



**REGION 10**  
SEATTLE, WA 98101

May 7, 2024

Marla Koberstein  
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Water Quality Program  
P.O. Box 47696  
Olympia, WA 98504-7696

Dear Ms. Koberstein:

Thank you for the opportunity to provide comments on the Washington State Department of Ecology's proposed amendments to WAC chapter 173-201A – Water Quality Standards for Surface Waters of the State of Washington, filed on February 15, 2024. Specifically, Ecology is proposing revisions to or additions to the Toxic Substances chapter WAC 173-201A-240.

The EPA has reviewed Ecology's proposed rule revisions and additions and offers the following comments on the Technical Support Document (TSD) for your consideration:

1. Throughout the TSD the word "toxic" is used to describe a chemical or criteria/criterion. The EPA recommends using the term "chemical," "criteria" or "criterion" as appropriate instead of the term "toxic."
2. Throughout the TSD the term "new science" is used as well as the term "new scientific data." The term "new science" could potentially have a broader implication/meaning than "new data." For instance, new science could mean new types of effects not traditionally used in criteria but shown to be significant.

The EPA suggests defining these terms to ensure clarity. The EPA further suggests that Ecology specify that it is using both "new science" and prior established science in the derivation of criteria.

3. The EPA appreciates Washington's commitment to the protection of aquatic life and its efforts to update aquatic life criteria to protect sensitive species in the state. The EPA does want to note that although consultation under the Endangered Species Act (ESA) is a legal requirement for federal agencies contemplating a CWA Section 303(c) approval action on a state's water quality standards package, the EPA's obligation under the CWA is to ensure that criteria protect applicable water body designated uses. As the state has provided an analysis of the protectiveness of its proposed standards for ESA listed species in Washington in its TSD, the EPA can consider this information when evaluating the effects of an approval of those

standards under Section 7(a)(2) of the ESA. If any standard was likely to adversely affect (LAA) an individual member of a listed species, the U.S. Fish and Wildlife Service and National Marine Fisheries Service (Services) would then evaluate whether the approval action would jeopardize the continued existence of a listed species or adversely modify its designated critical habitat. A finding of LAA does not automatically constitute a jeopardy opinion. Usually, reasonable and prudent measures are issued with any affirmative finding that may or may not involve a revision to a standard. While a jeopardy opinion may cause the EPA to conclude that an applicable use would not be protected, LAA determinations would not be in conflict with a conclusion that the use is nonetheless protected.

4. The Services finalized a new rule on April 5, 2024, that revises portions of the ESA implementation regulations, including portions of the regulations summarized in the TSD. For example, “direct and indirect effects” are no longer included in the ESA rule language. The new rule is effective May 6, 2024 and can be found at <https://www.federalregister.gov/documents/2024/04/05/2024-06902/jeopardy-and-laa-determinations-for-endangered-and-threatened-wildlife-and-plants-regulations-for-interagency-cooperation>.

The EPA suggests Ecology update this section of the TSD to incorporate changes from the new rule.

5. The EPA suggests amending the footnote to Table 1 “Oregon aquatic life toxics criteria submitted in 2004” to clarify that the value is hardness-dependent and the value shown is for a hardness of 100 mg/L. Additionally, the EPA suggests indicating this footnote is applicable to only the freshwater values.
6. For clarity, the EPA suggests removing previous values from Table 3 “Ambient water quality criteria for toxic pollutants submitted for consultation in EPA's 1999 Assessment and revisions by the State of Idaho (NMFS, 2014; USFWS, 2015).”
7. For clarity, in Table 5 “Biological evaluation results for the Swinomish Tribe (LAA = likely to adversely affect; NLAA = not likely to adversely affect; USEPA, 2022a),” the EPA suggests defining the meaning of “-” to differentiate it from the “not evaluated” designation.
8. In the background section, when Ecology is discussing the Swinomish Tribal water quality standards biological evaluation, it would be helpful to include the criteria that were adopted, similar to the layout of Idaho and Oregon in that same section.
9. In the “Endangered and Threatened Species in Washington” section, consider adding the latin names for the species for clarity and to be consistent with the other species discussions throughout the document.
10. In the six categories listed in the “Alternative Aquatic Life Toxics Derivation Method” section, ESA jeopardy and LAA determinations are discussed. It is unclear if Ecology is only using determinations made by the Services or by both the EPA and the Services.

The EPA suggests clarifying that Ecology is only using determinations made by the Services in this evaluation. In addition, Ecology should follow the methods that it set out in the Methods section of the TSD. For instance, the salt water (SW) acute and chronic arsenic values do not appear to follow Ecology's current method of using new science only when the Services made a LAA determination for that species in a nearby state.

11. In Table 8 of the "Evaluating Scientific Articles for Criteria Derivation" section, cyanide is noted to have been most recently updated in November 2013; however, the latest update was completed in the summer of 2023. There were approximately 84 new papers added to ECOTOX in that update, some of which appear to be included in the TSD with ECOTOX reference numbers, but a majority appear to be missing in this document.

The EPA suggests updating Table 8 to reflect the latest ECOTOX update and incorporate the new cyanide papers. It should be noted that none of these new papers appear to be lower than the draft cyanide criteria proposed.

12. In the "Study Acceptability" portion of the "Evaluating Scientific Articles for Criteria Derivation" section, Ecology indicates that the use of test species must be a non-invasive North American species. This requirement is carried throughout the document. However, test species provide information that is applicable to species beyond the one being tested, whether it is invasive or not, unless certain water chemistry/habitat conditions would affect the sensitivity of non-native species that would make it uniquely uninformative for resident species. Genus sensitivity distributions are about expressing the range of sensitivities across aquatic life. Data are already generally limited and the more information about the sensitivity of aquatic life to chemicals, the more accurate standards will be.

For all chemicals, if a tested species is in the same genus as an untested species, then it's a surrogate for the untested species and the EPA recommends it be retained. If the tested species represents other similar sensitive taxa, the EPA also recommends that the data be retained. For many chemicals, Washington could include data on a wider span of species and therefore derive criteria using the EPA's recommended eight-family method approach rather than using other data-limited approaches. The EPA suggests giving clear rationale as to why data were not used for each available study.

13. When deriving metals criteria, the EPA recommends that Washington ensure that final criteria values are reported as dissolved metals concentrations except for aluminum which is expressed as the total recoverable form. For clarity, ensure that each metals section is explicit on this point throughout the TSD.
14. Table 10 "Proposed acute and chronic aquatic life toxics criteria for freshwater (FW) and saltwater (SW) and EPA recommendations" appears to include some criteria that are not being proposed.

The EPA suggests removing criteria that are not being proposed or changing the title of the table.

15. Table 11 “Strategy for each freshwater (FW) and saltwater (SW) aquatic life toxics criterion considered in this rulemaking. Detail on each strategy can be found in the Alternative Aquatic Life Toxics Method section described above” lists “EPA recommendation” for SW acute and chronic lead and “New science” for SW acute pentachlorophenol. According to the discussion portion of the TSD and the rule language these should all be listed as “no change.”

The EPA suggests updating the table with corrected information.

16. In Table 12 “Comparison of Washington’s current freshwater (FW) and saltwater (SW) aluminum acute and chronic criteria (duration in parentheses) with EPA recommendations and the newly proposed criteria,” the EPA suggests adding a footnote to clarify that criteria calculated using concurrently sampled pH, hardness, and dissolved organic carbon (DOC) for a specific water body supersede the default criteria, regardless of whether the default criteria are higher or lower.
17. In the Aluminum section Ecology discusses the concurrent samples and locations used for developing regional default values including maps of locations.

The EPA suggests adding the timeframe these data were collected and how many years of data were used in the calculations. The EPA also recommends that Ecology re-evaluate the defaults periodically and update their rules accordingly as new data become available.

18. In the Aluminum section, the EPA suggests discussing if there was any type of outlier analysis performed on those conductance data that did not have a good fit with the regression model for aluminum and the outcome of any analysis performed.
19. In the Aluminum and Copper sections, Ecology discusses sampling data needs for determining site specific criteria. For consistency, the EPA suggests including the minimum number of sampling events required for site-specific criteria development and more specifics on sampling requirements.
20. The EPA suggests adding a footnote to all metals tables in the TSD to clarify if the criteria are total, total recoverable, or dissolved.

21. The EPA suggests adding additional discussion in the Arsenic section highlighting the live-diet experiment from Erickson et al. 2019

<https://www.sciencedirect.com/science/article/abs/pii/S0166445X18310130?via%3Dihub>. In short, Erickson exposed worms to arsenic in water, then exposed those worms to rainbow trout. The results are as follows:

- AsIII in water treatment = 2.4 mg/L,
  - Resultant AsIII in worms = 32.6 ug/g (dw),
  - Resultant AsIII in trout = 4.2 ug/g (dw).
- 
- AsV in water treatment = 6.0 mg/L,
  - Resultant AsV in worms = 37.9 ug/g (dw),

- Resultant AsV in trout = 4.2 ug/g (dw).

Overall, the exposed fish did not experience any effects and there were no significant effects on growth through this live-diet experiment, which was initiated with relatively high concentrations of AsIII and AsV in the worm treatment waters.

22. Throughout the document all references to the EPA's 304(a) recommendations for freshwater chronic cadmium criteria should reference the 2001 304(a) recommendation of 0.25 ug/l found at <https://www.epa.gov/sites/default/files/2019-03/documents/ambient-wqc-cadmium-2001.pdf>.

23. In the Swinomish Tribe Biological Evaluation portion of the Cadmium section, it states that: The Swinomish BE concluded no effects of their submission of a freshwater acute cadmium criterion of 1.3 µg/L (hardness of 100 mg/L) and chronic cadmium criterion of 0.55 µg/L (hardness of 100 mg/L; USEPA, 2022a).

The BE for the Swinomish water quality standards had a finding of not likely to adversely affect for acute cadmium, therefore, the EPA suggests this section be updated to reflect the BE's findings.

24. In regards to the criteria calculations in the Freshwater Acute Cadmium Section the EPA suggests reviewing the paper by Mebane <https://osf.io/preprints/osf/d3tpe> for additional information.

25. In the Freshwater Acute Cadmium Section it states: The 20<sup>th</sup> percentile was used to align with Idaho and the Swinomish Tribe freshwater acute cadmium criteria that has been demonstrated to be protective of endangered species and approved through ESA consultation.

The language around demonstrating the criteria to be protective and approved through ESA consultation is not fully accurate. The EPA suggests modifying the language to reflect that EPA concluded that the criteria would be not likely to adversely affect listed species.

26. The significant figures used in calculating the cadmium values need to be supported and consistent with the underlying data and rounded as appropriate.

27. The EPA suggests reviewing the proposed freshwater acute chromium VI criteria and cross reference the statement made in the chromium VI summary that endangered species and their populations in Washington may be at risk at EPA's recommendations.

28. Both the Chromium VI and Lead sections indicate that Ecology used the 1<sup>st</sup> percentile of the toxicity data distribution to derive the draft criteria. However, the calculations do not show the use of the 1<sup>st</sup> percentile of toxicity data. The EPA suggests removing the reference to the 1<sup>st</sup> percentile of toxicity data.

29. Suggest adding a footnote to Table 27 "Comparison of Washington's current freshwater (FW) and saltwater (SW) acute and chronic copper criteria (duration in parentheses) with EPA

recommendations and the newly proposed criteria” to clarify that criteria calculated using concurrently sampled pH, hardness, and DOC for a specific water body supersede the default criteria, regardless of whether the default criteria are higher or lower.

30. Throughout the Copper section the EPA suggests using the term “a copper MLR model” instead of “the copper MLR model.”
31. For clarity, the EPA suggests adding the equations the criteria are based on in the Copper section.
32. The freshwater acute copper criteria as proposed appears complicated to implement. The EPA suggests that Ecology consider the sampling that will be needed to implement the criteria protectively and how many hardness samples will be needed to determine that hardness at a site indicates a more or less protective regression/model. The EPA believes that it might be less complicated to adopt the reverse acute to chronic ratio (ACR) approach. This is not an EPA recommendation for the proposed criteria, but rather information sharing for Ecology to consider.
33. In Table 28 “Acute to chronic ratios used in the development of the copper multiple linear regression equation that are representative of data presented in Brix et al. 2021” the species mean ACR is missing for *Oncorhynchus mykiss*
34. The EPA understands Ecology’s hesitation in adopting chronic mercury criteria until new national 304(a) recommendations are finalized. In the meantime, please see the EPA’s recent proposed mercury water quality criterion for Idaho <https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho>.
35. The EPA suggests reviewing the data available for nickel as there are enough data to calculate criteria using the eight-family method.
36. The EPA suggests adding a “^” to EPA’s FW Acute and Chronic values In Table 33 “Comparison of Washington’s current freshwater (FW) and saltwater (SW) acute and chronic nickel criteria (duration in parentheses) with EPA recommendations and the newly proposed criteria,” as the values are expressed in terms of the dissolved metal in the water column.
37. For the calculation of nickel criteria there are currently known studies with LC50s lower than the proposed acute criterion. Ecology should justify why they chose not to include those studies in their database and calculations.
38. The EPA cannot reproduce the species mean acute value (SMAV) value for *Daphnia magna* in Table 34 “Freshwater acute toxicity data used for criteria derivation reported as total recoverable nickel.” Adding the study by Lari et al (2017) in Table 35 “New freshwater acute studies that met data acceptability requirements since EPA last updated nickel criteria (S = static, R = static renewal, U = unmeasured test concentrations, M = measured test concentrations)” with a normalized LC50 = 893.2 to those studies used in 1986 and 1995, the recalculated SMAV for *Daphnia magna* is 1070 and not 1033.

The EPA suggests recalculating the SMAV value for *Daphnia magna* and all other values that rely on the outcome of that calculation.

39. The EPA cannot reproduce the ACR value for *Daphnia magna* of 122.4 in Table 37 “Acute to chronic ratios (ACR) used in chronic criterion derivation.” The EPA suggests recalculating this value and all other values that rely on it. In addition, the ACR value of 122.4 despite being in error is within 10X the lowest ACR (13.94) and could be included in the species mean ACR calculation.
40. The EPA cannot reproduce the ACR value for *Pimephales promelas* of 53.03 in Table 37 “Acute to chronic ratios (ACR) used in chronic criterion derivation.” The EPA suggests recalculating this value and all other values that rely on it, including the species mean ACR.
41. In Table 37 “Acute to chronic ratios (ACR) used in chronic criterion derivation” all the acute and chronic values from *Ceriodaphnia dubia* to the end of the table are transposed. The EPA suggests fixing these transposed values.
42. The EPA cannot replicate the Species Mean ACR Geometric mean in Table 37 “Acute to chronic ratios (ACR) used in chronic criterion derivation.” The EPA suggests recalculating this value as well as all other values relying on it.
43. For future reference, the EPA has recently finalized technical support materials for the aquatic life selenium 304(a) criteria recommendations, which can be found at <https://www.epa.gov/wqc/aquatic-life-criterion-selenium>.
44. The EPA suggests adding an “\*” to the freshwater chronic criteria in Table 47 “Comparison of Washington’s current freshwater (FW) and saltwater (SW) acute and chronic zinc criteria (duration in parentheses) with EPA recommendations and the newly proposed criteria,” as it is hardness based.
45. The EPA suggests recalculating the zinc final acute value (FAV). Since the number of genus mean acute values (GMAV) is greater than 59, the FAV should be calculated using the ranks that are closest to 0.05 for its percentile rank; therefore, the FAV should be calculated using the ranks 2-5 instead of 1-4. Using this guidance, the FAV is calculated as 63.35 and the CMC=31.7 ug/L total Zn at hardness of 50. This calculation procedure for the FAV is found in the 1985 guidance (page 21): **N. Select the four GMAVs which have cumulative probabilities closest to 0.05 (if there are less than 59 GMAVs, these will always be the four lowest GMAVs).** The 1985 guidance can be found at: <https://www.epa.gov/sites/default/files/2016-02/documents/guidelines-water-quality-criteria.pdf>
46. Table 49 “New freshwater acute studies that met data acceptability requirements since EPA last updated zinc criteria (S = static, R = static renewal, FT = flow-through, U = unmeasured test concentrations, M = measured test concentrations)” indicates that the *Rhithrogena hageni* study will not be used in the derivation of zinc criteria. No other acute zinc studies for *Rhithrogena hageni* could be found in the TSD. The EPA suggests reviewing the data again and

including the data if this is the only study found for *Rhithrogena hageni*, or providing an explanation of why it should not be included.

47. For consistency, the EPA suggests adding the latin name for Mozambique tilapia in Table 50 “Freshwater acute studies not used from previous EPA criteria derivations.”
48. The EPA cannot replicate the calculation of the criterion continuous concentration (CCC) for freshwater chronic zinc. The EPA suggests recalculating this value as well as all other values relying on it.
49. The EPA suggests updating Table 51 “Acute to chronic ratios (ACR) used in chronic criterion derivation” to develop a species mean ACR for *cottus bairdi* and recalculating the ACR for *Prosopium williamsoni* as the EPA cannot replicate this number. All values that rely on these updates should be recalculated as well.
50. The EPA applauds Washington for moving forward with 6PPD-q criteria. As new scientific studies are being worked on for this chemical, the EPA recommends continuing to evaluate the new science as it is finalized. The EPA has published a draft surface water analytical method which can be found at <https://www.epa.gov/cwa-methods/6ppd-q-using-liquid-chromatography-tandem-mass-spectroscopy-lcmsms-method-1634-not-yet>. Also of note, the EPA plans to finalize screening values soon for 6PPD-q. Once those screening values are finalized, Ecology should evaluate them as appropriate.
51. In Table 55 “Acute toxicity data considered for criteria development for 6PPD-q,” observed loss should be taken into account with comparing the LC50 values, both for the coho studies and more broadly across the dataset. The author reported LC50 values are a mix of initial concentrations and averaged concentrations over the exposure duration.
52. In many of the studies in Table 55 “Acute toxicity data considered for criteria development for 6PPD-q,” no definitive LC50 was recorded and so they are not being used for criteria derivation. Generally, ">" values are considered conservative because the effective concentration is likely higher than the value reported. Although these are not definitive values, they do provide some information about other effects to aquatic life. If there are other reasons to not use some of these studies, the EPA suggests noting them here as well.
53. Lake trout (*Salvelinus namaycush*) seem to be missing from Table 55 “Acute toxicity data considered for criteria development for 6PPD-q,” but do appear in Figure 7 “Species sensitivity distribution for fish species LC50 values for 6PPD-q.” The EPA suggests adding the *Salvelinus namaycush* study to Table 55 for clarity. The study can be found at <https://www.biorxiv.org/content/10.1101/2024.03.26.586843v2.abstract>.
54. In Table 64 “Freshwater acute toxicity data used for criteria derivation,” the SMAV for *Daphnia magna* is from an unmeasured acute toxicity study from 2013. Only the nominal concentration of NaCN was reported in the reference, so the EPA suggests calculating the free cyanide concentration. Per the EPA’s calculation, the free cyanide concentration for *Daphnia magna* is 10.08 ug/L. All calculations based on this value should also be updated. It appears that another



LC50 value of 160 ug/L for *Daphnia magna* was used in the EPA's 1984 criteria derivation, but Washington omitted this value from the calculation of SMAV in Table 64 and it is not discussed in Table 66 "Freshwater acute studies not used from previous EPA criteria derivations."

55. Table 64 "Freshwater acute toxicity data used for criteria derivation" lists an acute value for *Gambusia affinis* which was not used in the EPA's 1984 criteria derivation. For clarity, the EPA suggests adding the study for this species to Table 65 "New freshwater acute studies that met data acceptability requirements since EPA last updated cyanide criteria (S = static, R = static renewal, FT = flow-through, U = unmeasured test concentrations, M = measured test concentrations)."
56. For consideration, the *Salmo salar* study from 1983 used in Table 64 "Freshwater acute toxicity data used for criteria derivation" and Table 65 "New freshwater acute studies that met data acceptability requirements since EPA last updated cyanide criteria (S = static, R = static renewal, FT = flow-through, U = unmeasured test concentrations, M = measured test concentrations)" was omitted from the EPA's 1984 criteria derivation because the exposure duration of the study was only 24 hours.
57. In the Freshwater Chronic Cyanide Criterion section, Washington stated that: "There was not adequate toxicity data available to calculate a chronic cyanide criterion using the eight-family method, and therefore, an ACR was used." For clarity, the EPA suggests identifying which of the minimum data requirements were not met.

The EPA appreciates Ecology's commitment to update Washington's water quality standards. We look forward to continuing to engage with you throughout this process. If you have any questions, please contact me at (206) 553-0268 or [Guzzo.Lindsay@epa.gov](mailto:Guzzo.Lindsay@epa.gov).

Sincerely,

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