



REGION 1

BOSTON, MA 02109

June 26, 2024

Meagan Sims
Water Quality Standards Coordinator
Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333

RE: WQS Change Proposals

Dear Ms. Sims:

The purpose of this letter is for the Environmental Protection Agency (EPA) to offer recommendations for revisions to be considered during the Maine Department of Environmental Protection (DEP) 2024 triennial review of its water quality standards (WQS), in accordance with Clean Water Act (CWA) Section 303(c)(1) and 40 C.F.R. §131.20. The EPA's water quality standards regulations at 40 C.F.R. §131.11(a) require states to adopt water quality criteria that protect the designated uses. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated uses. For waters with multiple use designations, the criteria shall support the most sensitive use.

In 2015, the EPA amended 40 C.F.R. §131.20(a). The amended regulation requires any state that chooses not to adopt new or revised criteria for any parameters for which EPA has published new or updated criteria recommendations under CWA §304(a) to explain its decision when reporting the results of its triennial review to EPA. The goal of this provision is to ensure public transparency about Station WQS decisions.

Aquatic Life Criteria:

The EPA recommends that DEP consider updating aquatic life criteria for the following pollutants to reflect the latest science as contained in the EPA's latest criteria recommendations pursuant to Section 304(a) of the CWA: Aluminum (Final Aquatic Life Ambient Water Quality Criteria for Aluminum 2018, EPA-822-R-18-001), Copper (Aquatic Life Ambient Freshwater Quality Criteria – Copper, EPA-822-R-07-001), pH (Quality Criteria for Water 1986, EPA 440/5-86-001), and Selenium (2021 Revision to Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016, EPA 822-R-21-006).

Aluminum:

The EPA has updated its national recommended aquatic life water quality criteria for aluminum to reflect the latest scientific information¹. The 2018 updated fresh water aluminum criteria uses a multiple linear regression (MLR) technique to model the interactive effects of three water quality parameters: pH, hardness, and dissolved organic carbon (DOC). The MLR models are used to normalize the available toxicity data to accurately reflect the effects of the water chemistry on the toxicity of aluminum to tested species. To obtain numeric criteria values for a specific set of water chemistry conditions, users can input site-specific data for pH, hardness, and DOC into the Aluminum Criteria Calculator² or use lookup tables in the criteria document that provide the same information for those conditions. Data which represents seasonal variation should be used to calculation the instantaneous criteria values for each set of data input into the model. EPA encourages DEP to coordinate with the Region concerning implementation of the updated aluminum criteria and how to use the instantaneous criteria values in a way to develop final criteria to protect designated uses and potential effects to Federal endangered or threatened species.

If Maine adopts the updated nationally recommend aluminum criteria, it would not be appropriate for DEP to apply water effect rations (WERs), either existing or developed in the future, to those criteria since the MLR criteria inherently take into account site-specific conditions. EPA recommends that Maine delete any existing aluminum WERs in Chapter 584 when it adopts the aluminum MLR criteria so there is no confusion.

Copper:

The bioavailability of copper is affected by many variables. In 2007, the EPA developed and issued recommended copper criteria using the biotic ligand model (BLM) to account for the effects of these variable when calculating copper criteria in fresh waters³. The BLM reflects the best available science on copper bioavailability and toxicity with which to develop protective copper criteria. The BLM explicitly and quantitatively accounts for the effect of individual water quality parameters that modify metal toxicity in fresh waters. Specifically, the BLM addresses the influence of both biotic and abiotic (organic and inorganic) ligands in the calculation of the bioavailability of metals to aquatic organisms over a broad range of conditions. The BLM can be applied cost-effectively and easily across spatial and temporal scales. EPA's 2007 BLM Criteria Document also incorporated the latest scientific information, with updated toxicity information for six sensitive species (*Ceriodaplmia dubia*, *Lithoglyphus virens*, *Scaphoheberis sp.*, *Actinonaias pectorosa*, *Hyalella azteca*, and *Juga plicifera*), including a freshwater mussel. As with the recommended 2018 aluminum criteria, EPA encourages DEP to coordinate with the Region concerning implementation of the updated aluminum criteria and how to use the instantaneous criteria values in a way to develop final criteria that will protect designated used and potential effects to Federal endangered or threatened species. Additionally, if Maine adopts the updated nationally recommend copper criteria, it would not be appropriate for DEP to apply WERs, either existing or developed in the future, to those criteria since the BLM criteria inherently take into account site-specific conditions. EPA recommends that Maine delete any existing copper WERs in Chapter 584 when it adopts the copper BLM criteria so there is no confusion.

¹ <https://www.epa.gov/sites/default/files/2018-12/documents/aluminum-final-national-recommended-awqc.pdf>

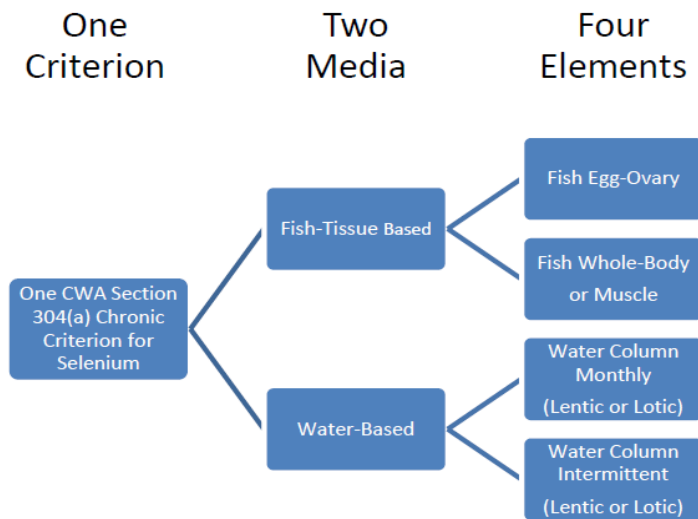
² <https://www.epa.gov/wqc/aquatic-life-criteria-aluminum>

³ <https://www.epa.gov/sites/default/files/2019-02/documents/al-freshwater-copper-2007-revision.pdf>

Selenium:

EPA published an updated fresh water aquatic life criterion for selenium in 2016, and revised the criteria document in 2021 to include errata concerning several footnotes⁴. The updated fresh water selenium criteria consists of several components to protect aquatic life from chronic effects. Aquatic communities are expected to be protected by this chronic criterion from any potential acute effects of selenium so there is not acute criterion as part of the 2016 CWA recommendation.

The chronic criterion includes values expressed both in terms of fish tissue concentrations (egg/ovary, whole body, muscle) and water concentration (lentic or lotic), as shown in the figure below:



EPA recommends that DEP consider the adoption of the comprehensive 2016 selenium criterion which is presented in the table below:

⁴ <https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf>

Table 1. Summary of the Recommended Freshwater Selenium Ambient Chronic Water Quality Criterion for Protection of Aquatic Life.

Media Type	Fish Tissue ¹		Water Column ⁴	
Criterion Element	Egg/Ovary ²	Fish Whole Body or Muscle ³	Monthly Average Exposure	Intermittent Exposure ⁵
Magnitude	15.1 mg/kg dw	8.5 mg/kg dw whole body or 11.3 mg/kg dw muscle (skinless, boneless filet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement ⁶	Instantaneous measurement ⁶	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average
<p>1. Fish tissue elements are expressed as steady-state. 2. Egg/Ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured. 3. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured. 4. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. Water column values are the applicable criterion element in the absence of steady-state condition fish tissue data. 5. Where WQC30-day is the water column monthly element, for either a lentic or lotic waters; C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥ 0.033 (corresponding to 1 day). 6. Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.</p>				

Ammonia:

In Chapter 584, Appendix A, Table 2, the reference to the ammonia criteria document EPA 822-R-99-014 can be deleted since the Maine adopted EPA’s 2013 fresh water ammonia criteria recommendation and the appropriate reference, EPA822-R-13-001, is contained in the Table 2.

pH:

In a letter dated May 4, 2023, EPA approved a revision to 38 MRSA § 464 subsection 4, paragraph A,(5) which changed the range for discharges to fresh water from 6.0 – 8.5 to 6.5 – 9.0 consistent with EPA’s 304(a) recommendation in Quality Criteria for Water – 1986 (EPA 440/5-86-001).⁵ While 38 MRSA § 464 subsection 4, paragraph A,(5) contains pH ranges for the discharge of pollutants to both fresh, estuarine and marine waters, EPA recommends that DEP consider addressing pH beyond the discharge of pollutants and add pH criteria to Class AA, A, B, C, GPA, SA, SB, and SC waters at 38 MRSA § 464, 465-A, and 465-B.

⁵ <https://www.epa.gov/sites/default/files/2018-10/documents/quality-criteria-water-1986.pdf>

Ambient Water Physical Characteristics:

Section 5.B of Chapter 584 establishes required ambient water physical characteristics for fresh, marine and estuarine waters for calculating water quality criteria that are dependent on hardness, temperature, pH, and salinity.

EPA notes that there is a note for this section which states:

“ These characteristics, however, may vary depending on the location of the discharge. The relative criteria for a pollutant subject to these considerations may be recalculated in any given licensing proceeding using the actual local ambient physical water characteristics. See Chapter 530.”

EPA recommends that Section 5.B of Chapter 584 be modified to delete the required hardness, temperature, pH, and salinity values for use in calculating water quality criteria and instead require that the actual ambient physical water characteristics for a specific site be used.

Secchi Disk Trophic State Index Equation:

In Section 6.A of Chapter 581 there is a typographical error in the equation for the Secchi Disk Trophic State Index (TSI). The equation should be updated to:

$$\text{Secchi TSI} = 70 \text{ Log} \left(\frac{105}{\text{mean Secchi}^2} \right) + 0.7$$

Human Health Criteria:

Criteria for Microcystins and Cylindrospermopsin:

EPA recommends that DEP consider the adoption of EPA’s May 2019 Section 304(a) nationally recommended criteria for microcystins and cylindrospermopsin (EPA 822-R-19-001).⁶ Alternatively, these same values can be used as the basis for issuing swimming advisories in recreational waters. The recommended values for microcystins and cylindrospermopsin consist of three components – magnitude, duration and frequency. In developing these recommendations, EPA incorporated peer-reviewed and published science on the adverse human health effects of these toxins, recreation-specific exposure parameters from peer reviewed scientific literature, and EPA’s Exposure Factors Handbook using established criteria methodologies. EPA derived these recommended values based on children’s recreational exposures, because children can be more highly exposed compared to other age groups. The recommendations are also protective of older age groups.

Recreational Bacteria Criteria:

In a letter dated August 27, 2020, EPA approved Maine’s revised bacteria criteria for Class AA, A, GPA, and SA waters. This approval also applies to Indian lands. The bacteria criteria for these waters apply year-round. EPA also approved revised bacteria criteria for Class B, C, SB, and SC waters outside of Indian lands. These are seasonal criteria and are effective from April 15 – October 31. For Class B, C, SB and SC waters on Indian lands the EPA-promulgated bacteria criteria continue to be in effect for CWA purposes.

⁶ <https://www.epa.gov/sites/default/files/2019-05/documents/hh-rec-criteria-habs-document-2019.pdf>

EPA recommends that DEP consider revising the bacteria criteria for Class B, C, SB and SC water to be applicable year-round.

Footnote aME:

In Appendix A, Table I, EPA recommends that that DEP add footnote aME to the two arsenic sustenance fishing criteria (water and organisms, and organisms only).

Recommendations Consistent with Certain EPA WQS Disapprovals in 2015 and Corresponding Federal Rules:

In 2015, EPA issued several decisions in which a number of Maine’s WQS were disapproved (see EPA letters to DEP dated February 2, March 16, and June 5, 2015). Most of the disapprovals related only to waters in Indian lands, but several related to all waters in Maine. EPA promulgated federal rules in place of most of the disapproved WQS (see 81 FR 92466). Consistent with 40 C.F.R. § 131.21(c), EPA’s federally promulgated WQS are and will be applicable for purposes of the CWA until EPA withdraws those federally promulgated WQS. EPA would undertake a rulemaking to withdraw the federal WQS if and when Maine adopts, and EPA approves, corresponding WQS that meet the requirements of Section 303(c) of the CWA and EPA’s implementing regulations at 40 C.F.R. part 131. Below are EPA’s recommendations for revisions to Maine’s WQS that could lead to EPA’s approval of state standards and subsequent withdrawal of federal standards. In each instance, we suggest DEP refer to the currently applicable federal rule as an example of an approvable state replacement rule or statute.

Temperature for Tidal Waters:

EPA recommends that DEP update Maine’s tidal temperature criteria in DEP Rule Chapter 582(5), consistent with EPA’s 304(a) recommended criteria for tidal waters in Quality Criteria for Water – 1986 (EPA 440/5-86-001).

Natural Conditions:

Maine 38 MRSA 420.2.(a) states “Except as naturally occurs or as provided in paragraphs B and C, the department shall regulate toxic substances in the surface waters of the State at the levels set forth in federal water quality criteria as established by the United States Environmental Protection Agency pursuant to the Federal Water Pollution Control Act, Public Law 92-500, Section 304(a), as amended.” Maine MRSA 464.4.C. states “Where natural conditions, including, but not limited to, marshes, bogs, and abnormal concentrations of wildlife cause the dissolved oxygen or other water quality criteria to fall below the minimum standards specified in sections 465, 465A, and 465B, those waters shall not be considered to be failing to attain their classification because of those natural conditions.”

These provisions are not consistent with EPA’s interpretation of the relationship between natural conditions and the protection of designated human health uses, which is articulated in EPA’s November 1997 guidance entitled Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. The natural conditions clauses at 38 MRSA 420.2.A. and 464.4.C. for waters in Maine are not appropriate as they apply criteria that protect human health because the application of the provisions fails to protect designated human health uses as required under the CWA and federal WQS regulations at 40 C.F.R. § 131.11(a). As articulated in EPA’s 1997 guidance, in contrast with aquatic life uses, a natural level of a naturally occurring pollutant does not necessarily protect designated human

uses. Naturally occurring levels of a pollutant are assumed to protect aquatic species that have adapted over evolutionary timescales to conditions in the affected waters. However, human health does not adapt to higher ambient pollutant levels, even if they are naturally caused. Consequently, the same assumptions of protectiveness cannot be made with regard to designated uses that affect human health (e.g., people eating fish or shellfish from Maine waters and recreating in Maine waters).

EPA recommends that 38 MRSA 420.2.A. and 464.4.C be modified or clarified to state that this provision “does not apply to water quality criteria intended to protect human health.” Under this approach, Maine could still implement the natural conditions provisions for other criteria related to non-human health uses. If there are naturally occurring pollutants which exceed Maine’s criteria to protect human health, Maine may revise its WQS on a site-specific basis to remove or modify a use in accordance with at 40 C.F.R. § 131.10(g) and 38 MRSA 464.2-A.

Mixing Zone Policy at 38 MRSA § 451:

EPA recommends that DEP update its current mixing zone policy to include specific restrictions on the scope and extent of mixing zones adequate to protect designated uses. EPA’s guidance in the Water Quality Standards Handbook⁷ explains that a mixing zone is a limited area or volume of water where initial dilution of a discharge takes place, and where certain numeric criteria may be exceeded, so long as the designated uses of the waterbody as a whole are protected. While mixing zones serve to dilute concentrations of pollutants in effluent discharges, they also allow increases in the mass loading of the pollutant to the waterbody (more so than would occur if no mixing zone were allowed). Therefore, if not applied appropriately, a mixing zone could adversely affect mobile species passing through the mixing zone as well as less mobile species (e.g., benthic communities) in the immediate vicinity of the discharge. Because of these and other factors, mixing zones should be applied carefully so that they do not result in impairment of the designated use of the waterbody as a whole or impede progress toward the CWA goals of restoring and maintaining the physical, chemical and biological integrity of the Nation’s waters. EPA’s guidance includes specific recommendations that a state’s mixing zone policy should include to ensure the protection of designated uses. Among other things, mixing zone policies should ensure the protection of designated uses, that pollutant concentrations in the mixing zone are not lethal to organisms passing through and do not cause significant human health risks, and do not endanger critical areas such as breeding or spawning grounds, drinking water intakes and sources, shellfish beds, or endangered or threatened species habitat.

⁷ <https://www.epa.gov/sites/default/files/2014-09/documents/handbook-chapter5.pdf>

Coordination:

The EPA looks forward to continued coordination with DEP during its triennial review and is committed to providing any technical assistance requested by the State in the future development and revision of the State's WQS.

Should you have any questions please contact Dan Arsenault (617 918-1562) or Bonnie Blalock (617 918-1253).

Sincerely,

Thelma Murphy, Deputy Director
Water Division
EPA-Region 1

cc:

Wendy Garland, Maine DEP