Idaho Aquatic Life Criteria for Selenium – Supplemental Technical Justification

Docket 58-0102-1701

State of Idaho
Department of Environmental Quality
Water Quality Division
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1 Introduction

1.1 Requirements under the Clean Water Act and Federal Regulations

To reflect the latest science and bolster the protection of US waters in Idaho, Idaho has updated its aquatic life criteria for selenium (Se) based on EPA's 2016 recommendation (EPA, 2016). Idaho DEQ developed the aquatic life criteria for Se in accordance with Section 303(c) of the Clean Water Act (CWA) and the federal regulations implementing the CWA, 40 CFR Part 131. States must develop criteria that protect designated beneficial uses and are based on sound science (CWA Section 303(c)(2)(A), 40 CFR 131.11(a)). Additionally, States are required to adopt criteria for which EPA has published recommended criteria under section 304(a) (CWA Section 303(c) (2)(B)). States have the discretion to adopt the EPA's criteria recommendations, the EPA's recommendations modified to reflect site-specific conditions, or criteria based on other scientifically defensible methods.

EPA recommendations under Clean Water Act section 304(a) provides an excellent opportunity for Idaho and its stakeholders to review existing water quality criteria and determine whether those existing criteria are still protective and based on sound scientific rationale. In 2014, EPA issued a letter (EPA 2014) to Idaho urging Idaho to consider their 304(a) recommendations and prioritize the updating of relevant Idaho WQS. The Se aquatic life criteria were prioritized due to EPA's letter. As required by 40 CFR 131.20(a) and due to this letter, we considered updating Idaho's water quality standards (WQS) for Se during Idaho's 2017 triennial review. Updating Idaho's WQS for Se was identified as a high priority due to the 304(a) recommendation and the two Biological Opinions (FWS 2015; NOAA NMFS 2014) that mandated updating the Se criteria by May of 2018.

1.2 Idaho's Aquatic Life Criteria Rulemaking for Selenium

Idaho DEQ's rulemaking for this toxic pollutant incorporated many opportunities for stakeholder input and public feedback for the need to adopt or modify the 304(a) recommendation for aquatic life criteria for Se (*www.deq.idaho.gov/58-0102-1701*). The final outcome was an updated statewide criterion and 5 site-specific criteria based on scientifically defensible rationale and the EPA 304(a) recommendation (EPA 2016a). These criteria were approved by DEQ Board in late 2017 and by the Idaho legislature in early 2018. The final rule was effective on March 28, 2018 and available in the Idaho Administrative Code on April 27, 2018. This Supplemental Technical Justification document will briefly provide a sound scientific basis for all criteria below and specifically focus on comments received during this public rulemaking process, however, detailed information for site-specific criteria are available in three separate justification documents (DEQ 2017; J.R. Simplot Company 2017; Nu-West Industries, Inc. 2017).

1.3 Aquatic Life Criteria for Selenium

Idaho's submitted aquatic life criteria for Se are based on 304(a) guidance and the most recent science available. All six of the new criteria are fundamentally a fish tissue criterion based on accumulative properties of Se.

This rule replaces the existing water column based criteria for Se with a four-element, 3 level hierarchy. The elements are, in hierarchical order, (1) a fish egg-ovary element, (2) a fish whole-body and/or muscle element, (3a) a water column element which includes one value for lentic (still water) and one value for lotic (running water) aquatic systems, or (3b) a water column intermittent element to account for potential chronic effects from short-term exposures (one value for lentic and one value for lotic aquatic systems).

This rule also includes the addition of Section 287, with five Site-Specific Aquatic Life Criteria for Se. Subsections 287.01 through 287.04 were negotiated in response to proposals for site-specific Se criteria submitted by Nu-West Industries, Inc., and J.R. Simplot Company. Subsections 287.01 and 287.02 set out site-specific Se criteria for Upper Blackfoot River and Georgetown Creek watersheds. Subsections 287.03 and 287.04 set out the site-specific Se criteria for Hoopes Spring, Sage Creek, and Crow Creek near the Smoky Canyon Mine. Subsection 287.05 sets out a site -specific Se criteria for portions of Idaho that applies to all waters of the state except the main stems of the Kootenai, Salmon, and Snake Rivers within the historic range of White Sturgeon, as well as subbasins flowing directly into the aforementioned rivers and those designated as critical salmonid habitat or Bull Trout habitat.

Information regarding the scientific basis of the site-specific Se criteria includes (1) Nu-West Industries' Proposal for Site-Specific Selenium Criteria: Upper Blackfoot River and Georgetown Creek Watersheds; (2) J.R. Simplot Company's Proposed Site-Specific Selenium Criterion for Hoopes Spring, Sage Creek, and Crow Creek near the Smoky Canyon Mine; and (3) DEQ's Justification for Site-Specific Selenium Criterion for Aquatic Life in Portions of Idaho. These documents are available at *www.deq.idaho.gov/58-0102-1701* and are cited in the references section of this document.

Beyond compliance with the Clean Water Act and federal regulations as well as public feedback and published Biological Opinions, further justification for adopting these aquatic life criteria for Se include the following:

- Hierarchy of Elements Within a Fish-tissue Based Criterion
- Derivations of Fish-tissue Elements for Site-Specific Criteria
- Adoption of EPA's Appendix K and Derivation of Water Column Elements
- Frequency of Exceedance
- Downstream Protection
- Monitoring Requirements
- Future Implementation Guidance

2 Hierarchy of Elements within a Fish Tissue Based Criterion

Out of all aquatic taxa, fishes have been shown to be most sensitive to elevated concentrations of Se. Aquatic organisms exposed to Se accumulate it primarily through their diets and not directly from the water. In fish, Se toxicity occurs primarily through transfer to the eggs, reducing reproductive success and survival. Water column criterion elements are derived from assessing the bioaccumulation responses in fish and other aquatic taxa given this updated understanding of Se bioaccumulation.

In order to apply the understanding of the bioaccumulative impacts of Se on aquatic life and to follow EPA's recommendation, Idaho's rule states that fish tissue elements supersede water column elements when measured (IDAPA 58.01.02.210.01, see footnotes 1 and 2 of the Se rule).

Since water column criterion elements are derived from fish tissue; it is expected and reasonable that if water column values are meeting criteria, then fish should be as well. The same is true when fish are meeting criteria, then water should be as well. But if there is discordance, the fish tissue criteria take precedence.

2.1 Aquatic Life Criteria Derived from Reproductive Endpoints for Resident Fish

These criteria are based on the premise that Se toxicity occurs primarily through transfer to the eggs, reducing reproductive success and survival. This is why egg-ovary concentrations supersede other fish tissue or water column concentrations when measured. This is also why it is important to determine resident fish populations for both the statewide and site-specific Se criteria (SSC).

The resident fishes found at each site were determined from empirical datasets, scientific literature (Sigler and Zaroban 2018.), biological opinions (FWS 2015, NOAA NMFS 2014), and Federal Register notices regarding critical habitat for threatened and endangered fish species in Idaho. The support for these determinations is clearly laid out in the site specific proposals (DEQ 2017; J.R. Simplot Company 2017; Nu-West Industries, Inc. 2017).

Additionally, it is crucial to understand management objectives for fish introduced outside of their historic range (e.g., White Sturgeon) as well as a site's capacity to provide habitat for successful reproduction. This impacts what species should be included in the derivation of a site-specific criterion (e.g., Portions of Idaho in Subsection 287.05). Please refer to the scientific justification for Portions of Idaho (DEQ 2017) and Response to Comment #3 and #4 for detailed information.

The cold water aquatic life designated use in Section 101.01.a of Idaho's regulations is broadly defined as "*water quality appropriate for the protection and maintenance of a viable aquatic life community for cold water species*". This protects a viable community, not individual species that are present but not viable, or introduced and undesirable. Rather, the phrase 'aquatic life community' relates to the entire aquatic community of a site. 'Viable' aquatic life communities are those that are functioning and intact and reproduction is required to be both a functioning and

intact aquatic community. Specific to Subsection 287.05, introduced White Sturgeon sportfish populations are managed within an adaptive framework and some of these populations are experimental (IDFG 2008). Due to this, we cannot predict the extent or duration of IDFG management objectives regarding this species when stocked outside of its historic range, and criteria protective of an introduced, non-viable population of White Sturgeon currently managed for sportfishing are not necessary to sufficiently protect the otherwise viable aquatic communities above Shoshone Falls. Please refer to the scientific justification for Portions of Idaho (DEQ 2017) and Response to Comment #5 in the Public Comment Summary for detailed information.

Further, all beneficial uses of waters within the Site described under Subsection 287.05 are protected by this SSC including salmonid spawning and cold water aquatic life, with no detrimental changes in biological communities of warm water or seasonal cold water since White Sturgeon is a phylogenetic outlier to all other fish species in Idaho and because of the geographical range of the Site. This complies with Idaho rules (IDAPA 58.01.02.275) and EPA guidelines (EPA 1985) for establishing site-specific criteria by not impairing designated or existing beneficial uses where aquatic communities do not vary substantially in sensitivity to pollutant within the specific geographical area described.

3 Derivations of Fish-tissue Elements for Site-Specific Criteria

3.1 Species Sensitivity Distribution using Genus Mean Chronic Values

The national toxicity dataset used to derive DEQ's proposed statewide Se criterion (and EPA's 2016 recommended Se criterion) consists of 15 genus mean chronic values (GMCVs). For fish-tissue criterion derivation for Subsection 287.05, we removed the Acipenser Genus Mean Chronic Value (GMCV) from the toxicity dataset and recalculated Se criterion elements based on the remaining resident species or species surrogates found in the national toxicity dataset. Using this approach, the egg-ovary criterion element of 19.0 milligrams per kilogram dry weight (mg/kg dw) is based on the four most sensitive species provided in Table 3 of the justification for Portions of Idaho SSC (DEQ 2017). Given that there are species-specific conversion factors (CF) for Se bioaccumulation in different tissue types (i.e., egg-ovary, whole-body, muscle), the hierarchy of the four most sensitive species changes depending on the tissue type being analyzed (EPA 2016a). Please see the detailed scientific justification (DEQ 2017) for specific information on the calculation and values as well as the rationale and list of species present (Appendix A in DEQ 2017) and rationale of species used in the derivation of fish tissue values.

3.2 Most Sensitive Species Approach

Fish-tissue elements in Subsections 287.01-287.04 were derived using the most sensitive species approach. Using the most sensitive species approach is consistent with EPA's 2016 National

Criterion on Se as well as recalculation procedure guidance (EPA 1985, 2013). This approach is scientifically defensible, protective of all resident fish, and consistent with options for SSC described in IDAPA 58.01.02.275 (i.e., see discussion in Section 4.1 of Nu-West Industries, Inc. 2017). Fish species diversity is rather limited in Idaho, and particularly so on the geographic scale of these four SSCs.

This limited fish diversity and knowledge of all the species occurring at the Site, provides the rationale for the most sensitive species approach. A description of these efforts is laid out in Section 2.1 of this document and fully detailed in the supporting scientific justification documents for these SSCs. Using this approach the SSC for tissue elements provides a similar or greater level of protection as criteria calculated from sensitivity distributions (i.e., the SSC protective of 100% vs 95% of genera using the 5th percentile of a genus sensitivity distribution).

The most-sensitive species' SMCV is proposed for the Upper Blackfoot River watershed (UBR) (Subsection 287.01) and Georgetown Creek (Subsection 287.02) watersheds because each Site supports a naturally-limited fish assemblage, as documented by extensive fish surveys. Consequently the sensitivity of all resident fish was documented to demonstrate the protectiveness of the proposed SSC to all resident species (Please see Response to Comment #25). Using this approach, Rainbow Trout was shown to be the most sensitive species for egg-ovary (24.5 mg/kg dw), whole body (12.5 mg/kg dw) and muscle (12.8 mg/kg dw) elements in the UBR (Subsection 287.01). In the Georgetown Creek watershed (Subsection 287.02), Brown Trout is the most sensitive species for the egg-ovary element (21.0 mg/kg dw) and Rainbow Trout is the most sensitive for the whole-body (12.5 mg/kg dw) and muscle (12.8 mg/kg dw) elements.

In regards to Subsections 287.03 and 287.04, to address EPA's comments, the derivation for fish-tissue concentrations for Crow Creek and Hoopes Spring/Sage Creek was changed from a species sensitivity distribution (SSD) approach using all species at the site to a most sensitive species approach (J.R. Simplot Company 2017, Response to Comment #18 and #20). Using the most sensitive species approach, Brown Trout was shown to be the most sensitive species for both the egg-ovary (20.5 mg/kg dw) and whole body (13.6 mg/kg dw) elements in Hoopes Spring/Sage Creek (Subsection 287.03). In Crow Creek (Subsection 287.04), Brown Trout is still the most sensitive species for the egg-ovary element while Rainbow Trout is the most sensitive for the whole-body element (12.5 mg/kg dw).

Simplot has been very involved in studies examining toxicity of Se on Yellowstone Cutthroat Trout and Brown Trout and has extensively monitored Se in fish, invertebrates, sediment, and water column within the Sites. These data on Brown and Cutthroat Trout have been reviewed considerably. To that point, the EPA calculated the national recommended criterion using Brown Trout data from Simplot's study, and although similar, the Brown Trout egg-ovary element for Subsections 287.03 and 287.04 is more conservative than the chronic effects value that EPA derived using data from the same study.

4 Adoption of EPA's Appendix K and Derivation of Water Column Elements

The methods used to derive the statewide water column criteria and for all SSCs water column criteria are based on Appendix K in EPA's Aquatic Life Ambient Water Quality Criterion for selenium - Freshwater 2016 (EPA 2016a). Referencing Appendix K in rule clarifies which bioaccumulation modeling approaches are permissible and refers to the specific approaches used in the 304(a) recommendation. This section provides justification for the water column element derivation for all SSCs and for using methods in Appendix K to assess compliance in fishless streams using fish tissue data from the nearest downstream fish-bearing water.

4.1 Water Column Element Derivation for Site-Specific Criteria

First, because the factors that determine Se bioaccumulation vary among aquatic systems, EPA advises that site-specific water column criterion element values may be necessary to ensure adequate protection of aquatic life (EPA 2016a). Due to this, Appendix K is incorporated into subsection 287 by reference and provides input parameters necessary for all methods it discusses. The water column element of the SSCs in subsection 287 are derived on a case-by-case basis and site specific information and data inform whether mechanistic or empirical BAF methods are appropriate. All SSCs have separate justifications that identify the approach used to derive the water column value and have been evaluated for consistency with Appendix K. Technical justifications for each SSC in Subsection 287 are cited within this document and available at *www.deq.idaho.gov/58-0102-1701*.

Many existing criteria are equation-based, for example EPA approved criteria for hardness dependent metals, and ammonia, and thus do not provided fixed criteria values for each waterbody. The performance-based approaches outlined in subsection 287 are only accepted for waters with an approved SSC and only apply to those waters. Water column criteria values that result from the equation-based criteria are not stated in rule, rather these values depend on in situ variables in a particular waterbody and are calculated as needed.

In the cases of 287.01 and 287.02, the rule provides example water column values based on known in situ variables in specific waterbodies within the sites. This is similar to the example values for hardness dependent metals criteria calculated at a hardness of 100 that appear in rule. Since it is not reasonable or feasible at this point to provide criteria values for all waters within the sites, the rule states the approved method to derive the values for the performance based criteria. Additional detail can be found in Response to Comment #14.

All water column criteria elements based on performance-based approaches are only accepted with an approved SSC in Subsection 287. Each SSC applies to a specific geographic location as defined within the SSC. If any element of the fish tissue based criteria are absent in a SSC, the respective statewide element applies.

For example, 'The Portions of Idaho SSC' in Subsection 287.05 consists of fish tissue criterion elements. This SSC does not include site-specific water column criterion elements because we do not have the necessary site-specific bioaccumulation information to calculate them using the empirical bioaccumulation factor (BAF) approach described in Appendix K of EPA's national

recommended Se criterion (EPA 2016a). Therefore, the water column criterion elements set out in the statewide rule (IDAPA 58.01.02.210.01) are also applicable to the water bodies identified in this SSC (Response to Comment #7, DEQ 2017). Similarly, in streams without sufficient data to calculate fish BAFs in the Sites of Subsection 287.01-287.02 (UBR and Georgetown watersheds) the water-column elements applicable statewide would be in effect. Please see Response to Comment #22.

EPA has requested that when new data are collected during compliance monitoring, any update to the water column criterion element for a stream within the geographic range of 287.01 and 287.02 should be submitted to the EPA for approval. In response, the intent of the language provided in Section 6.3 of Nu-West's proposal is to affirm the hierarchy of the Se criteria elements as they are implemented. EPA approval is not required for future water column values resulting from an EPA-approved performance-based approach within Idaho Water Quality Standards. This is consistent with other EPA-approved performance-based approaches used in Idaho Water Quality Standards (e.g., Hardness Dependent Metals, Ammonia). Please see Response to Comment #34.

For SSCs under Subsection 287.01 and 287.02, EPA has commented on calculating the water column element from averaged BAFs of multiple species and is specifically concerned that Brook Trout BAFs are higher than Rainbow Trout BAFs and the resulting water column element may not be protective of Brook Trout (Comment #29). However, it is incorrect to state that Brook Trout are more sensitive due to a higher BAF. The toxicity data presented in EPA (2016) show that brook trout are much less sensitive than rainbow trout, and EPA (2016) encourages targeting the most sensitive resident fish when developing site-specific water column elements. Although the average brook trout BAF is higher than the average rainbow trout BAF at a sampling location (e.g., BGTC-1) the difference is not statistically significant ($p > 0.05$) and juveniles of both species exhibit similar feeding ecologies (consuming primarily aquatic insects). Hence, tissue data for both species were combined to increase the sample size and power of a salmonid BAF in Georgetown Creek. Please see Response to Comment #29 for further details.

Combining BAFs of multiple species is also reasonable in regards to Angus and No Name Creek within the UBR watershed. First, as discussed in the proposal, juvenile salmonids are targeted for fish-tissue collection in accordance with the Interagency Fish Tissue Collection Protocol developed for Southeastern Idaho streams (DEQ 2016). Similar to sculpin species, juvenile trout feed primarily on invertebrates. Consequently, both species represent trophic level 3 consumers with similar feeding ecologies. Please see detailed rationale provided in Response to Comment #32.

For SSCs under Subsection 287.03 and 287.04, the water column criterion element is calculated using the BAF approach by dividing the fish tissue criterion element by the BAF. For the numerator of this equation, DEQ agrees with Simplot in deriving fish tissue criterion elements from data collected when Se concentrations in water appear stable (i.e., fall 2007). This ensures that the numerator of the water column element equation is derived from steady-state data. DEQ also agrees that it is valid for Simplot to use median BAF values from data collected 2006-2011 as the denominator of the equation to derive the water column element. The rationale is provided below.

Even though Se concentrations in water began to increase after 2008, whole-body fish tissue concentrations collected in Crow Creek were not significantly different among corresponding water concentrations of <2.9, 6.7, and 8.4 µg/L. This provides evidence that within this water column concentration range, fish tissue concentrations remain similar given increases in water column concentrations and subsequently derived BAFs can be used to represent the range of bioaccumulation rates that tested aquatic species exhibit without significantly impacting Se concentrations in fish tissue. DEQ supports Simplot's approach of using the median BAF of this data to derive the water column criterion element. Using the median BAF accurately estimates the central tendency for the relationship between fish tissue and water column concentrations that is less sensitive to potential bias from measurements of very high or very low concentrations. Using a median is also an approved summarizing technique used in EPA's 2016 Recommended Selenium Criterion.

Lastly, EPA used these data to derive a similar, yet less conservative, water column criterion element using the mechanistic modeling approach outlined in Appendix K (EPA 2016a). This approach yielded an average water column criterion element for Crow Creek of 4.4 µg/l, which is greater than Simplot's proposed criterion element of 4.2 µg/l. This gives further support that the approach and resulting water column criterion of 4.2 µg/l is protective of aquatic life in Crow Creek. For more detailed information, please see Response to Comment #48 and J.R. Simplot Company (2017).

4.2 Fishless Streams

Although this is a fish tissue criterion and fish have been shown to be the most sensitive taxa to Se, it is important to protect all aquatic assemblages in fishless streams in addition to protecting downstream waters. When fish tissue samples are not available, water column elements must be met in order to protect all aquatic assemblages in fishless streams. Data from downstream may help inform a listing decision, but readily available data from the stream segment in question must be the primary consideration for a listing decision.

Specifying a site-specific criterion for Se specifically for fishless streams is unnecessary. Fishless streams were included in EPA's recommended Se criterion (EPA 2016a). As stated in EPA recommendations and in the Idaho proposed rule, where fish tissue is unavailable, the water column value applies. Please see Response to Comment #11 for further information.

In regards to footnote 3 of the statewide rule, Appendix K may also be a tool used to assess compliance in fishless waters, for example, when there are inadequate data due to intermittent flow. We will be developing additional implementation guidance regarding the concept of 'nearest downstream waters' stated in rule.

A fishless water translator has been adopted in Subsections 287.01-287.02 which uses fish tissue from immediately downstream with water column concentrations in the fishless stream. We provide the following brief technical justification, however, please see Response to Comment #31 and the Nu-West Proposal (2017) for detailed rationale.

The fishless stream translator presented for No Name Creek was developed specifically to incorporate a fish threshold, because fish are the most sensitive taxa group (EPA 2016a). Fish tissue immediately downstream of the fishless No Name Creek could be evaluated to more

directly evaluate the protectiveness of the proposed element to downstream fish. However, based on stakeholder feedback during Idaho's negotiated rulemaking session, it was clear a numeric water column element was needed and, therefore, the fishless water translator was developed. In addition to downstream fish, this water column value must also be protective of the aquatic community in the fishless stream itself. This is addressed as follows.

Biological monitoring of No Name Creek was performed by Nu-West between 2013-2016. A detailed description of sampling methods and results is provided in Response to Comment #31 and in Nu-West Industries, Inc. 2017. The benthic macroinvertebrate (BMI) community was quantitatively sampled each year according to DEQ approved methods and Work Plans / Quality Assurance Project Plans. Nu-West analyzed BMI parameters relative to ambient surface water Se concentrations to demonstrate the water column element proposed for No Name Creek is also protective of the BMI community resident to No Name Creek.

As would be expected for this type of habitat, the BMI data from No Name Creek are somewhat variable. However, there is no indication of Se-related impacts to the site-specific BMI community despite Se concentrations greater than the site-specific water column element derived using the fishless stream translator for No Name Creek. The available data support a no-effect level to the site-specific BMI community up to the highest surface water concentration of 53 µg Se/L. Therefore, the site-specific water column element for No Name Creek (46.1 µg Se/L) is also protective of the BMI community resident to No Name Creek. This finding corroborates tolerance of invertebrates to Se consistent with information summarized by USEPA (2016), as described below.

The data and interpretation of Se toxicity to aquatic life presented by EPA (2016) clearly shows that invertebrates are tolerant of Se, especially when compared to fish. This differential toxicity is consistent with the mechanistic understanding of Se toxicity to aquatic organisms. For example, Janz et al. (2010) describes how maternal transfer of Se in the egg via vitellogenesis is the key mechanistic pathway for Se toxicity in aquatic life. Macroinvertebrates are not known to deposit significant amounts of vitellogenin in the egg compared with oviparous fish, and thus likely transfer less Se to the egg compared with fish. This probably accounts for the notable differences in sensitivity to Se between fish and invertebrates. EPA (2016) discusses that these mechanistic differences are consistent with the absence of observed field effects on aquatic macroinvertebrates, which is consistent with the above analysis presented for the BMI community of No Name Creek.

5 Frequency of Exceedance

The 304(a) recommendation for the Se criteria describes the frequency of exceedance for egg-ovary, whole-body, and muscle numeric values as 'not to exceed'. In their Oct. 6th, 2017 comment letter to DEQ, EPA states that "Frequency is the number of times an excursion of the criterion can occur over time without impairing the aquatic community or other uses." The naked phrase "not to exceed" is not a frequency as it fails to specify the number of times an excursion is allowed and over what time period. Without some added explanation the reader of "not to exceed" would be left to take the statement at face value – which would be zero exceedances, forever.

To correct the deficiency in the statement "not to exceed" and avoid the impracticality of zero allowed excursions in perpetuity, DEQ has adopted our frequency to exceed language to state: "Not to be exceeded; DEQ will evaluate all representative fish tissue data to determine compliance with the applicable criterion element."

Without this added explanation DEQ believes that a "not to exceed" frequency, stated explicitly in rule, would have the following impractical consequences: Any single exceedance, regardless of the weight of additional data, would require the state to list the water body as impaired. In practice, it would be impossible for us to refine or overcome a listing decision when subsequent, more comprehensive data indicate that the water/fish community is not impaired. Any subsequent monitoring of previously impaired waters would still fail a naked "not to exceed" and not allow for delisting, even after remediation or control of the Se source, since we would still have a sample that exceeded the criterion historically.

This could also lessen the protection waters receive. A consequence of listing waters is that they receive lower levels of protection than waters that are full support under Idaho's antidegradation policy. A water body that was listed as impaired for Se, and that can't be delisted based on the "not to exceed" language, even when water quality is improved, would still continue to receive lower antidegradation protection than if we were able to delist once Se is controlled.

We are not persuaded by EPA's rationale for why "not to exceed" is required based on the criterion being a fish-tissue criterion. EPA's argument is that since Se is bioaccumulative, and takes a long time to move out of the system, the "not to exceed" frequency is required to protect the fish community. However, this is a fish tissue criterion directly measuring the Se that has accumulated in the fish. Therefore, once fish tissue concentrations meet the criterion, that aquatic system would no longer be negatively impacted by Se or presenting any adverse effects resulting from Se exposure. Regardless of depuration rates, be they hours, years, or decades, once the fish tissue is below the criterion, the fish are no longer impaired.

DEQ understands the bioaccumulative nature of Se and that this can mean recovery of an aquatic system from Se exposure can be slow, and may take many years, particularly where Se levels have built up in sediments. While decline of tissue levels of Se may be slow, DEQ maintains that once measured levels of tissue Se return to meeting the criterion, the system will have demonstrably recovered and we would likely deem such a water as no longer impaired by Se regardless of prior measurements showing exceedance of the criteria. However, if there were a long history of tissue levels exceeding criteria, DEQ might wait to see multiple recent sampling events demonstrating tissue levels are now meeting criteria before declaring a system no longer impaired. In any event, we would find data older than the lifetime of the fish being protected to be irrelevant to assessment of current condition and would rely on such data only in absence of more recent data.

EPA argues we should somehow deal with our concerns in guidance or listing methodology. However, guidance cannot be contrary to the express rule language. And despite EPA's assurance that the situation described above is not their intent, that does not mean that we would not be held to the plain language reading of our rule. Other states (e.g., Florida) have confronted challenges with 'not to be exceeded' criteria. See Florida Public Interest Research Group Citizen Lobby v. EPA, 386 F.3d 1070 (11th Cir. 2004). Rather than depending on an unintended interpretation of "not to be exceeded," we find it appropriate to include the clarifying language

set out in footnotes 1 and 2 of the rule. EPA has reiterated their comment about frequency of exceedance to extend to SSCs. The frequency of exceedance applied to the statewide rule will also extend to the SSCs included in Section 287. For more information, the Responses to Comments 1 and 2 describe the rationale and frequency of exceedance that will be applied.

6 Downstream Protection

Downstream waters protection is specifically addressed in IDAPA 58.01.02.070.08, which states that all waters must maintain a level of water quality at their pour point into downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including waters of another state or tribe. Idaho shares waters with other states and will ensure compliance with their standards at the pour point between states.

We recognize that water quality criteria must be met where they are applied, thus the appropriate aquatic life Se criterion will need to be met in waters downstream of the statewide or any site-specific criterion. In the event a waterbody does not meet an aquatic life criterion, additional tools are employed to identify the source of the pollutant and address the issue (e.g., total maximum daily loads, source identification, point-source permit limits) so that aquatic life are protected within the waterbody and in downstream waters. See Response to Comment #6 and DEQ (2017).

To further protect water quality where White Sturgeon may be present, we also include certain upstream waters where White Sturgeon are not expected to be found but that contribute to downstream water quality. For this SSC, all 4th field hydrologic unit codes (HUCs) flowing directly into the Kootenai and Salmon Rivers as well as Snake River below Shoshone Falls are excluded from the definition of the Site in Subsection 287.05 (DEQ 2017). On a related note, critical habitats of Bull Trout and anadromous salmonids are also excluded from the site to ensure there is no adverse modification of critical habitats (Figure 2, DEQ 2017).

All waters must maintain a level of water quality at their pour point into downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters. Therefore, the protectiveness of the SSCs in Subsection 287.01 and 287.02 to adfluvial Yellowstone cutthroat trout (YCT) and life histories of all resident salmonids in the Blackfoot Reservoir is discussed below.

As discussed in the Nu-West proposal and Response to Comment #22, YCT are resident in the Upper Blackfoot River and tributaries, but are not the most sensitive resident fish. Based on the toxicity data presented in EPA (2016) and summarized in the Nu-West proposal, non-native rainbow trout are the most sensitive resident fish in the UBR watershed. Therefore, the tissue-based SSC are based on the species mean chronic value (SMCV) for Rainbow Trout to ensure protectiveness to this species as well as to all other (less sensitive) resident fish in the UBR watershed, including salmonids which reside in streams in the UBR watershed and Blackfoot Reservoir (i.e., resident salmonids are consistent between each site). In addition, there is no reason to assume that different life history strategies for salmonids result in differential sensitivities to Se. Therefore, the proposed tissue-based SSC for the UBR watershed are also protective of all salmonids, including adfluvial forms, in Blackfoot Reservoir.

To be clear, statewide Se water-column values for lotic and lentic waterbodies apply to the Upper Blackfoot River and the Blackfoot Reservoir. Protectiveness of the statewide lotic water-column value to a downstream lentic waterbody is not unique to the UBR watershed; in fact, this issue applies to aquatic systems across Idaho.

7 Monitoring Requirements

During this rulemaking, discussion emerged about monitoring requirements needed to implement this rule. Monitoring requirements as stated in this rule follow the draft implementation guidance by EPA (EPA 2016b). Averaging results from individual fish versus a composite of sampled fish is an option in rule. The rule states that either an 'average or composite sample of at least five individuals of the same species' is acceptable. While fewer than 5 fish may, in some cases, provide more than adequate biomass necessary for analysis, DEQ maintains that a minimum sample of 5 individuals for the average or composite sample is essential to adequately capture variability in Se concentrations in the population of a particular fish species within a water body. As described in our Response to Comments #8 and #9, we agree with EPA that a guidance document detailing sample requirements is needed and will be developed after rule development. However, it is appropriate to include a minimum sample size in rule to avoid the potential of misrepresenting a waterbody by using too few data.

The rule language also makes it clear that there are no circumstances where DEQ would consider analysis of a single fish useful or sufficient for determining compliance with the Se criterion. Stating the minimum number of fish required, in rule, also clarifies that regulatory decisions should be made based on the affected fish community (as measured by an average or composite) as opposed to a single fish. The need for this clarification has been illustrated in the implementation of the cited methylmercury criterion, where DEQ staff has been uncertain as to whether a single fish exceedance should be used to justify an impairment when composite samples indicate that the community is below criteria.

As described in Response to Comment 38, we agree with Idaho Department of Fish and Game (IDFG) that increasing the proposed sample size from a minimum of 5 to a minimum of 10 fish would increase the precision and reliability of fish tissue Se concentration estimates. On the other hand, it is appropriate to consider what is feasible to collect for purposes of evaluating water quality. A sample of 5 fish adequately characterizes Se in the fish population without unnecessarily impacting fish populations or making it unlikely to obtain sufficient data. Therefore, we will use the recommended sample size outlined by EPA based on 1) precedent (EPA's National Lake Fish Tissue Study) and 2) EPA's Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion (EPA 2016b). This in no way limits IDFG or others from pursuing larger (or smaller) samples sizes for purposes other than evaluating compliance with this criterion.

Secondly, we agree that juvenile fish are more likely to be living near a location where they have been foraging and may more accurately reflect local water quality conditions than an adult fish that may or may not reflect local water quality conditions given particular life history traits. DEQ agrees with IDFG that for trout and char, setting a maximum fish size target for whole body

tissue sampling of less than 200 mm total length would help to minimize the potential impact of unknown past locations of adult trout and char.

These topics will be addressed in a future guidance document that details the implementation of this rule. DEQ will collaborate with entities such as IDFG to provide guidance that is both feasible and representative of Se concentrations in a fish population.

8 Future Implementation Guidance

Following EPA's suggestion and as described above, DEQ intends to develop comprehensive implementation guidance for the statewide Se rule as well as the SSCs in Section 287. DEQ will use this guidance to implement these criteria across programs. This includes, but is not limited to, providing guidance for fishless streams and concept of 'nearest downstream waters' as well as fish tissue sample size and monitoring requirements. The guidance cannot modify the statewide rule, the SSCs, or the procedures for establishing new SSCs under Section 58.01.02.275.

Although EPA recommends that DEQ include a reference to such a document in the rule language, we will instead be developing additional guidance separately and based upon the language in rule. This follows the practice EPA has established in its national criteria recommendations.

Lastly, in regards to NPDES and IPDES permits, we certainly acknowledge the challenges a fish tissue criterion presents in the context of water quality based permitting. As EPA has noted, compliance with an NPDES permit is assessed against the effluent limits and other terms of the permit. Implementation of this rule will be addressed in a subsequent guidance document. However, in the context of any ambient water quality criterion and to clarify the footnote 3 in the statewide rule, "assess compliance" refers to the process of determining whether the ambient water quality at a particular location complies with the applicable criterion and thus identified as impaired or not.

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