6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[EPA-HQ-OW-2023-0325; FRL 11009-03-OW]

RIN 2040-AG35

Mercury Criterion to Protect Aquatic Life in Idaho

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; notice of public hearing.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to promulgate a Federal Clean Water Act (CWA) chronic aquatic life ambient water quality criterion for waters under the state of Idaho's jurisdiction to protect aquatic life from the effects of exposure to harmful concentrations or levels of total mercury (i.e., including methylmercury and inorganic mercury). In 2008, the EPA disapproved the state's revision of its mercury aquatic life criteria. The state has not adopted and submitted revised mercury aquatic life criteria to the EPA to address the EPA's 2008 disapproval. Therefore, the EPA is proposing a Federal mercury criterion to protect aquatic life uses in Idaho.

DATES: Comments must be received on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. *Public Hearing:* The EPA will hold two public hearings during the public comment period. Please refer to the **SUPPLEMENTARY INFORMATION** section for additional information on the public hearings.

ADDRESSES: You may send comments, identified by Docket ID No. EPA-HQ-OW-2023-0325, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Office of Water Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.

- Hand Delivery or Courier: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m. to 4:30 p.m., Monday through Friday (except Federal Holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the "Public Participation" heading of the **SUPPLEMENTARY INFORMATION** section of this document. The EPA is offering two public hearings on this proposed rulemaking. Refer to the **SUPPLEMENTARY INFORMATION** section below for additional information.

FOR FURTHER INFORMATION CONTACT: Kelly Gravuer, Office of Water, Standards and Health Protection Division (4305T), Environmental Protection Agency, 1200 Pennsylvania Avenue NW, Washington, DC 20460; telephone number: (202) 566-2946; email address: *Gravuer.Kelly@epa.gov*.

SUPPLEMENTARY INFORMATION:

This proposed rulemaking preamble is organized as follows:

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and Executive Order 14096: Revitalizing our Nation's Commitment to Environmental Justice for All

I. Public Participation

A. Written Comments

Submit your comments, identified by Docket ID No. EPA-HQ-OW-2023-0325, at *https://www.regulations.gov* (our preferred method), or the other methods identified in the **ADDRESSES** section. Once submitted, comments cannot be edited or removed from the docket. The EPA may publish any comment received to its public docket. Do not submit to the EPA's docket at *https://www.regulations.gov* any information you consider to be Confidential Business Information (CBI), Proprietary Business Information (PBI), or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (i.e., on the web, cloud, or other file sharing system). Please visit *https://www.epa.gov/dockets/commenting-epa-dockets* for additional submission methods; the full EPA public comment policy; information about CBI, PBI, or multimedia submissions; and general guidance on making effective comments.

B. Participation in Public Hearings

The EPA is offering two online public hearings so that interested parties may provide oral comments on this proposed rulemaking. For more details on the online public hearings and to register to attend the hearings, please visit *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.

II. General Information

A. Does this action apply to me?

Entities that discharge mercury to waters under Idaho's jurisdiction[1] that are subject to relevant aquatic life designated uses – such as industrial facilities and municipalities that manage stormwater, separate sanitary, or combined sewer systems – could be indirectly affected by this rulemaking because Federal water quality standards (WQS) promulgated by the EPA would be the applicable WQS for Clean Water Act (CWA) purposes. Specifically, these WQS would be the applicable standards that must be used in CWA regulatory programs, such as permitting under the National Pollutant Discharge Elimination System (NPDES) (CWA section 402)[2] and identifying impaired waters under CWA section 303(d). Categories and entities that could be affected include the following:

Category	Examples of Potentially Affected Entities
Industry	Industrial point sources discharging mercury to waters under Idaho's jurisdiction.
Municipalities, including those with stormwater or combined sewer system outfalls	Publicly owned treatment works or similar facilities responsible for managing stormwater, separate sanitary, or combined sewer systems that discharge mercury to waters under Idaho's jurisdiction.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities that could be indirectly affected by this action. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section above.

III. Background

A. Statutory and Regulatory Authority

CWA section 101(a)(2) establishes a national goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and

[1] Throughout this preamble, the phrase "waters under Idaho's jurisdiction" refers to waters of the United States under Idaho's jurisdiction, since the Clean Water Act applies to waters of the United States.
[2] Before any water quality-based effluent limit would be included in an NPDES permit, the permitting authority (here, the Idaho Department of Environmental Quality [IDEQ]), must first determine whether a discharge "will cause or has the reasonable potential to cause, or contribute to an excursion above any WQS." 40 CFR 122.44 (d)(1)(i) and (ii).

on the water" (hereafter, collectively referred to as "101(a)(2) uses"), wherever attainable. The EPA's regulation at 40 CFR 131.10(g) and (h) implements this statutory provision by requiring that WQS protect 101(a)(2) uses unless those uses are shown to be unattainable.

Under the CWA, states have the primary responsibility for establishing, reviewing, and revising WQS applicable to their waters (CWA section 303(c)). WQS define the desired condition of a water body, in part, by designating the use or uses to be made of the water and by setting the numeric or narrative water quality criteria to protect those uses (40 CFR 131.2, 131.10, and 131.11). There are two primary categories of water quality criteria: human health criteria and aquatic life criteria. Human health criteria protect designated uses such as public water supply, recreation, and fish and shellfish consumption. Aquatic life criteria protect designated uses such as survival, growth, and reproduction of fish, invertebrates, and other aquatic species. Regardless of their category, water quality criteria "must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use" (40 CFR 131.11(a)(1)).

Section 304(a) of the CWA directs the EPA to periodically develop and publish recommended water quality criteria "accurately reflecting the latest scientific knowledge" on the effects of pollutants on human health and welfare, including effects on aquatic life, as well as information on those pollutants, including their concentration and dispersal and how pollutants affect receiving waters (CWA section 304(a)(1)). Those recommendations are available to states for use in developing their own water quality criteria (CWA section 304(a)(3)). When states establish criteria, the EPA's regulation at 40 CFR 131.11(b)(1) specifies that they should establish numeric criteria based on: (1) the EPA's CWA section 304(a) recommended criteria, (2) modified 304(a) recommended criteria that reflect site-specific conditions, or (3) other scientifically defensible methods.

CWA section 303(c)(2)(B), added to the CWA in the 1987 amendments to the Act,[3] requires states to adopt numeric criteria, where available, for all toxic pollutants listed pursuant to CWA section 307(a)(1) (i.e., priority toxic pollutants[4]) for which the EPA has published CWA section 304(a) recommended criteria, the discharge or presence of which could reasonably be expected to interfere with the states' designated uses.

States are required to hold a public hearing to review applicable WQS at least once every three years and, if appropriate, revise or adopt new standards (CWA section 303(c)(1); 40 CFR 131.20(a)). Any new or revised WQS must be submitted to the EPA for review and approval or disapproval (CWA section 303(c)(2)(A) and (c)(3)). If the EPA disapproves a new or revised WQS because it is inconsistent with the requirements of the CWA, the EPA must notify the state within 90 days and "specify the changes to meet such requirements" (CWA section 303(c)(3)). If the state does not adopt changes to comply with the Act within 90 days of notification, the EPA must promptly propose a new or revised WQS for the waters involved (CWA section 303(c)(3) and (4)).

B. Sources of Mercury and Effects on Aquatic Life

Mercury is a naturally occurring metal that can be enriched in some mineral deposits (e.g., cinnabar) and is often present as an impurity in coal. In Idaho, there are several areas with geologically enriched mercury deposits.

Human activities can result in the release and transport of mercury to the aquatic environment primarily through the deposition of mercury that was released to the atmosphere, discharges to water, and leaching from mercury-bearing strata exposed due to mining or other activities. Historically, mercury was both mined directly and used in hardrock and placer gold mining in Idaho, resulting in a legacy of elevated mercury levels in several parts of the state. Industrial processes (e.g., chemical manufacture and metals processing) are the predominant

[3] Water Quality Act Amendments of 1987, Pub. L. 100-4, 101 Stat. 7.
[4] See 40 CFR part 423, Appendix A – 126 Priority Pollutants.

sources of current mercury emissions to air in Idaho and nationally. Globally, natural sources of mercury are less significant than anthropogenic sources and include the weathering of mercury-containing rocks, volcanoes, and geothermal activity.[5] In Idaho, hot springs throughout the state are a natural mercury source.[6] Because atmospheric releases of mercury, whether natural or human-caused, can ultimately be deposited in waterways far from their point of emission, some of the mercury in Idaho's environment originated outside the state.

In water, mercury can occur in a dissolved form or bound to particles. The main forms of dissolved mercury in the aquatic environment are inorganic mercury and methylmercury. Aquatic organisms can take up both forms of mercury through dietary exposure and through direct water column exposure. Aquatic organisms tend to take up mercury more rapidly than they eliminate it, causing mercury (especially methylmercury) to bioaccumulate. Methylmercury can also biomagnify (i.e., increase in concentration at successively higher trophic levels) within aquatic food webs, whereas inorganic mercury does not. Because of methylmercury's potential for biomagnification, dietary exposure is of greater concern than direct water column exposure for mercury toxicity.

Mercury is a potent neurotoxin that causes neurological damage, which can result in behavioral changes and ultimately in reduced growth and reproduction in aquatic organisms. Dietary exposure to methylmercury has been shown to impair reproduction in fish. Aquatic invertebrates are typically more tolerant to both inorganic and methylmercury exposures than vertebrates, with larval stages tending to be the most sensitive. However, there are exceptions to this general pattern. For example, the red swamp crayfish[7] was found to be the fourth most sensitive (out of 19 mostly vertebrate) species for which data were available to derive this

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[5] UN Environment, 2019. Global Mercury Assessment 2018. UN Environment Programme, Chemicals and Health Branch. Geneva, Switzerland. *https://www.unep.org/resources/publication/global-mercury-assessment-2018*

[6] U.S. Geological Survey. 1985. Geochemistry and hydrology of thermal springs in the Idaho Batholith and adjacent areas, Central Idaho. Water Resources Investigations Report 85-4172. H.W. Young, Boise, Idaho.

[7] Although the red swamp crayfish (*Procambarus clarkii*) is not native to Idaho, it serves as a surrogate for similar native invertebrate species for which toxicity data were not available.

mercury criterion (see section IV.B. in this preamble below).

In general, mercury cycling in the aquatic environment is affected by pH, temperature, oxidation-reduction (redox) potential, and the availability of nutrients, humic acids, and complexing agents. The conversion of inorganic mercury to the more toxic methylmercury occurs in anoxic environments, such as wetlands. Higher mercury methylation rates tend to occur in areas with higher anerobic microbial activity and when inorganic mercury is in a form that is bioavailable to the microbial community.[8] Mercury has a high affinity for sorbing to sediments as well as dissolved and particulate matter suspended in the water column. This sorption to sediments can allow sediments to serve as a source of mercury to the water column long after mercury-releasing activities have ceased.

C. History of Mercury Aquatic Life Criteria in Idaho

On June 25, 1996, the EPA approved Idaho's numeric aquatic life mercury criteria (0.012 µg/L chronic and 2.1 µg/L acute) under CWA section 303(c). In 2003, the Idaho Department of Environmental Quality ("IDEQ") began a negotiated rulemaking in response to a petition from the Idaho Mining Association to update Idaho's mercury criteria. As a result of that negotiated rulemaking, Idaho adopted and, on August 8, 2005, submitted revised standards to the EPA for review under CWA section 303(c). IDEQ's revised standards removed the acute and chronic numeric aquatic life criteria for mercury and added a footnote "g" to the state's toxic criteria table. Footnote "g" stated that Idaho's existing narrative criteria for toxics would apply instead of the numeric criteria and that the existing human health criterion for methylmercury would be protective of aquatic life in most situations.

On December 12, 2008, the EPA disapproved Idaho's removal of numeric acute and chronic aquatic life criteria for mercury and their replacement with footnote "g," stating that

[8] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*

these revisions were inconsistent with CWA section 303(c) and 40 CFR 131.11.[9] The EPA noted that "the supporting documentation that Idaho had submitted [did] not provide specific information which would demonstrate that the designated aquatic life uses in Idaho are assured protection from discharges of mercury that would adversely affect water quality and/or the attainment of the aquatic life uses." The EPA further stated that Idaho's Implementation Guidance for the Mercury Water Quality Criteria[10] (which primarily pertains to Idaho's human health criteria for mercury) did not "contain definitive information on how the State would translate the fish tissue criterion developed to protect human health to a value which could be used to protect aquatic life."

To remedy this disapproval, the EPA specified "several options Idaho could consider in establishing mercury criteria that are based on scientifically defensible methods and protect Idaho's designated aquatic life uses." These options included (1) evaluating the protectiveness of the EPA's existing recommended 304(a) numeric acute aquatic life criterion for mercury (1.4 µg/L); (2) evaluating the protectiveness of Idaho's previous numeric chronic aquatic life criterion for mercury (0.012 µg/L); (3) evaluating development of Idaho-specific numeric acute and chronic aquatic life criteria for mercury; and (4) evaluating the use of a combination of protective numeric water column values and numeric wildlife criteria appropriate for Idaho species. The EPA also pointed out that it was not recommending Idaho use the EPA's existing 304(a) numeric chronic aquatic life criterion for mercury (0.77 µg/L) as one of the options. The EPA explained that information arising after the derivation of that 304(a) criterion had indicated that it may not adequately protect certain fish species that are present in Idaho.

The EPA concluded that "[u]ntil Idaho develops and adopts and EPA approves revisions to [the] numeric acute and chronic aquatic life criteria for mercury, the numeric aquatic life

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[9] Letter from Michael F. Gearheard, Director, EPA Region 10 Office of Water and Watersheds to Barry Burnell, Water Quality Program Administrator, Idaho Department of Environmental Quality, Re: EPA's Disapproval of Idaho's Removal of Mercury Acute and Chronic Freshwater Aquatic Life Criteria, Docket No. 58-0102-0302 (December 12, 2008).

[10] Idaho Department of Environmental Quality. 2005. *Implementation Guidance for the Idaho Mercury Water Quality Criteria*. Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4836.*

mercury criteria applicable to the designated aquatic life uses in Idaho that are effective for Clean Water Act [p]urposes are the previously adopted acute (2.1 μg/L) and chronic (0.012 μg/L) mercury criteria which EPA approved" in 1996. No revisions to Idaho's aquatic life mercury criteria have been made since the EPA's December 2008 disapproval. Idaho's WQS acknowledge the EPA's 2008 disapproval and state that the mercury aquatic life criteria that were published in the 2004 Idaho Administrative Code (prior to adoption of the disapproved standards) still apply and are effective for CWA purposes.[11] Those criteria are currently being implemented for CWA purposes including NPDES permitting in the state.

On June 14, 2013, Northwest Environmental Advocates filed suit in the Federal district court for the District of Idaho against the National Marine Fisheries Service and the Fish and Wildlife Service (the Services).[12] The complaint alleged that the Services unreasonably delayed or unlawfully withheld completion of Endangered Species Act (ESA) consultation with the EPA regarding new and revised WQS that Idaho submitted in 1996 and/or 1997. On September 24, 2013, Northwest Environmental Advocates were joined by the Idaho Conservation League (collectively, the plaintiffs) in filing an amended complaint adding various CWA and ESA claims against the EPA regarding dozens of Idaho WQS submissions dating back to 1994.

By 2020, all claims against the EPA except one had either been dismissed on statute of limitations grounds or included in a stipulated dismissal agreed upon by the parties. The remaining claim alleged that the EPA failed to act under section 303(c)(4) of the CWA to promulgate aquatic life mercury criteria for Idaho following the EPA's December 12, 2008 disapproval of the state's revisions to its mercury criteria. On July 19, 2021, the Court issued a decision on that claim in favor of the plaintiffs, concluding that, as a result of its disapproval, the EPA was subject to a mandatory duty to promulgate new criteria for the state.[13] The Court directed the parties to file briefs regarding an appropriate remedy. The parties negotiated a

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[11] IDAPA 58 – Department of Environmental Quality, Surface and Wastewater Division, 58.01.02 – Water Quality Standards. *https://adminrules.idaho.gov/rules/current/58/580102.pdf*

[12] *Nw. Env't Advocs. v. United States Env't Prot. Agency*, No. 1:13-cv-263 (D. Idaho filed June 14, 2013).

[13] *Nw. Env't Advocs. v. United States Env't Prot. Agency*, 549 F. Supp. 3d 1218 (D. Idaho 2021).

settlement and entered into a Stipulated Order on Remedy on October 4, 2022.[14] The Order states that the EPA will sign for publication in the *Federal Register* proposed aquatic life mercury criteria for the state of Idaho within 18 months of its entry with the Court (*i.e.*, by April 4, 2024).

With regard to the form of the proposed criteria, the Stipulated Order on Remedy states that "[i]n recognition of the comparative ease of translating water column concentrations and values into permit effluent limitations and wasteload allocations, EPA commits to developing proposed Mercury Criteria that include water column concentrations, or default water column values that can be modified on a case-by-case basis, if EPA determines there are sufficient data available to support this form of criteria."

D. General Recommended Approach for Deriving Aquatic Life Criteria

The EPA developed the mercury criterion for Idaho in this proposed rulemaking consistent with the EPA's *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (referred to as the "Aquatic Life Guidelines").[15] The EPA's Aquatic Life Guidelines describe a method to estimate the highest concentration (magnitude) of a substance in water – averaged over a given time period (duration) and that should not be exceeded more than the allowable number of times during a specified time period (frequency) – that will not present a significant risk to the aquatic organisms in the water. The Aquatic Life Guidelines recommend using toxicity test data from a minimum of eight taxa of aquatic organisms to derive criteria. These taxa are intended to be representative of a wide spectrum of aquatic life, and act as surrogates for untested species. Therefore, the specific test organisms do not need to be present in the water(s) where the criteria will apply.

Aquatic life criteria are typically represented as concentrations of a pollutant in the water column with two magnitudes: one associated with a shorter-term (acute) duration and another

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[14] Stipulated Order on Remedy, *Nw. Env't Advocs. v. United States Env't Prot. Agency*, No. 1:13-cv-263 (D. Idaho October 4, 2022).

[15] USEPA. 1985. *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*. U.S. Environmental Protection Agency, Office of Research and Development, Duluth, MN, Narragansett, RI, Corvallis, OR. PB85-227049. *https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf*

associated with a longer-term (chronic) duration. However, depending on the mode of toxicity, for some pollutants, an acute-only or chronic-only water column criterion is appropriate.[16] For example, for pollutants where toxicity to aquatic life is primarily driven by diet (i.e., the consumption of contaminated prey) rather than by direct exposure to dissolved contaminants in the water column, longer-term water column measurements that capture the degree of likely pollutant uptake via dietary exposure – such as measurements with a 30-day average (chronic) duration – are often the most appropriate water column-based measure of their toxicity to aquatic life. Furthermore, for some pollutants, measurements of pollutant concentrations within the tissues of aquatic organisms provide a more direct measure of toxicity (to both the organisms themselves, and to humans consuming those organisms) than water column measurements. For bioaccumulative pollutants such as mercury, where exposure is primarily through diet, both of these rationales apply, with tissue measurements and longer-term water column measurements providing more appropriate measures of toxicity than the 1-hour and 4-day water column measurements that capture the toxic effects of many other pollutant types.

Because tissue measurements provide a more direct measure of toxicity for bioaccumulative pollutants such as mercury, the EPA has considered it appropriate to establish tissue criteria for these pollutants. However, criteria expressed as organism tissue concentrations can prove challenging to implement in CWA programs such as NPDES permitting and Total Maximum Daily Loads (TMDLs) because these programs typically demonstrate that water quality standards are met by using a water column concentration to calculate a load-based effluent limit or daily load, respectively. In recent years, the EPA has developed tissue-based national criteria recommendations for certain bioaccumulative pollutants and then assessed the degree to which available knowledge and data support translating those tissue criteria to water column criteria at the site, state, or national level.

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[16] *https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#table*.

For exceedance frequency, most water column aquatic life criteria developed by the EPA include a recommended exceedance frequency of no more than once in three years. The EPA based this maximum exceedance frequency recommendation of once every three years on the time aquatic ecosystems require to recover from the exceedances. For water column criteria, an exceedance occurs when the average concentration over the duration of the averaging period is above the criterion. Because fish tissue concentrations of bioaccumulative pollutants reflect longer-term uptake and elimination dynamics and tend to change slowly over time, their frequency and duration components tend to be different than those of water column criteria. Specifically, for fish tissue criteria, the EPA recommends for bioaccumulative pollutants[17,18] that the criteria be expressed with an "instantaneous measurement" duration and be considered exceeded if a fish tissue sample measurement from a single sampling event (defined as a composited tissue sample from each fish species or a central tendency estimate of individual tissue samples from each fish species, collected from a given site or waterbody in a discrete sampling period) exceeds the criterion value.[19]

IV. Proposed Mercury Aquatic Life Criterion for Idaho

A. Scope of the EPA's Proposed Rule

The final criterion resulting from this proposed rulemaking would establish levels of mercury appropriate for the protection and maintenance of a viable aquatic life community in waters under Idaho's jurisdiction that are designated for aquatic life uses. The criterion would apply to all of Idaho's aquatic life use designations and would replace the current CWA-effective acute and chronic mercury criteria.

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[17] USEPA. 2021. *2021 Revision to Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016*. EPA 822-R-21-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf*.

[18] USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic Acid (PFOA)*. EPA-842-D-22-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfoa-report-2022.pdf*; USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctane Sulfonate (PFOS)*. EPA-842-D-22-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfos-report-2022.pdf*.

[19] As previously stated, since fish tissue concentrations of bioaccumulative pollutants tend to change slowly over time, any exceedance indicates that waterbody conditions may not be protective of aquatic life.

B. Proposed Mercury Criterion

Since mercury is significantly more toxic through chronic dietary exposure than through water-based exposure, the EPA developed a proposed chronic criterion that is based on dietary exposures. The EPA did not develop a separate acute or chronic criterion from the results of toxicity tests with only water–based exposure. Because the most harmful effects of mercury on aquatic organisms are due to its bioaccumulative properties and because the resulting chronic effects are observed at lower mercury concentrations than acute effects, this chronic criterion based on dietary exposure is expected to additionally protect aquatic communities from any potential acute effects of mercury. For reasons described below, the EPA concluded that this chronic mercury criterion should integrate consideration of both relative organismal sensitivity (i.e., inherent toxicity) and relative exposure potential (i.e., bioaccumulation) across the aquatic species for which data are available. A summary of the EPA's approach is described below; for more details, please see the Technical Support Document included in the docket for this rulemaking.[20]

1. Inherent Toxicity Data

To account for inherent toxicity, the EPA evaluated toxicity studies in which the authors fed food spiked with methylmercury and/or inorganic mercury to aquatic organisms for an appropriate chronic duration (based on the taxon and the endpoint of interest, ranging up to 249 days in this data set[21]). The EPA then assessed each study that measured the organisms' resulting tissue mercury levels and associated toxicity effects. The tissue mercury levels in these studies were measured as methylmercury or total mercury. Although the toxicity reported in most of

[20] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.

[21] The chronic studies used in the derivation of the mercury criterion followed taxa-specific exposure duration requirements from various test guidelines (i.e., EPA's 1985 Aquatic Life Criteria Guidelines: *https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf* and EPA OCSPP's 2016 Ecological Effects Test Guidelines: *https://www.epa.gov/test-guidelines-pesticides-and-toxic-substances/series-850-ecological-effects-test-guidelines*) when available. Thus, most studies consisted of partial life-cycle tests of sufficient length to ascertain whether dietary exposure to mercury had a deleterious effect on the endpoint of interest. For studies involving amphibian taxa, only dietary exposure studies using fully aquatic life stages (larvae, tadpoles, and metamorphs) of these species were considered.

these studies was primarily due to methylmercury, the toxicity observed in at least some aquatic taxa was likely due to the combined effects of inorganic and methylmercury.

Idaho's aquatic life uses call for water quality appropriate for the protection and maintenance of a viable aquatic life community, including active self-propagating populations of salmonid fishes where appropriate habitat is available and the salmonid spawning use is designated. To protect these aquatic life designated uses, the EPA seeks to protect aquatic life and health of the aquatic community by minimizing adverse effects on the assessment endpoints of survival, growth, and reproduction in the taxa present in the aquatic community. Measures of effect (such as increased mortality, reduction in organism weight, or the number of eggs laid per female fish) reported in each study were used to quantify changes in the assessment endpoints of survival, growth, and reproduction. As with recent national recommended bioaccumulative pollutant criteria, the EPA selected the EC_{10} – the concentration that results in a 10% difference in a measure of effect (e.g., a 10% decrease in number of eggs laid per female) in the test population – as the numeric metric for the measures of effect, wherever possible. The EC_{10} estimates a low level of effect that is different from controls but is not expected to cause severe effects at the population level for a bioaccumulative contaminant. For studies with experimental designs that did not provide sufficient test concentrations to calculate an $EC_{10,}$ the EPA generally used an estimate of the No Observed Effect Concentration (NOEC) as a surrogate for the $EC_{10.}$[22]

The EPA collected chronic dietary toxicity test data of sufficient quality across the eight diverse taxonomic groups (including vertebrates and invertebrates) recommended in the Aquatic Life Guidelines. Quantitative data were available for 19 species within 18 genera. For each toxicity study, the EPA recorded the type of tissue in which the mercury concentration had been measured (muscle or whole-body) and then used conversion factors derived from the literature to create two equivalent data sets: one in terms of muscle tissue concentrations and the other in

[22] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.

terms of whole-body tissue concentrations. This approach allowed the EPA to develop two tissue criterion elements (one for muscle tissue and one for whole-body tissue).

2. Bioaccumulation Data

The EPA estimated bioaccumulation using the bioaccumulation factor (BAF) approach; a BAF is the ratio of the concentration of a chemical in the tissue of an aquatic organism to the concentration of the chemical dissolved in ambient water at the site of sampling. Because mercury bioaccumulation, and thus BAFs, can be affected by multiple site-specific factors (see section III.B. in this preamble above), it is desirable to base BAFs on field-collected data from the location(s) to which the criterion will be applied. Consequently, the EPA assembled a data set of paired (i.e., collected in the same waterbody within one year) aquatic organism tissue and water samples from Idaho. The data set contained data from 30 fish species and one crayfish species. Although no paired tissue and water data from Idaho were found for amphibians, the EPA conducted a literature search and identified paired tissue and water data for the wood frog (resident in Northern Idaho) that had been collected in Maine and Vermont; these data were added to the data set to ensure consideration and protection of Idaho amphibians.

From this data set, the EPA calculated species-level BAFs by first taking the median for a species at a site in a particular year, then the median across years within a site, then the median across sites for a species to get one median BAF per species.

3. Development of Fish Tissue Criterion Elements: Magnitude

Having assembled data on both toxicity and bioaccumulation for a suite of aquatic species relevant to protection and maintenance of a viable aquatic life community in Idaho, the EPA proceeded to develop the muscle and whole-body tissue criterion elements. The EPA noted that there were large ranges of toxicological sensitivity and bioaccumulation potential across taxa. Two specific issues were apparent related to differing bioaccumulation rates among species for mercury.

First, the two amphibians in the toxicity data set were the two most sensitive species based on dietary exposure (inherent toxicity), but also have by far the lowest mercury bioaccumulation potential. Fish, on the other hand, are comparatively more tolerant to inherent (direct) toxicity, but generally more vulnerable to mercury pollution due to their higher mercury bioaccumulation potential. Therefore, establishing a criterion based solely on inherent toxicity data, i.e., without considering bioaccumulation differences, would be inappropriate. The EPA also aimed to develop a criterion that was practical and implementable, recognizing that Idaho typically samples fish (rather than amphibians) for CWA implementation purposes. Therefore, in consideration of the bioaccumulation data, the EPA is proposing a chronic criterion for mercury based on fish and aquatic invertebrate inherent toxicity data, which also protects amphibians.

Second, mercury bioaccumulation potential among fish species varies widely (up to 20-fold differences) due primarily to their diets: as trophic level increases so does mercury bioaccumulation. In order to protect higher trophic level fish, such as salmonids, which are commercially, recreationally, and ecologically important in Idaho, the EPA made adjustments to account for known bioaccumulation differences among fish species. Doing so ensures that higher trophic level fish species are protected when evaluating sampling data from lower trophic level species (e.g., bluegill, suckers, pumpkinseed) for implementation purposes.

To address these two issues, the EPA used a modified approach based on the "good science" clause in the Aquatic Life Guidelines[23] to integrate inherent toxicity and bioaccumulation. Briefly, to address the first issue (the most sensitive organisms having by far the lowest bioaccumulation potential), the EPA calculated both tissue criterion elements using the fish and aquatic invertebrate data (i.e., excluding amphibians) and then analyzed whether the resulting criterion elements would be protective of all aquatic species in the data set in light of their inherent toxicity and bioaccumulation differences (see further details below).

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[23] The Aquatic Life Guidelines note that a modified approach may be needed in some situations, directing users to: "On the basis of all available pertinent laboratory and field information, determine if the criterion is consistent with sound scientific evidence. If it is not, another criterion, either higher or lower, should be derived using appropriate modifications of these Guidelines." (pg. 30)

To address the second issue, the EPA evaluated the differences in bioaccumulation between fish species in the data set and developed adjustment factors that can be used when sampling fish for implementation. If a high trophic level adult fish (e.g., trophic level 4) is sampled and found to have mercury tissue concentrations at (or below) the criterion level, it would be reasonable to assume that all aquatic species in that water body are protected (i.e., because lower trophic level species are expected to have lower levels of mercury bioaccumulation). However, if a lower trophic level fish is sampled and found to be below the criterion level, it does not necessarily mean that higher trophic level fish are protected. To resolve this issue, the EPA developed a method to estimate the tissue mercury levels of higher trophic level adult fish resident in that water body to determine whether all aquatic species in that water body are protected.

To make these estimates, the EPA developed Bioaccumulation Trophic Adjustment Factors (BTAFs). The BTAF is an adjustment factor applied to the tissue sample data from a lower trophic level fish and is based on the relative relationship of bioaccumulation rates of the highest trophic level fish species as compared to lower trophic level fish species. The EPA first assigned all the fish in the bioaccumulation data set to one of three trophic categories: low (trophic level 2 or TL2), medium (trophic level 3 or TL3), or high (trophic level 4 or TL4).[24] The EPA then developed two BTAFs by calculating the ratio between the trophic level BAFs: one to be used if a TL2 species is sampled (representative TL4 BAF / representative TL2 BAF) and another to be used if a TL3 species is sampled (representative TL4 BAF / representative TL3 BAF). To calculate representative BAFs, the EPA used the median of BAFs for species at that

[24] Fish species were binned into three trophic magnitude categories largely corresponding to trophic levels designated in Essig 2010 (Arsenic, mercury, and selenium in fish tissue and water from Idaho's major rivers: A statewide assessment. Idaho Department of Environmental Quality, Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/3472*) based on Zaroban et al. 1999 (Classification of species attributes for Pacific Northwest freshwater fishes. Northwest Sci. 73(2): 81-93). In some instances, additional information regarding trophic ecology and other attributes of Pacific Northwest fish species resident in Idaho were also incorporated into the trophic level categorization determination (Brown, C.J.D. 1971. Fishes of Montana. Bozeman, MT: Big Sky Books/Montana State University. 207 p.; Zaroban et al. 1999. Classification of species attributes for Pacific Northwest freshwater fishes. Northwest Sci. 73(2): 81-93; Froese, R. and D. Pauly. Editors. 2022. FishBase. World Wide Web electronic publication. *www.fishbase.org*).

trophic level from the species-level BAF data set for TL3 (TL3 BAF = 108,418 L/kg, n = 21) and TL4 (TL4 BAF = 378,150 L/kg, n = 6) fish. For the representative TL2 BAF, due to the paucity of TL2 fish species in the data set (n = 3), the EPA used the 20th centile of the full distribution of the species-level median BAFs (TL2 BAF = 67,203 L/kg, n = 30). The EPA's use of the 20th centile ensures appropriate protection for aquatic species in Idaho (i.e., providing water quality appropriate for the protection and maintenance of a viable aquatic life community as specified by Idaho's aquatic life uses) and is consistent with previous EPA approaches for bioaccumulative chemicals.[25,26]

Therefore, the EPA is proposing that if a TL2 fish is sampled, its muscle tissue mercury concentration (converted from whole-body tissue concentration where appropriate, as discussed below) must be multiplied by 5.6 (378,150 L kg^{-1} / 67,203 L kg^{-1}) to estimate the muscle tissue mercury concentration of a TL4 fish in the same water body, and that estimate must be compared to the muscle tissue criterion element (225 ng total mercury (THg) /g wet weight (ww)) to determine whether the criterion is met. Similarly, if a TL3 fish is sampled, its muscle tissue mercury concentration must be multiplied by 3.5 (378,150 L kg^{-1}/ 108,418 L kg^{-1}) and the resulting value compared to the muscle tissue criterion element. If an adult TL4 fish species is sampled, its muscle tissue mercury concentration must be compared directly to the muscle tissue criterion element. Because the BAFs in this data set were calculated using muscle tissue concentrations, it is most appropriate to use the BTAFs to adjust muscle (rather than whole-body) tissue concentration measurements. If whole-body tissue samples are taken from TL2 or TL3 fish, the EPA is proposing that those measurements must be converted to a muscle tissue

[25] USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic Acid (PFOA)*. EPA-842-D-22-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfoa-report-2022.pdf* ; USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctane Sulfonate (PFOS)*. EPA-842-D-22-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfos-report-2022.pdf*.

[26] USEPA. 2021. *2021 Revision to Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016.* EPA 822-R-21-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf*.

equivalent (by dividing by 0.72, a conversion factor derived from the literature[27]) before multiplying by the appropriate BTAF and comparing the result to the muscle tissue criterion element.

Trophic level assignments for fish species found in Idaho are included in the Technical Support Document[28] and should be used where available. Additional sources for trophic level assignment cited in the Technical Support Document should be consulted to assign trophic levels for other species. In some cases, consultation with state fisheries experts may be necessary. At this time, the EPA has developed BTAFs for fish based on Idaho species with available BAF data. The EPA requests comment on whether there is interest in sampling species other than fish to determine compliance with the criterion, and if so, whether any data exist to develop appropriate BTAFs for those other species.

Having confirmed that the most bioaccumulative species (i.e., those at the highest trophic level) would be protected by the tissue criterion with BTAF adjustments applied as appropriate, the EPA analyzed whether a tissue criterion derived based solely on fish and aquatic invertebrates (excluding the two amphibian species) would be protective of all aquatic species in the data set. Comparing the amphibian BAF (8,222 L/kg) to the median TL4 fish BAF (378,150 L/kg), the EPA found that amphibians would be expected to bioaccumulate approximately 46 times less mercury than the median TL4 fish when exposed to the same mercury levels. Therefore, if a TL4 fish is sampled and found to have a mercury level equivalent to the muscle tissue criterion value (225 ng THg/g ww), amphibians in that same water body would be expected to have muscle tissue concentrations of approximately 4.9 ng THg/g ww, well below the EC_{10} of the most sensitive amphibian species (33.7 ng THg/g ww). Similar reasoning would apply if TL2 or TL3 fish species were sampled and adjusted with the BTAFs to an estimated TL4 muscle tissue concentration at or below 225 ng THg/g ww; in all cases, estimated

[27] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.
[28] Ibid.

amphibian muscle tissue concentrations in that water body would be below the most sensitive amphibian's EC_{10}. Therefore, the EPA concluded that the tissue criterion elements protect the full suite of aquatic species (including amphibians) without being unnecessarily stringent.

The EPA's proposed tissue criterion elements are expressed as total mercury (THg) (i.e., including methylmercury and inorganic mercury). As noted above, both forms of mercury can bioaccumulate and have toxic effects, although only methylmercury biomagnifies. Furthermore, the analysis of total mercury incorporates the measurement of methylmercury, but costs less and uses less complex analytical methods than the measurement of methylmercury alone. Additionally, measurement of total mercury in fish tissue has served as the basis for quantifying mercury concentrations in fish tissue monitoring programs implemented by the EPA and many states, including Idaho.

4. Development of the Water Column Criterion Element: Magnitude

To develop the water column criterion element, the EPA first needed to assign a BAF to each species in the toxicity data set to facilitate the translation from tissue to water, since not all species in the toxicity data set were also present in the bioaccumulation data set. To determine appropriate BAFs for the fish species without species-specific BAFs, the EPA calculated TL-specific BAFs by taking the 80th centile of the median species-level BAFs for all fish within that TL. The EPA's use of the 80th centile here is consistent with the process for deriving water column criteria for other bioaccumulative pollutants.[29,30] The EPA then assigned the most representative BAF (i.e., species- or genus-level where available, otherwise trophic-level) to

[29] USEPA. 2021. *2021 Revision to Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016.* EPA 822-R-21-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf*.

[30] USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic Acid (PFOA)*. EPA-842-D-22-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfoa-report-2022.pdf*; USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctane Sulfonate (PFOS)*. EPA-842-D-22-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfos-report-2022.pdf*.

each fish species in the toxicity data set.[31] Nearly all BAFs were derived from field-collected Idaho tissue and water data, representing a diverse range of site-specific relationships between mercury in tissue and water across the state of Idaho (see TSD section 3.5 for more details). The EPA then translated the tissue-based toxicity value for each species in the toxicity data set to a water column-based toxicity value by dividing the species' tissue-based toxicity value by its assigned BAF.

The EPA ranked the translated water column-based toxicity values by sensitivity and calculated the water column criterion element per the Aquatic Life Guidelines calculation method to arrive at a final water column value of 2.1 ng/L (see Table 1 to proposed 40 CFR 131.XX(b)). No exclusions or adjustments to this criterion element were needed to account for bioaccumulation differences because in this case both mercury toxicity and bioaccumulation in aquatic species were directly incorporated into the water column criterion element derivation. The EPA is proposing to express the water column criterion element as total mercury in whole water (not dissolved or filtered) – i.e., including methylmercury and inorganic mercury measured from an unfiltered water sample. The EPA chose this unit rather than dissolved mercury for the following reasons. First, the water column data used to derive the BAFs were from unfiltered water samples. Second, NPDES regulations (40 CFR 122.45(c)) require that permit effluent limits be expressed as total recoverable metal (with limited exceptions), so most point source discharge monitoring data for mercury (in Idaho and elsewhere) is from unfiltered samples. Third, because the primary route of mercury toxicity is through dietary exposure, particulate mercury may contribute to toxicity (in contrast to some other metals for which the primary route of toxicity is absorption from water, and for which measurements of the dissolved fraction may therefore be more appropriate).

[31] For invertebrates, the EPA assigned the crayfish BAF to the other invertebrates in the data set (daphnid, mayfly, and clam). For amphibians, the EPA assigned the wood frog BAF.

For most of the paired aquatic organism tissue and water samples that were available for the calculation of Idaho BAFs, the unfiltered water samples were collected during the July to October period. In Idaho flowing waters, discharge rates and turbidity tend to be highest in the spring due to snowmelt, whereas they tend to be lower during the July to October time period (i.e., under baseflow conditions). In an analysis of time series data from several Idaho rivers, the EPA found that there are higher total mercury concentrations during high flow periods (see Technical Support Document section 3.1.2 for more details[32]). The EPA calculated BAFs using unfiltered water samples collected primarily during baseflow conditions, and then used those BAFs to calculate the water column criterion element. Therefore, water samples collected during baseflow conditions would be most representative of the data used to derive this criterion element.

5. Frequency and Duration of Water Column and Fish Tissue Criterion Elements

The EPA also determined appropriate frequencies and durations for the tissue and water column criterion elements. For the tissue criterion elements, because fish tissue mercury concentrations change slowly (e.g., changing on the order of 2-3% per year), fish tissue collected from a site can be assumed to integrate and represent the mercury bioaccumulation dynamics at that site over several years. Therefore, the EPA is proposing an "instantaneous measurement" duration for the fish tissue criterion elements (Table 1 to proposed 40 CFR 131.XX(b)) because fish tissue measurements already reflect longer-term bioaccumulation dynamics. For similar reasons and considering that fish tissue mercury concentrations are relatively slow to respond to a decrease in mercury inputs, the EPA is proposing a frequency of "not to exceed" for the fish tissue criterion elements (Table 1 to proposed 40 CFR 131.XX(b)).

For the water column criterion element, the EPA considered observed durations of mercury methylation processes affecting trophic transfer and of mercury bioaccumulation and

[32] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.

elimination processes in aquatic organisms and, consistent with the duration components of other bioaccumulative contaminants,[33,34] set the duration at 30 days (Table 1 to proposed 40 CFR 131.XX(b)). For the frequency aspect, the EPA considered the number of times mercury concentrations in water could exceed the criterion over time without negatively affecting the aquatic community and determined that a once-in-three years exceedance frequency is appropriate (Table 1 to proposed 40 CFR 131.XX(b)), based on the ability of an aquatic ecosystem to recover from stress caused by a toxic pollutant such as mercury.[35,36]

6. Structure of Criterion

The EPA requests comment on two alternatives for the relationship of the fish tissue and water column elements. The first alternative, preferred by the EPA, is for the fish tissue criterion elements to supersede the water column criterion element in a hierarchical structure (Table 1 to proposed 40 CFR 131.XX(b)). Because the tissue criterion elements were estimated directly from toxicity studies, whereas the water column criterion element required the use of BAFs to translate those tissue values, the water column element is a step removed from the toxicity values. These translations introduced some uncertainty into the water column values since species-specific BAFs from Idaho were not available for every species. In other words, the EPA has greater confidence in the tissue criterion elements, and therefore greater confidence in implementation decisions made using these criterion elements. If the EPA were to finalize this

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[33] USEPA. 2021. *2021 Revision to Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016.* EPA 822-R-21-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf*.

[34] USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic Acid (PFOA)*. EPA-842-D-22-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfoa-report-2022.pdf* ; USEPA. 2022. *Draft Aquatic Life Ambient Water Quality Criteria for Perfluorooctane Sulfonate (PFOS)*. EPA-842-D-22-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2022-04/pfos-report-2022.pdf*.

[35] USEPA. 1985. *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses.* U.S. Environmental Protection Agency, Office of Research and Development, Duluth, MN, Narragansett, RI, Corvallis, OR. PB85-227049. *https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf.*

[36] USEPA. 2023. *Proceedings from the EPA Frequency and Duration Experts Workshop September 11–12, 2019*. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2023-02/proceedings-frequency-duration-workshop.pdf*.

hierarchical structure, a water body would be attaining its aquatic life designated use if a tissue criterion element was met, even if its water column criterion element was exceeded.

The second alternative is for the fish tissue and water column criterion elements to be independently applicable. Because major sources of mercury to aquatic systems in Idaho are legacy mining contamination and atmospheric deposition, water column measurements of mercury from a waterbody are expected to be relatively stable over time. In contrast, pollutants with new and increasing direct sources tend to have more variable measurements over time, depending on the anthropogenic source of the pollutant. This expected relative stability of water column concentrations over time suggests that, while the EPA has relatively greater confidence in the fish tissue elements, as noted above, it would also be reasonable to conclude that a water body that is not meeting the water column element may be worthy of further evaluation, even if the fish tissue elements are being met. If the EPA were to finalize an independently applicable criterion structure, a water body would not be attaining its aquatic life designated use if either a tissue criterion element or the water column criterion element was exceeded. The EPA requests comment on the most appropriate relationship (hierarchical or independently applicable) of the fish tissue and water column elements.

Within the fish tissue elements, the EPA is proposing that sample data from TL4 fish supersede sample data from TL3 or TL2 fish. Where possible, TL4 fish should be sampled to determine whether a fish tissue criterion element is met, because these data provide a direct assessment of whether highly bioaccumulative species in the water body are experiencing tissue mercury levels associated with adverse effects. This direct assessment is more certain than an assessment based on an estimated TL4 fish tissue concentration generated by applying the appropriate BTAF to TL3 or TL2 fish tissue sample data, so if tissue sample data from fish at multiple trophic levels are available, the TL4 fish sample data would supersede.

The EPA requests comment on two alternatives for the relationship between TL3 fish sample data and TL2 fish sample data. The first alternative, preferred by the EPA, is for sample

data from TL3 fish to supersede sample data from TL2 fish (with both still being superseded by sample data from TL4 fish), for two reasons. First, the trophic ecology of TL4 fish is closer to that of TL3 fish than TL2 fish. Second, more data were available to establish the relationship between TL3 and TL4 fish than between TL2 and TL4 fish.[37] The second alternative is for sample data from TL3 fish and sample data from TL2 fish to be independently applicable (with both still being superseded by sample data from TL4 fish). A rationale for this structure would be that TL3 and TL2 sample data are equally uncertain, relative to TL4 sample data, because BTAFs must be applied to both. The EPA requests comment on the most appropriate relationship (hierarchical or independently applicable) of the TL3 fish sample data and TL2 fish sample data.

In addition to the criterion structure alternatives described above, the EPA invites public comment on all aspects of the process used to derive the proposed mercury criterion, including but not limited to the compilation of toxicity and bioaccumulation data, the derivation of the proposed tissue criterion element magnitudes and the water column criterion element magnitude from these data, the derivation and proposed application of the BTAFs, and the proposed frequency and duration of the criterion elements.

C. Implementation

The EPA understands that states have certain flexibility with how they implement WQS. The EPA is recommending possible approaches below to facilitate consistent implementation of the mercury aquatic life criterion resulting from this proposed rulemaking for the state's consideration and for public comment. The EPA recommends that Idaho develop implementation guidance, potentially building on its existing implementation guidance for the methylmercury fish tissue human health criterion,[38] adding information to clarify how implementation should proceed given the presence of a water column element and fish tissue elements as presented in

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[37] USEPA. 2023. Technical Support Document: Aquatic Life Water Quality Criterion for Mercury in Idaho. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/wqs-tech/mercury-criterion-protect-aquatic-life-idaho*.

[38] Idaho Department of Environmental Quality. 2005. *Implementation Guidance for the Idaho Mercury Water Quality Criteria*. Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4836*.

this proposed mercury aquatic life criterion.

1. Identification of Impaired Waters and TMDL Development

Section 303(d) of the CWA and the EPA's supporting regulations in 40 CFR 130.7 require states to develop biennial lists of waters impaired (i.e., not meeting one or more applicable water quality standards) or threatened by a pollutant and needing a TMDL (i.e., the Section 303(d) list). States are required to establish a prioritized schedule for waters on the lists and develop TMDLs for the identified waters based on the severity of the pollution and the sensitivity of their uses, among other factors (40 CFR 130.7(b)(4)). A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards, and an allocation of that load among the various point and/or nonpoint sources of the pollutant.

The state is required to assemble and evaluate all existing and readily available water-quality related data and information when determining which waterbodies belong on the CWA section 303(d) list (40 CFR 130.7(b)(5)). If multiple types of data and information are collected at a site, they must be assembled and evaluated consistent with the final structure of the mercury criterion. If the final criterion has a hierarchical structure as proposed, the fish tissue criterion elements would supersede the water column criterion element. If only water column data are available, assessment decisions can be made by comparing those data to the water column criterion element. If the final criterion does not have a hierarchical structure, each element would be its own criterion, and the waterbody would be listed if any criterion is exceeded. The water column criterion element proposed here would apply unless site-specific water column criterion elements were adopted by Idaho and approved by the EPA pursuant to CWA section 303(c) and the EPA's implementing regulation. Regardless of the structure of the fish tissue vs. water column elements (hierarchical or independent criteria), the trophic level hierarchy applies within the fish tissue criterion element. As noted above (section IV.B.6. in this preamble), the EPA is proposing that data from TL4 fish would supersede data from TL3 or TL2 fish, and data from

TL3 fish would supersede data from TL2 fish.

Idaho has flexibility to determine how to evaluate individual and composite samples for fish tissue. Tissue data provide instantaneous point measurements that reflect integrative accumulation of mercury over time and space in fish at a given site. The proposed mercury criterion provides Idaho with flexibility in how the state can interpret a discrete fish tissue sample to represent a given species' population at a site. Generally, fish tissue samples collected to calculate average tissue concentrations (often in composites) for a species at a site are collected during one sampling event, or over a short interval due to logistical constraints and the cost for obtaining samples. Consistent with the EPA's[39] and Idaho's[40] current recommendations for implementation of selenium fish tissue criterion elements, a central tendency of fish tissue data may be calculated, or a composite of fish tissue samples may be analyzed, within a fish species but should not be calculated or analyzed across species to determine whether a fish tissue element of this proposed mercury criterion is met. The EPA recommends that the state clearly describe its decision-making process in its assessment methodology.

Although the frequency component is expressed as "The average tissue concentration must not be exceeded," not meeting a fish tissue criterion element does not mean that fish populations cannot recover. As such, if Idaho determines that a fish tissue criterion element is not met and identifies the water as impaired on their CWA section 303(d) list, Idaho may determine in the future that the criterion is met based on readily available data and information and remove the waterbody-pollutant combination from the list. The EPA recommends that Idaho include in their assessment methodology a discussion of how the fish tissue criterion elements will be implemented, including information on how the criterion will be determined to be met after an exceedance of the fish tissue criterion elements.

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[39] USEPA. 2021. *Frequently Asked Questions: Implementing EPA's 2016 Selenium Criterion in Clean Water Act Sections 303(d) and 305(b) Assessment, Listing, and Total Maximum Daily Load Programs: Draft*. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2021-10/selenium-faq-cwa305-draft-2021.pdf*.

[40] Idaho Department of Environmental Quality. 2022. *Implementation Guidance for the Idaho Selenium Criteria for Aquatic Life*. Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/16846*.

2. NPDES Permitting

Under the CWA, WQS are used to derive Water Quality-Based Effluent Limits (WQBELs) in NPDES permits for point source discharges, thereby limiting the concentrations or levels of pollutants that may be discharged into a waterbody to attain and maintain its designated uses. The EPA is proposing a water column criterion element, which can be used for NPDES permitting as well as other aspects of implementation. To account for the 30-day duration of the proposed water column criterion element, adjustments can be made to WQBEL calculation methods that assume a 4-day averaging period[41] as the EPA described in its Notice of Availability for the 1999 ambient water quality criteria for ammonia,[42] which also included a 30-day duration. However, this water column criterion element would not prevent Idaho from using the fish tissue criterion elements for monitoring and regulating pollutant discharges at the state's discretion.

Determination of critical low flows and mixing zones for any criterion that results from this proposed rulemaking should proceed in the same manner as for other aquatic life criteria for toxic pollutants in Idaho, with appropriate adjustments to account for the 30-day duration of the water column element.

V. Endangered Species Act

On May 7, 2014, the National Marine Fisheries Service (NMFS) finalized a Biological Opinion[43] which evaluated whether the EPA's 1996 approval of Idaho's mercury aquatic life criteria – along with EPA actions in Idaho related to several other pollutants – would jeopardize the continued existence of threatened and endangered species in Idaho for which NMFS is

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[41] USEPA. 1991. *Technical Support Document For Water Quality-based Toxics Control*. EPA/505/2-90-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www3.epa.gov/npdes/pubs/owm0264.pdf*.

[42] USEPA. 1999. *Water Quality Criteria; Notice of Availability; 1999 Update of Ambient Water Quality Criteria for Ammonia*. 64 FR 71974–71980 (December 22, 1999). U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.govinfo.gov/content/pkg/FR-1999-12-22/pdf/99-33152.pdf*.

[43] National Marine Fisheries Service (NMFS). 2014. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation: Idaho Water Quality Standards for Toxic Substances. Biological Opinion. NMFS Consultation Number: 2000-1484.

responsible. NMFS concluded that the EPA's approval of the chronic mercury criterion (0.012 µg/L) would jeopardize Snake River spring/summer Chinook salmon, Snake River fall Chinook salmon, Snake River sockeye salmon and Snake River Basin steelhead – as well as adversely modify designated critical habitat for rearing Snake River salmon and steelhead – due to potential bioaccumulation occurring from exposure to mercury in the diet. In contrast, NMFS concluded that exposure of listed salmon and steelhead to mercury at the acute criterion (2.1 µg/L) was unlikely to result in death or sub-lethal effects that would result in injury or reduced survival.

The NMFS biological opinion contained Reasonable and Prudent Alternatives (RPAs) for the chronic criterion that would avoid the likelihood of jeopardy to the species. The RPAs directed the EPA to promulgate a new chronic mercury criterion that would be protective of aquatic life in Idaho, unless the EPA was able to approve such a criterion promulgated by the state. NMFS also specified an RPA for interim protection until this criterion was effective, stating that "until a new chronic criterion is adopted EPA will use the 2001 EPA/2005 Idaho human health fish tissue criterion of 0.3 mg/kg wet weight for WQBELs and reasonable potential to exceed criterion calculations using the current methodology for developing WQBELs to protect human health." The biological opinion also stated that "implementation of the Idaho methylmercury criterion shall be guided by EPA's methylmercury water quality criteria implementation guidance[44] or IDEQ's methylmercury water quality criteria implementation guidance,[45]" and that "for water bodies for which appropriate fish tissue data are not available, if the geometric mean of measured concentrations of total mercury in water is less than 2 ng/L, then the water body will be presumed to meet the fish tissue criterion of 0.3 mg/kg wet weight. If the water column concentration is greater than 2 ng/L, fish tissue data shall be collected." In the

[44] USEPA. 2010. *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion*. EPA 823-R-10-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/sites/default/files/2019-02/documents/guidance-implement-methylmercury-2001.pdf*.
[45] Idaho Department of Environmental Quality. 2005. *Implementation Guidance for the Idaho Mercury Water Quality Criteria*. Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4836*.

biological opinion, NMFS also opined that one significant digit was the appropriate level of precision for the total mercury water column value included in their RPA in light of the limitations of the data set from which it had been derived. The U.S. Fish and Wildlife Service reached the same conclusion for bull trout and Kootenai River white sturgeon and their associated critical habitats in its 2015 Biological Opinion evaluating the EPA's 1996 approval of Idaho's mercury aquatic life criteria and included the same RPAs for mercury.

The EPA's proposed chronic mercury criterion is consistent with the Services' RPAs, with the proposed muscle tissue criterion element being more stringent than the human health criterion (0.225 vs. 0.3 mg/kg[46] wet weight) and the proposed water column element being comparable to the RPA water column value (both 2 ng/L using one significant digit). The EPA will continue to work closely with the Services to ensure that the mercury criterion that the EPA ultimately finalizes is protective of federally listed species in Idaho.

VI. Applicability of EPA-Promulgated Water Quality Standards When Final

Under the CWA, Congress gave states primary responsibility for developing and adopting WQS for their waters (CWA section 303(a) through (c)). Although the EPA is proposing a mercury criterion for the protection of aquatic life in Idaho, Idaho continues to have the option to adopt and submit to the EPA mercury criteria for the state's waters consistent with CWA section 303(c) and the EPA's implementing regulation at 40 CFR part 131. The EPA encourages Idaho to consider adoption of mercury criteria protective of aquatic life uses. Consistent with CWA section 303(c)(4) and the Stipulated Order on Remedy, if Idaho adopts and submits mercury criteria for the protection of aquatic life, and the EPA approves such criteria before finalizing this proposed rulemaking, the EPA will not proceed with the promulgation for those waters for which the EPA approves Idaho's criteria. Under those

[46] Idaho's framework for implementing their mercury human health criterion in their TMDL and NPDES programs uses a mercury tissue concentration of 0.24 mg/kg, which represents a 20 percent margin of safety below the 0.3 mg/kg; Idaho Department of Environmental Quality. 2005. *Implementation Guidance for the Idaho Mercury Water Quality Criteria*. Boise, ID. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4836*.

circumstances, Federal promulgation would no longer be necessary to meet the requirements of the Act.

If the EPA finalizes this proposed rulemaking and Idaho subsequently adopts and submits mercury criteria for the protection of aquatic life in Idaho, the EPA would review Idaho's criteria to determine whether the criteria meet the requirements of section 303(c) of the CWA and the EPA's implementing regulation at 40 CFR part 131 and if so, the EPA would approve such criteria. If the EPA's federally promulgated criterion is more stringent than the EPA-approved state's criteria, the EPA's federally promulgated criterion would remain the applicable WQS for purposes of the CWA until the Agency withdraws that federally promulgated standard. The EPA would expeditiously undertake such a rulemaking to withdraw the Federal criterion if and when Idaho adopts and the EPA approves corresponding criteria. After the EPA's withdrawal of the federally promulgated criterion, the state's EPA-approved criteria would become the applicable criteria for CWA purposes. If the EPA-approved state's criteria are as stringent or more stringent than the federally promulgated criterion, then the state's criteria would become the CWA applicable WQS upon the EPA's approval of such criteria (40 CFR 131.21(c)).

VII. Implementation and Alternative Regulatory Approaches

The Federal WQS regulation at 40 CFR part 131 provides several approaches that Idaho may utilize, at its discretion, when implementing or deciding how to implement the final aquatic life criterion resulting from this proposed rulemaking. Among other things, the EPA's WQS regulation: (1) allows states and authorized Tribes to authorize the use of compliance schedules in NPDES permits to meet water quality-based effluent limits (WQBELs) derived from the applicable WQS (40 CFR 131.15); (2) specifies the requirements for adopting criteria to protect designated uses, including criteria modified to reflect site-specific conditions (40 CFR 131.11); (3) authorizes and provides a regulatory framework for states and authorized Tribes to adopt WQS variances where it is not feasible to attain the applicable designated use and criterion for a period of time (40 CFR 131.14); and (4) specifies how states and authorized Tribes adopt, revise,

or remove designated uses (40 CFR 131.10). Each of these approaches is discussed in more detail in the next sections.

A. NPDES Permit Compliance Schedules

The EPA's NPDES regulations at 40 CFR 122.47 address how a permitting authority can use compliance schedules in a permit if a discharger needs additional time to undertake actions like facility upgrades or operation changes that will lead to compliance with a WQBEL based on an applicable WQS that was issued or revised after July 1, 1977. *See In The Matter of Star-Kist Caribe,* 3 E.A.D. 172, 175, 177 (1990). 40 CFR 122.47 allows a permitting authority to include a compliance schedule in an NPDES permit, when appropriate, and the schedule must require compliance with the final WQBEL as soon as possible. Schedules longer than 1 year must include interim requirements and dates for their achievement. The EPA's Office of Wastewater Management 2007 Memorandum, *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits,*[47] provides additional information about implementing 40 CFR 122.47 compliance schedule requirements. The EPA's WQS program regulation at 40 CFR 131.15 requires that a state that intends to allow the use of NPDES permit compliance schedules adopt specific provisions authorizing their use and obtain EPA approval under CWA section 303(c) to ensure that a decision to allow permit compliance schedules is transparent and allows for public input.[48] Consistent with 40 CFR 131.15, Idaho has an EPA-approved WQS for compliance schedules. This WQS allows IDEQ to include compliance schedules in NPDES permits to meet WQBELs that are established to ensure that the discharge does not cause or contribute to an exceedance of the final Federal mercury criterion. In Idaho, compliance schedules can only be included in permits for new WQBELs that are more stringent than the WQBEL in a facility's previous NPDES permit.

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[47] USEPA. 2007. *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits*. Memo from James A. Hanlon, Director, Office of Wastewater Management to Alexis Strauss, Director, Water Division, EPA Region 9. 10 May 2007. *https://www3.epa.gov/npdes/pubs/memo_complianceschedules_may07.pdf*.
[48] 80 FR 51022, August 21, 2015.

B. Site-Specific Criteria

The regulation at 40 CFR 131.11 specifies requirements for modifying water quality criteria to reflect site-specific conditions. In the context of this rulemaking, a site-specific criterion (SSC) is an alternative value to the Federal mercury criterion that would be applied on an area-wide or water body-specific basis that meets the regulatory standard of protecting the designated uses, being based on sound science, and ensuring the protection and maintenance of downstream WQS. A SSC may be more or less stringent than the otherwise applicable Federal criterion. A SSC may be called for when further scientific data and analyses indicate that a different mercury concentration (e.g., a different fish tissue element) may be needed to protect the aquatic life designated uses in a particular water body or portion of a water body. A SSC may also be called for when the relationship between fish tissue and water column mercury concentrations at a site differs significantly from the relationship between fish tissue and water column mercury concentrations in the Idaho-specific dataset that the EPA used to derive the statewide water column criterion element.

C. WQS Variances

Idaho could adopt and submit WQS variances for the EPA's approval, consistent with 40 CFR 131.14, to aid in implementation of this federally promulgated criterion. The Federal regulation at 40 CFR 131.3(o) defines a WQS variance as a time-limited designated use and criterion, for a specific pollutant or water quality parameter, that reflects the highest attainable condition (HAC) during the term of the WQS variance. A WQS variance may be appropriate if attaining the use and criterion would not be feasible during a given time period because of one of the seven factors specified in 40 CFR 131.14(b)(2)(i)(A) but may be attainable in the future. These factors include where complying with NPDES permit limits more stringent than technology-based effluent limits would result in substantial and widespread economic and social impact. When adopting a WQS variance, states and authorized Tribes specify the interim

requirements by identifying a quantifiable expression that reflects the HAC during the term of the WQS variance, establishing the term of the WQS variance, and justifying the term by describing the pollutant control activities expected to occur over the specified term of the WQS variance. WQS variances provide a legal avenue by which NPDES permit limits can be written to comply with the WQS variance rather than the underlying WQS for the term of the WQS variance. WQS variances adopted in accordance with 40 CFR 131.14 (including a public hearing consistent with 40 CFR 25.5) provide a flexible but defined pathway for states and authorized Tribes to issue NPDES permits with limits that are based on the HAC during the term of the WQS variance, thus allowing dischargers to make incremental water quality improvements. If dischargers are still unable to meet the WQBELs derived from the applicable designated use and criterion once a WQS variance term ends, the regulation allows the state to adopt a subsequent WQS variance if it is adopted consistent with 40 CFR 131.14.

D. Designated Uses

The EPA's proposed mercury criterion, once finalized, would apply to Idaho waters where the protection of aquatic life is a designated use. The Federal regulation at 40 CFR 131.10 provides requirements for adopting, revising, and removing designated uses related to aquatic life and recreation when attaining the use is not feasible based on one of the six factors specified in the regulation. If Idaho removes the aquatic life designated use from any of the waters to which the EPA is proposing to apply this mercury criterion (i.e., from any water designated for an aquatic life use at the time this criterion is finalized), the state must adopt the highest attainable aquatic life use[49] and criteria, including a mercury criterion, to protect the newly designated highest attainable use consistent with 40 CFR 131.11 for those waters. It is possible

[49] If a state or authorized Tribe adopts a new or revised WQS based on a required use attainability analysis, then it must also adopt the highest attainable use (40 CFR 131.10(g)). Highest attainable use is the modified aquatic life, wildlife, or recreation use that is both closest to the uses specified in section 101(a)(2) of the Act and attainable, based on the evaluation of the factor(s) in 40 CFR 131.10(g) that preclude(s) attainment of the use and any other information or analyses that were used to evaluate attainability. There is no required highest attainable use where the state demonstrates the relevant use specified in section 101(a)(2) of the Act and sub-categories of such a use are not attainable (see 40 CFR 131.3(m)).

that criteria other than the federally promulgated criteria would protect the highest attainable use. If the EPA were to find Idaho's designated use revision to be consistent with CWA section 303(c) and the implementing regulation at 40 CFR part 131, the Agency would approve the revised WQS. The mercury criterion proposed here, once finalized, would not apply to those waters to which the aquatic life use no longer applies upon the EPA's approval.

VIII. Economic Analysis

The complete economic analysis for this proposed rulemaking is documented in "*Economic Analysis for Proposed Mercury Criterion to Protect Aquatic Life in Idaho*," which can be found in the docket for this rulemaking. For the economic analysis, the EPA assumed the baseline to be full implementation of Idaho's existing water quality criteria (i.e., "baseline criteria"), and then estimated the incremental impacts for compliance with the mercury criterion in this proposed rulemaking. Specifically, the EPA assumed full implementation of Idaho's existing 2.1 µg/L acute (1-hour) and 0.012 µg/L chronic (4-day) aquatic life water column total mercury criteria and Idaho's existing 0.3 mg/kg human health fish tissue methylmercury criterion. To estimate the incremental impacts of compliance, the EPA focused its economic analysis on two types of costs. First, the EPA estimated the potential cost impacts to current holders of NPDES permits. Second, the EPA estimated costs the state of Idaho may bear to develop Total Maximum Daily Loads (TMDLs) for waters newly identified as impaired under CWA section 303(d) using the proposed criterion.

Costs might also arise to sectors with operations that include nonpoint sources of mercury through implementation of TMDLs or through other voluntary, incentivized, or state-imposed controls. However, these costs were not included in this economic analysis for several reasons. First, the CWA, and therefore this proposed rulemaking, does not regulate nonpoint sources. The EPA recognizes that controls for nonpoint sources may be part of implementing future TMDLs, but those decisions would be at the state's discretion. Furthermore, to reasonably estimate those

decisions, the EPA would need to have today the detailed water quality data that Idaho would have in hand in the future when they reach those decision points. Second, nonpoint sources are intermittent, variable, and occur under hydrologic or climatic conditions associated with precipitation events. As such, any estimate of these costs would be associated with significant uncertainty.

The EPA seeks public comment on all aspects of the economic analysis including, but not limited to, its assumptions relating to the baseline, affected entities, implementation, and compliance costs.

A. Identifying Affected Entities

The proposed criterion would serve as a basis for development of new or revised NPDES permit conditions for point source dischargers. The EPA cannot be certain of whether a particular discharger would change their operations if this proposed criterion were finalized and the discharger were found to have reasonable potential to cause or contribute to an exceedance of the criterion. Moreover, the EPA cannot anticipate how Idaho would implement the criterion. Idaho is authorized to administer the NPDES program and retains discretion in implementing WQS. Despite this discretion, if Idaho determines that a permit is necessary, such permit would need to comply with the EPA's regulations at 40 CFR 122.44(d)(1)(i). Still, to best inform the public of the potential impacts of this proposed rulemaking, the EPA made some assumptions to evaluate the potential costs associated with state implementation of the EPA's proposed criterion.

Any NPDES permitted facility discharging mercury could potentially incur incremental compliance costs. The EPA identified 146 facilities in Idaho with effective or administratively continued individual permits (for any discharge, not just permits with mercury limits). The types of affected facilities include sewage treatment facilities and industrial facilities discharging wastewater to surface waters. In its analysis of point sources, the EPA did not include facilities

on Tribal lands with permits issued by the EPA because the proposed rulemaking would not cover Tribal lands.

Of the 146 facilities with individual permits, 17 are stormwater discharges. The EPA excluded facilities with individual permits for stormwater discharges (e.g., large or medium municipal separate storm sewer systems) and facilities covered under general permits for stormwater discharges because of limited data for such facilities and permit requirements that typically focus on best management practices (BMPs). This left 129 point source facilities with individual permits. In addition, the EPA identified one facility covered under an NPDES general permit that could be affected by the proposed rulemaking based on the general permit requirements and available effluent data, bringing the total number of potentially affected facilities to 130. Of these, 38 are major dischargers and 92 are minor dischargers.

The EPA reviewed Discharge Monitoring Report (DMR) data for the 130 facilities to identify facilities with effluent limitations and/or monitoring requirements for mercury in their NPDES permits. The EPA's review of DMR data indicates that 31 facilities with individual permits (24 majors, 7 minors) have effluent limitations and/or monitoring requirements for mercury. Of these, 20 (18 majors, 2 minors) are publicly owned treatment works (POTWs) categorized under North American Industry Classification System (NAICS) Industry 221320 (Sewage Treatment Facilities) and 11 (6 majors, 5 minors) are facilities categorized under other NAICS Industries. The one facility covered under a non-stormwater general permit with mercury data reported on DMRs operates under an EPA-issued general permit for Groundwater Remediation Discharge Facilities in Idaho, which includes mercury limits applicable to the facility. Table 1 in this preamble summarizes the potentially affected facilities by type (major or minor) and category (NAICS Industry 221320 or other NAICS Industries). Table 1 in this preamble also shows the number of facilities for which DMRs indicate there are effluent limits and/or monitoring requirements for mercury, including the facility covered by a general permit for groundwater remediation discharges.

Table 1: Potentially affected facilities, with facilities having mercury effluent limitations and/or monitoring requirements for mercury shown in parentheses.

Category	Major Facilities	Minor Facilities
Sewage Treatment Facilities (NAICS Industry 221320)	30 (18)	74 (2)
Industrial (Other NAICS Industries)	8 (6)	18 (6)
Total	38 (24)	92 (8)

B. Method for Estimating Costs

The EPA grouped facilities with individual permits by major or minor status and further grouped major facilities in NAICS Industry 221320 by design flow range. The EPA identified the facilities in each grouping with effluent concentration data for mercury. The EPA reviewed data for these facilities reported on DMRs accessed through the EPA's Enforcement and Compliance History Online (ECHO) site and the facilities' NPDES permits and fact sheets. The EPA used this information to characterize baseline conditions; determine whether a discharge would cause, have the reasonable potential to cause, or contribute to an exceedance of baseline or proposed mercury criteria; and assess whether the discharge is likely to exceed water quality-based effluent limitations (WQBELs) derived from baseline and proposed mercury criteria. Based on this analysis, the EPA identified facilities that may need to implement additional actions to achieve compliance with the proposed mercury criterion.

The EPA assumed that dischargers would pursue the least cost means of compliance with WQBELs derived from the proposed mercury criterion. Only the costs of compliance actions above the level of controls needed to comply with baseline criteria are attributable to the proposed rulemaking. To determine these incremental compliance costs, the EPA considered potential one-time costs (e.g., costs for developing or revising a pollutant minimization program (PMP), or applying for a WQS variance) and annual costs (e.g., costs for implementing a new PMP or for additional treatment).

For purposes of the analysis, the EPA assumed that major facilities in NAICS Industry 221320 with no mercury data reported in DMRs for the past five years would still likely discharge quantifiable concentrations of mercury, though not at high enough concentrations for mercury to be a pollutant of concern under the baseline Idaho mercury criteria (i.e., the facilities currently have no mercury effluent limits or monitoring requirements). The EPA also assumed that mercury may become a pollutant of concern at these facilities under the proposed mercury criterion. Based on these assumptions, the EPA extrapolated estimated one-time and annual incremental compliance costs for major facilities in NAICS Industry 221320 for which effluent data for mercury are available to major facilities in NAICS Industry 221320 with no available effluent data for mercury. Specifically, the EPA extrapolated cost within each facility flow rate range grouping proportionally by number of facilities for one-time costs and annual costs that are not flow-dependent (e.g., if 25% of the facilities with mercury data would incur one-time costs that do not depend on effluent flow rate, then the EPA assumed that 25% of facilities not reporting mercury data would also incur such costs). For flow-dependent annual costs, the EPA extrapolated based on design flow rate.

The EPA did not extrapolate costs for minor facilities in NAICS Industry 221320 or for facilities categorized in other NAICS Industries (major and minor industrial facilities). The EPA assumed that minor POTWs (NAICS Industry 221320) are less likely than major POTWs to receive influent from industrial and commercial sources of mercury, which reduces the likelihood of mercury being a pollutant of concern for those facilities where it has not already been identified as such. The EPA also assumed that facilities in other NAICS Industries (industrial discharges) for which mercury is a potential pollutant of concern based on the proposed criterion typically would already have effluent limits or monitoring requirements based on Idaho's baseline mercury criteria.

The EPA also evaluated potential administrative costs to the state for developing additional TMDLs under CWA section 303(d) for waters that may be newly identified as

impaired as a result of the proposed mercury criterion, as well as potential costs for revising existing TMDLs. Idaho assesses water bodies by assessment units (AUs). AUs are subdivisions of water body units (WBIDs) which are subdivisions of 8-digit hydrologic unit codes (HUCs). Using available fish tissue and ambient water column monitoring data, the EPA compared mercury concentrations to baseline Idaho mercury criteria and the proposed mercury criterion, and identified AUs that may be incrementally impaired (i.e., impaired under the proposed criterion but not under the baseline criteria). For waters impaired under the baseline criteria, the EPA assumes that the state will develop TMDLs and implementation plans to bring all these waters into compliance with baseline criteria. Therefore, only incremental costs identified to comply with the proposed criterion above and beyond the baseline are attributable to this proposed rulemaking.

C. Results

Based on the results for the 32 major and minor facilities (31 with individual permits and 1 covered under a general permit) with available effluent monitoring data for mercury, and extrapolation within each design flow rate range to the 12 additional major NAICS Industry 221320 facilities without mercury data, the EPA estimated a range of total one-time and total annual costs as shown in Table 2 in this preamble.

Table 2: Estimated One-Time and Annual Costs to Point Sources (2022 Dollars)

Total Estimated One-Time Cost		**Total Estimated Annual Cost (capital costs annualized over 20 years at 2%)**	
Low	High	Low	High
$253,000	$1,220,000	$120,000	$16,800,000

The low end of the one-time cost range reflects an assumption that most facilities potentially impacted would be able to comply with revised effluent limitations or would revise an existing PMP to achieve compliance. The high end of the one-time cost range assumes that

facilities would revise or develop a new PMP and, in some cases, conduct the studies needed to apply for a WQS variance.

The low end of the annual cost range reflects an assumption that, for most facilities, one-time actions, if needed, would result in compliance with revised effluent limitations. The low end annual cost estimate includes the costs for a limited number of facilities to implement a new PMP and assumes that facilities implementing a revised PMP plan do not incur incremental annual costs. The high end of the annual cost range assumes that some facilities would incur the cost of implementing a new PMP plan and some facilities would incur capital and operation and maintenance costs associated with installing and operating new or additional treatment, in this case non-membrane filtration for mercury removal.

Based on available fish tissue data, the EPA identified four instances of lake or reservoir AUs and two instances of river or stream AUs that may be considered incrementally impaired under the proposed criterion. In addition, based on ambient water quality data for mercury, the EPA identified an additional 7 AUs that may be considered incrementally impaired under the proposed criterion. The EPA estimated a range for the total cost to develop TMDLs for the 13 AUs potentially placed on Idaho's CWA section 303(d) list for mercury as a result of the proposed criterion. These costs were based on single-cause single-waterbody TMDL development costs. Actual costs may be lower if the state develops multi-cause or multi-waterbody TMDLs. In addition, Idaho currently has one approved TMDL for mercury for ID17040213SK007L_0L: Salmon Falls Creek Reservoir. This TMDL may need to be revised based on the proposed criterion and any new information that has become available since the TMDL was approved. Based on administrative costs associated with TMDL development for the 13 AUs identified as incrementally impaired and for potential revision of 1 TMDL, the EPA estimated total costs associated with incremental impairments to be $586,000 to $629,000.

IX. Statutory and Executive Orders Reviews

A. *Executive Order 12866: Regulatory Planning and Review and Executive Order 14094: Modernizing Regulatory Review*

This action is not a significant regulatory action as defined in Executive Order 12866, as amended by Executive Order 14094, and was therefore not subject to a requirement for Executive Order 12866 review.

B. *Paperwork Reduction Act (PRA)*

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection requirements activities contained in the existing regulation and has assigned OMB control number 2040-0049. This action does not directly contain any information collection, reporting, or record-keeping requirements.

C. *Regulatory Flexibility Act (RFA)*

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities.

EPA-promulgated WQS are implemented through various water quality control programs, including the NPDES program, which limits discharges to navigable waters except in compliance with a NPDES permit. CWA section 301(b)(1)(C)[50] and the EPA's implementing regulation at 40 CFR 122.44(d)(1) provide that all NPDES permits shall include any limits on discharges that are necessary to meet applicable WQS. Thus, under the CWA, the EPA's promulgation of WQS establishes standards that the state implements through the NPDES permit process.

After the EPA promulgates a final mercury criterion, the state of Idaho must ensure that NPDES permits it issues include any limitations on discharges necessary to comply with the

[50] 301(b) Timetable for achievement of objectives. In order to carry out the objective of this chapter there shall be achieved—(1)(C): not later than July 1, 1977, any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations (under authority preserved by section 1370 of this title) or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to this chapter.

WQS established in the final rule. While Idaho's implementation of the rule may ultimately result in new or revised permit conditions for some dischargers, including small entities, the EPA's action, by itself, does not impose any of these requirements on small entities; that is, these requirements are not self-implementing.

D. *Unfunded Mandates Reform Act (UMRA)*

This action does not contain any unfunded mandates as described in UMRA, 2 U.S.C. 1531-1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local or Tribal governments or the private sector.

E. *Executive Order 13132 (Federalism)*

This action does not have federalism implications. The EPA believes, however, that this action may be of significant interest to state governments. Consistent with the EPA's policy to promote communications between the EPA and state and local governments, the EPA consulted with Idaho officials early in the process of developing this rulemaking to permit them to have meaningful and timely input into its development.

On several occasions starting on July 12, 2023, the EPA discussed the development of this rulemaking with the Idaho Department of Environmental Quality. Early in this process, the EPA clarified that if and when the state decides to revise its own mercury aquatic life criteria, the EPA would assist the state in its process. During these discussions, the EPA also explained: the scientific basis for the fish tissue and water column elements of the mercury criterion; the external peer review process and the comments the EPA received on the derivation of the criterion; the EPA's consideration of those comments and responses; the assumptions and data being used in the economic analysis associated with the rulemaking; and the overall timing of the Federal rulemaking effort. The EPA took these discussions with the state into account during the drafting of this proposed rulemaking.

F. *Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)*

This action does not have Tribal implications as specified in Executive Order 13175. This

rule does not impose substantial direct compliance costs on federally recognized Tribal governments, nor does it substantially affect the relationship between the Federal government and Tribes, or the distribution of power and responsibilities between the Federal government and Tribes. Thus, Executive Order 13175 does not apply to this action.

Consistent with the EPA Policy on Consultation and Coordination with Indian Tribes, the EPA consulted with Tribal officials during the development of this action. A *Summary of Consultation, Coordination and Outreach with Federally Recognized Tribes on the EPA's Proposed Federal Promulgation of a Mercury Criterion to Protect Aquatic Life in Idaho* is available in the docket.

G. *Executive Order 13045 (Protection of Children from Environmental Health and Safety Risks)*

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of "covered regulatory action" in section 2-202 of the Executive Order. Therefore, this action is not subject to Executive Order 13045 because it does not concern an environmental health risk or safety risk. Since this action does not concern human health, the EPA's Policy on Children's Health also does not apply.

H. *Executive Order 13211 (Actions that Significantly Affect Energy Supply, Distribution, or Use)*

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

I. *National Technology Transfer and Advancement Act of 1995*

This rulemaking does not involve technical standards.

J. *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All*

The EPA believes that the human health and environmental conditions that exist prior to

this action do not result in disproportionate and adverse effects on communities with environmental justice (EJ) concerns. In the EPA's *Economic Analysis for Proposed Mercury Criterion to Protect Aquatic Life in Idaho* (economic analysis), which can be found in the docket for this rulemaking, Exhibit 5-3 illustrates the geographic distribution of waters where available data indicate levels of mercury that exceed Idaho's existing mercury criteria. These waters are located throughout the state, and waters with the highest levels of exceedance are similarly found in multiple parts of the state. Given the widespread nature of these impaired waters across the entire state, it is unlikely that impaired waters are disproportionately located in proximity to communities with potential EJ concerns.

The EPA believes that this action is not likely to result in new disproportionate and adverse effects on communities with EJ concerns. The EPA's proposed criterion for mercury in Idaho applies to aquatic life uses and does not directly address human health impacts. However, this rulemaking, if finalized and implemented, would support the health and abundance of aquatic life in Idaho and would, therefore, not only benefit those aquatic species but also benefit human communities that rely on or use these ecosystems. Compared to higher-income populations, low-income populations tend to rely more on fishing as a food source,[51] and therefore, this rulemaking may especially benefit low-income communities.

To achieve the benefits associated with a final rule, the EPA recognizes that some facilities may need to add pollution control measures and incur additional compliance costs over time to meet any new permit conditions or limits resulting from the mercury criterion, once finalized. The EPA's economic analysis identified three wastewater treatment plants and one mine that may need to install additional treatment technologies (e.g., non-membrane filtration) if the criterion is finalized as proposed. For the wastewater treatment plants, the EPA analyzed the compliance costs that might be passed on to residential households alongside the socioeconomic

[51] Von Stackelberg, K., et al. (2017). Results of a national survey of high-frequency fish consumers in the United States. *Environmental Research* 158, 126–136. *https://bgc.seas.harvard.edu/assets/vonstackelberg2017.pdf*.

characteristics of those households.

For the West Boise Water Renewal Facility, the high end of the estimated annual cost range from the economic analysis is $6.7M. For the Nampa Wastewater Treatment Facility, the high end of the estimated annual cost range is $5.1M. For the City of Caldwell Wastewater Treatment Plant, the high end of the estimated annual cost range is $2.4M. Based on the estimated number of households served by each facility[52] and conservatively assuming that 100% of the additional treatment costs are borne by residential ratepayers, these costs would translate to monthly household sewer bill increases of approximately $7.93, $11.78, and $10.16 for households served by the West Boise, Nampa, and Caldwell facilities, respectively. These amounts would represent approximately a 20-30% increase relative to current sewer bills in these areas.[53] After this increase, household sewer bills would represent approximately 0.85%, 1.17%, and 1.05% of the median household income[54] in Boise, Nampa, and Caldwell, respectively.

Using EJScreen, the EPA performed a screening-level analysis of the socioeconomic characteristics of these communities, focusing on EJScreen's individual socioeconomic indicators.[55] To interpret EJScreen results, the EPA used an 80th percentile filter for each indicator,[56] using percentiles reflecting comparison to the Idaho population and to the entire U.S. population. The percentile indicates what percent of the comparison population (here, Idaho or entire U.S.) has an equal or more favorable value.

When comparing each of the three communities to the entire U.S. population, the EPA

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[52] The EPA estimated the number of households served by the West Boise Water Renewal Facility from the 2022 IPDES Permit Fact Sheet. The EPA estimated the number of households served by the Nampa Wastewater Treatment Facility and the City of Caldwell Wastewater Treatment Plant from 2018-2022 American Community Survey 5-year data, since the most recent Permit Fact Sheets for these facilities were from 2015 and their service areas could be approximated by U.S. Census Places (Nampa City and Caldwell City).

[53] *https://www.idahopress.com/news/local/boise-voters-overwhelmingly-pass-sewer-bond/article_a72230a4-6875-5708-a41b-c7a9fbce8e6e.html*; *https://www.cityofnampa.us/1397/2021-Rate-Increase#:~:text=Sewer%20Rate%20Increase%20Approved%20as%20Part%20of%20Bond%20Repayment%20Plan&text=Beginning%20October%201%2C%20the%20average,per%20month%20for%20residential%20customers*.

[54] 2018-2022 American Community Survey 5-year data. *https://www.census.gov/data/developers/data-sets/acs-5year.html*.

[55] People of color, low income, unemployment rate, limited English speaking households, less than high school education, under age 5, over age 64, and low life expectancy. See *EJScreen Technical Documentation for Version 2.2* for indicator definitions (*https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf*).

[56] *https://www.epa.gov/ejscreen/how-interpret-ejscreen-data*.

found limited indication of potential EJ concern that would warrant further analysis; only one indicator in one community just reached the 80th percentile threshold (the percentage of people under age 5 in Caldwell, ID was at the 80th percentile). At the same time, comparing each of the communities to the Idaho population highlighted some differences in their socioeconomic situations. While Boise did not exceed the 80th percentile (relative to the Idaho population) for any of the eight socioeconomic indicators, Nampa exceeded for two indicators (people of color and limited English speaking households) and Caldwell exceeded for three indicators (people of color, limited English speaking households, and less than high school education) and had another two indicators (under age 5 and unemployment rate) at the 77th percentile. Therefore, due to the potentially greater socioeconomic vulnerability as indicated by this screening-level analysis, these potential (albeit relatively modest) sewer rate increases may have disproportionate economic impacts in Caldwell relative to Boise, Nampa, and other Idaho communities.

However, actual impacts would depend on a number of factors, including how the state implements the criterion, how costs are financed, and how costs are distributed among ratepayers. States have wide latitude in how they implement criteria, including the authority to adopt variances for those facilities for which meeting WQS would cause substantial and widespread economic and social impact. Communities can apply for various grants to finance wastewater treatment upgrades or the state may share part of the cost burden. In addition, the Bipartisan Infrastructure Law included $50 billion in funding for infrastructure improvements to the Nation's wastewater and drinking water systems. Moreover, municipalities may implement customer assistance or progressive rate structures that reduce the cost burden on low income households.[57] Finally, the costs of wastewater treatment upgrades must be balanced against the potential benefits of having access to cleaner water. The EPA seeks comment on all potential EJ impacts of the rulemaking.

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[57] USEPA. 2023. *Clean Water Act Financial Capability Assessment Guidance*. 800b21001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. *https://www.epa.gov/system/files/documents/2023-01/cwa-financial-capability-assessment-guidance.pdf*.

In addition to Executive Order 12898, and in accordance with Title VI of the Civil Rights Act of 1964, each Federal agency shall ensure that all programs or activities receiving Federal financial assistance that affect human health or the environment do not directly, or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin. With that directive in mind, in August 2011 the Environmental Justice Interagency Working Group established a Title VI Committee to address the intersection of agencies' EJ efforts with their Title VI enforcement and compliance responsibilities. While the EPA only has an oversight role for CWA implementation, if Idaho receives Federal funds for CWA implementation, the state is legally prohibited from discriminating on the basis of race, color, or national origin under Title VI when engaging in CWA implementation activities. Additionally, and in compliance with Executive Order 12898, the EPA expects that Idaho will consider disproportionately high adverse human health and environmental effects on communities with EJ concerns when implementing this rulemaking under the CWA.

The information supporting this Executive Order review is contained in the EPA's *Economic Analysis for Proposed Mercury Criterion to Protect Aquatic Life in Idaho*.

List of Subjects in 40 CFR Part 131

Environmental protection, Indians-lands, Intergovernmental relations, Reporting and recordkeeping requirements, Water pollution control**.**

Michael S. Regan,

Administrator.

For the reasons set forth in the preamble, the EPA proposes to amend 40 CFR part 131 as follows:

PART 131—WATER QUALITY STANDARDS

1. The authority citation for part 131 continues to read as follows:

Authority: 33 U.S.C. 1251 *et seq.*

Subpart D—Federally Promulgated Water Quality Standards

2. Add §131.XX to read as follows:

§131.XX Mercury criterion to protect aquatic life in Idaho.

(a) *Scope*. This section promulgates an aquatic life criterion for mercury in Idaho.

(b) *Criterion for mercury in Idaho*. The applicable aquatic life criterion for mercury is shown in Table 1 to Paragraph (b).

Table 1 to Paragraph (b). Proposed Chronic Mercury Ambient Water Quality Criterion for the Protection of Aquatic Life in Idaho.

Media Type	Fish Muscle Tissue [1, 2, 3] Total Mercury (ng THg/g wet weight)	Fish Whole Body Tissue [1, 2] Total Mercury (ng THg/g wet weight)	Water Column [1,4] Total Mercury (ng/L) in whole water
Magnitude	225	162	2.1
Duration	Instantaneous measurement [5]		30 day average
Frequency	The average tissue concentration must not be exceeded		Not more than once in three years on average

[1] The proposed criterion elements are hierarchical, with both tissue elements superseding the water column element. The fish muscle tissue and fish whole body tissue criterion elements are independently applicable.

[2] Tissue sample measurements must be based on measurement(s) of the total mercury concentration (in a composited tissue sample from each fish species or a central tendency estimate of individual tissue samples from each fish species) collected from a given site or waterbody in a discrete sampling period. These criterion elements support Idaho's aquatic life uses. Only samples of adult life stage trophic level (TL) 4 fish can be directly compared to the muscle or whole-body criterion elements.

[3] If adult life stage TL2 or TL3 fish are sampled, a Bioaccumulation Trophic Adjustment Factor (BTAF) must be applied to the muscle concentrations of those fish. If whole-body tissue from TL2 or TL3 fish is sampled, the fish whole body – muscle conversion factor of 0.72 must be applied to generate a translated muscle value before a BTAF is applied to the sample concentration. A TL2 sampled fish concentration must be multiplied by the TL2 BTAF of 5.6 and the resultant value compared to the muscle tissue criterion element. A TL3 sampled fish concentration must be multiplied by the TL3 BTAF of 3.5 and the resultant value compared to the muscle tissue criterion element. If multiple adults of different TLs are sampled, the TL4 fish result would supersede TL3 BTAF-applied or TL2 BTAF-applied value outcomes. If TL3 and TL2 fish are sampled, the TL3 BTAF-applied values supersede the TL2 BTAF-applied values.

[4] Water column values are based on total mercury in unfiltered or "whole water" samples. Total mercury includes all inorganic and organic species of mercury in the water column. Water samples collected during baseflow conditions would be most representative of the data used to derive this criterion element. This criterion element supports Idaho's aquatic life uses.

[5] Fish tissue data provide integrative measurements that reflect accumulation of mercury over time and space in aquatic organisms from a given site or waterbody in a discrete sampling period.

(c) *Applicability*. (1) The criterion in paragraph (b) of this section applies to all of Idaho's aquatic life use designations and applies concurrently with other applicable water quality criteria.

(2) The criterion established in this section is subject to Idaho's general rules of

applicability in the same way and to the same extent as are other federally promulgated and state-adopted numeric criteria when applied to waters in Idaho designated to protect aquatic life uses.

(3) For all waters with mixing zone regulations or implementation procedures, the criterion applies at the appropriate locations within or at the boundary of the mixing zones and outside of the mixing zones; otherwise the criterion applies throughout the water body including at the end of any discharge pipe, conveyance or other discharge point within the water body.

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