



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10**

1200 Sixth Avenue, Suite 155
Seattle, WA 98101

WATER
DIVISION

August 4, 2023

The Honorable Steve Edwards
Chair, Swinomish Senate
Swinomish Indian Tribal Community
11404 Moorage Way
La Conner, WA 98257

Re: EPA's Clean Water Act Action on Certain Provisions of the April 30, 2019, Submittal of the Swinomish Indian Tribal Community's Surface Water Quality Standards Related to Aquatic Life

Dear Chairman Edwards:

The U.S. Environmental Protection Agency has completed its review of certain water quality standards (WQS) that the Swinomish Tribe submitted to EPA on April 30, 2019. Under Clean Water Act (CWA) section 303(c), 33 U.S.C. § 1313(c), states and authorized tribes must submit new and revised WQS to EPA for review and action, and EPA must ensure that those WQS are consistent with the CWA and EPA's implementing regulations. The details of EPA's action are outlined below and are further described in the enclosed technical support document.

The Tribe submitted initial WQS to EPA for CWA review and action on February 8, 2017. On August 25, 2017, EPA approved certain provisions of the February 8, 2017, submittal related to the Tribe's water contact bacteria criteria, including provisions establishing the designated uses that involve water contact and the recreational criteria that support those uses. Following a public notice and comment process, the Tribe revised its WQS, and the Swinomish Senate readopted the entire WQS into law on April 8, 2019, as revised. The Tribe submitted revised WQS to EPA for CWA review and action on April 30, 2019. On May 20, 2019, EPA approved the portions of the new and revised WQS included in the April 30, 2019, submittal that were not related to the protection of aquatic life.

Pursuant to section 7 of the Endangered Species Act (ESA), EPA completed a Biological Evaluation evaluating the effects to ESA listed species and designated critical habitat associated with EPA's approval of the Tribe's new WQS related to aquatic life protection, which was submitted to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) on June 23, 2022.¹ Today's action addresses certain water quality criteria in the April 30, 2019, submittal that support aquatic life, including numeric aquatic life criteria for certain toxic chemicals; numeric criteria for temperature, dissolved oxygen, and pH; and narrative criteria that support the aquatic life designated use.

EPA's action applies to waters under the jurisdiction of the Swinomish Tribe. The action does not apply to waters outside of the jurisdiction of the Swinomish Tribe which are under Washington State jurisdiction. CWA section 518(e) authorizes EPA to treat an Indian tribe in a similar manner as a state to manage and protect water resources "within the borders of an Indian reservation," provided certain

¹ The addendum *Appendix H: Saltwater Criteria Assessment for Ammonia* and *Erratum A: Revised Indirect Effects Analysis for Chromium VI* were submitted to USFWS and NMFS on December 23, 2022.

requirements are satisfied. The Swinomish Tribe received EPA approval for treatment in a similar manner as a state for the purpose of developing and administering the WQS and water quality certification programs, CWA sections 303(c) and 401, respectively, in 2008.

Summary of EPA's Action

Pursuant to EPA's authority under CWA section 303(c) and the implementing regulations at 40 CFR Part 131, EPA is approving the following new or revised WQS:

Subchapter I – Designated Uses and Water Quality Criteria

Section 19-06.120(C)(2), Aquatic Life Use Criteria in Freshwater, and related tables, including paragraphs (a), (b), (c), (d), and Tables 4, 5, and 6.

Section 19-06.130(C)(2), Marine Water Designated Uses and Criteria and related tables, including paragraphs (a), (b), (c), (d), and Tables 10, 11, and 12.

Section 19-06.140, Criteria for Toxic Pollutants, including part or all of paragraphs (A), (B), (G), and Table 15 as applied to aquatic life uses.

EPA is taking no action on the chronic arsenic criterion for freshwaters, the acute and chronic criteria for cyanide for freshwaters, and the acute and chronic mercury criteria for fresh and marine waters, and associated footnotes, included in Section 19-06.140, Table 15. EPA's decision not to act on these criteria is due to previous ESA consultations within EPA Region 10 that resulted in jeopardy determinations for threatened or endangered species.

EPA appreciates our work together and we remain committed to providing technical assistance to the Tribe. If you have any questions regarding this letter, please contact me at (206) 553-0171 or Andrea Ramirez, EPA staff lead, at (206) 553-1058 or ramirezpuentes.andrea@epa.gov.

Sincerely,

HANH
SHAW

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SHAW
Date: 2023.08.04
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Hanh Shaw, Manager
Standards, Assessment and
Watershed Management Branch

Enclosure: Technical Support Document

cc (e-Copy): Mr. Todd Mitchell, Environmental Director, Swinomish Department of Environmental Protection; tmitchell@swinomish.nsn.us

Technical Support Document

EPA's Clean Water Act Action on Certain Surface Water
Quality Standards of the Swinomish Tribe

AUGUST 4, 2023

Table of Contents

1	Introduction.....	1
1.1	Clean Water Act Requirements for Water Quality Standards.....	1
1.2	The Swinomish Tribe’s Water Quality Standards Submittal and Previous EPA CWA actions	
2	Summary of EPA’s CWA Action.....	5
3	Narrative Criteria for Aquatic Life Use Protection.....	6
3.1	EPA Action	6
3.2	Rationale	6
4	Aquatic Life Use Criteria for Temperature, Dissolved Oxygen, and pH	7
4.1	Aquatic Life Use Criteria in Fresh Water, Section 19-06.120(C)(2)	7
4.1.1	Temperature	8
4.1.2	Dissolved Oxygen.....	9
4.1.3	pH.....	10
4.2	Aquatic Life Use Criteria in Marine Water, Section 19-06.130(C)(2).....	11
4.2.1	Temperature	12
4.2.2	Dissolved Oxygen.....	15
4.2.3	pH.....	17
5	Aquatic Life Use Criteria for Toxic Pollutants, Section 19-06.140	17
5.1	EPA Action	22
5.2	Rationale	23
6	List of Aquatic Life Criteria Documents	29

1 Introduction

This document provides the basis for the Environmental Protection Agency’s (EPA) decision under section 303(c) of the Clean Water Act (CWA), 33 U.S.C. 1313(c), and the federal water quality standards (WQS) regulations at 40 CFR 131 to approve certain new or revised WQS that the Swinomish Indian Tribal Community (Swinomish Tribe or Tribe) submitted to EPA on April 30, 2019.

The Swinomish Tribe was authorized for treatment in a similar manner as a state by EPA under section 518 of the CWA in 2008. EPA previously approved certain WQS adopted by the Swinomish Tribe on August 25, 2017, and May 20, 2019.²

1.1 Clean Water Act Requirements for Water Quality Standards

Under section 303(c) of the CWA and federal implementing regulations at 40 CFR 131.4, states and authorized tribes³ have the primary responsibility for reviewing, establishing, and revising WQS, which consist of the designated uses of a waterbody or waterbody segment, the water quality criteria necessary to protect those designated uses, and an antidegradation policy. This statutory framework allows states and tribes to adopt appropriate designated uses (as required at 40 CFR 131.10(a)), criteria to protect those designated uses (as required at 40 CFR 131.11(a)), and an antidegradation policy to protect existing uses and high quality waters (as required at 40 CFR 131.12(a)).

States and tribes are required to hold public hearings for the purpose of reviewing applicable WQS periodically but at least once every three years and, as appropriate, modify existing and adopt new standards (40 CFR 131.20). Each state or tribe must follow its own legal procedures for adopting standards (40 CFR 131.5(a)(6)) and submit certification by the appropriate legal authority within the state or tribe that the WQS were duly adopted pursuant to state or tribal law (40 CFR 131.6(e)). EPA’s review authority and the minimum requirements for state and tribal WQS submittals are described at 40 CFR 131.5 and 131.6, respectively.

Section 303(c)(2)(B) of the CWA requires states and tribes to adopt water quality criteria for toxic pollutants that are listed pursuant to section 307(a)(1) and for which EPA has published criteria under section 304(a), where the discharge or presence of these toxics could reasonably be expected to interfere with the designated uses adopted by the state or tribe. In adopting such criteria, states and tribes should establish numeric values based on one of the following:

² See <https://www.epa.gov/wqs-tech/water-quality-standards-regulations-swinomish-indian-tribal-community>

³ The term “authorized tribe” means a tribe eligible under CWA section 518(e) and 40 CFR 131.8 for treatment in a similar manner as a state for the purpose of administering a water quality standards program. In this document, the term “tribe” refers to authorized tribe.

- (1) CWA section 304(a) guidance
- (2) CWA section 304(a) guidance modified to reflect site-specific conditions, or
- (3) Other scientifically defensible methods (40 CFR 131.11(b)(1)).

In addition, states and tribes should establish narrative criteria where numeric criteria cannot be established or to supplement numeric criteria (see 40 CFR 131.11(b)(2)).

Section 303(c) of the CWA also requires states and tribes to submit new or revised WQS to EPA for review and action. EPA is required to review these changes to ensure revisions to WQS are consistent with the CWA and EPA's implementing regulations.

EPA considers four questions when evaluating whether a particular provision is a new or revised WQS. If all four questions are answered "yes" then the provision would likely constitute a new or revised WQS that EPA has the authority and duty to approve or disapprove under CWA section 303(c)(3). The following four questions are considered:⁴

- (1) Is it a legally binding provision adopted or established pursuant to state or tribal law?
- (2) Does the provision address designated uses, water quality criteria (narrative or numeric) to protect designated uses, and/or antidegradation requirements for waters of the United States?
- (3) Does the provision express or establish the desired condition (e.g. uses, criteria) or instream level of protection (e.g. antidegradation requirements) for waters of the United States immediately, or mandate how it will be expressed or established for such waters in the future?
- (4) Does the provision establish a new WQS or revise an existing WQS?

Furthermore, the federal WQS regulations at 40 CFR 131.21 state, in part, that when EPA disapproves a state or tribe's WQS, EPA shall specify any changes that are needed to assure compliance with the requirements of the CWA and federal WQS regulations and shall explain why the WQS is not in compliance with such requirements.

Finally, EPA considers non-substantive edits to existing WQS to constitute new or revised WQS that EPA has the authority to approve or disapprove under CWA section 303(c)(3). While such edits and changes do not substantively change the meaning or intent of the existing WQS, EPA believes it is reasonable to treat such edits and changes in this manner to ensure public

⁴ USEPA. 2012a. What is a New or Revised Water Quality Standard under 303(c)(3)? Frequently Asked Questions. EPA Publication No. 820F12017 (Oct. 2012). Accessed at <https://www.epa.gov/sites/production/files/2014-11/documents/cwa303faq.pdf>.

transparency as to which provisions are applicable for CWA purposes. EPA notes that the scope of its review and action on non-substantive edits or editorial changes extend only to the non-substantive edits or changes themselves. EPA is not re-opening or reconsidering the underlying WQS which are the subject of the non-substantive edits or editorial changes.

1.2 The Swinomish Tribe's Water Quality Standards Submittal and Previous EPA CWA actions

The Tribe initiated a public process for its initially proposed WQS on November 23, 2016, by publishing notice of the 45-day public comment period in the La Conner Weekly News and on the Tribe's website, and by holding a public hearing on January 9, 2017. The Tribe revised the proposed WQS in response to public comments, and the Swinomish Senate adopted the final WQS into law on February 7, 2017. On February 8, 2017, the Tribe submitted the WQS to EPA for review and action in accordance with section 303(c) of the CWA. The Tribe's WQS submittal included a letter from Emily Haley, Tribal Attorney, certifying that the WQS were adopted in accordance with all applicable laws. On August 25, 2017, EPA took CWA action on part of the February 8, 2017, submittal by approving the WQS related to water contact designated uses and criteria that support those uses.⁵

The Tribe initiated a public process for review and adoption of new fecal coliform criteria on October 25, 2018, and held a public hearing on December 13, 2018. The Tribe initiated an additional public process on February 28, 2019, to propose clarifying revisions and corrections to the WQS, and held a public hearing on March 28, 2019. The Tribe modified its WQS revisions in response to comments, and the Swinomish Senate re-adopted the WQS, including the new and revised provisions, on April 8, 2019. On April 30, 2019, the Tribe submitted the WQS adopted on October 25, 2018, and April 8, 2019, to EPA for review under CWA 303(c). The Tribe's submittal included a letter from Emily Haley, Tribal Attorney, certifying that the new and revised provisions were adopted in accordance with all applicable Tribal laws.⁶

On May 20, 2019, EPA took CWA action on part of the new or revised WQS in the April 30, 2019, submittal.⁷ Specifically, EPA approved the following provisions:

⁵ Letter from Michael Lidgard, Acting Director of US EPA Region 10 Office of Water and Watersheds, to Brian Cladoosby, Swinomish Indian Tribal Community, re: Approval Action of Water Quality Standards for Primary Contact and Spiritual & Cultural Uses, Water Contact Bacteria Criteria in Fresh and marine Waters, and Relevant Definitions. Enclosure, Technical Support Document: The EPA's Approval of the Swinomish Tribe's Water Quality Standards for Primary Contact and Spiritual & Cultural Uses, Water Contact Bacteria Criteria in Fresh and Marine Water, and Relevant Definitions Submitted February 8, 2017. Letter and enclosure dated August 25, 2017. Available online at <https://www.epa.gov/sites/production/files/2017-09/documents/swinomish-letter-8252017.pdf>.

⁶ The April 30, 2019, WQS submittal did not change the WQS related to water contact designated uses and criteria that EPA approved on August 25, 2017.

⁷ Letter from Daniel Opalski, Director of US EPA Region 10 Water Division, to Brian Cladoosby, Swinomish Indian Tribal Community, re: The EPA's Action on Certain Provisions of the Swinomish Indian Tribal

- 19-06.010, Title
- 19-06.020, Purpose
- 19-06.030, Findings, paragraphs (G) and (M)
- 19-06.040, Authority
- 19-06.050, Jurisdiction
- 19-06.060, Applicability and Use
- 19-06.080, Definitions, except (20), (38) and (46), which were previously approved

Subchapter I – Designated Uses and Water Quality Criteria

- 19-06.090, Basis for Uses and Criteria
- 19-06.100, General Conditions Applicable to All Regulated Surface Waters
- 19-06.110, General Use Designations
- 19-06.120, Fresh Water Designated Uses and Water Quality Criteria and related tables, except as approved previously, undergoing ESA consultation, or not requiring action. Approval includes part or all of paragraphs (A), (B), (C)(1), (D)(1), (D)(2), (E), (F), (G), and Tables 1, 3, and 7
- 19-06.130, Marine Water Designated Uses and Criteria and related tables, except as approved previously, undergoing ESA consultation, or not requiring action. Approval includes part or all of paragraphs (A), (B), (C)(1), (D)(1), (D)(2), (E), (F), and Tables 2, 9, and 13
- 19-06.140, Criteria for Toxic Pollutants, except as undergoing ESA consultation. Approvals include part of all of paragraphs (A), (B), (E), and Table 15.
- 19-06.150, Narrative Criteria Applicable to All Regulated Surface Waters, except paragraphs (B)(4) and (B)(5)
- 19-06.160, Site-Specific Criteria and Criteria Based on Natural Conditions
- 19-06.170, Modifications of Use Designations and Water Quality Criteria
- 19-06.180, Triennial Review

Subchapter II – Antidegradation Policy

- 19-06.190, Purpose
- 19-06.200, Tier I – Protection of Existing and Designated Uses
- 19-06.210, Tier II – Protection of Waters of Higher Quality than the Standard
- 19-06.220, Tier III – Protection of Outstanding Tribal Resource Waters
- 19-06.230, Thermal Discharges
- 19-06.240, Mixing Zones

Community's 2019 Surface Water Quality Standards. Enclosure, Technical Support Document: The EPA's Action on Human Health Criteria and Other Water Quality Standards of the Swinomish Indian Tribal Community. Letter and enclosure dated May 20, 2019. Available online at. <https://www.epa.gov/sites/default/files/2019-07/documents/swinomish-letter-5202019.pdf>

Subchapter IV – Public Involvement, Implementation, and Enforcement

19-06.350, Compliance Schedules and Interim Criteria for Existing Activities

19-06.360, Variances.

The above listed provisions, which EPA approved on May 20, 2019, are currently effective WQS for purposes of the CWA. EPA's present action addresses certain WQS that were included in the April 30, 2019, submittal but that were not part of EPA's May 20, 2019, action.

2 Summary of EPA's CWA Action

EPA is now acting on certain additional WQS in the Tribe's April 30, 2019, submittal that were not previously acted on, as described below. Specifically, EPA is taking action to approve certain water quality criteria that support aquatic life. At this time, EPA is not acting on the chronic arsenic criterion for freshwaters, the acute and chronic criteria for cyanide for freshwaters, and the acute and chronic mercury criteria for fresh and marine waters.

As described in this technical support document, EPA is approving the following new or revised WQS under CWA section 303(c):

Subchapter I – Designated Uses and Water Quality Criteria

19-06.120(C)(2), Aquatic Life Use Criteria in Freshwater, and related tables, including paragraphs (a), (b), (c), (d), and Tables 4, 5, and 6, which provide temperature, dissolved oxygen, and pH criteria to protect the aquatic life uses identified in Table 3. Approval includes the application of the narrative criteria to aquatic life use in fresh water as identified in Table 3.

19-06.130(C)(2), Marine Water Designated Uses and Criteria and related tables, including paragraphs (a), (b), (c), (d), and Tables 10, 11, and 12, which provide temperature, dissolved oxygen, and pH criteria to protect the aquatic life uses identified in Table 9. Approval includes the application of the narrative criteria to aquatic life use in marine water as identified in Table 9.

19-06.140, Criteria for Toxic Pollutants, including part or all of paragraphs (A), (B), (G), and Table 15, except as approved previously or specifically not acted on previously due to not being a WQS. Approval includes Table 15 aquatic life acute and chronic marine and freshwater criteria, including associated footnotes. EPA is approving Paragraph 19-06.140(G) that provides information on hardness-dependent metals freshwater criteria for cadmium, chromium (iii), lead, nickel, acute silver, and zinc.

3 Narrative Criteria for Aquatic Life Use Protection

Sections 19-06.100, 19-06.140 and 19-06.150 provide narrative criteria to protect the aquatic life and aquatic-dependent wildlife uses in Table 3 (freshwater designated uses) and Table 9 (marine designated uses).

3.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.100(A), Section 19-06.140(B), and Section 19-06.150, paragraphs (A)(1), (A)(2), (A)(3), (A)(4), (A)(5)(a), (A)(6), (B)(1), (B)(2), (B)(3), (C), (C)(3), (D), and (E) as applied to aquatic life uses.

3.2 Rationale

The regulations at 40 CFR 131.11(a) require states and authorized tribes to adopt water quality criteria that contain sufficient parameters or constituents to protect designated uses. In accordance with 40 CFR 131.11(b)(2), in adopting water quality criteria, states and tribes should “establish narrative criteria or criteria based on biomonitoring methods where numeric criteria cannot be established or to supplement numeric criteria.” The narrative criteria in Section 19-06.100(A), Section 19-06.140(B), and the paragraphs of Section 19-06.150 listed above are consistent with the regulations at 40 CFR 131.11.

The Tribe’s narrative criteria require aquatic life to be protected in all waters regulated under these standards.⁸ Where numeric criteria have not been adopted, the narrative criteria provide a mechanism for the Tribe or EPA, as the implementing authority, to address a specific water quality problem by interpreting the narrative criteria on a case-by-case basis. They are broad in scope and can be used to address the protection of a particularly sensitive species or a unique set of circumstances.

Section 19-06.100(A) provides a general narrative criterion and requirements applicable to the designated uses and to supplement the numeric criteria. Paragraph (A) requires pollutants to be maintained at levels that will protect the designated uses and that will specifically protect the most sensitive use.

Section 19-06.140(B) provides a narrative criterion that prohibits release of toxic substances to regulated waters in toxic amounts. It protects all uses of Reservation waters from impairment due

⁸ The Tribe’s WQS include definitions for both “Regulated Surface Waters” and “Reservation Waters.” Regulated Surface Waters are generally defined to mean “all surface waters located within the exterior boundaries of the Swinomish Indian Reservation...” 19-06.080(40). Reservation Waters are defined to mean “all surface waters located within the exterior boundaries of the Swinomish Indian Reservation, including without limitation Regulated Surface Waters.” 19-06.080(44).

to toxic pollutants, including pollutants for which no numeric criteria have been established and toxicity that may result from the cumulative effects of multiple pollutants. The narrative toxics criterion supplements the numeric toxics criteria in Table 15.

Section 19-06.150 provides narrative criteria that apply to Regulated Surface Waters. Paragraph (A) provides narrative criteria to protect the aesthetic quality of the Regulated Surface Waters and prohibits or limits the following substances and conditions: (1) floating solids, oil, and grease; (2) color; (3) odor and taste; (4) nuisance conditions; (5)(a) turbidity; and (6) bottom deposits.

Section 19-06.150 Paragraph (B) provides narrative criteria to protect the integrity of biological communities in Regulated Surface Waters. Paragraph (B) includes narrative criteria that (1) mandate water quality sufficient to support biota and resident aquatic communities; (2) require maintaining riparian habitat in order to maintain or enhance stream temperatures; and (3) prohibit discharge of toxic substances from any source at concentrations and in combinations that may have a deleterious effect on aquatic communities.

Section 19-06.150 Paragraph (C) provides a narrative statement of the application of the narrative and toxics criteria that are specified in Tables 3 and 9 to wetlands. Paragraph (C)(3) provides a narrative criterion that requires maintaining biological, physical, and hydrological conditions in wetlands in a natural state.

Section 19-06.150 Paragraph (D) provides a narrative criterion for protection of wildlife that use Regulated Surface Waters.

Section 19-06.150 Paragraph (E) requires maintaining instream flows at levels that support existing and designated uses.

4 Aquatic Life Use Criteria for Temperature, Dissolved Oxygen, and pH

Section 19-06.120(C)(2) and Tables 4, 5, and 6 of the Tribe's WQS provide criteria for temperature, dissolved oxygen, and pH in fresh waters, and Section 19-06.130(C)(2) and Tables 10, 11, and 12 provide criteria for temperature, dissolved oxygen, and pH in marine waters.

4.1 Aquatic Life Use Criteria in Fresh Water, Section 19-06.120(C)(2)

Section 19-06.120(C)(2) and Tables 4, 5, and 6 of the Tribe's WQS provide criteria for temperature, dissolved oxygen, and pH in fresh waters to protect the aquatic life designated uses in Table 1 of the Tribe's WQS (Salmon and trout fish use). Section 19-06.120(C)(1)(a) applies the salmon and trout fish use to water bodies that are protected for use by all life stages of native

species of salmon and trout that occur or may occur year round, and identifies juvenile salmonid rearing and bull trout foraging and migration as the most sensitive uses.

4.1.1 Temperature

The aquatic life criterion for salmon and trout in fresh water is a 7-day average of daily maximum temperatures (7-DADMax) of 16°C (19-06.120(C)(2)(b), Table 4).

4.1.1.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.120(C)(2)(b) and Table 4 which include the criteria for temperature in fresh waters to protect the aquatic life designated use.

4.1.1.2 Rationale

EPA is approving the magnitude and averaging period of the Tribe's aquatic life criteria for temperature in fresh water because they meet requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA's 304(a) guidance.

The Tribe's freshwater temperature criterion is expressed as a 7-DADMax. The 7-DADMax is the measure of the maximum temperatures in a stream, averaged over a seven-day period. This metric integrates more information into one value, relative to an instantaneous maximum. The 7-DADMax metric is not overly influenced by the maximum temperature of any single day as it reflects an average temperature that fish are exposed to over a week-long period. This metric is recommended by EPA for water temperature criteria because it protects aquatic life against acute effects (e.g., lethality) and incorporates daily maximum temperatures.⁹ The metric is also protective of chronic effects to aquatic life (e.g., reduced growth) because it describes the thermal exposure over 7 days.

As explained in EPA (2007a),¹⁰ the 16°C 7-DADMax criterion is designed to:

Protect juvenile salmon and steelhead from lethal temperatures [23 to 26°C (73 to 79°F) constant];

Provide conditions during the period of summer maximum temperature and other times of the year that are in the optimal range when food is limited for juvenile growth [10 to 16°C (50 to 61°F) constant];

⁹ USEPA. 2003a. EPA Region 10 Guidance for Pacific Northwest state and tribal temperature water quality standards. EPA 910-B-03-002. USEPA Region 10 Office of Water, Seattle, WA.

¹⁰ USEPA. 2007a. Biological Evaluation of the Revised Washington Water Quality Standards. Region 10, Seattle, WA.

Protect against temperature-induced elevated disease rates [14 to 17°C (57 to 63°F) constant];

Provide temperatures that juvenile salmon and trout prefer, as demonstrated by studies indicating fish in high densities at these temperatures [10 to 17°C (50 to 63F) constant or less than 18°C (64°F) 7DADM];

Protect salmon and steelhead from competitive disadvantage with cool and warm water species which can occur when average temperatures are greater than 15°C and maximum temperatures exceed 17-18°C;¹¹

Provide conditions during the period of summer maximum temperatures that protect adult and sub-adult foraging and migration [less than 15°C];¹² and

Provide conditions that protect chinook salmon that are holding over the summer.¹³

The 16°C 7-DADMax is protective of the Tribe's "Salmon and Trout Fish Use" because it is within the range of temperatures that are used by the salmonid life stages observed in freshwaters within the Tribal waters, including adult holding, summer rearing, and foraging by adult and sub-adult salmonids. Salmonid spawning and incubation do not occur in freshwaters within Tribal waters. Spawning and incubation are neither designated nor existing uses and it is therefore not necessary for the Tribe's temperature criteria to protect those life stages. The 16°C 7-DADMax criterion applies year-round and throughout all freshwater bodies. Assuming this criterion is met at the warmest times of the year and in the warmest parts of the freshwater bodies in the Tribal waters, then 7-DADMax temperatures will be cooler than 16°C most of the time.

4.1.2 Dissolved Oxygen

The aquatic life criterion for dissolved oxygen for salmon and trout use in fresh water is a 1-day minimum (instantaneous minimum) of 9.5 mg/L (19-06.120(C)(2)(c), Table 5).

4.1.2.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.120(C)(2)(c) and Table 5, which include the criteria for dissolved oxygen in fresh waters to protect the aquatic life designated use.

4.1.2.2 Rationale

EPA is approving the Tribe's aquatic life criteria for dissolved oxygen in fresh water because it meets requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and

¹¹ See Washington Department of Ecology (WDOE). December 2002. Evaluating Standards for Protection Aquatic Life in Washington's Surface Water Quality Standards, Temperature Criteria, Draft Discussion Paper and Literature Summary, page 67.

¹² See USEPA. 2003a. EPA Region 10 Guidance for Pacific Northwest state and tribal temperature water quality standards. EPA 910-B-03-002. USEPA Region 10 Office of Water, Seattle, WA. page 27.

¹³ USEPA. 2003a. EPA Region 10 Guidance for Pacific Northwest state and tribal temperature water quality standards. EPA 910-B-03-002. USEPA Region 10 Office of Water, Seattle, WA.

authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA’s 304(a) guidance.

EPA guidance states that salmonid life stages other than embryos and larvae will have no production impairment at a dissolved oxygen concentration of 8.0 mg/L (see Table 1).¹⁴ Since salmonid spawning and incubation does not occur in freshwaters in Tribal waters and the Tribe’s criterion is more protective than the concentration resulting in no production impairment of salmonid life stages other than embryos and larvae, the 1-day minimum dissolved oxygen criterion of 9.5 mg/L is protective of the “Salmon and Trout fish use” adopted by the Tribe.

Table 1. Dissolved oxygen criteria recommendations as presented in EPA 1986a

	Coldwater Criteria		Warmwater Criteria	
	Early Life Stages ^{1,2}	Other Life Stages	Early Life Stages ²	Other Life Stages
30 Day Mean	NA ³	6.5	NA	5.5
7 Day Mean	9.5 (6.5)	NA	6.0	NA
7 Day Mean Minimum	NA	5.0	NA	4.0
1 Day Minimum ^{4,5}	8.0 (5.0)	4.0	5.0	3.0

¹ These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. The 3 mg/l differential is discussed in the criteria document. For species that have early life stages exposed directly to the water column, the figures in parentheses apply.

² Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching.

³ NA (not applicable).

⁴ For highly manipulatable discharges, further restrictions apply (see page 37)

⁵ All minima should be considered as instantaneous concentrations to be achieved at all times.

4.1.3 pH

The aquatic life criterion for pH for salmon and trout fish use in fresh water is, “may not be less than 6.5 or greater than 8.5, with a human-caused variation within the above range of less than 0.2 units” (19-06.120(C)(2)(d), Table 6).

¹⁴ USEPA. 1986a. Ambient aquatic life water quality criteria for dissolved oxygen (Freshwater). EPA/440/5-86-003; PB86208253. Washington, DC: U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=00001MSS.PDF>

4.1.3.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.120(C)(2)(d) and Table 6, which include the criteria for pH in fresh waters to protect the aquatic life designated use.

4.1.3.2 Rationale

EPA is approving the Tribe's aquatic life criteria for pH in fresh water because it meets requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA's 304(a) guidance.

A review of the effects of pH on freshwater fish published by the European Advisory Commission states that although there is no definite range at which a fishery is unharmed and outside which is damaged, the pH range which is not directly lethal to fish is 5.0 - 9.0.¹⁵ Although pH in the range of 5.0 - 6.5 is unlikely to be harmful to fish, it may be harmful if free CO₂ concentrations are greater than 20 ppm or if the water contains iron salts which are precipitated as ferric hydroxide.

Non-salmonid fishes are, with some exceptions, more tolerant of high pH, with sensitivity appearing at or over pH 10 for most species tested.¹⁶ Levels of pH greater than 9.0 may adversely affect benthic invertebrate populations, thereby altering the food base for salmonids. The Tribe's criterion for pH provides an upper limit of 8.5, as opposed to the recommended criterion which has an upper bound of 9.0, to ensure there are no noticeable adverse effects for relevant species of salmonids and invertebrates found in the Tribe's waters. In addition, the Tribe's WQS limit changes in pH due to anthropogenic activities to no more than 0.2 pH units, which provides a protective constraint on deviations from natural pH levels.

4.2 Aquatic Life Use Criteria in Marine Water, Section 19-06.130(C)(2)

Section 19-06.130(C)(2) and Tables 10, 11, and 12 of the Tribe's WQS provide criteria for temperature, dissolved oxygen, and pH in marine waters to protect aquatic life uses in the Tribe's WQS Table 2 (fish use). Section 19-06.130(C)(1)(a) applies the fish use to marine water bodies that are protected for use by all life stages of native species of salmonids, other finfish and shellfish, including but not limited to: salmonid and other finfish spawning, rearing, and

¹⁵ USEPA. 1986b. Quality criteria for water, 1986. EPA/440/5-86-001. Washington, DC: U.S. Environmental Protection Agency, Office of Water Regulations and Standards Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=00001MGA.PDF>; <http://www.epa.gov/waterscience/criteria/goldbook.pdf>

¹⁶ European Inland Fisheries Advisory Commission. 1969. Water quality criteria for European freshwater fish – extreme pH values and inland fisheries. Prepared by EIFAC Working Party on Water Quality Criteria for European Freshwater Fish Water Research 3:593.

migration; forage fish spawning and rearing; clam, oyster, mussel spawning and rearing; and crustaceans and other shellfish spawning and rearing. In the Biological Evaluation (BE), dated June 22, 2022, EPA determined that the marine dissolved oxygen and temperature criteria were not likely to adversely affect threatened and endangered species and their critical habitat in the Action Area. With regard to other aquatic life that are present in Puget Sound, EPA has likewise determined that the Tribe's criteria are protective of aquatic life. Aquatic life in Puget Sound where the Tribe's criteria apply are diverse, ranging from planktonic phytoplankton and zooplankton, including larvae of commercially important species, marine plants, such as seagrasses and macroalgae, and sensitive fish species, including diverse rockfish assemblages, salmonids and sturgeon that are in and out-migrating, forage fish (herring, anchovies), and benthic infauna. The potential effects of EPA's action to approve the marine dissolved oxygen, temperature, and pH criteria on listed species and their critical habitat (where designated), are further described in the BE.

4.2.1 Temperature

The aquatic life criterion for fish use in marine water is a 1-day maximum temperature of 16°C (19-06.130(C)(2)(b), Table 10).

4.2.1.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.130(C)(2)(b) and Table 10, which include the criteria for temperature in marine waters to protect aquatic life uses. In the Tribe's April 30, 2019, WQS submittal there was a typo in the parenthetical reference to the temperature criteria as converted to Fahrenheit. EPA is approving the magnitude of 16°C (60.8°F) temperature criteria.

4.2.1.2 Rationale

EPA is approving the Tribe's aquatic life criteria for temperature in marine water because it meets requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA's 304(a) guidance.

The Swinomish Tribe's adopted temperature criterion to protect aquatic life uses in marine water is a 1-day maximum temperature of 16°C (19-06.130(C)(2)(b), Table 10) to protect the designated fish use which includes salmonid and other finfish rearing and migration.

Thermal stress causes well-documented effects on marine organisms.^{17,18} EPA’s nationally recommended criteria to protect aquatic life in marine waters is a narrative that includes a thermal cap of 1.0°C on “artificial sources” on top of the weekly average temperature during all seasons of the year, providing that the summer maxima are not exceeded, and that daily temperature cycles characteristic of the water body segment should not be altered in either amplitude or frequency.¹⁹ Finally, the summer thermal maxima defining the upper thermal limits for communities should be established on a site-specific basis. Further, EPA Region 10’s Pacific Northwest Temperature Guidance²⁰ identified several thresholds protective of anadromous salmonids. For thermally-sensitive salmonids, one of the more sensitive lifestages is the smoltification period. As discussed in the BE, the EPA Temperature Guidance recommends a 14°C criterion to protect smoltification.

In EPA’s review of additional data for the Puget Sound (summarized in the BE), protection of the seasonal cycle in marine temperature (as required by Tribal supplementary narrative WQS) together with the 16°C not to exceed value at the maximum point in summer, are more protective than the EPA nationally recommended criteria, and would result in the attainment of 14°C during the smoltification period for salmon and steelhead (June/spring). Further, meeting the 16°C at the surface will result in cooler temperatures below the well mixed zone of the upper water column²¹ and are more stringent than the R10 Temperature Guidance’s recommended criteria to protect salmonid migration corridors. EPA Region 10 recommended temperature criteria to protect salmonid migration corridors only is 20°C as a 7-DADMax.²² To protect juvenile rearing and migration together, the criterion recommendation is 18°C as a 7-DADMax, and to protect bull trout foraging, migration, and overwintering the criterion recommendation is 16°C as a 7-DADMax.

For Puget Sound species in addition to listed species reviewed in the BE, while thermal maxima for benthic intertidal (coastal shellfish such as mussels, snails, and barnacles) and shoreline infaunal communities that can burrow are nearer to typical local air temperatures due to periodic inundation and exposure to air, continuous exposure to high temperatures can increase disease risk and contribute to hypoxic conditions. For example, proliferation of shellfish kills was well-documented in 2021 due to hot air and surface ocean temperatures, with air temperatures

¹⁷ USEPA 1986b. Quality Criteria for Water. EPA 440/5-86-001.

¹⁸ U.S. Global Change Research Program. 2022. Our Changing Planet: The U.S. Global Change Research Program for Fiscal Year 2022. Washington, DC, USA. doi: 10.7930/ocpfy2022

¹⁹ USEPA 1986b. Quality Criteria for Water. EPA 440/5-86-001.

²⁰ USEPA. 2003a. USEPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. USEPA 910-B-03-002. USEPA Region 10 Office of Water, Seattle, WA

²¹ PSEMP 2021. PSEMP Marine Waters Workgroup. 2021. Puget Sound marine waters: 2020 overview., J. Apple, R. Wold, K. Stark, J. Bos, P. Williams, N. Hamel, S. Yang, J. Selleck, S. K. Moore, J. Rice, S. Kantor, C. Krembs, G. Hannach, and J. Newton (Eds).

²² USEPA. 2003a. EPA Region 10 Guidance for Pacific Northwest state and tribal temperature water quality standards. EPA 910-B-03-002. USEPA Region 10 Office of Water, Seattle, WA.

continuously far in excess of the marine summer average high air temperature, ~18°C in the surface ocean during the late summer months.²³ Attaining the 16°C maximum criterion will lessen the stress on such coastal communities.

There are several high-temperature intolerant planktonic/pelagic organisms and macrophytes such as kelp which exhibit stress including reduced growth when temperatures exceed 15°C (coldwater species of kelp can survive and reproduce at temperatures from zero to 18°C but grow optimally in the range of 5 to 15°C).^{24,25} However, germination of spores is reduced starting at 15°C, with growth and development impacted at 17°C and higher and exposure to 20°C resulting in widespread spore mortality.²⁶ For larvae such as zoea and megalopa (including dungeness crab larvae), temperatures in excess of 15°C combined with pH effects can result in adverse effects (growth, survival) for larval stages.²⁷ Currently, exposure to continuous temperatures >15°C has historically been a rare event,^{28,29} although marine heatwaves appear to be increasing in frequency and extent,³⁰ including an extreme thermal event in spring-summer 2015.³¹ Such marine heatwaves can also contribute to marine harmful algal bloom proliferation and biotoxin production, which can then accumulate in fish and shellfish tissue when consumed.³² It is important for cooler surface temperatures to be preserved in the future via e.g., effective implementation of the CWA in order to enable Puget Sound aquatic life to remain healthy and productive, as well as to protect human health. Given that the 16°C maximum will limit exposures to average daily temperatures > 15°C, so long as seasonal and diurnal variability are protected from excess anthropogenic source impacts, and since 16°C as a maximum comports

²³ Raymond et al. 2022. Assessment of the impacts of an unprecedented heatwave on intertidal shellfish of the Salish Sea. *Ecology*. Volume 103, Issue 10. October 2022. <https://doi.org/10.1002/ecy.3798>

²⁴ Lüning, K. and W. Freshwater. 1988. Temperature tolerance of Northeast Pacific marine algae. *Journal of Phycology* 24(3):310-315.

²⁵ Bartsch, I., C. Wiencke, K. Bischof, C.M. Buchholz, B.H. Buck, A. Eggert, P. Feuerpfeil, D. Hanelt, S. Jacobsen, R. Karez, U. Karsten, M. Molis, M.Y. Roleda, H. Schubert, R. Schumann, K. Valentin, F. Weinberger, and J. Wiese (2008). The genus *Laminaria* sensu lato: recent insights and developments. *European Journal of Phycology* 43(1):1-86. <https://doi.org/10.1080/09670260701711376>

²⁶ Schiltroth B, Bisgrove S, Heath B, editors. Effects of warm ocean temperatures on bull kelp forests in the Salish Sea. Salish Sea Ecosystem Conference; 2018 April 4, 2018; Seattle, WA

²⁷ Berger et al. 2021. Seasonality and Life History Complexity Determine Vulnerability of Dungeness Crab to Multiple Climate Stressors. *AGU Advances*. 07 October 2021. DOI: <https://doi.org/10.1029/2021AV000456>

²⁸ PSEMP 2021. PSEMP Marine Waters Workgroup. 2021. Puget Sound marine waters: 2020 overview., J. Apple, R. Wold, K. Stark, J. Bos, P. Williams, N. Hamel, S. Yang, J. Selleck, S. K. Moore, J. Rice, S. Kantor, C. Krembs, G. Hannach, and J. Newton (Eds).

²⁹ Khangaonkar, T. et al. 2018. Analysis of Hypoxia and Sensitivity to Nutrient Pollution in Salish Sea. *JGR Oceans*. 08 June 2018 <https://doi.org/10.1029/2017JC013650>

³⁰ Dilorenzo, E. and N. Mantua 2016. Multi-year persistence of the 2014/15 North Pacific marine heatwave. *Nature Climate Change*. 6, pages 1042–1047 (2016).

³¹ PSEMP 2021. PSEMP Marine Waters Workgroup. 2021. Puget Sound marine waters: 2020 overview., J. Apple, R. Wold, K. Stark, J. Bos, P. Williams, N. Hamel, S. Yang, J. Selleck, S. K. Moore, J. Rice, S. Kantor, C. Krembs, G. Hannach, and J. Newton (Eds).

³² Trainer, V. et al. 2020. Climate Extreme Seeds a New Domoic Acid Hotspot on the US West Coast. *Front. Clim.*, 14 December 2020 Sec. Climate Services <https://doi.org/10.3389/fclim.2020.571836>

with historic natural maximum surface temperatures in summer, EPA is approving the Tribe's temperature criteria.

The Swinomish Tribe's marine criterion is as, or more protective than EPA's Temperature Guidance Recommendations for migration corridors for salmon and steelhead, and migration, foraging and overwintering for bull trout. If the criterion is met in summer, sufficiently cold waters during the smoltification period will be available to provide sufficient water quality in estuarine environments to promote survival, growth, and reproduction, and therefore, the marine 16°C 1-day maximum criterion for estuarine and marine waters is protective of the "Fish use" adopted by the Tribe.

4.2.2 Dissolved Oxygen

The aquatic life criterion for dissolved oxygen for fish use in marine water is a 1-day minimum (instantaneous minimum) of 6.0 mg/L (19-06.130(C)(2)(c), Table 11).

4.2.2.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.120(C)(2)(c) and Table 11, which include the criteria for dissolved oxygen in marine waters to protect the aquatic life designated use.

4.2.2.2 Rationale

EPA is approving the Tribe's aquatic life criteria for dissolved oxygen in marine water because it meets requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA's 304(a) guidance.

EPA's nationally recommended criteria to protect cold water aquatic life (all lifestages, such as juvenile outmigration, and adult migration and holding) is 4 mg/L dissolved oxygen as a minimum value; in other words, it is an instantaneous concentration to be achieved at all times (with no anthropogenic depression of this value allowed unless species-specific tolerance thresholds are well understood).³³ The acute mortality limits for nonsalmonid waters are identified as 3-4 mg/L dissolved oxygen minima, depending upon the species present.

EPA's BE analysis demonstrated that based upon available data, meeting 6 mg/L dissolved oxygen as a minimum will result in greater than 7 mg/L dissolved oxygen in the water column

³³ USEPA 1986b. Quality Criteria for Water. EPA 440/5-86-001.

on average,³⁴ with well oxygenated water in the surface/shoreline, so long as temperature criteria are met as well. The Tribe's criteria are comparable to Oregon water quality criteria (6.5 mg/L dissolved oxygen) for estuaries, which have been identified as generally protective of coastal aquatic life, even accounting for multi-stressor effects like those of pH conditions < 7.5.³⁵ Further, Vaquer-Sunyer and Duarte³⁶ summarized marine dissolved oxygen thresholds across a range of species, and determined that 10% of species would be subjected to lethal and sublethal effects at a minimum dissolved oxygen of 5 mg/L or less, and that 6 mg/L dissolved oxygen as a minimum is generally not acutely lethal (broadly across all species reviewed for which data were available) except for extremely sensitive outlier species, and is likewise protective of sublethal effects for approximately 95% of species. It should be noted that in its 1999 biological opinion on EPA's action on Oregon's dissolved oxygen WQS, NMFS acknowledged some adverse effects for listed salmonids, including juvenile rearing and juvenile and adult migration for EPA's approval of Oregon's 6 mg/L minimum cold water aquatic life dissolved oxygen criterion (the estuarine criterion was not reviewed in consultation). However, NMFS did not find that the application of the criterion would jeopardize listed species or adversely modify or destroy designated critical habitat.³⁷

The Swinomish Tribe's one day-minimum of 6.0 mg/L is more stringent than EPA's 1986 recommendation of instantaneous minimum of 4.0 mg/L for life stages other than early life stages of salmonids.³⁸ Given that the Tribe's dissolved oxygen criteria are generally protective broadly across species for both lethal and sublethal effects, and that per natural variability and monitoring data, even higher water column dissolved oxygen concentrations would be available in surface waters of the Tribe, resulting in full protection of threatened and endangered and other sensitive species in Puget Sound, EPA is approving the Tribe's criteria. Since salmonid spawning and incubation does not occur in marine Tribal waters and the Tribe's criterion is more protective than the concentration resulting in no production impairment of salmonid life stages other than embryos and larvae, the 1-day minimum dissolved oxygen criterion of 6.0 mg/L is protective of the effects to juvenile and adult salmon and trout in the marine waters and the "Fish use" adopted by the Tribe.

³⁴ PSEMP 2021. PSEMP Marine Waters Workgroup. 2021. Puget Sound marine waters: 2020 overview., J. Apple, R. Wold, K. Stark, J. Bos, P. Williams, N. Hamel, S. Yang, J. Selleck, S. K. Moore, J. Rice, S. Kantor, C. Krembs, G. Hannach, and J. Newton (Eds).

³⁵ Tomasetti, S.J. and C.J. Gobler. 2020. Dissolved oxygen and pH criteria leave fisheries at risk. *Science*. 368(6489), 372-373.

³⁶ Vaquer-Sunyer and Duarte. 2008. Thresholds of hypoxia for marine biodiversity. *PNAS*. October 7, 2008 105 (40) 15452-15457 <https://www.pnas.org/doi/full/10.1073/pnas.0803833105>

³⁷ NMFS. 1999. Biological and conference opinion on EPA's approval of Oregon's water quality standards for dissolved oxygen, temperature and pH, and accompanying conservation measures. July 7, 1999.

³⁸ USEPA. 1986a. Ambient aquatic life water quality criteria for dissolved oxygen (Freshwater). EPA/440/5-86-003; PB86208253. Washington, DC: U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=00001MSS.PDF>

4.2.3 pH

The aquatic life criterion for pH for fish use in marine water is, “May not be less than 7.0 or greater than 8.5, with a human-caused variation within above range of 0.2 units” (19-06.130(C)(2)(d), Table 12).

4.2.3.1 EPA action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves Section 19-06.130(C)(2)(d) and Table 12, which includes the criterion for pH in marine waters to protect the designated fish use.

4.2.3.2 Rationale

EPA is approving the Tribe’s aquatic life criterion for pH in marine water because it meets the requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as those provided in EPA’s 304(a) guidance.

EPA’s 304(a) guidance recommends a pH range of 6.5 to 8.5 pH units for the protection of aquatic life in marine waters. In addition, EPA recommends that the pH should not deviate more than 0.2 units from the naturally occurring variation outside of the range of 6.5 to 8.5 in open ocean waters where the depth is substantially greater than the euphotic zone.³⁹ Therefore, the Tribe’s pH criteria are more conservative than the EPA criteria at the low end, i.e. 7.0 instead of 6.5 pH units, and equivalent at the high end of the EPA range of 8.5 pH units. Additionally, the Tribe’s criteria include EPA’s recommended requirement for any variability in pH to be within 0.2 pH units of naturally occurring variation, within the criterion range. The effects analysis of marine pH is further discussed in the BE.

5 Aquatic Life Use Criteria for Toxic Pollutants, Section 19-06.140

Section 19-06.140 and Table 15 of the Tribe’s WQS provide numeric criteria for toxic substances for protection of aquatic life. Table 15 includes footnotes related to the aquatic life criteria, which provide information on equation-based criteria, equations and input values used to calculate hardness-dependent metals criteria, and other information related to the numeric toxics criteria. Section 19-06.140(A) and (G) provide additional narrative statements related to the aquatic life criteria:

³⁹ USEPA. 1986b. Quality criteria for water, 1986. EPA/440/5-86-001. Washington, DC: U.S. Environmental Protection Agency, Office of Water Regulations and Standards Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=00001MGA.PDF>;

19-06.140(A): “The concentrations for toxic pollutants listed in Table 15 shall represent the numeric criteria for aquatic life and human health protection. Selecting values for regulatory purposes will be determined by the most sensitive beneficial use to be protected and the level of protection necessary for aquatic life and human health as specified within Table 15. All concentrations, except asbestos, are listed in micrograms per liter (µg/l), which is equivalent to parts per billion (ppb).”

19-06.140(G): “Hardness-dependent metals criteria will be calculated using the ambient hardness, up to a maximum of 400 mg/L, measured as calcium carbonate (CaCO₃). For ambient hardness values over 400 mg/L, the criteria will be calculated using a hardness of 400 mg/L in the hardness equation. There is no minimum ambient hardness value for calculation of the criteria.”

Table 2. Excerpt of the Aquatic Life Toxics Criteria from Table 15 of the Tribe’s WQS. All values are in µg/L unless otherwise noted. The criteria in white cells are the subject of today’s action; criteria in the gray cells are deferred and not included in EPA’s action.

CAS	Compound Name (or Class)	Fresh Water				Marine Water			
		Acute ^a Criteria		Chronic ^b Criteria		Acute ^a Criteria		Chronic ^b Criteria	
7664417	Ammonia, total (mg/L)	equation-based	f	equation-based	g		k		k
	Ammonia, unionized (mg/L)					k			k
16887006	Chloride	860,000		230,000					
7782505	Chlorine	19		11		13		7.5	
57-12-5	Cyanide	22		5.2		1		1	
7723140	Phosphorus Elemental							0.1	
7783064	Sulfide - Hydrogen Sulfide			2				2	
7440382	Arsenic	340	h,l	150	h,l	69	h,l	36	h,l
7440439	Cadmium	hardness-based	j,l	hardness-based	j,l	33	l	7.9	l
18540299	chromium (vi)	16	l	11	l	1100	l	50	l
16065831	chromium (iii)	hardness-based	j,l	hardness-based	j,l				
7440508	Copper	BLM-based	o	BLM-based	o	4.8	l	3.1	l
7439896	Iron			1,000 _p					
7439921	Lead	hardness-based	j,l	hardness-based	j,l	210	l	8.1	l
7439976	Mercury _m	2.4	p	0.012	p	2.1	p	0.025	p
7440020	Nickel	hardness-based	j,l	hardness-based	j,l	74	l	8.2	l
7782492	Selenium		p,u		p	290	p,u	71	p

CAS	Compound Name (or Class)	Fresh Water				Marine Water			
		Acute ^a Criteria		Chronic ^b Criteria		Acute ^a Criteria		Chronic ^b Criteria	
7440224	Silver	hardness-based	j,l			1.9	l		
	Tributyltin (TBT)	0.46		0.072		0.42		0.0074	
7440666	Zinc	hardness-based	j,l	hardness-based	j,l	90	l	81	l
107-02-8	Acrolein	3		3					
63252	Carbaryl	2.1		2.1		1.6			
84852153	Nonylphenol	28		6.6		7		1.7	
87-86-5	Pentachlorophenol	19	n	15	n	13		7.9	
309-00-2	Aldrin	3	e			1.3	e		
58-89-9	gamma-Hexachlorocyclohexane (HCH) (Lindane)	0.95				0.16	e		
57-74-9	Chlordane	2.4	e	0.0043	e	0.09	e	0.004	e
2921882	Chlorpyrifos	0.083		0.041		0.01		0.0056	
333415	Diazinon	0.17		0.17		0.82		0.82	
50-29-3	p,p'- Dichlorodiphenyl-trichloroethane (4,4'-DDT)	1.1	e,q	0.001	e,q	0.13	e,q	0.001	e,q
8065483	Demeton			0.1				0.1	
60-57-1	Dieldrin	0.24	e	0.056	e	0.71	e	0.0019	e
	Endosulfan-Alpha+Beta	0.22	e	0.056	e	0.03	e	0.0087	e
72-20-8	Endrin	0.086		0.036		0.04	e	0.0023	e
86500	Guthion			0.01				0.01	
76-44-8	Heptachlor	0.52	e	0.0038	e	0.05	e	0.0036	e
1024-57-3	Heptachlor Epoxide	0.52	e	0.0038	e	0.05	e	0.0036	e
121755	Malathion			0.1				0.1	
72-43-5	Methoxychlor			0.03				0.03	
2385855	Mirex			0.001				0.001	
56382	Parathion	0.065		0.013					
	Polychlorinated biphenyls			0.014	r			0.03	r
8001-35-2	Toxaphene	0.73		0.0002		0.21		0.0002	

Footnotes:

a. Acute criteria: The Criteria Maximum Concentration (CMC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. With the exception of those pollutants which cite to footnote e, the CMC concentration is expressed as a one hour average not to be exceeded more than once in a three year period.

b. Chronic criteria: The Criterion Continuous Concentration (CCC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. With the exception of those pollutants which cite to footnotes e and g, the CCC concentration is expressed as a four day average not to be exceeded more than once in a three year period.

e. The acute values shown are expressed as maximum values not to be exceeded. The chronic values are expressed as a 24-hour average not to be exceeded. These criteria are based on the 1980 criteria which used different Minimum Data Requirements and derivation procedures from the 1985 Guidelines. If evaluation is to be done using an averaging period,

CAS	Compound Name (or Class)	Fresh Water		Marine Water	
		Acute ^a Criteria	Chronic ^b Criteria	Acute ^a Criteria	Chronic ^b Criteria

the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

- f. Ammonia Aquatic Life Criteria for Fresh Waters, Acute Criterion: The one-hour average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CMC (acute criterion) calculated using the following equations.

Where salmonid fish are present:

$$CMC = MIN \left(\left(\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}} \right), \left(0.7249 \times \left(\frac{0.0114}{1 + 10^{7.204 - pH}} \right) \times \frac{1.6181}{1 + 10^{pH - 7.204}} \right)^{1.26} \times 10^{0.036 \times (20 - T)} \right)$$

Or where salmonid fish are not present:

$$CMC = 0.7249 \times \left(\frac{0.0114}{1 + 10^{7.204 - pH}} \right) \times \frac{1.6181}{1 + 10^{pH - 7.204}} \times MIN(51.93, 23.12 \times 10^{0.036 \times (20 - T)})$$

Tables 5a (salmonids present) and 5b (salmonids absent) of the EPA ammonia criteria document, *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, 2013* (USEPA, 2013a) may be used to determine CMC values.

When using these tables, measured temperature and pH values that fall between available table values should be rounded up to yield protective criteria.

- g. Ammonia Aquatic Life Criteria for Fresh Waters, Chronic Criterion: The 30-day average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CCC (chronic criterion) calculated using the following equation.

$$CCC = 0.8876 \times \left(\frac{0.0278}{1 + 10^{7.688 - pH}} \right) \times \frac{1.1994}{1 + 10^{pH - 7.688}} \times 10^{0.028 \times (20 - MAX(T, 7))}$$

In addition, the highest four-day average within the 30-day period should not exceed 2.5 times the CCC more than once in three years on average.

Table 6 of the EPA ammonia criteria document, *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, 2013* (USEPA, 2013a) may be used to determine CCC values. When using this table, measured temperature and pH values that fall between available table values should be rounded up to yield protective criteria.

- h. The aquatic life criteria were derived from data for arsenic (III), but are applied as total arsenic. The human health criteria refer to the inorganic form only.

- j. Fresh water aquatic life criteria for these metals are expressed as a function of total hardness (expressed as mg/L CaCO₃) according to the following equations. The factors for the equations are provided in the following matrix.

Acute criterion (dissolved) = exp[mA[ln(hardness)]+bA] x conversion factor

Chronic criterion (dissolved) = exp[mC[ln(hardness)]+bC] x conversion factor

Note to the table: The term “exp” represents the base e exponential function.

* The conversion factors (CF) for cadmium and lead are hardness dependent. Conversion factors can be calculated for any hardness using the following equations:

Cadmium Acute CF = 1.136672–[(ln hardness) (0.041838)]

Cadmium Chronic CF = 1.101672–[(ln hardness) (0.041838)]

Lead (Acute and Chronic) CF = 1.46203–[(ln hardness) (0.145712)]

Factors for Calculating Metals Criteria						
Metal	m _A	b _A	m _C	b _C	Conversion Factors	
					Acute	Chronic
Cadmium	0.8403	-3.572	0.6247	-3.384	*	*
Chromium (III)	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Lead	1.273	-1.460	1.273	-4.705	*	*
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997

Silver	1.72	-6.59	N/A	N/A	0.85	N/A
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Note to the table: The term “exp” represents the base e exponential function.

* The conversion factors (CF) for cadmium and lead are hardness dependent. Conversion factors can be calculated for any hardness using the following equations:

$$\text{Cadmium Acute CF} = 1.136672 - [(\ln \text{ hardness}) (0.041838)]$$

$$\text{Cadmium Chronic CF} = 1.101672 - [(\ln \text{ hardness}) (0.041838)]$$

$$\text{Lead (Acute and Chronic) CF} = 1.46203 - [(\ln \text{ hardness}) (0.145712)]$$

k. To develop total ammonia criteria use Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989 (EPA 440/5-88-04)(USEPA, 1989). Ammonia criteria for saltwater are for unionized ammonia. Unionized ammonia is the most toxic form of ammonia to aquatic life. In saltwater, the fraction of the total ammonia that is unionized depends mainly on the pH, temperature and salinity of the water. For implementation purposes, the unionized ammonia criteria are generally converted to total ammonia to be consistent with standard water quality monitoring methods.

l. These freshwater and marine criteria for metals are expressed in terms of the dissolved metal in the water column.

m. If the ambient concentration of total mercury exceeds 0.012 µg/L more than once in a 3-year period in the ambient water, the edible portion of aquatic species of concern must be analyzed to determine whether the concentration of methyl mercury exceeds the FDA action level (1.0 mg/kg). If the FDA action level is exceeded, the Tribe must notify the EPA Region 10 Regional Administrator, initiate a site-specific criterion or a revision of its mercury criterion so as to protect designated uses, and take other appropriate action, such as issuance of a fish consumption advisory for the affected area.

n. Fresh water aquatic life criteria for pentachlorophenol are expressed as a function of pH, and are calculated as follows (values in the table correspond to a pH of 7.8):

$$\text{Acute criterion} = \exp(1.005(\text{pH}) - 4.869)$$

$$\text{Chronic criterion} = \exp(1.005(\text{pH}) - 5.134)$$

o. The available toxicity data, when evaluated using the procedures described in the “Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses” (C.E. Stephan et al., 1985) indicate that freshwater aquatic life should be protected if the 1-hour average and four-day average concentrations do not respectively exceed the acute and chronic criteria concentrations calculated by the Biotic Ligand Model.

A return interval of 3 years between exceedances of the criterion continues to be EPA's general recommendation. However, the resilience of ecosystems and their ability to recover differ greatly. Therefore, scientific derivation of alternative frequencies for exceeding criteria may be appropriate. See Aquatic Life Ambient Freshwater Quality Criteria – Copper, 2007 Revision (USEPA, 2007a) .

Freshwater copper criteria shall be developed using EPA’s current Biotic Ligand Model [BLM current criteria document: EPA-822-R-07-001 (2007a)]. When criteria are developed such criteria must be protective of aquatic life for all expected water quality conditions. A minimum number of 24X samples over two years, reflecting intra-annual or seasonal flow and spatial variability related water quality variability must be collected. If inter-annual or spatial variability in water quality occurs regularly, the monitoring plan shall reflect these characteristics. In the absence of sufficient ambient data for any of the BLM input parameters, default values corresponding to the 10th percentile of the applicable ecoregional dataset for the relevant stream order for each missing parameter shall be used. Default values shall be found in EPA’s Missing Parameters Technical Support Document [EPA 820-R-15-106, (2016c)], hereby incorporated by reference. All BLM criteria shall be made available on the Tribe’s website.

p. This criterion is expressed in terms of the total recoverable metal in the water column.

q. This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

r. This criterion applies to total PCBs (e.g., the sum of all congeners, isomers, homologs or Aroclors).

u. Selenium Aquatic Life Criteria for Fresh Waters:

Criterion Element	Magnitude	Duration	Frequency
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CAS	Compound Name (or Class)	Fresh Water		Marine Water	
		Acute ^a Criteria	Chronic ^b Criteria	Acute ^a Criteria	Chronic ^b Criteria
	Fish Tissue ^a (Egg-Ovary) ^b	15.1 mg/kg dw	Instantaneous measurement ^c	Not to be exceeded	
	Fish Tissue ^a (Whole Body or Muscle) ^d	8.5 mg/kg dw or 11.3 mg/kg dw muscle (skinless, boneless filet)	Instantaneous measurement ^c	Not to be exceeded	
	Water Column ^e (Monthly Average Exposure)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	30 days	Not more than once in three years on average	
	Water Column ^e (Intermittent Exposure) ^f	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$	Number of days/month with an elevated concentration	Not more than once in three years on average	
<p>^a Fish tissue elements are expressed as steady-state.</p> <p>^b Egg/ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured.</p> <p>^c Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.</p> <p>^d Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured.</p> <p>^e 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.</p> <p>^f Where WQC_{30-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).</p>					

5.1 EPA Action

In accordance with its CWA authority, 33 U.S.C. § 1313(c)(3) and 40 CFR 131, EPA approves the criteria for toxic pollutants for the protection of aquatic life in Section 19-06.140(A) and Table 15, except for those criteria that are highlighted in gray cells in the above

Table 2.

EPA is approving 65 criteria for 40 pollutants for freshwater and 59 criteria for 36 pollutants for marine water, and footnotes a, b, e, f, g, n, q, r, and parts of footnote k and o that provide additional information and requirements. EPA approves footnote j as applied to the freshwater criteria for cadmium, chromium iii, lead, nickel, acute silver, and zinc; footnote l as applied to marine arsenic, cadmium, chromium iii, chromium vi, lead, marine copper, nickel, silver, and zinc; and footnote u as applied to freshwater selenium. EPA is taking no action on parts of footnote k and footnote o because they are not WQS that EPA has the duty or authority to approve or disapprove pursuant to CWA section 303(c).

EPA is approving Paragraph 19-06.140(G) that provides information on hardness-dependent metals freshwater criteria for cadmium, chromium (iii), lead, nickel, acute silver, and zinc.

EPA is taking no action on the freshwater chronic criterion for arsenic, freshwater aquatic life criteria for cyanide, freshwater and marine aquatic life criteria for mercury, and footnotes h, m, and p as applied to these criteria.

5.2 Rationale

Paragraph 19-06.140(A) specifies that the toxics criteria in Table 15 are intended to protect aquatic life; requires the most sensitive use to be protected, i.e., the lowest criterion will be used for regulatory purposes; and identifies the concentration units for the criteria values. EPA approves this provision, which provides clarifying information for the toxics criteria in Table 15 and requirements regarding their application to protect designated uses.

EPA is approving 65 criteria for 40 pollutants for freshwater and 59 criteria for 36 pollutants for marine water because the criteria meet requirements at 40 CFR 131.11(a)(1) and (b)(1)(i), which specify that states and authorized tribes must adopt water quality criteria that are based on sound scientific rationale, such as EPA's national recommended water quality criteria. Except for freshwater cadmium, the Tribe's criteria are consistent with EPA's 304(a) national recommended aquatic life criteria. The Tribe's freshwater criteria for cadmium are more stringent than EPA's 304(a) national recommended freshwater cadmium criteria. EPA's 304(a) criteria documents for each of the pollutants provide the detailed scientific basis and rationale for the criteria and for their protectiveness of aquatic life.⁴⁰ EPA is approving the footnotes associated with the aquatic life toxics criteria in Table 15 because these footnotes are scientifically defensible and protective of the applicable use, for the reasons articulated in the associated 304(a) criteria recommendations.

Footnotes a and b in Table 15 provide information regarding the duration and frequency components for the criteria:

Acute criteria: The Criteria Maximum Concentration (CMC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. With the exception of those pollutants which cite to footnote e, the CMC concentration is expressed as a one hour average not to be exceeded more than once in a three year period.

Chronic criteria: The Criterion Continuous Concentration (CCC) is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. With the exception of

⁴⁰ See Section 6 of this technical support document for a list of the aquatic life toxics criteria documents.

those pollutants which cite to footnotes e and g, the CCC concentration is expressed as a four day average not to be exceeded more than once in a three year period.

EPA's 1985 guidelines for deriving aquatic life criteria⁴¹ (the "1985 Guidelines") recommend that aquatic life criteria include three components: the magnitude of the criterion; the averaging period for the criterion, known as the duration component; and the maximum frequency at which the criterion may be exceeded. EPA typically recommends averaging durations of one hour for the CMC and four days for the CCC for aquatic life criteria that are based on standard laboratory toxicity tests. As indicated in the 1985 Guidelines, aquatic ecosystems can generally recover from most exceedances in about three years, and therefore EPA recommends once in three years as the maximum frequency of exceedance for aquatic life criteria. The above text in footnotes a and b establishes duration components and frequency components for the acute and chronic criteria provided in Table 15. The Tribe's duration and frequency components are scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's 1985 Guidelines and EPA's 304(a) recommendations for the individual criteria.

Footnote e provides information on the application of an averaging period for aldrin, chlordane, p,p'- Dichlorodiphenyl-trichloroethane (4,4'-DDT), endosulfan-alpha+beta, heptachlor, heptachlor epoxide, endrin, dieldrin, and gamma-hexachlorocyclohexane (lindane). Footnote e provides a 24-hour averaging period for the referenced chronic criteria and identifies the acute criteria as maxima that may not be exceeded at any time. EPA's national recommended criteria for these chemicals were published before EPA developed the 1985 Guidelines and used different data requirements and derivation procedures (45 FR 79318, Nov. 28, 1980).⁴² The 1980 national recommended criteria include a 24-hour averaging period for the CCC, while the CMC is a maximum value not to be exceeded. Based on procedures for the derivation of CMCs included in the 1985 Guidelines, EPA recommends that if a 1-hour averaging period is applied to the CMC for the 1980 criteria, the acute criteria values should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines. Footnote e of Table 15 is consistent with EPA's national criteria recommendations and additional guidance for the referenced pesticides; however, EPA recommends that the Tribe consider updating the footnote e for freshwater dieldrin criteria to be consistent with the revised 304(a) criteria document⁴³ in its next triennial review of the Swinomish Tribe's WQS.

⁴¹ USEPA. 1985a. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. Accessed at <https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf>

⁴² USEPA. 1980a. Water Quality Criteria Documents; Availability. Federal Register 45: 79318-79379. November 28, 1980.

⁴³ USEPA. 1996. 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-96-001. Washington, D.C. U.S. Environmental Protection Agency.

Footnote f and g provide information on the ammonia acute and chronic freshwater criteria. The Tribe's ammonia criteria are consistent with EPA's national recommended aquatic life criteria for ammonia, including an acute criterion consistent with EPA's recommended criterion for waters where salmonids are present. The EPA criteria document for ammonia provides the detailed scientific basis and rationale for the development of the criteria and for their protectiveness of aquatic life.⁴⁴

Footnote j provides the equations for freshwater hardness-dependent metals criteria for cadmium, chromium iii, lead, nickel, acute silver, and zinc, including the conversion factors to be used for each metal. Except for the cadmium input parameters, the hardness-dependent equations, input parameters, and conversion factors are consistent with the EPA recommended criteria, as described in the respective criteria documents.^{45,46,47} The Tribe's adopted hardness-dependent input parameters for cadmium result in more stringent criteria than the EPA recommended criteria.⁴⁸ Section 19-06.140(G) provides additional information on the calculation of hardness-dependent metals and specifies that the ambient hardness will be used in calculations up to a maximum of 400 mg/L, measured as calcium carbonate (CaCO₃), and that there is no minimum ambient hardness value for calculation of the criteria. For ambient hardness values over 400 mg/L, the criteria will be calculated using a hardness of 400 mg/L in the hardness equation. Since the hardness-dependent metals included in the Tribe's WQS become less toxic (and the criteria become less stringent) as hardness increases, using a maximum hardness of 400 mg/L in the criteria calculation will provide protective criteria in waters with a hardness greater than 400 mg/L. This provision for cadmium, chromium iii, lead, nickel, acute silver, and zinc provides for criteria that are scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria documents.

Footnote k specifies that the Tribe will use the tables from USEPA 1989 to determine the total ammonia criteria for marine water, which are based on the unionized ammonia criteria and dependent on pH, temperature and salinity. The first sentence of footnote k provides this additional detail regarding the criterion and is scientifically defensible and protective of the

⁴⁴ USEPA. 2013. Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, 2013. EPA 822-R-13-001. Office of Water, Washington, DC.

⁴⁵ EPA's national recommendations for parameters for calculating freshwater dissolved metals criteria that are hardness-dependent and metals conversion factors are summarized in Appendix B of EPA's webpage National Recommended Water Quality Criteria - Aquatic Life Criteria Table, accessed at <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table>.

⁴⁶ USEPA. 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Washington D.C.: U.S. Environmental Protection Agency. Retrieved from <https://www.epa.gov/sites/default/files/2019-03/documents/metals-criteria-interpretation-life-memo.pdf>

⁴⁷ See Appendix A for the hardness-dependent metals criteria documents.

⁴⁸ Mebane, C.A. 2006 (2010 rev.), Cadmium risks to freshwater life: Derivation and validation of low-effect criteria values using laboratory and field studies. (version 1.2): U.S. Geological Survey Scientific Investigations Report 2006-5245, 130 p.

applicable use, for the reasons articulated in EPA's criteria document.⁴⁹ EPA is taking no action on the remaining sentences of footnote k because they are not WQS that EPA has the duty or authority to approve or disapprove pursuant to CWA section 303(c).

Footnote l specifies that the criteria for marine arsenic, cadmium, chromium iii, chromium vi, lead, marine copper, nickel, silver, and zinc are expressed in terms of the dissolved metal in the water column. This footnote provides additional detail regarding the criterion that is scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria documents for these metals.⁵⁰

Footnote n provides the equations that constitute the Tribe's pentachlorophenol criteria that are a function of pH. This footnote provides additional detail regarding the criterion that is scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria document for pentachlorophenol.^{51,52}

Footnote o provides the Tribe's copper criteria derivation procedure, which uses a biotic ligand model (BLM) to derive copper criteria values on a site-specific basis, which is consistent with EPA's current 304(a) recommendations for copper.⁵³ EPA is approving the third paragraph of footnote o that states:

Freshwater copper criteria shall be developed using EPA's current Biotic Ligand Model [BLM current criteria document: EPA-822-R-07-001 (2007a)]. When criteria are developed such criteria must be protective of aquatic life for all expected water quality conditions. A minimum number of 24X samples over two years, reflecting intra-annual or seasonal flow and spatial variability related water quality variability must be collected. If inter-annual or spatial variability in water quality occurs regularly, the monitoring plan shall reflect these characteristics. In the absence on sufficient ambient data for any of the BLM input parameters, default values corresponding to the 10th percentile of the applicable ecoregional dataset for the relevant stream order for each missing parameter shall be used. Default values shall be found in EPA's Missing Parameters Technical

⁴⁹ USEPA. 1989. Ambient Water Quality Criteria for Ammonia (Saltwater)-1989. EPA 440/5-88-004. Office of Water, Washington, D.C.

⁵⁰ USEPA. 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Washington D.C.: U.S. Environmental Protection Agency. Retrieved from <https://www.epa.gov/sites/default/files/2019-03/documents/metals-criteria-interpretaqlife-memo.pdf>

⁵¹ USEPA. 1986c. Ambient aquatic life water quality criteria for pentachlorophenol. EPA/440-5-86-009; PB87-105391. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=2000M5GU.PDF>

⁵² USEPA. 1996. 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-96-001. Washington, D.C.: U.S. Environmental Protection Agency.

⁵³ USEPA. 2007b. Aquatic Life Ambient Freshwater Quality Criteria – Copper, 2007 Revision. EPA-822-R-07-001. Office of Water, Washington, DC.

Support Document (EPA 820-R-15-106), hereby incorporated by reference. All BLM criteria shall be made available on the Tribe's website.

EPA is taking no action on the remaining sections of footnote o because they are not WQS that EPA has the duty or authority to approve or disapprove pursuant to CWA section 303(c). The copper BLM uses ten input parameters to calculate instantaneous water quality criteria, which are the protective criteria magnitudes that correspond to the water quality conditions for which they are calculated. The duration component and the recommended frequency component of the copper criteria in footnote o are consistent with the recommendations outlined in EPA's 1985 Guidelines and 2007 national recommended copper criteria. In order to ensure that the copper BLM is applied in a protective manner, it is important to identify the most toxic conditions at a site, and to implement the criteria in a manner that ensures protection of aquatic life under the most toxic conditions. EPA encourages the Swinomish Tribe to ensure that the criteria are applied in a manner that is protective of aquatic life under all water quality conditions found in the Tribe's waters, including conditions of greatest copper toxicity, and recommends using available data for input parameters specific to the Tribe's waters that capture the diurnal and seasonal variability of input parameters. In the absence of sufficient ambient data for any of the BLM input parameters, EPA recommends the Tribe uses EPA's Metals Aquatic Life Criteria and Chemistry Map,⁵⁴ which has superseded EPA's Missing Parameters Technical Support Document (EPA 820-R-15-106), as well as considering updating footnote o during the next triennial review of the Swinomish Tribe's WQS.

Footnote q specifies that the DDT criteria in Table 15 applies to the total concentration of DDT and its metabolites. The criteria values for DDT are consistent with EPA's 304(a) recommendations, which also apply the numeric criteria to DDT and its metabolites.⁵⁵ Therefore, EPA is approving footnote q as it is scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria document.

Footnote r specifies that the PCBs criteria in Table 15 applies to the sum of all PCB congeners, isomers, homologs, or Arochlors. The criteria values for PCBs are consistent with EPA's 304(a) recommendations, which also apply the numeric criteria to the sum of PCBs.⁵⁶ Therefore, EPA is approving footnote r as it is scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria document.⁵⁷

⁵⁴ USEPA. 2022. MetALiCC-MAP v1.0. Available at

<https://epa.maps.arcgis.com/apps/View/index.html?appid=8c7cb6950ffa4a74b73465bfa0b3191c>

⁵⁵ USEPA. 1980b. Ambient Water Quality Criteria for DDT. EPA 440/5-80-038. Office of Water, Washington, DC.

⁵⁶ USEPA. 2002. National Recommended Water Quality Criteria: 2002. EPA-822-R-02-047. Washington, D.C. USA.

⁵⁷ USEPA National Recommended Water Quality Criteria. Available at <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table>

Footnote u specifies the freshwater selenium criteria, including the magnitude, duration, and frequency components. EPA is approving the freshwater selenium criteria outlined in footnote u as it is scientifically defensible and protective of the applicable use, for the reasons articulated in EPA's criteria document.⁵⁸ In 2021, EPA published a revision to the 304(a) criteria document for selenium to address errata in the footnotes associated with the criterion.⁵⁹ The corrected footnote e now states: "Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. When selenium inputs are increasing, water column values are the applicable criterion element in the absence of steady-state condition fish tissue data." Footnotes b and d were also revised to reflect the corrections in footnote e. EPA is approving the Tribe's aquatic life criterion for selenium outlined in footnote u; however, EPA recommends that the Tribe consider updating the footnotes in the selenium criteria table to be consistent with the revised 304(a) criteria document in its next triennial review of the Swinomish Tribe's WQS.

EPA is taking no action on footnote p because it is inconsistent with the information in footnote u that specifies that the criteria in the water column are based on dissolved total selenium. EPA has confirmed with the Tribe that footnote p was mistakenly applied to the selenium criteria and recommends the Tribe remove footnote p from the selenium criteria table to resolve this inconsistency. EPA is also taking no action on footnote p as applied to mercury.

EPA is taking no action on the freshwater chronic criterion for arsenic, freshwater aquatic life criteria for cyanide, freshwater and marine aquatic life criteria for mercury, and footnotes h, m, and p as applied to these criteria. These criteria are equivalent to criteria that the USFWS and/or the NMFS determined are likely to jeopardize ESA-listed species that may be present in waters under the Tribe's jurisdiction. On May 25, 2023, the EPA Administrator determined that new or revised WQS for arsenic, cyanide and mercury in Washington State are necessary to meet the requirements of the CWA.⁶⁰ As explained in that determination, EPA is in the process of evaluating the latest science to derive protective aquatic life criteria for these pollutants in Washington State. After these analyses are complete, EPA will work with the Tribe to ensure that its chronic criterion for arsenic, freshwater aquatic life criteria for cyanide, and freshwater and marine aquatic life criteria for mercury are protective of ESA listed species and designated critical habitat.

⁵⁸ USEPA. 2016a. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater. EPA 822-R-16-006. Washington, D.C., USA.

⁵⁹ U.S. Environmental Protection Agency. 2021. 2021 Revision to: Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016 (EPA 822-R-21-006). Office of Water, Washington, DC

⁶⁰ Letter from Radhika Fox, Assistant Administrator for the EPA Office of Water, to Laura Watson, Director of the Washington State Department of Ecology, May 25, 2023, available at <https://www.epa.gov/system/files/documents/2023-05/Signed-WA-ALC-Determination-May-2023.pdf>

6 List of Aquatic Life Criteria Documents

- Mebane, C.A. 2006 (2010 rev.), Cadmium risks to freshwater life: Derivation and validation of low-effect criteria values using laboratory and field studies (version 1.2): U.S. Geological Survey Scientific Investigations Report 2006-5245, 130 p.
- USEPA. 1980a. Federal Register, Vol. 45, No. 231 &
- USEPA. 1980b. Ambient Water Quality Criteria for DDT. EPA 440/5-80-038. Office of Water, Washington, DC.
- USEPA. 1980c. Ambient Water Quality Criteria for Aldrin/Dieldrin. EPA 440/5-80-019. Office of Water, Washington, DC.
- USEPA. 1980d. Ambient Water Quality Criteria for Chlordane. EPA 440/5-80-027. Office of Water, Washington, DC.
- USEPA. 1980e. Ambient Water Quality Criteria for Polychlorinated Biphenyls. EPA 440/5-80-068. Office of Water, Washington, DC.
- USEPA. 1980f. Ambient Water Quality Criteria for Silver. EPA 440/5-80-071. Office of Water, Washington, DC.
- USEPA. 1985a. Guidelines for Deriving Ambient Aquatic Life Advisory Concentrations. EPA 822-R-86-100. Washington, D.C.
- USEPA. 1985b. Ambient Water Quality Criteria for Cyanide – 1984. EPA-440/5-84-028. Springfield, Virginia: National Technical Information Service.
- USEPA. 1985c. Ambient Water Quality Criteria for Lead. EPA 440/5-84-027. Washington, DC.
- USEPA. 1986b. Quality criteria for water, 1986. EPA/440/5-86-001. Washington, DC: U.S. Environmental Protection Agency, Office of Water Regulations and Standards Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=00001MGA.PDF>
- USEPA. 1986c. Ambient aquatic life water quality criteria for pentachlorophenol. EPA/440-5-86-009; PB87-105391. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=2000M5GU.PDF>
- USEPA. 1986d. Ambient Water Quality Criteria for Chlorpyrifos – 1986. EPA 440/5-86-005. Office of Water, Washington, D.C.
- USEPA. 1986e. Ambient Water Quality Criteria for Toxaphene – 1986. EPA 440/5-86-006. Office of Water, Washington, D.C.
- USEPA. 1989. Ambient Water Quality Criteria for Ammonia (Saltwater)-1989. EPA 440/5-88-004. Office of Water, Washington, D.C.
- USEPA. 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Washington D.C.: U.S. Environmental Protection Agency Retrieved from <https://www.epa.gov/sites/default/files/2019-03/documents/metals-criteria-interpretation-memo.pdf>
- USEPA. 1995. Quality criteria for water 1995. EPA 823-D-95-003. Washington, DC: U.S. Environmental Protection Agency, Office of Water, Health and Ecological Criteria Division Retrieved from <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=910076BC.txt>
- USEPA. 1996. 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-96-001. Washington, D.C. U.S. Environmental Protection Agency.
- USEPA. 2002. National Recommended Water Quality Criteria: 2002. EPA-822-R-02-047. Washington, D.C. USA.

- USEPA. 2003b. Ambient Aquatic Life Water Quality Criteria for Tributyltin (TBT) – Final. EPA 822-R-03-031. Office of Water, Washington, D.C.
- USEPA. 2005a. Aquatic Life Ambient Water Quality Criteria for Diazinon. EPA 822-R-05-006. Office of Water, Washington, D.C.
- USEPA. 2005b. Ambient Aquatic Life Water Quality Criteria, Nonylphenol: Final. EPA-822-R-05-005. Washington, D.C.: U.S. Environmental Protection Agency
- USEPA. 2007b. Aquatic Life Ambient Freshwater Quality Criteria – Copper, 2007 Revision. EPA-822-R-07-001. Office of Water, Washington, DC.
- USEPA. 2009. Ambient Aquatic Life Water Quality Criteria for Acrolein, 2009. Office of Water, Washington, D.C.
- USEPA. 2012b. Aquatic Life Ambient Water Quality Criteria for Carbaryl – 2012. EPA 820-R-12-007. Office of Water, Washington, D.C.
- USEPA. 2013. Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, 2013. EPA 822-R-13-001. Office of Water, Washington, DC.
- USEPA. 2016a. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater. EPA 822-R-16-006. Washington, D.C., USA
- USEPA. 2016b. Aquatic Life Ambient Water Quality Criteria Cadmium. EPA 820-R-16-002. Washington D.C. Retrieved from <https://www.epa.gov/sites/default/files/2016-03/documents/cadmiumfinal-report-2016.pdf>
- USEPA. 2021. 2021 Revision to: Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016. EPA 822-R-21-006. Washington D.C. Retrieved from <https://www.epa.gov/wqc/aquatic-life-criterion-selenium>