP member asked why Deep Water was excluded from the additional decimal place; DEQ cited VAMWA's objection and explained that the original data lacked sufficient precision and that adding the decimal place implies more accuracy than intended. No objections were raised when gauging consensus, and the proposal was accepted.

Bay Assessment Language and Cumulative Frequency Distribution (CFD): DEQ presented proposed changes to the WQS regulation section requiring use of the CFD for assessment (9VAC25-260-185 D 3). DEQ presented revised language that removed reference to a DEQ guidance document to comply with Virginia's Administrative Code. Staff explained the current Chesapeake Bay DO assessment methods and described the CFD method and its limitations. Staff explained reasons for adding a qualifier for when the CFD would be used, including that EPA recommends that the method should not be used for 7-day, 1-day, and instantaneous minimum criteria with existing datasets, which means that monitoring data are being under-utilized by limiting assessments to the CFD method. DEQ explained that it would continue using the CFD method for criteria that have been assessed using this method. The proposal allows for multiple data types and assessment methods to identify impairments and follows the approach of other Bay jurisdictions. In response to a question, DEQ clarified that staff are considering a multiple-lines-of-evidence approach and that any single method indicating impairment would result in a designation of impairment. Staff emphasized that the assessment methods available and chosen for use are transparent to the public through multiple avenues, including the

Chesapeake Bay Criteria Assessment Protocol Workgroup, DEQ's assessment guidance, and in the biennial Integrated Report. Another member supported seeing all the available data used in assessments. In gauging consensus on the topic, RAP members were supportive of the change, with one member (VAMWA) indicating that they were supportive but may offer wording changes later.

Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) Aquatic Life Criteria: DEQ reviewed proposed aquatic life criteria for PFOA and PFOS. A question was raised about whether a single fish exceeding the limit would trigger impairment; DEQ confirmed this interpretation. Staff clarified that composite fish samples are used for analysis. A RAP member felt it was premature given the lack of finalized implementation guidance from EPA. DEQ maintained that they felt that they could proceed without implementation guidance because the PFOA and PFOS assessments are expected to be uncomplicated, since the criteria are expressed as water column and fish tissue concentrations. Staff explained that in other cases the agency has waited for implementation guidance, such as selenium criteria, because the methods were much more complicated than what is necessary for PFOS and PFOA. Staff stated that they did not know if there were plans for implementation guidance from EPA and it was not required to include the criteria. When gauging consensus of the RAP, Jim Taylor, VMA, expressed reservations and withheld consensus due to concerns over implementation. No other objections were raised.

Copper Biotic Ligand Model (BLM) Language Modification: DEQ revisited the Copper Biotic Ligand Model (BLM) language, with DEQ presenting updated language that removed direct references to guidance documents, while stating that the guidance will still be developed to explain methodology. In response to a question, staff explained that guidance was being developed because the method is much more complicated than the hardness-based criteria. The group discussed the development of study plans and reached consensus on the modified language, noting that minor changes to language might be provided during public comment. No other objections, suggestions or comments were noted.

Numeric Turbidity Criteria: DEQ briefly addressed numeric turbidity criteria, expressing the hope to revisit the issue and the existing rulemaking in 2026. Staff noted the agency has made progress on addressing turbidity via the recently adopted Construction Stormwater General Permit, which now includes requirements for turbidity. A comment was made urging the DEQ to finalize the existing rulemaking and avoid ongoing delays.

Public Water Supply Language Consistency: DEQ reviewed comments about inconsistencies in Public Water Supply (PWS) descriptions and a request to standardize the 5-mile buffer.

Dick Sedgley (VAMWA) presented recommendations for standardizing PWS criteria, highlighting inconsistencies in regulatory language. VAMWA advocated for a uniform 5-mile standard, citing historical support from VDH and EPA documentation. They argued that standardization would be protective and consistent, and that the inconsistency creates challenges for VAMWA members.

DEQ showed examples of segments with and without the 5-mile limit. They identified challenges regarding addressing this topic including the legality of standardizing PWS, VDH's drinking water protection policy, and the rationale for existing PWS segments. DEQ staff discussed that limiting PWS would require removal of the existing PWS beyond 5-miles. Staff discussed the challenges with removing designated uses under the Clean Water Act, which

would require a Use Attainability Analysis to modify designated uses creating a barrier to blanket standardization. Slides from VDH were shared, though VDH Office of Drinking Water staff were not present to elaborate. Members inquired about the origin of the 5-mile standard and whether a rationale exists for segments that extend beyond that distance. DEQ clarified that the 5-mile buffer is a practice followed by VDH for risk assessment and is not codified in regulation. While DEQ assumes that a rationale was provided for each extended segment, the agency has not conducted a comprehensive review to confirm or document those justifications across all cases. DEQ stated that they could not make this change during this triennial review cycle, but that this may be more appropriate for a separate rulemaking process, due to the number of possible changes. It was suggested that legislative support would be helpful for future changes related to this subject. Questions arose about the ability to modify designated uses, with DEQ clarifying that while uses can be added or changed, removing them is more complex and requires formal processes.

Mixing Zones. During the Notice of Intended Regulatory Action (NOIRA) commenters requested that DEQ re-evaluate its mixing zone regulations to better protect sensitive aquatic life like freshwater mussels. Joseph Bryan (DEQ's VPDES program) explained how mixing zones are currently determined and regulated. Concerns were raised regarding mixing zones not addressing resident species whereas the recently adopted ammonia standards presume the presence of mussels. DEQ acknowledged the concerns and indicated that the Agency may need to further evaluate how the new ammonia standards interact with current regulation and guidance addressing mixing zones. Questions about overlapping zones and temperature criteria were addressed by DEQ modeling staff. No regulatory changes were proposed, but further review may occur outside the triennial cycle.

Narrative criteria implementation guidance: DEQ responded to NOIRA comments that DEQ amend the WQS to fully implement and enforce the narrative criteria in all regulatory actions. DEQ described multiple situations where they apply the narrative criteria in assessments, compliance, and enforcement, among other situations. A member commented that the narrative criteria for turbidity are ineffective and should evolve into numeric standards. While no formal proposal was made, one stakeholder suggested this issue may benefit from further review.

Public Remarks. No public remarks were provided.

The meeting concluded with an overview of the upcoming regulatory process, including steps under the Administrative Process Act and how RAP input would be incorporated into proposed amendments. No additional RAP meetings were requested. Members asked whether changes to the proposals could still be made after the RAP meetings concluded. DEQ confirmed that revisions were possible, depending on feedback received during internal agency reviews, or recommendations from the State Water Control Board or EPA. When a member inquired about the current composition of the State Water Control Board, DEQ directed them to its website, where the list of board members is publicly available.



Virginia Water Quality Standards

Triennial Review

Regulatory Advisory Panel Meeting #3

Sandra Mueller

Water Monitoring and Assessment Program Manager
Office of Ecology

August 28, 2025

FOIA

1. The group is a public body subject to the Freedom of Information of Act. As such, all business of the group must be conducted in a public forum that has been duly noticed in accordance with the Act and minutes must be prepared.
2. Emails may be considered the conduct of business, so individual members of the RAP should not use "reply to all" when receiving emails from DEQ, and any member of the RAP that wants to provide information to the RAP should send it to the staff contact (David Whitehurst) for distribution.
3. Any committees of the RAP if more than 2 members of the RAP serve on the committee are also public bodies, subject to these same rules.

RAP Guidelines for Discussions

- Listen with an open mind - it allows deeper understanding and, therefore, progress. Goal is consensus.
- Be concise and try to speak only once on a particular issue, unless you have new or different information to share.
- Simply note your agreement with what someone else has said if you feel that it is important to do so, it is not necessary to repeat it.
- Focus on the issue, not the speaker - personalizing makes it impossible to listen effectively.
- Present options for solutions at the same time you present the problems you see.

Agenda

- Welcome, introductions, meeting information – Sandy Mueller, DEQ
- Recap of Items Presented at Meeting #2 – Tish Robertson, DEQ
- Discussion
- Continued Review of Issues submitted by commenters during the NOIRA comment period
 - Public Water Supply segment delineation clarification
 - Mixing zones
 - Narrative criteria implementation in WQS
- LUNCH BREAK

Agenda cont'd

- Discussion
- Other issues
- Public remarks – *Comments provided by the public are limited to 3 minutes each and the total time will not exceed 30 minutes*
- Next steps and wrap up

Regulatory Advisory Panel Introductions

- Mike Gerel - Chesapeake Bay Foundation
- K.C. Filipino – Hampton Roads Planning District Commission
- Tom Dunlap – James River Association
- Jamie S. Heisig-Mitchell – VA Assoc. of Municipal Wastewater Agencies (VAMWA)
- Jim Taylor – VA Manufacturers Assoc. (VMA)
- David Sligh – Wild Virginia
- Martha Moore – VA Farm Bureau Federation
- Joanne Banda – US Fish and Wildlife Service
- Kaylyn Gootman – EPA Chesapeake Bay Program
- Juan Vincenty-Gonzalez – EPA Region 3
- Darryl Glover – VA Dept of Conservation and Recreation
- Danielle Schools – VA Dept of Health
- Robert Edelman – VDH Office of Drinking water
- Hannah Schul – VA Dept of Wildlife Resources
- Carl Friedrichs – VA Institute of Marine Science

DEQ Staff Identified Issues for Consideration Presented at RAP Meeting #2

- Significant Digits and Bay Implementation Language Modification
- Aquatic Life Criteria for PFOA and PFOS
- Copper BLM Language Modification

Recap:
Significant Digits and Bay Criteria Implementation
Language Modification

Chesapeake Bay Water Quality Criteria (9VAC25-260-185)

Significant Digits

9VAC25-26-185 (Bay Criteria)

A. Dissolved oxygen. The dissolved oxygen criteria in the following table apply to all Chesapeake Bay waters according to their specified designated use and supersede the dissolved oxygen criteria in [9VAC25-260-50](#).

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean ≥ 6 mg/l (tidal habitats with 0-0.5 ppt salinity) Instantaneous minimum ≥ 5 mg/l	February 1 - May 31
Open water ¹	30-day mean ≥ 5.5 mg/l (tidal habitats with 0-0.5 ppt salinity) 30-day mean ≥ 5 mg/l (tidal habitats with > 0.5 ppt salinity) 7-day mean ≥ 4 mg/l Instantaneous minimum ≥ 3.2 mg/l at temperatures < 29°C Instantaneous minimum ≥ 4.3 mg/l at temperatures $\geq 29^\circ\text{C}$	year-round ²
Deep water	30-day mean ≥ 3 mg/l 1-day mean ≥ 2.3 mg/l Instantaneous minimum ≥ 1.7 mg/l	June 1 - September 30
Deep channel	Instantaneous minimum ≥ 1 mg/l	June 1 - September 30

DEQ is considering recommending the addition of a decimal place to these criteria.

Significant Digits

9VAC25-26-185 (Bay Criteria)

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Deep water	30-day mean ≥ 3 mg/l 1-day mean ≥ 2.3 mg/l Instantaneous minimum ≥ 1.7 mg/l	June 1 - September 30
Deep channel	Instantaneous minimum ≥ 1 mg/l	June 1 - September 30

Reason #1:

DEQ's rounding policy directs staff to round analytical values to the same number of significant digits as the applicable regulatory threshold.

The analytical accuracy of EPA Method 360.1 is to the tenths' place. DEQ's Assessment Guidance instructs assessors to round all DO measurements to the tenths' place prior to being assessed.

Because of this, field-measured DO values less than 1 will only have one significant digit.

DEQ staff will not be changing this criterion at this time.

Significant Digits

9VAC25-26-185 (Bay Criteria)

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Deep water	30-day mean ≥ 3 mg/l 1-day mean ≥ 2.3 mg/l Instantaneous minimum ≥ 1.7 mg/l	June 1 - September 30
Deep channel	Instantaneous minimum ≥ 1 mg/l	June 1 - September 30

Reason #2:

USEPA (2003) provides more support for 1 mg/L than 1.0 mg/L.

DEQ staff will not be changing this criterion at this time.

Chesapeake Bay Criteria Implementation Language

- Chesapeake Bay Criteria implementation language is in [9VAC25-26-185.D](#).
- DEQ staff recommend that Paragraph 3 of this subsection be modified.

CURRENT LANGUAGE

3. Attainment of these criteria shall be assessed through comparison of the generated cumulative frequency distribution of the monitoring data to the applicable criteria reference curve for each designated use. If the monitoring data cumulative frequency curve is completely contained inside the reference curve, then the segment is in attainment of the designated use. The reference curves and procedures to be followed are published in the USEPA, Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries, EPA 903-R-03-002, April 2003 and the 2004 (EPA 903-R-03-002 October 2004), 2007 (CBP/TRS 285/07, EPA 903-R-07-003), 2007 (CBP/TRS 288/07, EPA 903-R-07-005), 2008 (CBP/TRS 290-08, EPA 903-R-08-001), 2010 (CBP/TRS 301-10, EPA 903-R-10-002), and 2017 (CBP/TRS 320-17, EPA 903-R-17-002) addenda. An exception to this requirement is in measuring attainment of the SAV and water clarity acres, which are compared directly to the criteria.

Chesapeake Bay Criteria Implementation Language

- Chesapeake Bay Criteria implementation language is in [9VAC25-26-185.D](#).
- DEQ staff recommend that Paragraph 3 of this subsection be modified.

RECOMMENDED PROPOSED LANGUAGE

3. The cumulative frequency distribution method, where applicable, and other published methods approved by DEQ ~~Attainment of these criteria~~ shall be used to assess attainment of these criteria. These methods include procedures described in ~~assessed through comparison of the generated cumulative frequency distribution of the monitoring data to the applicable criteria reference curve for each designated use. If the monitoring data cumulative frequency curve is completely contained inside the reference curve, then the segment is in attainment of the designated use. The reference curves and procedures to be followed are published in~~ the USEPA, Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries, EPA 903-R-03-002, April 2003 and the 2004 (EPA 903-R-03-002 October 2004), 2007 (CBP/TRS 285/07, EPA 903-R-07-003), 2007 (CBP/TRS 288/07, EPA 903-R-07-005), 2008 (CBP/TRS 290-08, EPA 903-R-08-001), 2010 (CBP/TRS 301-10, EPA 903-R-10-002), and 2017 (CBP/TRS 320-17, EPA 903-R-17-002) addenda. ~~An exception to this requirement is in measuring attainment of the SAV and water clarity acres, which are compared directly to the criteria.~~

What is the current assessment method for Bay DO?

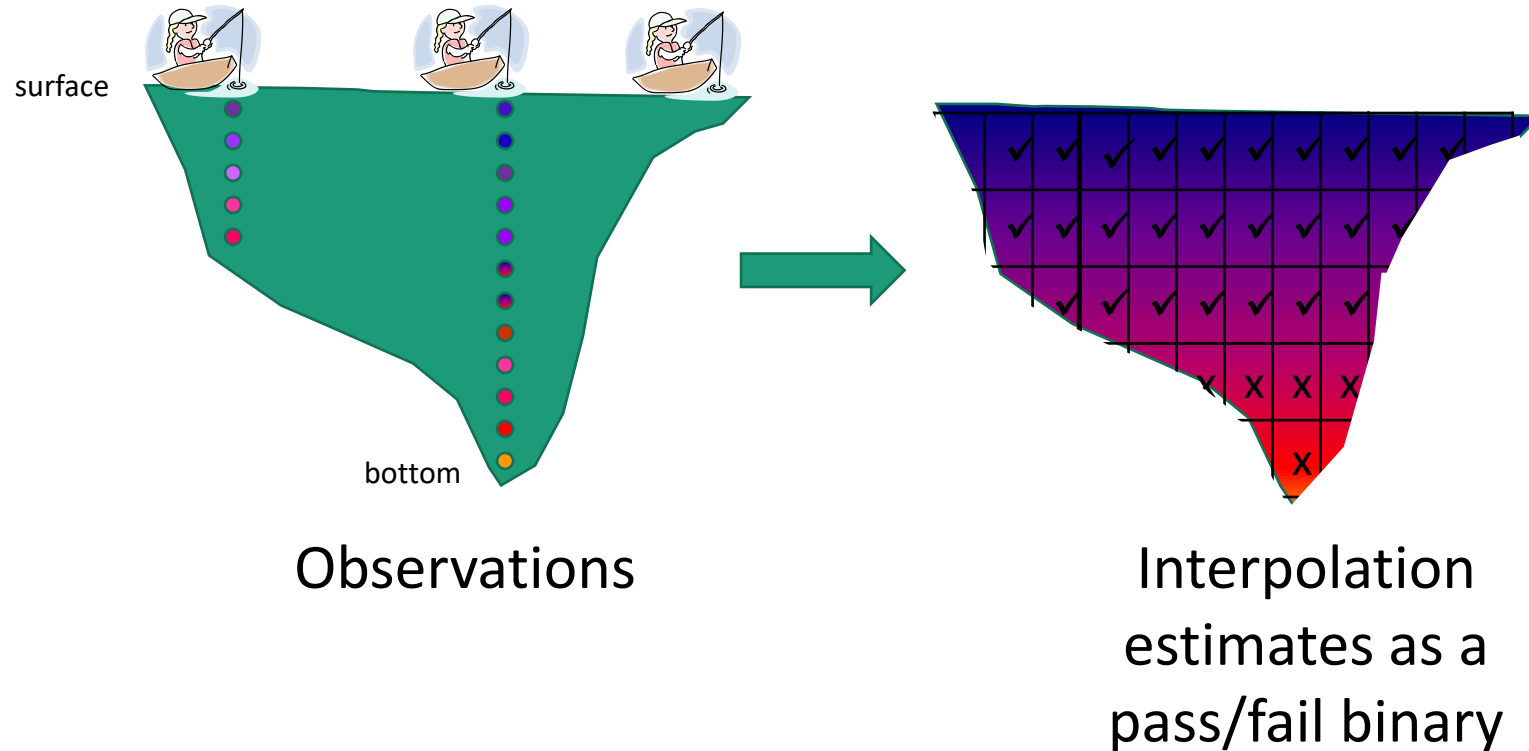
What is the current assessment method for Bay DO?

There are two basic components to the current method:

- Spatial interpolation of monitoring data
- Assessment of the cumulative frequency distribution of spatial exceedance rates.

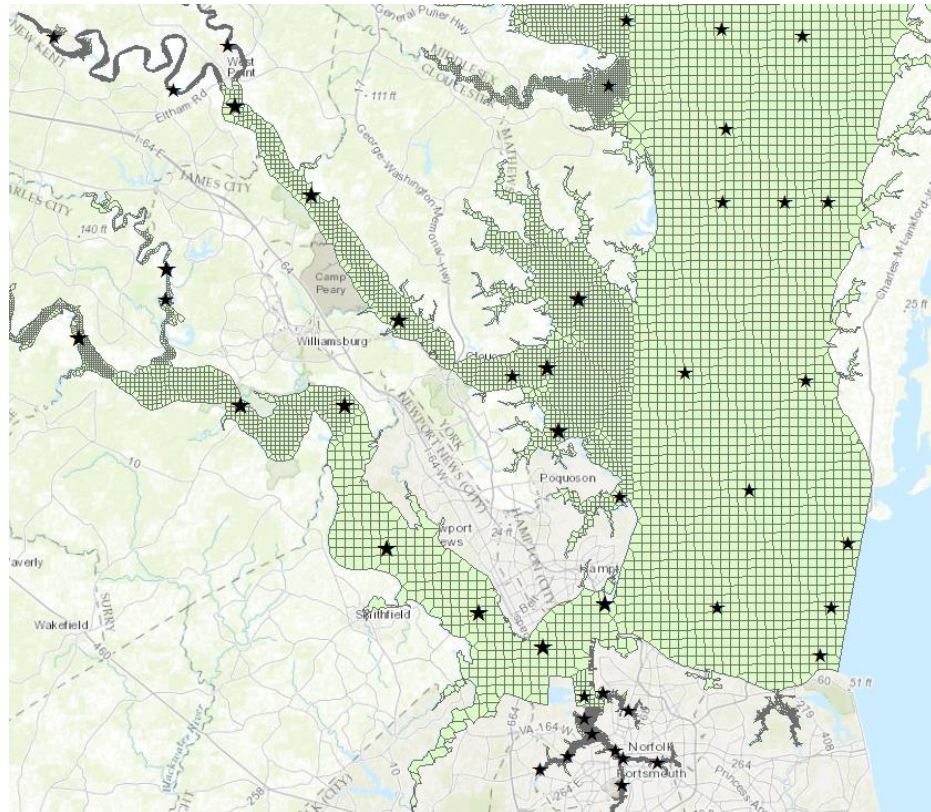
What is the current assessment method for Bay DO?

Spatial Interpolation of Monitoring Data



What is the current assessment method for Bay DO?

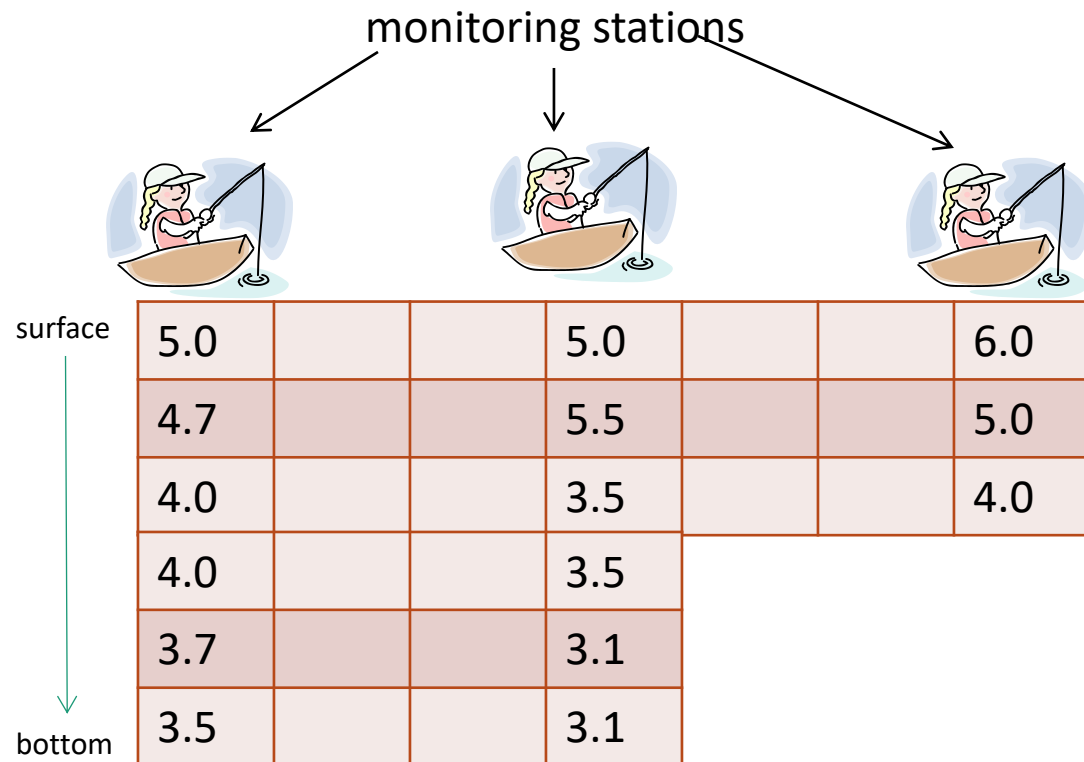
The “Bay Interpolator Grid”
(2-dimensions are shown here, but it’s actually 3-D)



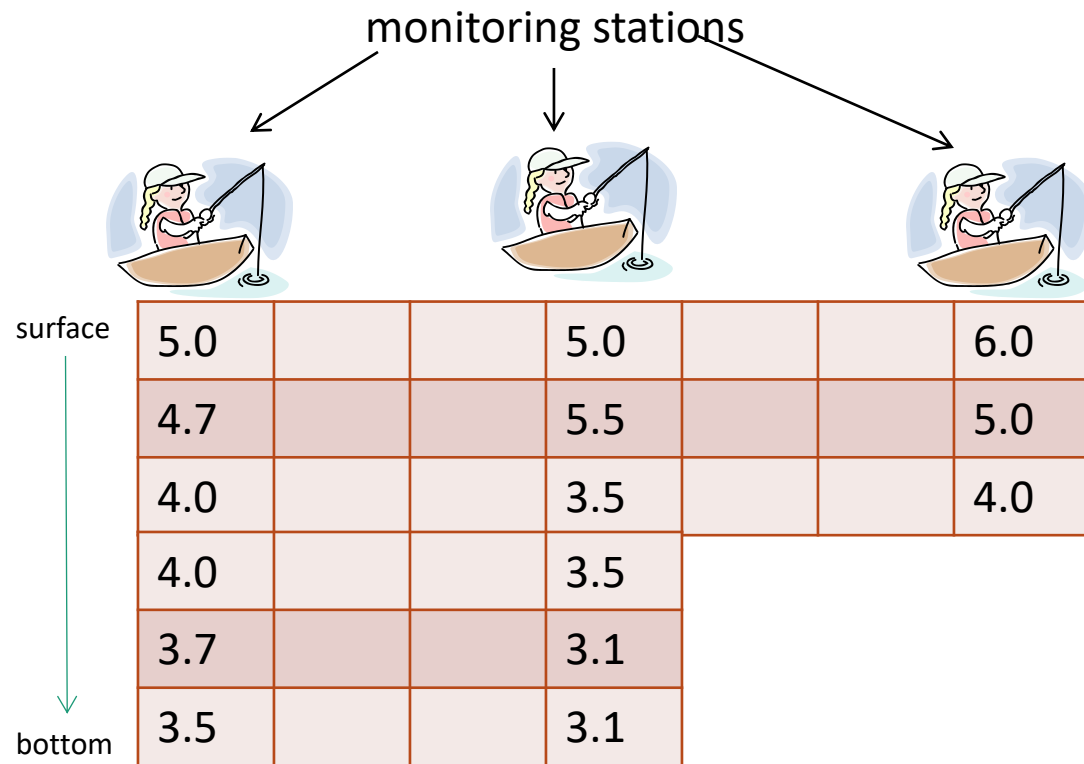
★ CPBO Station

Estimates are generated for each cell using DO concentrations observed at fixed stations .

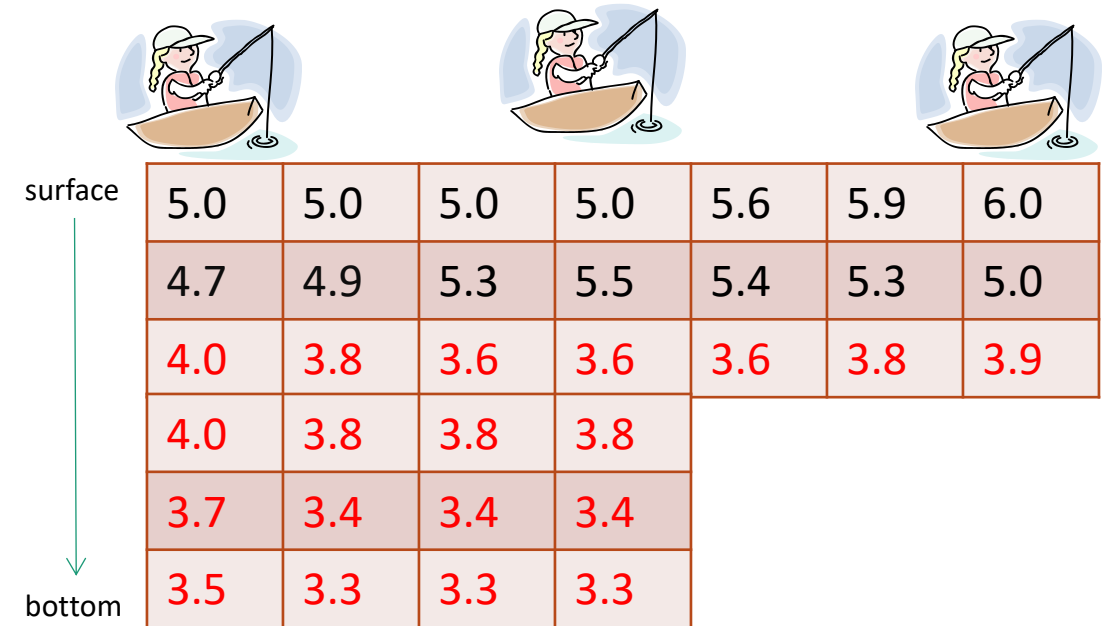
What is the current assessment method for Bay DO?



What is the current assessment method for Bay DO?



The interpolation is performed horizontally, using inverse distance weighting (IDW).



The “red” values are exceedances of the Open Water 30-Day mean criterion (5 mg/l).

What is the current assessment method for Bay DO?

The assessment period for Bay DO is three years.

For the Open Water use, the 30-Day Mean is applied seasonally—summer months and non-summer months. The summer months are June to September.

So for a typical assessment of the summer 30-Day mean criterion for a particular segment's Open Water use, there will be a total of twelve 30-Day mean spatial exceedance rates.

month-year	spatial exceedance rate
Jun-22	0.10
Jul-22	0
Aug-22	0.30
Sep-22	0.10
Jun-23	0.64
Jul-23	0.01
Aug-23	0
Sep-23	0
Jun-24	0.10
Jul-24	0.20
Aug-24	0.26
Sep-24	0.24

Hypothetical spatial exceedance rates
for a Bay segment over a 3-year period

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month-year	spatial exceedance rate
Jun-22	0.10
Jul-22	0
Aug-22	0.30
Sep-22	0.10
Jun-23	0.64
Jul-23	0.01
Aug-23	0
Sep-23	0
Jun-24	0.10
Jul-24	0.20
Aug-24	0.26
Sep-24	0.24

Hypothetical spatial exceedance rates
for a Bay segment over a 3-year period

month-year	spatial exceedence rate for a segment
Jun-23	0.64
Aug-22	0.3
Aug-24	0.26
Sep-24	0.24
Jul-24	0.2
Jun-22	0.1
Sep-22	0.1
Jun-24	0.1
Jul-23	0.01
Jul-22	0
Aug-23	0
Sep-23	0

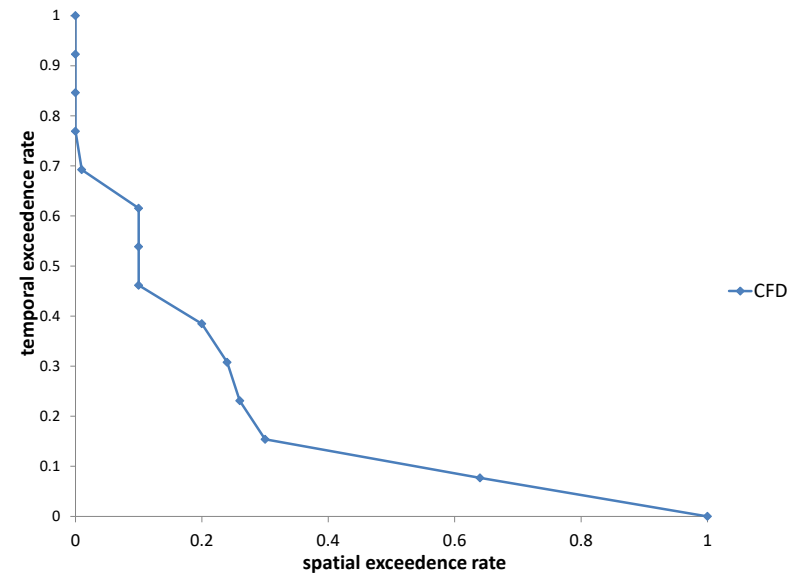
1. Rank the spatial exceedence rates from highest to lowest.

month-year	spatial exceedence rate for a segment	rank	cumulative probability
	1		0
Jun-23	0.64	1	0.08
Aug-22	0.3	2	0.15
Aug-24	0.26	3	0.23
Sep-24	0.24	4	0.31
Jul-24	0.2	5	0.38
Jun-22	0.1	6	0.46
Sep-22	0.1	7	0.54
Jun-24	0.1	8	0.62
Jul-23	0.01	9	0.69
Jul-22	0	10	0.77
Aug-23	0	11	0.85
Sep-23	0	12	0.92
	0		1

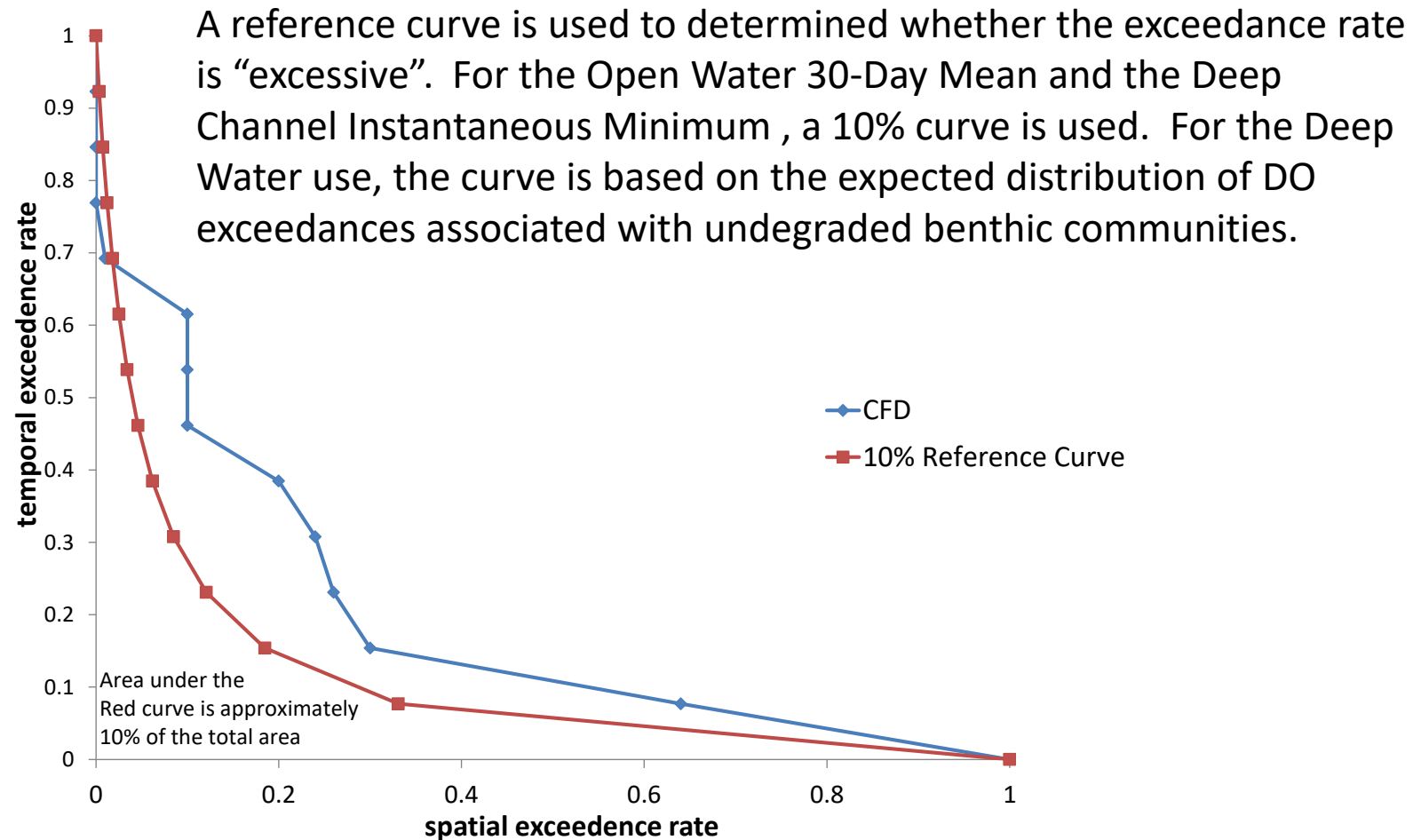
3. Insert end points so that your distribution is filled out

2. Calculate the temporal exceedence rate (aka cumulative probability) by dividing each rank by 13

month-year	spatial exceedence rate for a segment	rank	cumulative probability
Jun-23	0.64	1	0.08
Aug-22	0.3	2	0.15
Aug-24	0.26	3	0.23
Sep-24	0.24	4	0.31
Jul-24	0.2	5	0.38
Jun-22	0.1	6	0.46
Sep-22	0.1	7	0.54
Jun-24	0.1	8	0.62
Jul-23	0.01	9	0.69
Jul-22	0	10	0.77
Aug-23	0	11	0.85
Sep-23	0	12	0.92



The Cumulative Frequency Distribution in graphic form



We would say that the CFD indicates this segment failed the 30-Day Mean DO criterion since the two curves cross each other. If the blue curve was fully “contained” by the red curve, the segment would be in compliance with the standard.

Why does DEQ want to add a qualifier for when the CFD would be used?

RECOMMENDED PROPOSED LANGUAGE for 9VAC25-260-185.D Item 3

3. The cumulative frequency distribution method, **where applicable**, and other published methods approved by DEQ ~~Attainment of these criteria shall be used to assess attainment of these criteria. These methods include procedures described in~~ ~~assessed through comparison of the generated cumulative frequency distribution of the monitoring data to the applicable criteria reference curve for each designated use. If the monitoring data cumulative frequency curve is completely contained inside the reference curve, then the segment is in attainment of the designated use. The reference curves and procedures to be followed are published in~~ the USEPA, Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries, EPA 903-R-03-002, April 2003 and the 2004 (EPA 903-R-03-002 October 2004), 2007 (CBP/TRS 285/07, EPA 903-R-07-003), 2007 (CBP/TRS 288/07, EPA 903-R-07-005), 2008 (CBP/TRS 290-08, EPA 903-R-08-001), 2010 (CBP/TRS 301-10, EPA 903-R-10-002), and 2017 (CBP/TRS 320-17, EPA 903-R-17-002) addenda. ~~An exception to this requirement is in measuring attainment of the SAV and water clarity acres, which are compared directly to the criteria.~~

Why does DEQ want to add a qualifier for when the CFD would be used?

Currently the CFD is only used for three Bay DO criteria.

A. Dissolved oxygen. The dissolved oxygen criteria in the following table apply to all Chesapeake Bay waters according to their specified designated use and supersede the dissolved oxygen criteria in 9VAC25-260-50.

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean ≥ 6 mg/l (tidal habitats with 0-0.5 ppt salinity) Instantaneous minimum ≥ 5 mg/l	February 1 - May 31
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Deep water	30-day mean ≥ 3 mg/l 1-day mean ≥ 2.3 mg/l Instantaneous minimum ≥ 1.7 mg/l	June 1 - September 30
Deep channel	Instantaneous minimum ≥ 1 mg/l	June 1 - September 30

Why does DEQ want to add a qualifier for when the CFD would be used?

The Bay states have been told that the current method is not suitable for assessing the 7-day mean, 1-day, and non-Deep Channel instantaneous minimum criteria with the existing monitoring data, but that the method + existing data are adequate for 30-day mean and Deep Channel instantaneous minimum criteria assessments.

“[I]t is also acknowledged that assessing the attainment status of [the 7-day, 1-day, and instantaneous] criteria requires data collections at temporal and spatial scales that are simply not practicable nor sustainable across all Chesapeake Bay and tidal tributary waters.” [USEPA \(2004\)](#)

Why does DEQ want to add a qualifier for when the CFD would be used?

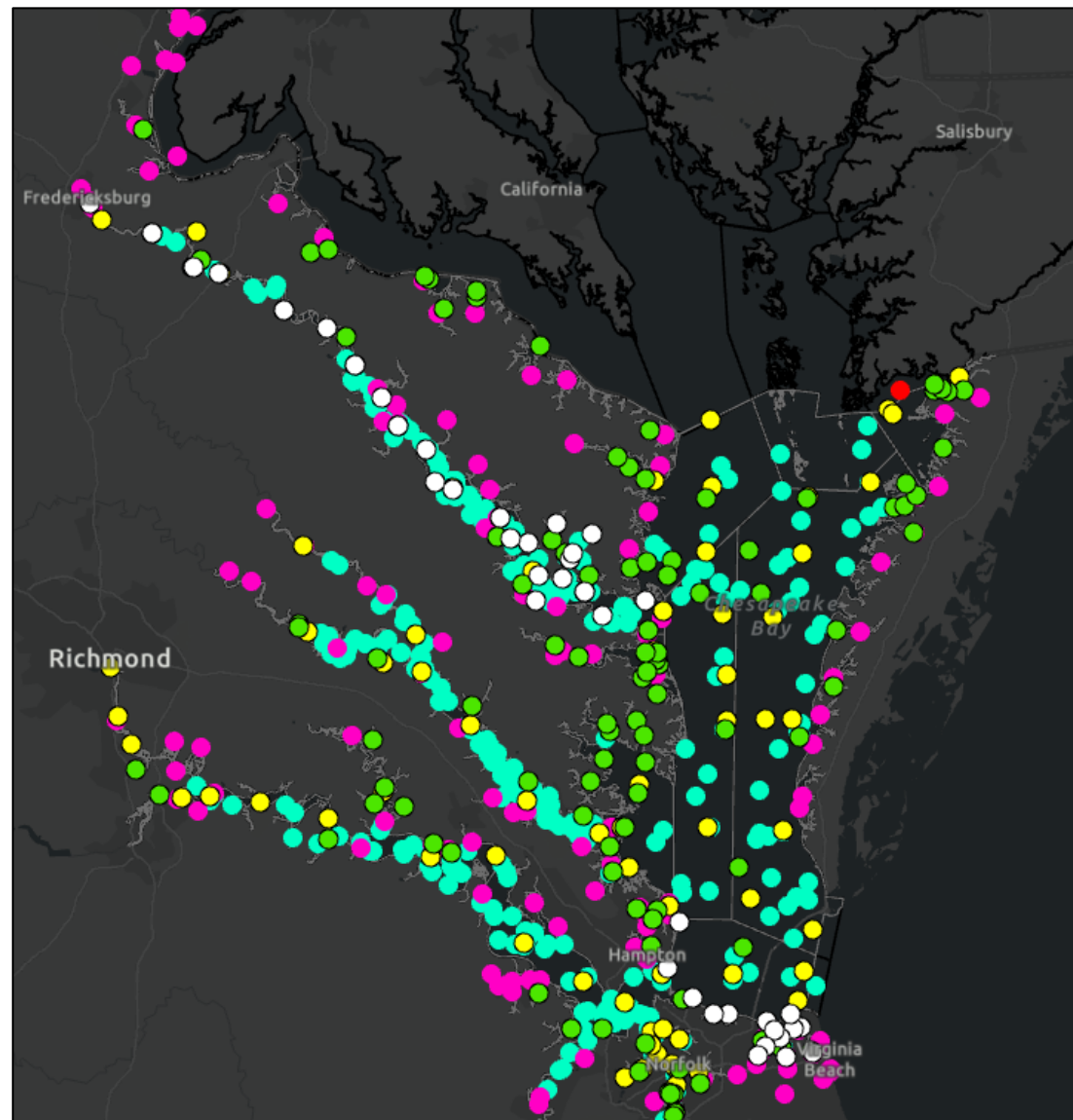
DEQ staff assert the following:

- The aforementioned statement in USEPA (2004) has never been substantiated and seems to assume that the CFD method is the only scientifically defensible way of assessing DO criteria.
- The current method is not the only way of assessing DO criteria in large surface water systems.
- There is no widely accepted technical basis for requiring more data for 7-day, 1-day, and instantaneous minimum criteria assessments than a 30-day mean assessment.
- A considerable amount of monitoring data is being under-utilized by focusing solely on three criteria.

Virginia's DO Monitoring Effort for the 2024 Integrated Report

- CBP Stations (n=21,163)
- DEQ Stations (n=1,698)
- ODU-BEN Stations (n=352)
- DEQ Estuarine ProbMon Stations (n=456)
- VIMS Stations (n=4,350)
- CMC Stations (n=46)

Total # of VA Bay DO observations assessed for 2024IR = **28,065**



What would the language modification mean for Bay DO assessments?

- DEQ staff intend to keep using the current method for the criteria that have always been assessed using this method.
- DEQ staff are considering a multiple-lines-of-evidence approach that would integrate the results of multiple data types and assessment methods, including the CFD *where it is applicable*.
- If DEQ were to use such an approach, a segment would be assessed as impaired if any line of evidence indicates impairment.
- A multiple-lines-of-evidence approach mitigates the uncertainty and weaknesses in any single method or dataset.

Flexibility with Bay DO assessment methods would:

- Allow assessment of all Bay DO criteria.
- Maximize the use of all available datasets.
- Reduce the need for enhanced monitoring.
- Reduce the reliance on a model that has never been validated.
- Simplify procedures - making them easier to implement and communicate to the general public.
- Allow reporting on incremental progress towards meeting DO criteria.

Non-CFD methods for Bay DO criteria assessments are already being used.

- District of Columbia
- Delaware

Virginia is the only Bay jurisdiction that mentions the CFD in its WQS. No other Bay jurisdiction limits the Bay criteria assessment to a single method. The implementation language in 9VAC25-260-180.D was not a Partnership agreement and was not recommended by EPA.

Non-CFD methods for Bay DO have already been agreed upon by the Bay Partnership. DEQ cannot use them at this time due to the current WQS language.

United States
Environmental Protection
Agency

Region III
Chesapeake Bay
Program Office

Region III
Water Protection
Division

EPA 903-R-17-002
CBP/TRS 320-17
November 2017

In coordination with the Office of Water/Office of Science and Technology, Washington, D.C., and the states of Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia and the District of Columbia



Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll *a* for the Chesapeake Bay and Its Tidal Tributaries

2017 Technical Addendum

November 2017

USEPA (2017)

Zone	Zone Description	Applicable Criteria Assessment Procedures
1	Open, well-mixed mainstem Bay and tidal tributary waters	• CFD-based assessment of the 30-day mean • CFD-based assessment of the 7-day mean with enhanced temporal frequency of monitoring • Conditional attainment assessment of the 7-day mean • Continuous monitoring-based assessment of the instantaneous minimum
2	Shallow-water waters	• Continuous monitoring-based assessment of the instantaneous minimum
3	Tributaries of tributaries off of the mainstem Chesapeake Bay and its tidal tributaries	• Discrete sampling-based assessment of the instantaneous minimum

Transparency of Bay DO Assessment Protocols

<https://www.chesapeakebay.net/who/group/criteria-assessment-protocol-workgroup>

- DEQ staff are active participants on the Chesapeake Bay Criteria Assessment Protocol Workgroup, which meets monthly (2nd Monday of each month).
- Bay jurisdictions, CBPO staff, academic researchers, and other members of the Partnership meet to discuss issues pertaining to the implementation of Bay criteria. These meetings are always open to the public.
- DEQ's Assessment Guidance is updated biennially and involves two public comment periods.
- DEQ's water quality assessment decisions, as published in the biennial Integrated Report, are also released for public comment.

Chesapeake Bay Criteria Implementation Language

- Chesapeake Bay Criteria implementation language is in [9VAC25-26-185.D](#).
- DEQ staff recommend that Paragraph 3 of this subsection be modified.

RECOMMENDED PROPOSED LANGUAGE

3. The cumulative frequency distribution method, where applicable, and other published methods approved by DEQ ~~Attainment of these criteria shall be used to assess attainment of these criteria. These methods include procedures described in assessed through comparison of the generated cumulative frequency distribution of the monitoring data to the applicable criteria reference curve for each designated use. If the monitoring data cumulative frequency curve is completely contained inside the reference curve, then the segment is in attainment of the designated use. The reference curves and procedures to be followed are published in~~ the USEPA, Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries, EPA 903-R-03-002, April 2003 and the 2004 (EPA 903-R-03-002 October 2004), 2007 (CBP/TRS 285/07, EPA 903-R-07-003), 2007 (CBP/TRS 288/07, EPA 903-R-07-005), 2008 (CBP/TRS 290-08, EPA 903-R-08-001), 2010 (CBP/TRS 301-10, EPA 903-R-10-002), and 2017 (CBP/TRS 320-17, EPA 903-R-17-002) addenda. ~~An exception to this requirement is in measuring attainment of the SAV and water clarity acres, which are compared directly to the criteria.~~

Significant Digits and Implementation Language

A. Dissolved oxygen. The dissolved oxygen criteria in the following table apply to all Chesapeake Bay waters according to their specified designated use and supersede the dissolved oxygen criteria in 9VAC25-260-50.

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean ≥ 6 mg/l (tidal habitats with 0-0.5 ppt salinity)	February 1 - May 31
	Instantaneous minimum ≥ 5 mg/l	
Open water ¹	30-day mean ≥ 5.5 mg/l (tidal habitats with 0-0.5 ppt salinity)	year-round ²
	30-day mean ≥ 5 mg/l (tidal habitats with > 0.5 ppt salinity)	
	7-day mean ≥ 4 mg/l	
	Instantaneous minimum ≥ 3.2 mg/l at temperatures < 29°C	
	Instantaneous minimum ≥ 4.3 mg/l at temperatures $\geq 29^\circ\text{C}$	
Deep water	30-day mean ≥ 3 mg/l	June 1 - September 30
	1-day mean ≥ 2.3 mg/l	
	Instantaneous minimum ≥ 1.7 mg/l	
Deep channel	Instantaneous minimum ≥ 1 mg/l	June 1 - September 30

DEQ is considering recommending the addition of a decimal place to these criteria.

3. The cumulative frequency distribution method, where applicable, and other published methods approved by DEQ ~~Attainment of these criteria shall be used to assess attainment of these criteria. These methods include procedures described in assessed through comparison of the generated cumulative frequency distribution of the monitoring data to the applicable criteria reference curve for each designated use. If the monitoring data cumulative frequency curve is completely contained inside the reference curve, then the segment is in attainment of the designated use. The reference curves and procedures to be followed are published in the USEPA, Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries, EPA 903-R-03-002, April 2003 and the 2004 (EPA 903-R-03-002 October 2004), 2007 (CBP/TRS 285/07, EPA 903-R-07-003), 2007 (CBP/TRS 288/07, EPA 903-R-07-005), 2008 (CBP/TRS 290-08, EPA 903-R-08-001), 2010 (CBP/TRS 301-10, EPA 903-R-10-002), and 2017 (CBP/TRS 320-17, EPA 903-R-17-002) addenda. An exception to this requirement is in measuring attainment of the SAV and water clarity acres, which are compared directly to the criteria.~~

Discussion

Recap: Aquatic Life Criteria for PFOA and PFOS

Criteria for surface water (9VAC25-260-140)

Aquatic Life Criteria (PFOA & PFOS)

- In 2024, EPA finalized nationally recommended criteria for two PFAS substances, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).
- These criteria are designed to protect freshwater organisms.
- These criteria are expressed as water column and invertebrate/fish tissue concentrations.

Aquatic Life Criteria (PFOA & PFOS)

Criteria Component	Acute Water Column (CMC) ¹ (mg/L)	Chronic Water Column (CCC) ² (mg/L)	Invertebrate Whole-Body (mg/kg ww ³)	Fish Whole-Body (mg/kg ww ³)	Fish Muscle (mg/kg ww ³)
PFOA Magnitude	3.1	0.10	1.18	6.49	0.133
PFOS Magnitude	0.071	0.00025	0.028	0.201	0.087
Duration	1-hour average	4-day average	Instantaneous	Instantaneous	Instantaneous
Frequency	Not to be exceeded more than once in three years, on average	Not to be exceeded more than once in three years, on average	Not to be exceeded	Not to be exceeded	Not to be exceeded

¹ Criterion Maximum Concentration.

² Criterion Continuous Concentration.

³ Wet Weight.

Discussion

Copper BLM Language Modifications

Criteria for surface water (9VAC25-260-140.G)

Copper BLM Language Modification

- The Biotic Ligand Model (BLM) is a tool for predicting the toxicity of copper to aquatic organisms based on observed site-specific water characteristics. It is the basis of the 2007 nationally recommended aquatic life freshwater copper criteria from the United States Environmental Protection Agency (EPA).
- In 2016, the Virginia State Water Control Board adopted the BLM into Virginia's Water Quality Standards to provide an alternative to hardness-based copper criteria.

Copper BLM Language Modification

Current Language (9VAC25-260-140.G)

G. Biotic Ligand Model for copper. On a case-by-case basis, EPA's 2007 copper criteria (EPA-822- F-07-001) biotic ligand model (BLM) for copper may be used to determine alternate copper criteria for freshwater sites. The BLM is a bioavailability model that uses receiving water characteristics to develop site-specific criteria. Site-specific data for 10 parameters are needed to use the BLM. These parameters are temperature, pH, dissolved organic carbon, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. If sufficient data for these parameters are available, the BLM can be used to calculate alternate criteria values for the copper criteria. The BLM would be used instead of the hardness-based criteria and takes the place of the hardness adjustment and the WER. A WER will not be applicable with the BLM.

Copper BLM Language Modification

Recommended Proposed Language (9VAC25-260-140.G)

G. Biotic Ligand Model for copper. ~~On a case-by-case basis, EPA's 2007 copper criteria (EPA-822-F-07-001) biotic ligand model (BLM) for copper may be used to determine alternate copper criteria for freshwater sites.~~ The copper Biotic Ligand Model (BLM) may be used as an alternative to the hardness-based freshwater copper criteria in 9VAC25-260-140.B. The copper BLM is described in the document "Aquatic Life Ambient Freshwater Quality Criteria for Copper – 2007 Revision" (EPA-822-R-07-001). Site-specific BLM criteria, where established, will supersede hardness-based criteria for freshwater copper. The BLM is a bioavailability model that uses receiving water characteristics to develop site-specific criteria.

1. Site-specific data for 10 parameters are needed to use the BLM. These parameters are temperature, pH, dissolved organic carbon, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity.

2. Any dataset used to develop BLM-based criteria ~~If sufficient data for these parameters are available, the BLM can be shall be used to calculate alternate criteria values for freshwater the copper criteria shall be collected in accordance with Guidance Memo [Insert GM number] a study plan approved by DEQ.~~ The BLM criteria would be used instead of the hardness-based criteria and takes the place of the hardness adjustment and the WER. A WER will not be applicable with the BLM.

Copper BLM Language Modification

- This modification would allow the copper BLM to be used for permitting evaluations.
- The guidance would outline procedures for conducting a BLM study.
 - Study design to ensure representative sampling and collection of data for application of the BLM
 - How to derive site-specific criteria under the BLM
- Guidance would not address established procedures for permitting evaluations, such as reasonable potential analysis.

Discussion

Continued review of issues submitted by commenters during the NOIRA comment period

- Numeric Turbidity/Solids Criteria
- Public Water Supply segment delineation clarification
- Mixing zones
- Narrative criteria implementation in WQS

Numeric Turbidity/Solids Criteria

- Virginia State Water Control Board directed DEQ to develop numeric criteria for turbidity in 2019.
- DEQ initiated the process in 2021.
- Turbidity criteria will be handled in its own rulemaking process.



Public Water Supply Language Consistency



Triennial Review 2025
Regulatory Advisory Panel #3

August 28, 2025

Public Water Supply Segment Delineation Clarification

- **WQS Reg Includes HH Criteria for some pollutant parameters**
 - In addition to aquatic life and non-PWS waters HH
 - Applicable to waters identified for PWS protection (9 VAC 25-260-140.B). WQS Part IX identifies PWS waters
 - Inconsistent application in the existing regulation
 - In some cases, 5 miles above a PWS intake, some “and their tributaries,” some “to their headwaters.”
 - No apparent reasoning or basis for these inconsistencies

We Recommend Standardizing

- Other than any cases where there is an identified reason to do otherwise, at 5 miles
- An effort that was started in 2002 Triennial Review
- VDH was OK with a 5 mile standard
 - Va Town Hall, Proposed Regulation Agency Background Document (July 19, 2002) (Handout 1)
- But delayed until the “Next” Triennial Review

No Water Quality Reason to Not Standardize

- At 5 miles
- Full protection at the PWS intake point
- VPDES permitting addresses downstream impacts
 - Controls / limits on dischargers further upstream if needed

“Existing Use” or Designated Use Issues do not Prevent the PWS Change

- The PWS use remains in place and fully protected
- EPA Support for this Point. “EPA considers [that its] Regulations, relating to the protection of existing uses, require states . . . To maintain and protect those uses, not specific water quality parameters . . . “
 - EPA (2008) (Handout 2)

Public Water Supply Language Consistency

- Comment indicates inconsistencies with PWS segment descriptions in Basin Tables.
- Comment suggests that all existing PWS uses be delineated to a point five miles above the intake to be consistent with VDH's drinking water protection policy.
- Currently there is no uniform delineation for PWS waters in the WQS.

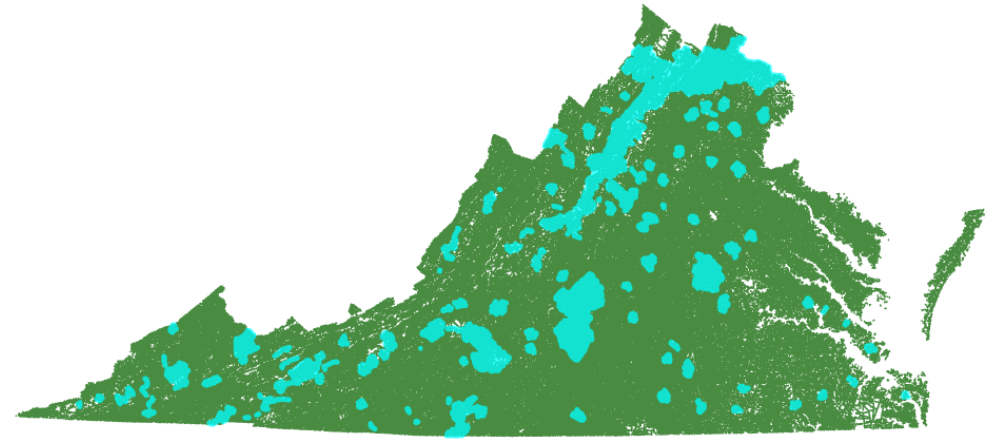


Example of a raw water intake

Approximately 92 section descriptions use the “5 mile” delineation (~4,000 stream miles)

Example:

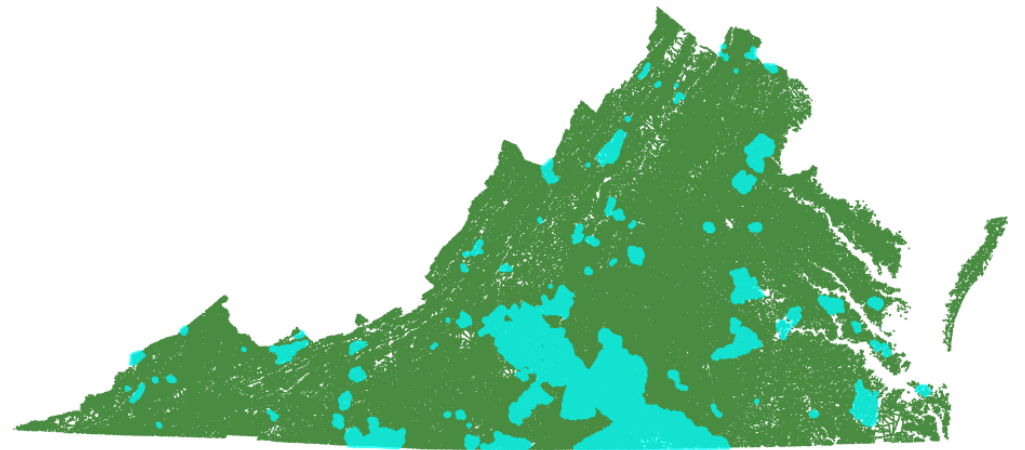
“Cedar Run and its tributaries from the Town of Warrenton's raw water intake to points 5 miles upstream (Fauquier County).”



Approximately 112 section descriptions are described otherwise (~10,000 stream miles).

Example:

“Ni River and its tributaries from Spotsylvania's raw water intake near Route 627 to their headwaters.”



Public Water Supply Language Consistency

Issues to address:

- Is it legally possible for existing PWS delineations to be standardized?
- Specifics regarding VDH's drinking water protection policy.
- Rationale behind existing PWS segments where application is other than "5 miles from the intake".

Is it legally possible for existing PWS delineations to be standardized?

- Limiting the PWS designation to only waters within 5 miles upstream of a raw water intake would require the removal of the PWS use from waters that are currently designated as PWS that are beyond this extent.
- Under 40 CFR 131.10, designated uses that are existing uses (§131.3) cannot be removed. Furthermore, designated uses that are being attained or are attainable cannot be removed.
- Non-existing designated uses that are not being attained can be modified through a Use Attainability Analysis based on a demonstration of at least one of six factors.

UAA Factors

9VAC25-260-10.H

H. The board may remove a designated use which is not an existing use, or establish subcategories of a use, if the board can demonstrate that attaining the designated use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use;
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met;
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use;
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by §§ 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

Rationale behind existing PWS segments where application is other than “5 miles from the intake”

- Lake Gaston and the John Kerr Reservoir in Virginia and their tributaries in Virginia, unless otherwise designated.
 - Rationale: Requested by the Director of the North Carolina State Stream Sanitation Committee in 1967
- The impounded waters of Occoquan River above the water supply dam of the Fairfax County Water Authority to backwater of the impoundment on Bull Run and Occoquan River.
 - Rationale: Occoquan Watershed Policy adopted in 1971
- Banister River and its tributaries from Burlington Industries' inactive raw water intake (about 2000 feet downstream of Route 360) inclusive of the Town of Halifax intake at the Banister Lake dam upstream to the Pittsylvania-Halifax County line.
 - Rationale: Requested by a locality in 1997

VA Department of Health Office of Drinking Water Presentation

5 Miles Upstream Policy

Robert D. Edelman, PE

Director, Division of Technical Services

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Five miles upstream of a surface water intake

1. Powers of localities as to public utilities and computer services; prevention of pollution of certain water.
 - Originally part of Code of Virginia Title 15.1
 - Moved to COV Title 15.2 on December 1, 1997
2. Zone 1 for Source water protection is 5 miles for surface water sources.
3. VDH ODW review of VPDES Permits
 - No written policy directing comments mentioning the 5-mile distance to an intake
 - No specific list of “allowed” or “not allowed” activities.

Article 2. General Provisions for Public Utilities.

§ 15.2-2109. Powers of localities as to public utilities and computer services; prevention of pollution of certain water.

A. Any locality may (i) acquire or otherwise obtain control of or (ii) establish, maintain, operate, extend and enlarge: waterworks, sewerage, gas works (natural or manufactured), electric plants, public mass transportation systems, stormwater management systems and other public utilities within or outside the limits of the locality and may acquire within or outside its limits in accordance with § [15.2-1800](#) whatever land may be necessary for acquiring, locating, establishing, maintaining, operating, extending or enlarging waterworks, sewerage, gas works (natural or manufactured), electric plants, public mass transportation systems, stormwater management systems and other public utilities, and the rights-of-way, rails, pipes, poles, conduits or wires connected therewith, or any of the fixtures or appurtenances thereof. As required by subsection C of § [15.2-1800](#), this section expressly authorizes a county to acquire real property for a public use outside its boundaries.

The locality may also prevent the pollution of water and injury to waterworks for which purpose its jurisdiction shall extend to five miles beyond the locality. It may make, erect and construct, within or near its boundaries, drains, sewers and public ducts and acquire within or outside the locality in accordance with § [15.2-1800](#) so much land as may be necessary to make, erect, construct, operate and maintain any of the works or plants mentioned in this section

VDH Policy (WTR-2019-01-Source Water Manual)

Establishes a Surface Water Assessment Area:

- Zone 1 = Watershed area within a 5-mile fixed radius of the raw water intake
- Normally considered upstream of intake
- Consider tidal and drought scenarios

“The Zone 1 assessment area is a priority zone for managing potential sources of contamination where contamination is believed to pose the greatest risk.”

Waterworks Regulations (12VAC5-590)

“This chapter governs waterworks facilities from any source water to all service connections.”

This is generally interpreted to begin at the surface water intake

VDH has no authority over activities before the intake.

VDH has no authority to the 5-mile limit.

VDH Statement of Support

- VDH supports retaining the existing PWS segment descriptions, with a minimum 5-mile protection zone.
- The zone should consider tidal effects and drought considerations.
- Consider how localities will implement or enforce Code of Virginia § 15.2-2109.

Continued review of issues submitted by commenters during the NOIRA comment period

- Numeric Turbidity/Solids Criteria
- Public Water Supply segment delineation clarification
- Mixing zones
- Narrative criteria implementation guidance in WQS

Mixing Zones

Commenters request that DEQ re-evaluate its mixing zone regulations to be protective of sensitive aquatic life like freshwater mussels.

9VAC25-260-20 B – Mixing Zone Concepts

Joseph Bryan
VPDES Permits Manager I

August 28, 2025

Mixing Zone references

- [40 CFR 131.13](#) (General Policies) -
 - Allows inclusion of mixing zones in state standards, subject to EPA review/approval
- [EPA 1991 Technical Support Document](#)
 - Recommends mixing zones be designed to avoid lethality to aquatic organisms and to ensure the designated use of the waterbody as a whole is protected.
 - Recommends that states have a definitive statement in their standards on whether or not mixing zones are allowed and describe the procedures for defining mixing zones consistent with CWA goals.
- [9VAC25-260-20](#) (General Criteria), Section B

B. The board may use mixing zone concepts in evaluating limitations for Virginia Pollutant Discharge Elimination System permits.
- [GM00-2011](#) – “Guidance on Preparing VPDES Permit Limits based on Water Quality Standards for Toxics”
 - Mixing Zones are discussed on pages 16-32.

What may happen in a Mixing Zone?

- [9VAC25-260-5](#) (Definitions)

"Mixing zone" means a limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but designated uses in the waterbody on the whole are maintained and lethality is prevented.

- [9VAC25-260-20](#) (General Criteria) B.1.a and B.2.a state that mixing zones evaluated or established by the board shall not:

- a. Prevent movement of or cause lethality to passing and drifting aquatic organisms through the water body in question;

What may happen in a Mixing Zone?

- [9VAC25-260-20](#) (General Criteria) B.5 and 6 further note that:

5. An allocated impact zone may be allowed within a mixing zone. This zone is the area of initial dilution of the effluent with the receiving water where the concentration of the effluent will be its greatest in the water column. Mixing within these allocated impact zones shall be as quick as practical and shall be sized to prevent lethality to passing and drifting aquatic organisms. The acute aquatic life criteria are not required to be attained in the allocated impact zone.

6. Mixing zones shall be evaluated or established such that acute criteria are met outside the allocated impact zone and chronic criteria are met at the edge of the mixing zone.

How are Mixing Zones determined?

- [9VAC25-260-20](#) B includes spatial restrictions for mixing zones:
- Freshwater (B.1) mixing zones shall not:
 - b. Constitute more than one half of the width of the receiving watercourse nor constitute more than one third of the area of any cross section of the receiving watercourse;
 - c. Extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.
- Open Ocean, Estuarine, Transition Zones (B.2) mixing zones shall not:
 - b. Extend more than five times in any direction the average depth along a line extending $\frac{1}{3}$ of the way across the receiving water from the discharge point to the opposite shore.

How are Mixing Zones determined?

- However, [9VAC25-260-20 B.10](#) specifically allows waiving of the spatial requirements in two specific cases:
 10. The board may waive the requirements of subdivisions 1 b and c, 2 b, 3 and 4 of this subsection on a case-by-case basis if:
 - a. The board determines that a complete mix assumption is appropriate; or
 - b. A discharger provides an acceptable demonstration of:
 - (1) Information defining the actual boundaries of the mixing zone in question; and
 - (2) Information and data demonstrating no violation of subdivisions B 1 a, 2 a and B 7 of this subsection by the mixing zone in question.
- [9VAC25-260-20 B.7](#)
 7. No mixing zone shall be used for, or considered as, a substitute for minimum treatment technology required by the Clean Water Act and other applicable state and federal laws.

How are Mixing Zones determined?

- 9VAC25-260-20 B.10 a and b are the two ways that “mixing zone concepts” are generally applied in Virginia:
 - a) “Complete mix assumptions” – further described in GM00-2011
 - a) Completely Mixed: The condition where there is no more than a specified difference in the concentration of a material across the width and/or depth of a flowing stream.”
 - b) Physical Mixing Area (PMA): The actual physical space required for an effluent to become completely mixed with its receiving stream.
 - b) Mixing studies that, if approved, are “established by the board”, also known as “Regulatory Mixing Zones”
- GM00-2011, page 18, describes in general terms how we determine which path to take:
 - “The standard basically means that the PMA must be evaluated to ascertain if there is a reasonable potential for any of the chemicals, listed under the acute or chronic heading, to cause lethality to passing and drifting organisms. If it is suitably demonstrated that no reasonable potential exists for lethality within the PMA, then routine complete mixing equations are appropriate to evaluate permit limits.

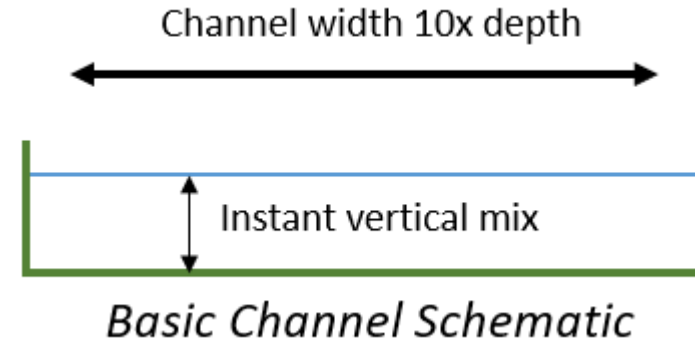
If a reasonable potential is shown for the PMA associated with an effluent to result in lethality to passing or drifting organisms or the PMA is otherwise unacceptable (to be discussed later) and an acceptable PMA cannot be attained, then a Regulatory Mixing Zone (RMZ) must be established that will comply with the specific requirements of the standard.”

Complete Mix Assumptions (GM00-2011, pages 16-32).

- The model described in GM00-2011 is a very conservative screening tool that is used to estimate the largest probable PMA under worst case conditions in a free-flowing stream. It does not attempt to accurately model a mixing zone.
- The recommendations of GM00-2011 are based on the following:
 - **IF** the physical configuration of the stream and effluent and the concentrations in each are such that complete mixing during drought conditions (acute: 1Q10; chronic: 7Q10) results in concentrations equal to or lower than the criteria,
 - **AND** these concentrations are reached in a time that is equal to or less than the exposure times allowed by the standard (acute: 1-hour; chronic: 2-day),
 - **THEN** it is assumed that no acute lethality or chronic toxicity or blockage of passage, attributable to the discharge, will occur for passing or drifting organisms regardless of initial concentration.

Complete Mix Assumptions (GM00-2011, pages 16-32).

- Assumptions in the mixing model:
 1. Outfall enters side of a free-flowing stream
 2. Rectangular channel, 10x wider than it is deep
 3. Longitudinal mixing is insignificant
 4. Instantaneous vertical mixing
 5. Neutrally buoyant substance
- If any of these assumptions are deemed inappropriate, end-of-pipe limits apply unless the permittee submits a hydrodynamic mixing model (e.g. CORMIX models)



Distance Required for DEQ Complete Mix:

$$L = \frac{0.24 * u * W^2}{E}$$

Where:

L = Length of stream required for complete mix (ft)

u = Average stream velocity (ft/s)

W = Average stream width (ft)

E = Transverse mixing rate (ft²/s)

$$E = 0.6 * C * d * u^*$$

Where:

C = Sinuosity correction factor

d = Average depth of stream (ft)

u^* = Shear velocity (ft/s)

See Eq. 2.68 in *Mixing in Inland and Coastal Waters* (Fischer et al., 1979)

Resident Species in Mixing Zones

- The mixing zone standard does not require protection for organisms permanently resident within a mixing zone. It does, however, require the following regarding Endangered Species ([9VAC25-260-20 B.8](#)):
 - 8. The board shall not approve a mixing zone that violates the federal Endangered Species Act of 1973 (16 USCA §§ 1531-1543) or the Virginia Endangered Species Act, Article 6 (§ [29.1-563](#) et seq.) of Chapter 5 of Title 29.1 of the Code of Virginia.
- Further, [GM00-2011](#) notes the following (page 19):
 - “... this guidance should not be applied to a stream or stream segment that contains important resident species that are deemed to require special protection from toxic effects ... This exclusion acknowledges that there are some waters having critical beneficial uses or sensitive resident species where a RMZ, with the appropriate spatial considerations, should be specified as a matter of course.

If the receiving water has a rare and endangered species within reasonable proximity of the proposed mixing zone then this guidance should not be used unless data exists that demonstrate that the parameters for which a mixing zone is being allowed will not result in adverse impacts on that species”

Questions?

Continued review of issues submitted by commenters during the NOIRA comment period

- Public Water Supply segment delineation clarification
- Mixing zones
- Narrative criteria implementation guidance in WQS

Narrative criteria implementation guidance in WQS

- Commenter requests that DEQ amend the WQS to specify that all parts of the narrative criteria be fully implemented and enforced in all regulatory actions the state has authority to take.
- Commenter requests that photographic evidence, reports and testimony by members of the public, and data and information provided by local, other state, or federal agencies be considered and, if scientifically valid, be relied upon for regulatory actions.

Narrative Water Quality Criteria

Can be used to assess water quality impacts by developing translators that assess direct impacts on designated uses, for example:

- Biological indices (Virginia Stream Condition Index, Coastal Plain Macroinvertebrate Index)
- Estuarine probabilistic weight-of-evidence assessments
- Fish tissue screening values
- VDH fish consumption advisories
- VDH shellfish harvesting closures
- VDH beach closures
- VDH HAB swimming advisories
- Sediment deposits on stream bottoms or in wetlands
- Construction stormwater permit
- Whole effluent toxicity testing



Information submitted to DEQ is considered

Public-generated reports and photos are frequently the basis of follow-up monitoring or compliance actions:

- Sediment in streams or wetlands
- Shenandoah nuisance algae
- Potential HABs sightings
- Fish kill sightings
- Reports of odor, color, foam, and scum

Compliance and Enforcement

Compliance with WQS is supported in three ways:

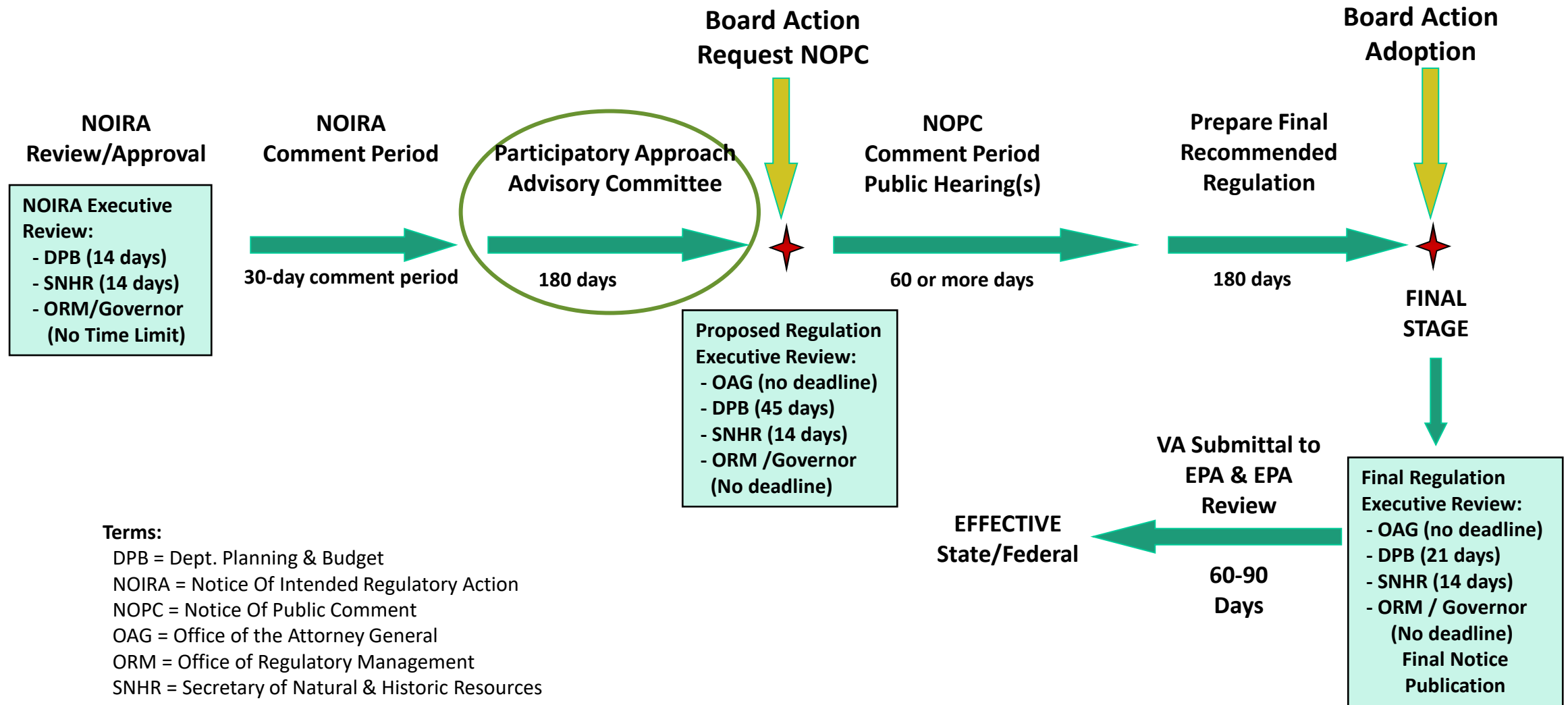
1. Biennial evaluation of ambient water quality in accordance with the water quality assessment guidance manual
2. Compliance monitoring of water-quality based effluent limits or control requirements in permits
3. Through enforcement actions e.g. against 1) permitted dischargers in violation of their permits, or 2) unpermitted discharges or impacts based on measurable impacts on designated uses (aquatic life, human health) attributable to a specific discharger.

Public remarks

Comments provided by the public are limited to 3 minutes each and the total time will not exceed 30 minutes.

Wrap Up

Administrative Process Act (APA) Regulatory Process Timeline



Next Steps in Rulemaking Process

- State Water Control Board meeting November 2025
 - Staff present proposed amendments and work of the RAP for consideration, and request approval to proceed to public comment
- Executive review
- 60-day comment period and public hearing
 - Must comment to address Board when final amendments are considered
 - Must comment to ensure any comments are part of the official record
- Changes to proposed amendments based on comments
- Present final amendments for consideration at future Board meeting