Docket Number: 58-0102-1701
Effective Date: 2017 Sine die
Rules Title: Water Quality Standards
Agency Contact and Phone: Barry Burnell, 373-0194/Stephanie Jenkins, 373-0407

Descriptive Summary of Rule as Initially Proposed:

This rulemaking has been initiated to update the selenium criteria for aquatic life use. This proposed update is identified as a Reasonable and Prudent Alternative (RPA) in the National Oceanic and Atmospheric Administration's (NOAA) biological opinion (BiOp) on Idaho's criteria for toxic substances to support aquatic life. This BiOp concluded that the current selenium criterion was likely to adversely affect endangered species and would result in adverse modification of critical habitat. The NOAA recommendation is to use EPA's 2016 304(a) selenium criterion based on fish-tissue concentrations. NOAA has called for state adoption and EPA approval or EPA promulgation of this criterion by May 2018. In order to avoid EPA promulgating a federal selenium standard for Idaho, DEQ initiated this rulemaking for a revised selenium aquatic life criterion in Idaho's water quality standards. DEQ's 2014 triennial review identified revision of the aquatic life criteria for selenium as a medium priority.

Although selenium may cause acute toxicity at high concentrations, the most detrimental effect on aquatic organisms is due to its bioaccumulative properties. Aquatic organisms exposed to selenium accumulate it primarily through their diets and not directly through water. In fish, selenium toxicity occurs primarily through transfer to the eggs, reducing reproductive success and survival. Current criteria derived from water column concentrations do not take into account the effects of selenium bioaccumulation in aquatic systems and are generally under-protective of aquatic life. The proposed criterion is derived from the allowable concentration of selenium in fish tissue found to be protective of aquatic life. The fish-tissue concentration, in conjunction with site-specific bioaccumulation factors, can be used to determine the allowable concentration of selenium in ambient water. Aquatic communities are expected to be protected by this chronic criterion from any potential acute effects of selenium. By adopting the fish-tissue-derived criterion, DEQ will ensure that its criterion neither unnecessarily burdens dischargers nor increases risk to aquatic life.

This proposed rule replaces the existing water column based criteria for selenium with a four-part criterion. The recommended elements are (1) a fish egg-ovary element, (2) a fish whole-body and/or muscle element, (3) a water column element which includes one value for lentic (still water) and one value for lotic (running water) aquatic systems, and (4) 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 proposed rule also includes the addition of Section 287, Site-Specific Criteria for Selenium. Subsections 287.01 through 287.04 were negotiated in response to proposals for site-specific selenium criteria submitted by Nu-West Industries, Inc., and J.R. Simplot Company. Subsections 287.01 and 287.02 set out site-specific selenium criteria for Upper Blackfoot River and Georgetown Creek Watersheds. Subsections 287.03 and 287.04 set out the site-specific selenium criteria for Hoopes Spring, Sage Creek, and Crow Creek near the Smoky Canyon Mine. The negotiated rulemaking also included site-specific selenium criteria for portions of Idaho (Subsection 287.05). This proposed rule 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 site-specific selenium 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.

DEQ recommends that the Board adopt the rule, as presented in the final proposal, as a pending rule with the final effective date coinciding with the adjournment *sine die* of the Second Regular Session of the Sixty-fourth Idaho Legislature. The rule is subject to review by the Legislature before becoming final and effective.

Public Notice
Hearings: [ ]Yes [X] No
Locations and Dates: N/A
Written Comment Deadline: 10/6/17

Negotiated Rule Making: [X] Yes [ ] No

The Negotiated Rulemaking Summary is attached.

Relevant Statutes: Sections 39-105, 39-107, and 39-3601 *et seq*., Idaho Code

Idaho Code § 39-107D Statement: This rule does not regulate an activity not regulated by the federal government, nor is it broader in scope or more stringent than federal regulations.

Costs To the Agency: DEQ expects to incur some initial training costs in addition to normal rulemaking costs. Once the rule is adopted, DEQ expects no changes in agency operational costs or staffing. The additional costs for training will come from existing general fund support of the surface water program.

Costs to the Regulated Community: The costs will be dependent upon the waterbody and data requirements. For some dischargers, adoption of the new selenium aquatic life criterion may result in increased treatment requirements, for others it may make the criteria less restrictive.

Temporary Rule	[ ] Necessary to protect public health, safety or welfare [ ] Compliance with deadlines in amendments to governing law or federal programs [ ] Conferring a benefit

Docket Number: 58-0102-1701

Section	Section Title	Summary of Rule Changes Based on Public Comment
210.	**Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use**	Subsection 210.01, table footnote r, has been revised. DEQ's Response to Comments is attached.
287. 287.01 287.02 287.03 287.04 287.05	**Site-Specific Aquatic Life Criteria for Selenium.** Subsection of Blackfoot Subbasin. Subsection of Bear Lake Subbasin. Subsection of Salt Subbasin – Sage Creek. Subsection of Salt Subbasin – Crow Creek. Portions of Idaho.	Section 287 has been revised. DEQ's Response to Comments is attached. In response to input received during the proposed rule comment period, Nu-West Industries' Proposal for Site-Specific Selenium Criteria: Upper Blackfoot River and Georgetown Creek Watersheds; J.R. Simplot Company's Proposed Site-Specific Selenium Criterion for Hoopes Spring, Sage Creek, and Crow Creek near the Smoky Canyon Mine; and DEQ's Justification for Site-Specific Selenium Criterion for Aquatic Life in Portions of Idaho have been revised and are available at www.deq.idaho.gov/58-0102-1701.

Department of Environmental Quality
Water Quality Standards, IDAPA 58.01.02
Docket No. 58-0102-1701

Negotiated Rulemaking Summary
Idaho Code § 67-5220(3)(f)

This rulemaking has been initiated to update selenium criteria for aquatic life.

The Notice of Negotiated Rulemaking was published in the April 2017 issue of the Idaho Administrative Bulletin, and a preliminary draft rule was made available for public review. Meetings were held on April 27, June13, and July 25, 2017. Key information was posted on the DEQ rulemaking web page and distributed to the public. Members of the public participated in the negotiated rulemaking process by attending the meetings and by submitting written comments.

All comments received during the negotiated rulemaking process were considered by DEQ when making decisions regarding development of the rule. For comments that were not incorporated into the draft rule, DEQ's response to those comments is attached. At the conclusion of the negotiated rulemaking process, DEQ formatted the final draft for publication as a proposed rule in the Idaho Administrative Bulletin. The negotiated rulemaking record, which includes the negotiated rule drafts, written public comments, documents distributed during the negotiated rulemaking process, and the negotiated rulemaking summary, is available at www.deq.idaho.gov/58-0102-1701.

DEQ's Response to Comments/Negotiated Rulemaking Summary
Docket No. 58-0102-1701

Commenter 1 – U.S. Environmental Protection Agency (EPA)	Commenter 2 – Wyoming Department of Environmental Quality (WDEQ)

Rule Section/ Subject Matter	Commenter	Comment	Response
210.01 287.01 287.02 287.03 287.04 287.05	**1**	EPA regulations at 40 CFR 131.1 O(b) provide that "[i]n designating uses of a waterbody and the appropriate criteria for those uses, the state shall take into consideration the water quality standards of downstream waters and ensure that its water quality standards provide for the attainment and maintenance ·of the water quality standards of downstream waters." Especially in cases where downstream waters are lentic waterbody types (e.g., lakes, reservoirs, impoundments, some slow-moving rivers), or harbor more sensitive species, a selenium criterion more stringent than that required to protect in-stream uses may be necessary to ensure that water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.	DEQ recognizes 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, tools are employed to identify the source of the pollutant and restore water quality (e.g., total maximum daily loads, source identification, point-source permit limits) so that criteria will be met and aquatic life are protected within the waterbody and in downstream waters. 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. Specific to 287.03 and 287.04, the SSC includes two values for the water column criterion element based on respective bioaccumulation rates in Sage Creek and Crow Creek. The revised site-specific water column criterion element of 4.1 µg/L for Crow Creek will meet the Wyoming water quality standard of 5 µg /L. Lastly, to protect White Sturgeon, the geographic scope of 287.05 includes 4th Field HUCs that drain directly into the historic range of White Sturgeon.
210.01 287.01 287.02 287.03 287.04 287.05	**1**	When implementing the water quality criterion for selenium under the NPDES permits program, DEQ may need to establish additional procedures due to the unique components of the selenium criterion. If the state decides to use the selenium water column concentration criterion element only (as opposed to using both the water column and fish tissue elements) for conducting reasonable potential (RP) determinations and establishing water quality-based effluent limitations (WQBELS) per 40 CFR 122.44(d), existing implementation procedures used for other acute and chronic aquatic life protection criteria may be appropriate. However, if the state also decides to use the selenium fish tissue criterion element values for NPDES permitting purposes, additional state WQS implementation procedures will be needed for determination of RP and development of appropriate WQBELs. The EPA recommends the use of the water column element in developing WQBELs.	DEQ appreciates your recommendation and certainly acknowledge the challenges a fish tissue criterion presents in water quality based permitting. However, DEQ believes this is beyond the scope of this rulemaking, and that implementation of this rule is better addressed in a subsequent guidance document. This follows the practice EPA has established in its national criteria recommendations.

210.01	**1**	Develop additional guidance which provides a full discussion and establishes a detailed procedure for the applicant of selenium criteria in fishless waters and in areas with new selenium inputs.	DEQ will be developing additional guidance, based upon the language in rule. As EPA has done nationally, guidance development will follow the rule.
287.03 287.04	**1**	In order to determine a whole body criterion element, a conversion factor (CF) calculated from the brown trout data was used to convert the egg-ovary criterion element into a whole body criterion element. The EPA has some concerns about this method of calculating a whole body criterion element value. Conversion factors are based on physiological processes and tend to be driven more by the species than the site. Therefore, it is more appropriate to create a new SSD of whole body SMCVs. The whole body SMCVs could be calculated by converting each egg-ovary SMCV to a whole body SMCV using a species specific CF or a whole body SMCV that was directly measured could be used. This whole body SSD should be used to calculate the whole body criterion element using the 4 most sensitive species as described in the 1985 Guidelines (EPA PB85-227049).	The method chosen in this site-specific proposal was used because it best represents the Site and species present. The approach used to derive the whole body 2016 National Criterion must consider a large scale where species present and their relative sensitivities are unknown or not fully characterized, and when egg/ovary data are not available. The 2016 National Criterion notes that "Adopting the fish whole-body or muscle tissue element into water quality standards ensures the protection of aquatic life when measurements from fish eggs or ovary are not available…" For this Site, comprehensive egg/ovary effects data are available and the egg/ovary element of the criterion has primacy over all other elements because "the concentration of selenium in eggs and ovaries is the most sensitive and consistent indicator of toxicity." The data for brown trout show they are the most sensitive species and that the egg/ovary selenium concentration is the best to assess the risk of effects on this species. USEPA (2016) states that "Using the most sensitive assessment endpoint (based on the state of the science) reduces uncertainty in the ability of the criterion to protect aquatic life." The egg/ovary metric for brown trout is the ultimate measure in the criterion. The other metrics to be included in the criterion should be selected from the best predictors of brown trout egg/ovary selenium concentration. Future monitoring to assess compliance with the whole body criterion will be conducted based on collection and chemical analysis of brown trout whole body tissues. Brown trout are one of only two recreationally important game species found at all locations within the Study area (except Deer Creek) where tissue monitoring will be conducted for compliance monitoring. It is numerically the predominant of the two trout species found and is also a non-native species. Thus to minimize potential impacts of harvesting the native Yellowstone cutthroat trout (YCT) as a monitoring species for tissue analyses, and because the predominant tissue data base for the study area is for brown trout, and because brown trout is the most sensitive fish species present - brown trout is the logical target species for monitoring compliance with a fish tissue criterion. As recommended by USEPA (2016), "Selection of the fish species in the aquatic system with the greatest selenium sensitivity and bioaccumulation potential is recommended." For this SSSC proposal, derivation of the whole body tissue

			criterion based on the most sensitive species, from a sensitive effects threshold (egg/ovary) with effects data derived directly from the Site, and using that same species as the compliance monitoring target species is the most scientifically defensible and unbiased approach available.
287.03 287.04	**2**	WDEQ/WQD is also concerned with the validity of applying a CF value based solely on brown trout sensitivity to an egg-ovary concentration derived from the four most sensitive fish species. Though this may be a more conservative approach since brown trout are the most sensitive species in the study area, WDEQ/WQD questions whether it would be more appropriate to develop a CF value based on the four species that were used to derive the egg-ovary element.	Same as response to EPA's comment directly above.
287.03 287.04	**1**	The EPA has several concerns about the species sensitivity distribution (SSD) that was used to derive the egg-ovary selenium criterion element. First, the EPA has concerns over the use of species mean chronic values (SMCVs) in this SSD as opposed to using genus mean chronic values (GMCVs). When creating an SSD, EPA recommends using GMCVs rather than SMCVs as species within a genus tend to be more similar toxicologically than species in different genera. Using GMCVs rather than SMCVs prevents data sets from being biased by an overabundance of species in one or a few genera. The EPA also has concerns about some of the species that were included in the SSD. Simplot included some species in their SSD that EPA did not include in the criterion derivation due to the inability to effectively characterize an ECw value for the species. These include the Yellowstone cutthroat trout and white sucker. The EPA found that the Yellowstone cutthroat trout data were highly variable and therefore a clear effect value could not be calculated from these data. The EPA also decided not to include the white sucker data in the criterion derivation, as this study did not have a control and a clear effect level was not observed in this study. Lastly the EPA is concerned about the inclusion of the sculpin data, which is >22 mg/kg dw for a NOEL. This lower bound is lower than all the Oncorhynchus genera, so while we know that there is no effect below 22 mg/kg dw, we do not know when that effect begins. Given that this is unknown and that there is a small chance it may be lower than the trout (solely based on the fact that we don't have information showing otherwise), it may not be appropriate to include this information in the SSD. In addition, this study was not considered for the 2016 criterion and the quality of the data has not been evaluated by the EPA. As only a summary of the study was included in the proposal, the EPA requests that additional information about this study be presented so that the quality of these data can be verified.	Excerpt from Comments Letter received on August 1, 2017 from J.R. Simplot Company: This multipart comment addresses two primary issues: (1) use of species mean chronic values (SMCVs) versus genus mean chronic values (GMCVs) and, (2) inclusion of species in the derivation process that EPA has some concerns about, namely YCT, white sucker, and sculpin. Use of SMCVs vs GMCVs EPA states that using GMCVs rather than SMCVs prevents data sets from being biased by an overabundance of species in one or a few genera and that the GMCVs should be used for criteria derivation. Simplot disagrees and the use of SMCVs in place of GMCVs for a site-specific criterion are applicable for several reasons: (1) The current selenium dataset for maternal reproductive studies, particularly with fish is limited. Of the eight fish maternal reproductive studies utilized to derive the species sensitivity distribution in USEPA (2016), only two were GMCVs (Lepomis and Oncorhynchus), while the remaining six were SMCVs. (2) When small streams are being evaluated with limited species diversity, there simply are not enough species to use when EPA's recalculation procedure is the process being used to derive site-specific criteria. Of the 15 GMCVs utilized to compile the overall number of species in the 2016 National Criterion derivation, the SSSC proposal eliminated five genera as either not found within the Site or not being representative as a surrogate for another similar sensitive species. Simply recalculating the SSSC based on 10 GMCVs (all of which are SMCVs except for Oncorhynchus) severely limits the potential available data set and will result in an unrealistic criterion as described in further detail below.

			(3) The recalculation procedure is "conducted on a species level rather than a genus level, making it more acceptable to utilize the SMAVs for the FAV calculation" (GLEC 2005). This same logic for species mean acute values (SMAVs) and final acute values (FAVs) also applies to SMCVs and final chronic values (FCVs). As noted in the Draft Compilation of Existing Guidance for the Development of Site-Specific Water Quality Objectives in the State of California, "when the recalculation procedure is used with species deletion, there should be no species left in the dataset that is not either a resident species or a species that is the most appropriate surrogate for a resident species. For this reason, it should be acceptable to utilize SMAVs for the calculation of FAVs when an SSO is developed using the recalculation procedure with species deletion. Where there is only one species in each genus remaining in the dataset, this is the same as using GMAVs" (GLEC 2005). For this SSSC proposal, there is only one genus with more than one species left in the database for the criterion derivation. (4) Use of the GMCV may actually bias the dataset due to dilution of sensitive species effects information (Parametrix et al. 2006). The genus Oncorhynchus represents three of the four most sensitive species in the SSSC derivation process with brown trout, genus Salmo, representing the most sensitive species. Not using the SMCV in this case dilutes the most sensitive species information. Rainbow trout are included, because it has the potential to be present and represent a sensitive species. At least one hybrid rainbow x cutthroat trout has been captured within the Site over the year monitoring period. Westslope cutthroat trout are not present at this Site, but are included to represent another salmonid that is present for which there are no data, the Mountain whitefish. Yellowstone cutthroat trout is the second most abundant trout species present behind brown trout. For these three species in the genus Oncorhynchus, the EC10 for rainbow trout is 24.5 mg/kg dw, the EC10 for Westslope cutthroat trout is 26.2 mg/kg dw, and finally, the EC10 for YCT is 28.4 mg/kg dw. If these data were combined as a geometric mean to derive a GMCV, the value would be 26.32 mg/kg dw. There is a dilution of the most sensitive species information when these data are combined into a GMCV rather than using them independently as SMCVs. Parametrix et al. (2006) states that, "while within-genus toxicity values are relatively consistent (at least more so than higher taxonomic levels), toxicity of a contaminant to different species within the same genus is not always equivalent. Even though the difference in toxicity between species may be small (< a factor of 10; e.g., Physa sp. For zinc), using a GMAV dilutes the sensitivity of the more sensitive species". (5) For this SSSC proposal, not only would use a GMCV for Oncorhynchus that would dilute the sensitive species information, it would reduce the number of chronic values available for use and the process loses representation of other potentially sensitive species for which there are no data. Loss of chronic values (e.g., SMCVs) for use in the overall number of chronic values represented

			results in lowering the derived criterion. This is because the derivation procedure is designed to calculate a more conservative criterion when database size is small (Erickson and Stephan 1988). Inclusion of the Oncorhynchus data as individual SMCVs versus a single GMCV in this SSSC proposal provides for sensitive species representation without being under or over protective by resolving the effect of sample size for the chronic values. The resulting chronic criterion of 19.9 mg/kg dw for this SSSC proposal is less than the most sensitive species EC10 of 20.5 mg/kg dw due to how the criterion calculations are weighted towards protection of 95 percent of the species.
287.05	**1**	DEQ will need to ensure that this SSC provides protection for species within the family Salmonidae may occur in locations where sturgeon do not; thus, DEQ should consider appropriate toxicity data (e.g., whole body Oncorhynchus Genus Mean Chronic Value (an EC10) of 9.052 mg/kg dry weight) in light of any recalculation procedure, especially if toxicity values fall below the recalculated criterion.	This comment refers to the non-reproductive endpoint (EC10) for juvenile anadromous salmonids. This study was not a reproductive study; therefore, it was not used in the derivations of the 2016 EPA recommended selenium criterion. This SSC provides protection for juvenile anadromous salmonids by excluding their critical habitat from the geographic scope of this SSC. That being the case, critical salmonid habitat for anadromous salmonids is protected by the statewide selenium chronic criterion that includes the whole-body element of 8.5 mg/kg dry weight which is less than the EC10 for juvenile anadromous salmonids.

DEQ's Response to Comments
Docket No. 58-0102-1701

Commenter 1 – U.S. Environmental Protection Agency (EPA)	**Commenter 2 – Idaho Department of Fish and Game (IDFG)**
Commenter 3 - Idaho Mining Association (IMA)	**Commenter 4 – Kinross DeLamar Mining Company (KDMC)**
Commenter 5 – Simplot (SIM)	**Commenter 6 – Wyoming Department of Environmental Quality (WDEQ)**

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
1	210.01 287.01 287.02 287.03 287.04 287.05	1	EPA finds no discussion or justification for DEQ's selection of the frequency component of once in three years for the fish tissue criteria elements. Frequency is the number of times an excursion of the criterion can occur over time without impairing the aquatic community or other uses. EPA's current recommendation for aquatic life criteria (1985 Guidelines) [footnote omitted] of a once in three years on average exceedance frequency is based on the ability of an aquatic ecosystem to recover from a toxic insult when pollutant impacts are associated exclusively with a water column exposure. The selenium criterion differs from these typical toxic parameters because it incorporates fish tissue components into the criterion, along with a water column component. The EPA recommends that the frequency component of the fish tissue elements of the magnitude component for the selenium criterion differ from the typical "once-in-three years on average" frequency, and instead have a frequency of "not to exceed". Selenium is a bioaccumulative pollutant; therefore, elevated levels in various ecological compartments (e.g., biota, surficial sediments) require a long time period to decrease, and the associated aquatic community requires time to recover following reduction or removal of an elevated selenium exposure in a given system, if such reduction or removal is achievable. The "once in three years" frequency is recommended for toxics where the pathway of effect is through exposure to the water column. The typical criteria return frequency is not appropriate for selenium in fish tissue as this could lead to sustained ecological impacts. Past studies have shown that it	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" 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. To correct the deficiency in the statement "not to exceed" and avoid the impracticality of zero allowed excursions over eternity DEQ has updated 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 consequences: 1. Any single exceedance, regardless of the weight of additional data, would require the state to list the water body as impaired. In practice, what this means is that it would be impossible for us to refine a listing decision when subsequent, more comprehensive data indicate that the water/fish community is not really impaired. We could be in a situation where we collect a minimum composite (5 fish) of whole-body or muscle tissue that exceeds the criterion and list the water as impaired. If, as part of the development of a subbasin assessment or

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
			can take fish tissue in excess of 10 years to return to an acceptable level after fish tissue concentrations have reached concentrations associated with reproductive impacts (Chapman et al. 2010, Finley and Garrett 2007). As selenium concentrations in fish tissues are the result of accumulation through the food web over time, a, a frequency of "not to exceed" is more appropriate for this criterion element. Frequencies of once-in-three years are associated with water column concentrations, not accumulated fish tissue body burdens of reproductive toxicants. For additional information regarding duration and frequency, see sections 2.7.6 and 2.7.7 of the EPA's Aquatic Life Ambient Water Quality Criterion for Selenium-Freshwater 2016 [footnote omitted]. The EPA recommends DEQ include a frequency of "not to be exceeded" for the magnitude component of fish tissue criteria consistent with the EPA's 2016 national recommended selenium criterion.	TMDL, we collect additional samples and discover that the water is not truly impaired, we still would not be able to refine the listing due to the single sample being exceeded if we don't have, in rule, language that allows for this. 2. Any subsequent monitoring of a previously impaired water would also not allow for delisting, even after remediation or control of the selenium source, since we would still have a sample that exceeded the criterion at some time. 3. An unintended consequence of listing waters is that they receive lower levels of protection than waters that are full support under our antidegradation policy. A water body that was listed as impaired for selenium, 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 protection than if we were able to delist once selenium is controlled. DEQ understands the bioaccumulative nature of selenium and that this can mean recovery of an aquatic system from selenium exposure can be slow, and may take many years, particularly where selenium levels have built up in sediments. While decline of tissue levels of selenium may be slow, DEQ maintains that once measured levels of tissue selenium return to meeting the criterion, the system will have demonstrably recovered and would likely deem such a water no longer impaired by selenium regardless of prior measurements showing exceedance of the criteria. However, If there were a long history of tissue levels exceeding criteria, DEQ might want 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 newer data.

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
				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 selenium 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 criterion is a fish tissue criterion and is directly measuring the selenium that has accumulated in the fish. Therefore, once fish tissue concentrations meet the criterion, that aquatic system should no longer be negatively impacted by selenium or presenting any adverse effects resulting from selenium 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. 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.
2	210.01 287.01 287.02 287.03 287.04 287.05	1	Idaho has expressed concerns that the frequency of "not to be exceeded" implies that one fish with a fish tissue selenium concentration higher than the criterion means that a water is impaired and that once a water is impaired and placed on the 303(d) list that the water body can never be delisted. EPA does not interpret this frequency to mean that either of these circumstances should occur. EPA has developed draft technical support materials regarding how to sample for fish tissue, and recommends that a single fish having selenium concentrations above the criterion not be considered an exceedance of the criterion. EPA has clarified that the selenium criterion	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 a questionable interpretation of "not to be exceeded," we find it appropriate to include the clarifying language set out above in Response to Comment 1.

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
			is focused on the protection of populations, not individuals.	
3	287.05	1	**Non-Sturgeon Waters Criteria** Geographic Scope - The EPA has concerns regarding the inclusion of parts of the Snake River in the definition of the site for its non-sturgeon waters criteria. As provided in the justification document, DEQ states that sturgeon are not a resident species for purposes of the recalculation approach in areas of the Snake River above Shoshone Falls. The EPA does not agree with DEQ's position that sturgeon is not considered a resident species in the American Falls, Lake Walcott area of the Snake River. The Recalculation Procedure in part states that the equivalent terms "resident" or "occur at the site" includes life stages and species that: a. are usually present at the site, b. are present at the site only seasonally due to migration, c. are present at the site intermittently because they periodically return to or extend their ranges into the site, d. were present at the site in the past, are not currently present at the site due to degraded conditions, but are expected to return to the site when conditions improve, or e. are present in nearby bodies of water, are not currently present at the site due to degraded conditions, but are expected to be present at the site when conditions improve. DEQ cites the Idaho Department of Fish and Game (IDFG) Management Plan for the Conservation of Snake River White Sturgeon in Idaho [footnote omitted] as a basis in support of DEQ's decision to apply non-sturgeon criteria to portions of the Snake River (American Falls and Lake Walcott) where IDFG has a long-term	The EPA recommended aquatic life criterion for selenium is based on reproductive endpoints; as such, these values have no relevance for a White Sturgeon population that is not managed or intended to reproduce. Rather, this Sportfish population is introduced outside of its historical range purely for recreational fishing opportunity. Among other habitat requirements, White Sturgeon require specific concurrent water flows and temperatures in order to successfully spawn. Due to natural factors and altered hydrography, the reach below American Falls Dam to Lake Walcott and the Snake River at Idaho Falls do not provide these concurrent requirements during the White Sturgeon spawning period. Additionally, sturgeon *spp.* larvae require long stretches of river as they are not strong swimmers and drift with the current and cannot navigate or avoid dams[1]. The reach length between American Falls Dam and Milner Dam is not sufficient for larva survival[3]. Finally, given the genetic composition of stocked sturgeon, the IDFG does not want them to reproduce with wild sturgeon in Core Conservation populations downstream[2]. In conclusion, aside from any water quality criterion, reproduction is improbable and undesirable given basic habitat and genetic constraints for these Sportfish populations. Therefore, it is not appropriate to apply a selenium criterion derived to protect reproductive success and offspring survival for a species that is stocked in unsuitable spawning and rearing habitat solely for sportfishing purposes. [1]Verhille, C. E., Poletto, J. B., Cocherell, D. E., DeCourten, B., Baird, S., Cech, J. J., & Fangue, N. A. 2014. Larval green and white sturgeon swimming performance in relation to water-diversion flows. Conservation Physiology, 2(1). [2] IDFG. 2008. Management plan for the conservation of Snake River white sturgeon in Idaho (p. Authored by J. Dillon and S.A. Grunder). Boise: Idaho Department of Fish and Game.

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
			sturgeon sport fishery management program. The rationale DEQ provides for determining sturgeon is not a resident species in these specific waters is twofold - 1) the locations where IDFG stocks sturgeon for purposes of a sport fishery is beyond the species' historical range, and 2) these fish are not expected to reproduce, nor do the locations provide habitat elements to maintain a self-propagating population of sturgeon. However, as stated in the IDFG Management Plan *"the survival and growth of stocked sturgeon in the American Falls Dam to Lake Walcott area of the Snake River has been good and is a very popular catch-and-release fishery. As the fish proved to be doing well and angling interest has increased, stocking has increased to a more regular basis"*. In addition, IDFG's management objectives for this area of the Snake River are to develop a long-term stocking plan and maintain or increase fishing opportunity for sturgeon. According to IDFG staff, they lack any specific data and/or information to know with any certainty whether or not these fish are reproducing (Jon Linders, IDFG, personal communication).	[3]Joe Kozfkay, SW Regional Fisheries Manager, IDFG, pers comm
4	287.05	1	Furthermore, of the nine reaches of the Snake River which include the historical extent of sturgeon, only two support viable populations characterized by self-sustaining natural recruitment (Bliss Dame to C.J. Strike Reservoir and Hells Canyon Dam to Lower Granite Reservoir). Reaches other than these two show little to no detectable reproduction [footnote omitted].	Many factors, primarily habitat modifications due to dams and irrigation diversions, are impacting sturgeon populations within their historic range. This criterion addresses only selenium toxicity in aquatic ecosystems and White Sturgeon within their historic range will be protected by the statewide criterion.
5	287.05	1	Idaho's cold water aquatic life designated use at 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*". Nowhere do the regulations characterize "viable" to include naturally self-sustaining and self-reproducing. Additionally, given the numerous waters in Idaho where IDFG has an active role in	The quoted language from Section 101.01.a protects a viable community, not individual species that are present but not viable. 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. Further, since these introduced White Sturgeon Sportfish

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			the management and stocking of both native and non-native fish, DEQ's broad cold water aquatic life use has provided and continues to provide protection to stocked fish as part of the "viable aquatic community" of species. DEQ may want to consider subcategorization of the aquatic life uses to provide additional specificity regarding stocked fisheries, if DEQ believes it is necessary to make such a distinction for the purposes of determining applicable criteria. Given the above information, the EPA recommends DEQ consider sturgeon a resident species in areas of the Snake River above Shoshone Falls, specifically from American Falls Dam to Lake Walcott. The proposed criteria based on the recalculation approach deleting sturgeon would not be protective of Idaho's cold water aquatic life use and the aquatic community in these waters. DEQ Note: This paragraph continues as Comment 6.	populations are managed within an adaptive framework and some of these populations are experimental[4], we cannot predict the extent or duration of IDFG management objectives regarding this species when stocked outside of its historic range. 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. [4]IDFG. 2008. Management plan for the conservation of Snake River white sturgeon in Idaho (p. Authored by J. Dillon and S.A. Grunder). Boise: Idaho Department of Fish and Game.
6	287.05	1	Furthermore, consistent with the water quality standards regulation at 40 CFR 131.10(b), DEQ would need to provide additional justification and a demonstration that the criteria applied to non- sturgeon waters above Shoshone Falls would provide for the attainment and maintenance of the downstream water quality standards where DEQ has proposed criteria that are protective of sturgeon. The EPA recommends DEQ reconsider the proposed geographic scope of the non-sturgeon criteria and apply the statewide selenium criteria (which, as proposed, are protective of sturgeon) in those areas of the Snake River above Shoshone Falls where IDFG has a long term and active stocking program for sturgeon.	We have explained downstream waters protection previously in this negotiated rulemaking. Please see Response 1 in the DEQ's Response to Comments/Negotiated Rulemaking Summary (http://www.deq.idaho.gov/media/60180660/58-0102-1701-negotiated-rulemaking-summary-0917.pdf) and Slide 27 of Negotiated Rulemaking Meeting on 7/25/2017 (http://www.deq.idaho.gov/media/60180428/58-0102-1701-aquatic-life-criterion-selenium-presentation-072517.pdf) Our response is repeated below: *Regarding the protection of downstream waters, we recognize that water quality criteria must be met where they are applied, thus the appropriate aquatic life selenium 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*

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				criterion, tools are employed to identify the source of the pollutant and restore water quality (e.g., total maximum daily loads, source identification, point-source permit limits) so that criteria will be met and aquatic life are protected within the waterbody and in downstream waters. *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.* *To protect White Sturgeon, the geographic scope of 287.05 excludes 4th Field HUCs that drain directly into the historic range of White Sturgeon.*
7	287.05	1	Bioaccumulation Factor (BAF) - DEQ has derived a BAF to be used for the calculation of a water column criterion element to be applied to non-sturgeon waters. DEQ derived this BAF using the numerical relationship (a proportion) between the EPA's 304(a) recommended whole body and water column criterion elements. With this BAF (2.75 (lotic) and 5.69 (lentic) L/g) and the proposed non-sturgeon whole body criterion element of 9.5 mg/kg dry weight, DEQ proposed new water column elements of 3.4 and 1.7 µg/L for lotic and lentic waters, respectively. DEQ stated that because the BAF was "conservative," the resulting water column criteria were conservative. DEQ's calculated BAF is based upon the national water column criterion element, a 20th percentile of national water column values protective of the fish tissue element. EPA previously commented that DEQ may consider using its own data for this analysis and/or further explain how the national BAF represents bioaccumulation processes in Idaho waters by detailing how water body types compare for each region. DEQ has not provided sufficient information in its justification document that addresses this concern.	We have few data in the site to use for any analysis. This is why we used EPA's recommended values to calculate a protective water column value. Our selenium data[5] reveals only 7 lotic locations within the geographic site of the site-specific criterion (SSC). Mean selenium in the water column is low at 0.7 ± 0.5 (Standard Error (SE)) ug/l and mean selenium concentration in fish tissue is well below the EPA 2016 selenium criterion at 4.5 ± 4.3 (SE) mg/kg dw wb. These data show a mean BAF of 7.2 ± 2.8 (SE) dw L/g which is greater than 2.75 used by dividing 8.5 by 3.1 obtained from the EPA 2016 selenium criterion. Given this limited dataset, DEQ has revised this SSC proposal to only include fish tissue criterion elements, leaving the water column criterion elements of the statewide rule to apply for the following reasons: 1. Too few data available to adequately describe the BAFs within the site. 2. Lentic BAFs are unknown. We do not have empirical selenium data for lentic systems and therefore have no way to derive a lentic water column value using data from the site. Next, instead of adding a line representing the BAF for lotic systems in Idaho to

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			Although Figure 4 and associated text in the justification document indicates that selenium concentrations in water and fish muscle collected statewide in 2008 were generally below the proposed non-sturgeon criteria, this information does not allow EPA to determine whether the BAF is representative of Idaho waters. EPA recommends adding a line to this graph, which represents the BAF for lotic systems that Idaho is proposing to use to modify the water column criterion element. Adding this line will help represent how the BAFs of these data points compare to the proposed value. In addition, it would be useful to include an appendix that calculates the BAFs of each of these points and the resulting criterion that would be appropriate for that BAF so that the data can be easily compared to the proposed criterion. Finally, it would be useful for Idaho to also present data from lentic systems, if available, so that EPA can evaluate how protective the proposed criterion is of Idaho's lentic waters.	Figure 4, it is more clear to incorporate a description of available lotic BAFs in the text of DEQ's Justification for Site-Specific Selenium Criterion for Aquatic Life in Portions of Idaho, available at www.deq.idaho.gov/58-0102-1701. Last, per EPA's request, the lotic data we have for this site have been included as an appendix of the SSC justification document. [5]DEQ. (2010). Arsenic, Mercury, and Selenium in Fish Tissue and Water from Idaho's Major Rivers: A Statewide Assessment (p. Prepared by Don A. Essig). Boise: Idaho Department of Environmental Quality.
8	210.01 287.01 287.02 287.03 287.04 287.05	1	**Rule Language- Section 58.01.02.210.01 Statewide Selenium Criterion** **<u>Sampling of Fish Tissue</u>** Footnote #2 includes a statement regarding sampling of fish tissue. It specifies that composite sampling shall consist of at least five individuals of the same species and similar size. Although this limited statement regarding composite sampling might appear helpful, additional and more detailed information regarding sampling is needed. The EPA recommends DEQ not include information related to sampling in the footnotes to the criteria values because the proposed language does not adequately cover or address multiple considerations for conducting sampling of fish tissue. The EPA recommends DEQ address sampling and monitoring recommendations more comprehensively and	We agree 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 selenium 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 have been unclear as to whether a single fish exceedance should be used to justify an impairment when composite samples indicate that the

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			separate from the regulatory language for the criteria, as Idaho does with respect to its methyl mercury fish tissue criterion. For example, it would be helpful to provide information on circumstances when analysis of individual fish samples might be useful and sufficient. The EPA' s draft technical support document provides a detailed discussion of a number of considerations such as temporal and spatial concerns, sample type (composite and individual) and target species [footnote omitted].	community is below criteria. As described in Response to Comment 38, we agree with 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 selenium 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 selenium in the fish population without unnecessarily impacting fish populations or making it infeasible 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[6]. This in no way limits IDFG or others from pursuing larger (or smaller) samples sizes for purposes other than evaluating compliance with this criterion. [6]EPA (U.S. Environmental Protection Agency). 2016. Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
9	210.01 287.01 287.02 287.03 287.04 287.05	1	Although EPA recommends the use of composite samples for selenium fish tissue monitoring, there are some instances where collecting individual fish may be desirable. An individual sample is a discrete sample from a single fish, and can be an egg-ovary sample, a whole body, or a muscle (fillet) sample. Analysis of individual fish samples may be of interest to evaluate spatial and temporal differences among individuals of a species of similar size or across the population of a species residing in a specific water body. For water bodies or segments that are known to be impacted by selenium, individual samples may better estimate the magnitude (i.e., extreme values) of the impact and may provide information about selenium source-exposure relationships in large water bodies. Individual samples may also allow for the identification of	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 selenium concentrations in the population of a particular fish species within a water body. DEQ acknowledges that the analyses described in this comment may be important and desirable, but that they have no bearing on evaluation of criterion compliance. As stated in Response to Comment 8, the sample size requirements for this criterion in no way limit

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			fish that are migrant or transient in a population, since that fish may have a higher or lower concentration of selenium than other fish in the area. EPA recommends 20 grams as a minimum tissue mass required per individual fish for analysis and quality assurance/quality control (QA/QC). If using individual samples for the purposes of selenium criteria implementation, all fish should be the same species and from the same waterbody (or site for large waterbodies) within the same sampling period. Where compositing such individual samples or calculating an average concentration, the fish should be of similar size (within the 75% rule) and the samples should be of the same tissue type. When using individual fish tissue samples for selenium monitoring, EPA recommends targeting at least 5 individuals for analysis to achieve measurements of a reasonable statistical power. In the event that collecting at least 5 individuals of one species is not possible, fewer specimens may be sufficient to provide adequate biomass for both selenium analysis and QA/QC, but the statistical power of the analysis may be affected. As previously stated, the EPA suggests more detailed information on monitoring and sampling considerations would be helpful and recommends that DEQ provide such information in separate technical support materials and/or implementation guidance. The EPA recommends that DEQ include a reference to such a document in the rule language.	IDFG or others from pursuing larger (or smaller) samples sizes for purposes other than evaluating compliance with this criterion. As described within Response to Comment 8, we agree that a guidance document detailing sample requirements is needed and will be developed after rule development.
10	287.01 287.02 287.03 287.04	1	**Rule Language-Section 58.01.02.287. Site-Specific Criteria** See the EPA's detailed comments below regarding concerns with each of the site-specific fish tissue criteria proposed for the subsection of the Blackfoot Subbasin (Nu West's proposal) and the subsection of the Salt Subbasin (J.R. Simplot's proposal). The EPA recommends DEQ evaluate	Comments specific to the Blackfoot, Bear Lake, and Salt Subbasin SSCs are addressed below. With regard to EPA's three recommended revisions, DEQ 1. 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. The

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			all concerns the EPA has identified regarding the site-specific criteria and consider revisions to the site-specific criteria regulatory language consistent with any modifications to delineation of the site(s) and/or recalculations that may be needed to address these concerns. The EPA recommends DEQ consider revising the rule to address the following: 1) the rule language should specify the frequency component of "not to be exceeded" for the site-specific fish tissue criteria, 2) the numeric values contained in the tables under Section 287.01 and 287.02 should be recalculated to address concerns the EPA discussed above with respect to the egg/ovary and whole body tissue criteria, and water column criterion for both the Blackfoot and Salt Subbasins and 3) the EPA recommends that the tables in Section 287.01 (subsection of the Blackfoot subbasin) and 287.02 (subsection of Bear Lake subbasin) include criteria values for the water column elements. As proposed, footnotes #3 and #4 at 287.01 and .02 state the following: *3. Water column values are derived using the empirical BAF method. For comparative purposes only, the example value displayed in this table represents the lotic water column value for Sheep Creek based on the average BAF for Cutthroat Trout among all sampling locations and years.* *4. Lotic Water Column Equation =* $Tissue_{criterion}/BAF$ *where* $Tissue_{criterion}$ *is the fish tissue element (whole-body), and BAF is the bioaccumulation factor derived by dividing site-specific field-collected samples of fish tissue (whole-body) by site-specific field-collected samples of water.* The EPA recommends DEQ revise footnotes 3 and 4 and provide values for the water column criteria element in the table for each site-specific	Responses to Comments 1 and 2 describes the rationale and frequency of exceedance that will be applied. 2. It is not clear what concerns need to be addressed with respect to the egg/ovary and whole-body tissue criteria, as these issues have not been communicated yet in this enclosure, however, any comments regarding tissue criteria will be addressed. 3. Water column criteria values resulting from equation-based criteria are not required in rule, as these values depend on in situ variables in a particular waterbody. Many criteria are equation-based, including criteria that EPA has approved (e.g., Hardness Dependent Metals, Ammonia) and do not include criteria values for each waterbody. Although the rule provides example water column values based on known in situ variables in specific waterbodies within the sites, it is not reasonable or feasible at this point to provide criteria values for all waters within the sites. As such, we will not be modifying the rule.

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			criterion.	
11	210.01	1	**<u>Monitoring Compliance in Fishless Waters</u>** Footnote #3 to footnote "r" contained in Section 210 of the proposed rule discusses assessing compliance in fishless waters and similar language was added to the proposed site-specific criteria. The proposed language is as follows: *3. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. Water column values are the applicable criterion element in the absence of steady-state condition fish tissue data. In fishless waters, selenium concentrations in fish from the nearest downstream waters may be used to assess compliance using approaches provided in Aquatic Life Ambient Water Quality Criterion for Selenium-Freshwater, EPA-822-R-16-006, Appendix K: Translation of a Selenium Fish Tissue Criterion Element to a Site-Specific Water Column Value (June2016).* This approach is based on language from Appendix K, *"When fish are absent from a waterbody, consideration of sampling the most sensitive fish species inhabiting nearby, most proximate downstream waters may be useful in order to understand selenium bioaccumulation potential in such systems. Although the upper reaches of some aquatic systems may not support fish communities, the invertebrate organisms that reside there may tolerate high concentrations of selenium and pose a selenium risk to predator fish if transported downstream. Users may choose to evaluate upstream waters without fish by measuring the selenium*	Although this is a fish tissue criterion and fish have been shown to be the most sensitive taxa to selenium, 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. We will be developing additional guidance, based upon the language in rule. As EPA has done nationally, guidance development will follow the rule. The concept of 'nearest downstream waters' as stated in rule will be addressed in implementation guidance. Specifying a site-specific criterion for selenium in fishless streams is unnecessary. Fishless streams were included in EPA's recommended selenium criterion[7]. As stated in EPA recommendations and in the Idaho proposed rule, where fish tissue is unavailable, the water column value applies. In the context of an ambient water quality criterion such as the proposed rule, "assess compliance" refers to the process of determining whether the ambient water quality at a particular location complies with the applicable criterion. As EPA notes, compliance with an NPDES permit is assessed against the effluent limits and other terms of the permit. We appreciate your recommendation and certainly acknowledge the challenges a fish tissue criterion presents in the context of water quality based permitting. However, this rulemaking does not pertain to water quality based effluent limits, and implementation of this rule is better addressed in a subsequent guidance document. This follows the practice EPA has established in its national criteria recommendations. We intend to develop additional guidance, based upon the language in rule.

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			concentration in water, biotic and/or abiotic particulate material, and/or the tissues of invertebrate aquatic organisms that reside there. Because selenium associated with particulate material and invertebrate organisms can be transported downstream during intermittent high flows, elevated concentrations of selenium in the tissues of downstream fish could indicate upstream sources of selenium that require a more detailed evaluation of upstream conditions." This suggestion from Appendix K is intended to help understand the system and the downstream effects of selenium in the context of developing a site-specific criterion. It's not intended to demonstrate whether the upstream use is protected, but rather whether the criterion set upstream in the fishless water is going to be protective· of the fish communities downstream. In addition, the selenium criterion is an aquatic life criterion that is intended to protect the entire aquatic community, not just fish within the aquatic community. Given this, it is important to assess selenium within the water body where aquatic species occur, even if those aquatic species are invertebrates. By only assessing fishless waters with fish downstream, a situation that may harm invertebrates may be missed upstream, if the water column concentration is too high. The EPA does not recommend solely using fish tissue from the nearest downstream water to assess whether the criterion is met in the upstream water. 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 [footnote omitted]. If the state decides to use fish data from downstream to help inform their listing decision, the EPA recommends that they define downstream in its implementation guidance. Examples of some elements that need to be	[7] EPA (US Environmental Protection Agency). 2016. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016 (No. EPA 822-R-16-006). Washington, D.C.: Office of Water. Office of Science and Technology.

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			defined are: What constitutes a downstream water? Does it only refer to downstream within the same water body or does it refer to the proximate downstream water body? After what distance can data no longer be considered in the assessment? In a fishless water, consistent with the requirement in 40 CFR 130.7 to assemble and evaluate all readily available data and information, the EPA recommends that DEQ not disregard available water column data for assessment purposes. Given that the aquatic community in a fishless water varies from waters containing fish populations, the EPA suggests developing site-specific criteria for these waters. A criterion that reflects the unique situation of this ecosystem will protect this water body more appropriately and allow for more accurate assessment of attainment of designated uses. The EPA recommends the development of a site-specific criterion and assessing using that new criterion over assessing fishless waters by using downstream fish. In addition, it is unclear what is meant by "[assessing] compliance." Is this meant to refer to making listing decisions and deciding whether the water body is attaining the criterion or meant to refer to whether a facility is in compliance with a NPDES permit? The EPA recommends that states use the water column element to develop and establish WQBELs in NPDES permit limits. Permit compliance should then be assessed against the established WQBELs.	
12	210.01 287.01 287.02 287.03 287.04	1	**<u>Adoption of Appendix K as a Performance Based Approach for Deriving Site-Specific Water Column Criteria Elements</u>** The EPA is supportive of DEQ's adoption of Appendix K in EPA's *Aquatic Life Ambient Water Quality Criterion for Selenium - Freshwater 2016*	It's not clear to what EPA is referring to regarding individual actions or coordination of implementation programs. DEQ intends to develop comprehensive implementation guidance for the statewide selenium rule as well as the SSCs in Section 287, and DEQ will use this guidance to implement these criteria across programs. The guidance would not modify the statewide

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	287.05		[footnote omitted], by reference as a performance-based approach that derives site-specific water column targets to account for the most up-to-date data and information. Because comments on the site-specific water column element derived using the performance-based approach would be received in response to individual actions through each of the implementing programs this approach likely involves more coordination among the implementation programs to ensure that they are aiming to achieve the same desired condition in the water body. DEQ should consider including additional language noting that if alternate approaches other than Appendix K are used that such criteria will need to be treated individually as site-specific criteria consistent with the procedures described in DEQ rule at section 58.01.02.275. EPA discussed the performance-based approach to setting water quality standards at *EPA Review and Approval of State and Tribal Water Quality Standards*, 65 Fed. Reg. 24641, at 24648 (Apr. 27, 2000). Once again, the EPA recommends that DEQ develop additional guidance that would be helpful to entities developing site-specific water column elements using the performance-based approach.	rule, the SSCs, or the procedures for establishing new SSCs under Section 58.01.02.275. The particular methods used to define the statewide rule and all SSCs are based on Appendix K in EPA's Aquatic Life Ambient Water Quality Criterion for Selenium - Freshwater 2016. It is not necessary to repeat the procedures for establishing SSCs as part of this rulemaking, as that information is already provided in IDAPA 58.01.02.275.
13	210.01 287.01 287.02 287.03 287.04 287.05	1	In the *Draft Technical Support for Adopting and Implementing EPA's 2016 Selenium Criterion for Water Quality Standards* [footnote omitted], the EPA provided example language for adopting the procedures in Appendix K as a performance based approach for deriving water column criteria elements. That language is as follows: "Site-specific water column criteria elements will be derived using the mechanistic model and associated procedures laid out in appendix K of *Aquatic Life Ambient Water Quality Criterion/or Selenium-Freshwater 2016*. **To derive scientifically defensible site- specific water column criteria elements, appropriate input parameters (as described in Appendix K) will be selected to adequately represent the water**	Appendix K is incorporated into the proposed rule by reference and provides input parameters necessary for all methods it discusses. Therefore, it is not necessary to add language in Section 287 specifying the input parameters that will adequately represent the water body. SSC proposals will be expected to identify the approach used to derive the water column value and will be evaluated for consistency with Appendix K. We will not be adding language in rule to identify particular circumstances in which a method is appropriate. SSCs are derived on a case-by-case basis and site specific information and data should inform whether mechanistic or empirical BAF methods are appropriate.

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			body of interest." The EPA recommends that DEQ include additional language in Section 287 of the proposed rule similar to the above to specify that input parameters will adequately represent the water body. In addition, the EPA recommends DEQ specify in what circumstances they would use the mechanistic or empirical BAF method.	
14	287.01 287.02 287.03 287.04 287.05	1	For public transparency, DEQ should maintain a list of the resulting site-specific criteria on their publicly accessible website. DEQ has not discussed or provided details regarding how it intends to ensure the public as well as other agencies and programs that utilize the site-specific water column criteria resulting from use of the performance based approach would know the effective criteria for specific waters. EPA also encourages DEQ to coordinate closely with EPA when developing the first few studies to develop a water column element based on the performance- based approach.	Appendix K can be used to derive site-specific water column criteria for waters covered in subsection 287. For the statewide criterion, the water column values defined in the statewide rule apply. To clarify 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. The performance-based approaches outlined in subsection 287 are only accepted for waters with an approved SSC. Site-specific proposals that have been accepted as well as Water Quality Standards (IDAPA 58.01.02) are available through DEQ's website at http://www.deq.idaho.gov/58-0102-1701 and https://adminrules.idaho.gov/rules/current/58/0102.pdf. Effective criteria are publicly available through our website at https://adminrules.idaho.gov/rules/current/58/0102.pdf (as listed in the previous paragraph) and at http://www.deq.idaho.gov/water-quality/surface-water/standards/epa-actions-on-proposed-standards/ .
15	287.03 287.04	1	Executive Summary of the J .R. Simplot revised report (p. x) "The frequency component for this SSSC proposal is consistent with the overall IDEQ treatment of the frequency component in adoption of the 2016 National Criterion. IDAPA 58.01.02.010.15 defines the frequency of chronic criteria exceedance as follows '... Chronic criteria are expected to adequately protect the designated aquatic life	DEQ supports Simplot's response. Please also refer to our response to comments 1 and 2 that details frequency of exceedance. Simplot's Response: "Simplot will follow the State's guidance on the exceedance frequency issue for the tissue criterion element. The Hardy et al. (2010) study was referenced

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			use if not exceeded more than once in every three (3) years ...'" As mentioned previously, EPA recommends a frequency of "not to be exceeded" for fish tissue criterion elements, consistent with the EPA's 2016 national recommended selenium criterion. The frequency component of the fish tissue elements of the selenium criterion differs from the typical "once-in-three years on average" frequency of water column criteria because selenium is a bioaccumulative and the pathway for exposure is through the food web. Even in lotic systems, selenium is an element that is persistent in the ecosystem. It is expected to be present in the sediments and retained in the system for over some period of time. This creates the potential for selenium to continue to transfer into the food web and impact upper trophic levels, such as fish. A shorter exceedance frequency period will increase the proportion of the population that experiences reproductive effects over time and increases the variability in reproductive success within the population. There is not a lot of empirical information on which inorganic form of selenium is dominant in lotic systems. There is information in the literature on which selenium form is predominant in different sources of selenium [footnote omitted]. Fish accumulate selenium primarily via their diet in which the forms of selenium have been largely transformed from inorganic selenium to primarily proteinaceous selenium and seleno-amino acids. The recovery time of the fish population will depend on how fast a system recovers from a population level effect, such as reproductive impacts of selenium. Simplot has referenced Hardy et al. (2010) [footnote omitted] to support the rationale that a frequency of 1 in 3 years is appropriate for the fish tissue criterion elements of their proposed selenium criteria. In this study, laboratory fish were switched from a high selenium diet to a	simply to illustrate that depuration occurs, it occurs quickly when the selenium source is removed, and the recovery is not a 10 year time frame in lotic systems as USEPA suggested in its previous comment letter." Please see attached Simplot Response Letter to DEQ Concerning EPA Comments

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			control diet and the rate of depuration was observed. In natural situations selenium environmental concentration reductions would likely be a gradual process assuming clean-up efforts resulted in lower selenium inputs into the system. Hardy et al. (2010) concluded that there would be a lower (*of unknown magnitude*) depuration rate in the field that would vary by fish species. Given this information, this study is not comparable to the situation that fish at this site would be experiencing. In addition, this study had a number of treatment groups that only had a sample size of 2 at the completion of the study. This low sample size adds uncertainty to the conclusions of this study. Further, a controlled laboratory body burden depuration study with one food source and no sediment matrix, as reflected in the Hardy et al. (2010) study, may not reflect population level reproductive effects potentially occurring in the environment after sustained selenium exposures. EPA requests additional information justifying the appropriateness of the use of the 1-in-3 years exceedance frequency.	
16	287.03 287.04	1	(p. viii, Table ES-1, Footnote 1) The EPA recommends sampling and monitoring recommendations be addressed more comprehensively and separate from the regulatory language for the criteria. As stated previously, the EPA suggests more detailed information on monitoring and sampling considerations would be helpful and that DEQ provide such information in separate technical support materials.	As stated above, DEQ intends to address implementation of this rule in a subsequent guidance document. DEQ supports Simplot's Response. Simplot's Response: "Simplot will follow the State's guidance and recommendations on sampling and monitoring requirements for the criteria." Please see attached Simplot Response Letter to DEQ Concerning EPA Comments
17	287.03 287.04	1	<u>Section 2.3 Geographic Scope of Applicability and Section 5.2.3 North Fork Sage Creek and Pole Canyon Creek</u> (p. 9 and p. 23-24) The EPA has concerns regarding the application of	DEQ supports Simplot's Response. Simplot's Response:

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			the proposed SSC to North Fork Sage Creek and Pole Canyon Creek; areas that have not been sufficiently characterized in the SSC documentation. The report lacks the necessary detailed justification for applying the proposed SSC to these two additional water bodies as they were not included in the initial development of the study design and therefore have not been characterized. The EPA continues to recommend inclusion of data and an analysis of those data to corroborate the statement that the SSC is applicable to these streams. Although the revised Simplot report now contains additional citations to several documents, this does not address the EPA's previous comment, as no data were presented directly within the SSC document. Data from the cited CERCLA documents should be included and interpreted by Simplot in light of the SSC application, to ensure that they can be easily evaluated in the context of the proposed SSC. Additionally, an analysis of any applicable data and/or information such as water quality and biological survey results is needed in order to provide support to the stated assumption that the SSC for the downstream waters is also "appropriate" for North Fork Sage Creek and Pole Canyon Creek. Without such an analysis there remains a significant amount of uncertainty regarding whether bioaccumulation of selenium in these waters is similar or different compared to Hoopes Spring, South Fork Sage Creek and Sage Creek and ultimately whether the proposed criteria developed specifically for other waters wouldbe protective of aquatic life in North Fork Sage and Pole Canyon Creeks.	"In the revised SSSC proposal submitted to IDEQ in August 2017, Simplot provided references to existing work which the EPA possesses. Additional information on Pole Canyon Creek and North Fork Sage Creek was provided that described the water concentrations of selenium in North Fork Sage Creek as well Pole Canyon Creek (Figure 5 of the revised proposal). Historical documentation about Pole Canyon Creek's lack of fish and the species of fish that have been previously found in North Fork Sage Creek were also provided. Simplot will provide additional information about Pole Canyon Creek and North Fork Sage Creek in its revised SSSC to further address EPA's concerns." Please see attached Simplot Response Letter to DEQ Concerning EPA Comments
18	287.03 287.04	1	<u>Section 6.2 Whole Body</u> In order to determine a whole-body criterion element, a conversion factor (CF) calculated from the brown trout data was used to convert the egg-ovary criterion element into a whole body criterion element. The EPA has some concerns about this method of calculating a whole-body criterion element value. Conversion factors are based on physiological	DEQ supports Simplot's Response. Simplot's Response (footnotes omitted): "EPA, in its October 6 comments, continued to request changes to the species sensitivity distribution (SSD) approach for the SSSC. It is Simplot's opinion that the requested changes make the SSSC less site-specific, and therefore increase

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			processes and tend to be driven more by the species than the site. Therefore, it is more appropriate to create a new species sensitivity distribution (SSD) of whole body species mean chronic values (SMCVs). The whole body SMCVs could be calculated by converting each egg-ovary SMCV to a whole body SMCV using a species-specific CF or a whole body SMCV that was directly measured could be used. This whole-body SSD should be used to calculate the whole-body criterion element using the 4 most sensitive species as described in the 1985 Guidelines (EPA PB85-227049). For purposes of comparison, EPA calculated what the whole body criterion would be after applying EPA's 2016 CFs to the Simplot egg-ovary SSD. Simplot's current proposed whole body criterion is 13.63 mg/kg dw selenium, whereas using the method stated above, the whole-body criterion would be 9 .87 mg/kg dw selenium. The EPA recommends that species specific CFs be utilized to develop a SSD for whole body selenium in order to determine the site specific whole body criterion element. Currently, Simplot is utilizing the brown trout specific CF to convert the egg-ovary criterion element, which was derived from an SSD with multiple species, to the whole body criterion element. As CFs are specific to species, using one species specific CF to convert a criterion element intended for all species at the location is problematic. The influence of site is less important than species when considering CF values. Simplot contends that the brown trout CF should be utilized because brown trout is the most sensitive species at the site and that the egg-ovary is the most sensitive end point for this species. While it is true that the egg-ovary is the most sensitive end point and brown trout is the most sensitive species with respect to that end point, brown trout is not	uncertainty that any calculated criteria values reflect site-specific conditions. Therefore, Simplot has opted to adjust the proposed SSSC for Hoopes Spring/Sage Creek and Crow Creek to a most sensitive species approach. Using the most-sensitive species approach is consistent with EPA's 2016 National Criterion on selenium as well as recalculation procedure guidance (EPA 1994; 2013). Idaho water quality regulations allow a most sensitive species approach to setting site-specific water quality criteria." "Simplot maintains that using the brown trout CF and the SSD-derived egg/ovary EC10 is an adequately protective and scientifically defensible method for the species assemblage at this Site. However, given EPA's other comments on the exclusion of other species (noted below) in the primary egg/ovary criterion derivation, as suggested by EPA, Simplot has chosen to utilize a most-sensitive species approach for the SSSC proposal. This approach will eliminate SSD-related factors cited in EPA comments. The revised whole body criterion elements will be based on the most sensitive species for the respective areas. <u>Hoopes Spring/Sage Creek</u> - Whole-body criterion = 13.6 mg/kg dw <u>Crow Creek</u> - Whole body criterion= 12.5 mg/kg dw (based on rainbow trout). Please see attached Simplot Response Letter to DEQ Concerning EPA Comments

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			the most sensitive species with respect to the whole-body endpoint. The genus *Oncorhynchus* is the most sensitive genus with respect to the whole-body endpoint, with rainbow trout being the most sensitive species. Converting from an egg-ovary number derived from the site specific SSD, which utilizes data from multiple species, to a whole-body number using only the CF from brown trout is not appropriate. The resulting criterion element derived in this manner would not be protective of rainbow trout. Simplot also contends that the use of the brown trout CF is appropriate because brown trout will be the species sampled for monitoring. While this again may be true, a criterion should be designed to protect all species within a site, not designed to reflect what species will be monitored. The use of species specific CFs is more appropriate for developing a whole-body criterion element that is protective of the entire community.	
19	287.03 287.04	1	<u>Tables</u> Table 1: The presence/absence data presented in Table 1 is useful for demonstrating what species are present at these sites. Is there corresponding abundance data available? Also, what time of year were these fish surveyed and with what methods?	DEQ supports Simplot's Response. Simplot's Response [footnote omitted]: "As noted in the SSSC proposal, all of these data have been documented in the various reports submitted to the SSSC Work Group of which the EPA (Region 10 and headquarters) has been an active participant. The Technical Support Document (Formation 2012) contains all of the data for fish assessments from 2006 to 2008 but does not include data from 2009 to 2011. From 2006 to 2008, fish were sampled during spring and late summer/fall with sampling beginning in the fall of 2006 and concluding in the fall of 2008. For the 2009 to 2011 sampling, all sampling was conducted in late summer/fall. All fish were captured using electrofishing methods as part of three pass removal population survey estimates. As part of its revised SSSC

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				proposal, Simplot will include an additional appendix of fish data to address all of the data considered in this SSSC proposal." Please see attached Simplot Response Letter to DEQ Concerning EPA Comments
20	287.03 287.04	1	Table 5: The EPA has several concerns about the SSD that was used to derive the egg-ovary selenium criterion element. First, the EPA has concerns over the use of SMCV s in this SSD as opposed to using genus mean chronic values (GMCVs). When creating an SSD, EPA has recommended, in the 1985 Guidelines methodology document, using GMCVs rather than SMCVs as species within a genus tend to be more similar toxicologically than species in different genera. Using GMCVs rather than SMCVs prevents data sets from being biased by an overabundance of species in one or a few genera and artificially elevating the "N" in the regression analysis. However, if the State believes that all the species present within this site have been identified, then it may be appropriate to use SMCVs to calculate the criterion. The EPA also has concerns about some of the species that were included in the SSD. Simplot included some species in their SSD that EPA did not include in the criterion derivation due to the inability to effectively characterize an EC_{10} value for the species based on currently available data. These species include the Yellowstone cutthroat trout and white sucker. The EPA found that the Yellowstone cutthroat trout data were highly variable and therefore a clear effect value could not be calculated from these data. While Simplot has indicated that these data have been reevaluated with a modified data set, this new data set also still has a large amount of variability. In addition, the asymptote of the fitted curve	DEQ supports Simplot's Response. Simplot's Response (footnotes omitted): "Simplot's Revised SSSC proposal will eliminate the SSD approach and use the most sensitive species approach to derive the egg/ovary and whole body criterion elements. Because brown trout is the most sensitive species with respect to the egg/ovary element of the criterion, there should be no concern over the species mentioned above. Based on information in USEPA (2016) Yellowstone cutthroat trout and white sucker indicate no observed effects at selenium concentrations that are greater than 20.5 mg/kg dw. For the sculpin data, Lo et al. (2014) reports a NOEC value of >22 mg/kg dw eggs. The zero value USEPA commented on is based on nominal addition of selenium to the experimental treatment diet, and could be characterized as "no added selenium'. As far as the NOEC being based on the maximum value rather than the average (as suggested in EPA's Comment), Simplot notes that USEPA (2016) includes numerous instances where EPA cited a single maximum value as the NOEC for studies included in the criterion derivation process and for studies reviewed but excluded in the derivation process. The most notable example is the brown trout whole body value, which is based on a single value and called the highest no observed effect concentration (HNOEC). In the Carolina Power and Light (1997) study, USEPA set the NOEC at 24.6 mg/kg, a single value in the exposure group. By

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			shows that the proportion of the larvae that were normal and surviving was about 30%, which is a very low value to establish as a baseline. Also, three data points were removed in order to establish this fit. EPA requests additional statistical analysis to demonstrate that these points were in fact outliers and should be removed from the data set. The EPA also decided not to include the white sucker data (de Rosemond et al. 2005 study [footnote omitted]) in the 2016 selenium criterion derivation, as this study did not have a control and a clear effect level was not observed in this study. The lack of a control treatment in this study complicates the interpretation of this study as certain types of deformities were classified as naturally occurring and were not included in the analyses of effects. Without a control, it cannot be confirmed that the removal of the embryological deformities from the analysis was appropriate. Given these complications, definitive conclusions cannot be drawn from this study. For additional support, Simplot references the Muscatello and Janz 2009 study [footnote omitted], where white sucker eggs had concentrations of selenium of 4.86 ± 0.52 mg/kg dw for exposed sites versus 1.94 ± 0.25 mg/kg dw for reference sites. In this study, only edema was higher for fry from the exposed site. As the exposure concentration in this study is much lower than the proposed egg-ovary criterion of 19.9 mg/kg dw, it is unclear how this study lends support for the use of the white sucker data or the protectiveness of the proposed criterion element. Regarding the sculpin data, EPA appreciates the additional information included in Appendix B on Lo et al. (2014) [footnote omitted] and the existing sculpin population, age class, and whole body selenium data. EPA remains concerned about the inclusion of the sculpin data in Simplot's SSD. With the limited information that is available, it is	definition, the NOEC is the highest concentration where no effects are observed. At a minimum, the sculpin data indicate that this genus is less sensitive than brown trout. The supporting population data corroborate (based on a whole body basis) that sculpins from the Site are not particularly sensitive to selenium. Figure 1 of Appendix B does not show the Deer Creek location. A revised Appendix B Figure 1 will show this location. However, Figure 3 in the main text document does show the location. Deer Creek is a background location, with a naturally present mineralized zone where weathering contributes to occasional increases in selenium in the Deer Creek watershed. It is not considered a reference area. All of this is documented in a previous report (Formation 2012). There are multiple years of data from reference sites and background sites. The comparisons being made are to CC-350 downstream of Deer Creek because it is the location with the longest most consistent data set. Other reference and background sites have been sample at different times over the past 11 plus years. The Crow Creek site at CC-350 is also an integrative location of natural background selenium and non-selenium related impacts (e.g., sedimentation, grazing impacts, etc.). Using an upstream background site for aquatic ecology and water quality based decisions has long been a standard practice." Please see attached Simplot Response Letter to DEQ Concerning EPA Comments

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			difficult to give a comprehensive review. One potential issue is the control group being exposed to 0 mg/kg selenium. Since selenium is a micro nutrient; this would likely result in some decline in fish health unless selenium was supplemented or present in their diet. Additionally, based on Simplot's summary, no significant adverse effects were observed for hatching success, fry survival, or deformities and the authors of the study concluded that the NOEC for egg tissue was greater than 22.0 mg/kg selenium dw (maximum concentration observed in eggs), resulting in an unbounded NOEC. EPA believes that the NOEC should be the mean concentration of all the fish in the exposure group that were no different from the controls, and that it isn't appropriate to use one fish from the exposure group to represent the NOEC. For EPA to fully assess the Lo et al. (2014) study, more details on this study are still needed. For the reasons stated above, EPA does not agree with the inclusion of the sculpin data in Simplot's SSD and subsequent site-specific criterion. EPA also reviewed the site-specific sculpin data provided in Appendix B of Simplot's proposal. While the field data appears to suggest that sculpin populations are performing similarly in reference vs. selenium impacted sites, EPA has a few questions/comments regarding this assessment: 1) EPA would like to know where the Deer Creek monitoring site is and why the Deer Creek data were not used on a more consistent basis across all site comparisons? Figure E2 shows it upstream of impacted sites and a tributary of Crow Creek. Deer Creek is said to be a reference site, but selenium water concentrations are higher there than any of the other sites (Figure 2, App B). This is something EPA would like to see	

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			explained in more detail. 2) EPA is concerned that comparisons between reference sites and impacted sites may not be fully representative. The reference sites are generally only from one creek which is concerning in terms of a lack of experimental replication. In other words, fish populations in one creek may be affected by factors other than selenium levels; therefore, more than one reference location (creek) is important to more reliably determine if selenium has affected fish populations. Additionally, the reference site sampling locations that are closer to impacted areas show higher selenium concentrations in sculpin tissue (e.g., CC-350 has higher selenium concentrations than CC-75). This suggests that some of the reference sites are in fact not truly reference sites.	
21	287.01 287.02	1	<u>Section 3.1 Resident Fish in the Upper Blackfoot River Watershed</u> The proposed lower site boundary for the selenium SSC for the Upper Blackfoot River is at the river's mouth, where it enters the Blackfoot Reservoir. Given the selenium criteria in the reservoir (a downstream lentic waterbody) are more stringent that the proposed selenium SSC in the river it would be important to discuss how the proposed selenium SSC would be protective of the adfluvial trout in this area. Yellowstone cutthroat trout exhibit three life history strategies: 1) a fluvial life history in which fish feed and grow in larger rivers such as the Blackfoot River and then migrate to tributaries for spawning and rearing 2) an adfluvial life history in which individuals feed and grow in lakes before migrating to tributaries for spawning and rearing, and 3) a resident form in which fish live their entire life cycle in the tributary streams. It is the EPA's understanding the Blackfoot Reservoir provides lacustrine habitat for an adfluvial form of Yellowstone cutthroat trout that resides	Regarding the protection of downstream waters, please see Response to Comment 6. Additionally, DEQ supports Nu-West's Response below. Nu-West Response: "In the Upper Blackfoot River (UBR) watershed, Nu-West has proposed Se [selenium] SSC for fish-tissue elements that reflect the resident fish assemblage, and site-specific water-column values for select streams that contain sufficient data to calculate fish bioaccumulation factors (BAFs). For other streams in the UBR watershed not specifically included in the proposal, Nu-West is not proposing site- specific water column values. In these streams, Nu-West understands the statewide water-column value applies. The protectiveness of the proposed Se SSC for tissue elements and the statewide water-column values to adfluvial Yellowstone cutthroat trout (YCT) and life histories of all resident salmonids in the Blackfoot Reservoir is discussed below.

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			in the reservoir for most of its life before migrating upstream in the spring to spawn and rear in the upper tributaries. Therefore an important concern is whether the proposed selenium SSC is protective of any resident species with an adfluvial life history and that are or could be present at the site. The EPA recommends that the protectiveness of the proposed SSC to the adfluvial species be addressed and discussed in the report.	As discussed in the Nu-West proposal, 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 USEPA (2016) and summarized in the Nu-West proposal, rainbow trout are the most sensitive resident fish in the UBR watershed. Therefore, the proposed tissue-based Se 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 the 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 Se SSC for the UBR watershed are also protective of all salmonids, including adfluvial forms, in the Blackfoot Reservoir. Nu-West is not proposing site-specific Se water-column values for the Upper Blackfoot River (see above) or the Blackfoot Reservoir. As a result, statewide Se water-column values for lotic and lentic waterbodies will apply to each waterbody. Protectiveness of the EPA-recommended and/or Idaho 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 and other states that adopt the USEPA (2016) Se criteria. The Nu-West proposal discusses how downstream waters can be assessed for protectiveness, per USEPA and IDAPA regulations: *Enforcement of the statewide Se criterion in waters downstream of the Site will ensure the protectiveness of the proposed SSC to those downstream waters. That enforcement could encompass appropriate actions in upstream waters as specified in the IDAPA, including potentially those required by Section 303(d) of the Clean Water Act, if required to protect beneficial uses (includes resident fish species) in the downstream waters.*

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				See attached Nu-West Response Letter to DEQ Concerning EPA Comments
22	287.01 287.02	1	Section 3.2 Resident Fish in Georgetown Creek Watershed Please provide additional information about the methods that were utilized to conduct each fish survey. Descriptions of several of the surveys only refer to fish surveys being conducted (for both the Upper Blackfoot River watershed and the Georgetown Creek Watershed). Without additional information about how those surveys were conducted, EPA is unable to evaluate how comprehensive the fish surveys were and how appropriate the species data are for developing these site-specific criteria. (p. 4) Please specify the specific dates (at least to the level of month) and exact locations of surveys used to summarize data for Table 2.	DEQ supports Nu-West's Response. Nu-West Response: "The proposal has been revised to include additional information on fish surveys, including sampling methods, dates, and locations as requested. While methods and documentation vary in the fish surveys conducted in the UBR watershed and Georgetown Creek, the list of resident fish at each Site is consistent through time regardless of sampling methods or entity performing the surveys." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
23	287.01 287.02	1	Section 4 Proposed Site-Specific Criteria for Selenium Section 4.1 Summary of Approach to Developing a Fish-Tissue SSC (Table 3) Please provide site-specific water column criterion elements that correspond with proposed fish tissue criterion elements. Nu-West is currently proposing site-specific selenium criteria, for which they have proposed modified fish tissue criterion elements. In addition, NuWest is proposing to modify the water column criterion elements after this rulemaking, utilizing the performance-based approach that Idaho is proposing to adopt for site-specific adjustments to the water column elements in the statewide selenium criterion. EPA does not believe this is appropriate. The proposed SSC should reflect all 4 elements of the selenium criterion to be protective of aquatic life at the site. In addition, the performance-based approach is appropriate for modifying water column criterion elements utilizing the state-wide fish tissue criterion at a future date. In this case, when Nu-West is proposing site-specific criteria elements for fish tissue, there appears no reason for Nu-West to be unable to develop and propose site-specific water column	DEQ supports Nu-West's Response. Nu-West Response: "In the July 2017 Nu-West proposal for SSC, Nu-West proposed site-specific water- column values for streams in the UBR and Georgetown Creek watersheds that were sampled for fish- tissue Se and surface-water Se. In streams without sufficient data to calculate fish BAFs, Nu-West has not proposed site-specific water-column values, and understands the water-column elements applicable statewide would be in effect." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments

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			translations. In the absence of such water-column elements, the EPA expects that the water column elements applicable statewide would be in effect in the waters covered by this site specific proposal.	
24	287.01 287.02	1	(p. 5, footnote 7) A description of the hydrology at each site would better qualify the statement in this footnote - *i.e.,* 'In streams or reaches of streams where fish are naturally absent due to low flow conditions.'	DEQ supports Nu-West's Response. Nu-West Response: "Additional text describing the hydrology of No Name Creek (the fishless stream included in this proposal) has been added to Section 6.2.2.1: *No Name Creek is an intermittent tributary to Angus Creek that does not support fish populations due to persistent low-flow conditions, dry stream channel, and its lack of permanent connection with Angus Creek."* Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
25	287.01 287.02	1	(p. 5) To perform a recalculation of the 304(a) criterion, the EPA recommends using the 2013 recalculation method (https://www.epa.gov/sites/production/files/2015-08/documents/revised_deletion_process_for_the_site-specific_recalculation_procedure_for_aquatic_life_criteria.pdf) to determine which species should be retained in the SSD, and then calculating the criterion using the four most sensitive genera according to the 1985 aquatic life criterion guidelines (https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-gualitycriteria.pdf). Using this process ensures that an appropriate regression is utilized to derive a criterion that is protective of 95% of the genera. The method often results in a value that is slightly lower than the most sensitive GMCV. For selenium, the dose-response curve is very steep, so a small increase in selenium concentration results in a disproportionately large effect on the organism. Given this, the EPA encourages the use of this conservative	DEQ supports Nu-West's Response. Nu-West Response: "The reference to page 5 in this comment is applicable to the April 2017 version of the Nu-West proposal for SSC. The July 2017 revised proposal provided additional rationale for use of the most sensitive species' SMCV (beginning on page 6). The proposed SSC for tissue elements should provide a similar or greater level of protection as criteria calculated from sensitivity distributions (i.e., the SSC is protective of 100% vs 95% of genera using the 5^{th} percentile of a genus sensitivity distribution). Nu-West believes 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 the Nu- West SSC proposal). The most-sensitive species' SMCV is proposed for the UBR and Georgetown Creek watersheds because each Site supports a naturally-limited fish assemblage, as documented by extensive fish surveys, and the sensitivity of all resident fish is documented to demonstrate the protectiveness of the proposed SSC to all residents."

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			methodology for the derivation of the Nu-West fish tissue criterion elements. When this method is used the criterion for Georgetown Creek would be an egg-ovary criterion element of 20.60 mg selenium/kg dw, a muscle criterion element of 13.58 mg selenium/kg dw, and a whole-body criterion element of 10.27 mg selenium/kg dw. The criterion for Upper Blackfoot River using this method would be an egg-ovary criterion element of 22.31 mg selenium/kg dw, a muscle criterion element of 12.9 mg selenium/kg dw, and a whole-body criterion element of 9.86 mg selenium/kg dw. These values are generally more conservative than the currently proposed criteria. The currently proposed criterion for Georgetown Creek is an egg-ovary criterion element of 21.0 mg selenium/kg dw, a muscle criterion element of 12.8 mg/kg dw, and a whole-body criterion element of 12.5 mg selenium/kg dw. The currently proposed criterion for the Upper Blackfoot River is an egg-ovary criterion element of 24.5 mg selenium/kg dw, a muscle criterion element of 12.8 mg/kg dw, and a whole body criterion element of 12.5 mg selenium/kg dw. While EPA recommends this methodology of criterion derivation, the use of the most sensitive species' SMCV may be appropriate if the State believes that all species within these sites have been identified and incorporated in the calculation.	Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
26	287.01 287.02	1	Section 5.3.1 Genus Catostomus The EPA would like to encourage Nu-West to use caution when interpreting the data from the de Rosemond et al. 2005 study. No control treatment was present in this study. The lack of controls complicates the interpretation of this study as certain types of deformities were classified as naturally occurring and were not included in the analyses of effects. Given these complications, it is difficult to draw definitive conclusions from this study. While collectively the studies presented for the family *Catosomidae* add some support to the demonstration that the proposed criteria are protective of this species,	DEQ supports Nu-West's Response. Nu-West Response: "Nu-West is unclear what deformities EPA is referring to as not being included in the analysis of effects. All deformities are reported in Table 2 of de Rosemond et al. (2005) and were considered in the Nu-West analysis of effects. EPA is correct that a control treatment was not evaluated in this study and this was pointed out as a weakness in the Nu-West data analysis. Nu-West agrees that this study alone might not be sufficient to conclude Catastomidae will be protected by the proposed SSC. However, the additional studies (see Table 9) collectively provide reasonable evidence that

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			this information is not conclusive.	Catastomidae will be protected by the proposed SSC." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
27	287.01 287.02	1	Section 6 Site-Specific Water Column Selenium Concentrations It appears based on the report that for the derivation of the BAFs, multiple sculpin species were collected, as sculpin were only identified as "sculpin spp." rather than as a specific species. For deriving BAFs it is not appropriate to average together data from different species. If the fish were identified down to species level, then the sculpin data should be divided into its corresponding species.	DEQ supports Nu-West's Response. Nu-West Response: "This comment is applicable to fish-tissue data presented for Sheep Creek (Table 11) and Angus Creek (Table 12), as sculpin species are not resident to Georgetown Creek (Section 3.2). Freshwater sculpin species are difficult to differentiate in the field; in fact, morphological differences between some species are so subtle that many sculpin species are rarely differentiated (USFS:https://www.fs.fed.us/rm/boise/AWAE/projects/fish_tissue_collection.html#pubs). It is likely the sculpin species reported for Sheep Creek and Angus Creek between 2014-2016 were either mottled sculpin (*Cottus bairdii*) or Paiute sculpin (*C. beldingii*), as both species have been identified in Angus Creek and Sheep Creek in previous studies (see Attachment 1). Sculpin specimens were collected during Nu-West biomonitoring from these streams, preserved in the field, and subsequently identified as Paiute sculpin in the laboratory under a microscope. However, because both species occur in these streams, are difficult to differentiate in the field, and often occur together within the same stream reaches, it is possible the Se tissue data comprise both species. *C. bairdii* and *C. beldingii* exhibit very similar life cycles, habitat preferences, and feeding ecologies. Both species spawn in the spring, are typically found in rubble and gravel riffles of cold-water streams, and feed primarily on aquatic insect larvae (www.fishbase.org; http://calfish.ucdavis.edu/species/?ds=241&uid=63). Given their similar feeding ecologies, the fact that both sculpin species occur in Angus Creek and Sheep Creek and thus feed on the same insect populations (receiving a similar level of Se exposure), and recognizing the difficulty in differentiating these

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				species, Nu-West believes it is appropriate to calculate a sculpin BAF from the existing data, as presented in the proposal. Sculpin BAFs were not incorporated in the derivation of site-specific water-column elements for Sheep Creek (or Georgetown Creek since sculpin are not resident in this stream). Nu-West included sculpin BAFs in the derivation of the site-specific water-column element for Angus Creek because the existing data suggests sculpin represent a conservative surrogate for juvenile trout (see response to EPA comments on Section 6.2.2.1)." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
28	287.01 287.02	1	Nu-West recommends in their report that "to correctly implement these site-specific water column values, it is necessary to utilize average results (i.e., not single values) of ambient dissolved selenium for comparison to the Ctarget and specifically that those results be averaged in the same way dissolved selenium concentrations were averaged to calculate site-specific BAFs." This language implies that Nu-West expects water concentrations to be averaged over the year from peak flow and base flow events. However, the frequency of the water column criterion value is a 30-day average and will be applicable as such. Assessment of the criterion should reflect the duration component of the criterion and should follow state implementation guidelines. EPA cautions that averaging the peak flow and the base flow water concentrations may result in missing the impacts of a large pulse of selenium. If that pulse occurs prior to a spawning event and affects reproductive females, it may result in reproductive impacts.	DEQ supports Nu-West's Response. Nu-West Response: "Nu-West proposed to implement the site-specific water column values by averaging surface water concentrations in the same way surface water concentrations were averaged (over the year) to calculate the fish BAFs. This ensured consistency between evaluating a site-specific water column element with methods used to derive this element. Nu-West understands that EPA has recommended a 30-d duration component for the water-column element and any SSC will be applicable as such. Therefore, in response to EPA's comment, and to better incorporate Se-runoff periods, Nu-West has revised the site-specific water column element for Angus Creek, Sheep Creek, and Georgetown Creek using BAFs calculated from the 30-d average Se concentration during spring runoff conditions for each stream. (Table 10, 11, 12 in response)" Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
29	287.01	1	Table 10.	DEQ supports Nu-West's Response.

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	287.02		For Site BGTC-1, EPA would recommend calculating the water column criterion element solely from the brook trout data, rather than combining the brook trout data and the rainbow trout data. As the brook trout BAF is higher than the rainbow trout, this species is more sensitive, and a lower criterion is more appropriate to protect this species. When the data from the two fish species are combined, the resulting water column criterion element is likely not protective of brook trout.	Nu-West Response: "It is incorrect to state that brook trout are more sensitive due to a higher BAF. The toxicity data presented in USEPA (2016) show that brook trout are much less sensitive than rainbow trout, and USEPA (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 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." See attached Nu-West Response Letter to DEQ Concerning EPA Comments
30	287.01 287.02	1	Section 6.2.1 Sheep Creek Please define the specific boundaries of the site-specific water column criterion elements. The water column value for Sheep Creek starts downstream of the confluence with South Fork Sheep Creek, but it is not stated how far down Sheep Creek this criterion applies.	DEQ supports Nu-West's Response. Nu-West Response: "The following text has been inserted in Section 6.2.1 to describe the boundary of the site-specific water column element in Sheep Creek: *The site-specific water column value for Sheep Creek is 11.9 µg Se/L. The geographic boundary of this element is Sheep Creek from its confluence with South Fork Sheep Creek to its confluence with Lanes Creek (i.e., the same reach sampled to develop this value)."* Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
31	287.01 287.02	1	Section 6.2.2.1 No Name Creek The language referenced from Appendix K is intended to help understand the system and the downstream effects of selenium in the context of developing a site-specific criterion. It's not intended to indicate that fish tissue downstream should be used for criterion	DEQ supports Nu-West's Response below. Nu-West Response: "Nu-West appreciates EPA's comment on the language referenced in Appendix K as it relates to the proposed site-specific water column element for the fishless No Name Creek. The fishless stream translator

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			development in a fishless water, but rather whether the criterion set upstream in the fishless water is going to be protective of the fish communities downstream. In addition, the selenium criterion is an aquatic life criterion that is intended to protect the entire aquatic community, not just fish within the aquatic community. The method that was utilized to derive the water column criterion element for No Name Creek may result in a value that is not appropriate for that water body and is not protective of the entire aquatic community within that fishless water body. EPA requests that Nu-West provide additional information that demonstrates that the proposed water column criterion elements for No Name Creek are protective of the entire aquatic community of this creek.	presented for No Name Creek was developed specifically to incorporate a fish threshold, because fish are the most sensitive taxa group (USEPA 2016). 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, Nu-West understood that stakeholders might prefer a numeric water column element for No Name Creek and therefore proposed water column values considering the available information of Se toxicity to aquatic life. Nu-West also understand EPA's request to provide additional information to demonstrate the proposed water column element for No Name Creek is protective of the limited aquatic community resident to No Name Creek. 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 annual Data Summary Reports (GEI 2016a, GEI 2016b, GEI 2016c, Arcadis 2017). The benthic macroinvertebrate [BMI] community was quantitatively sampled each year according to methods outlined in IDEQ (2013) and agency-approved Work Plans / Quality Assurance Project Plans. In brief, at each No Name Creek reach with water present, three replicate samples of BMIs were collected from riffle habitat using a Hess sampler (to capture small-scale variability of BMI populations and provide additional statistical power in interpreting community results); a sweep sample was also collected from non-riffle habitats to provide additional information on the BMI community. BMI samples were preserved in the field and transported to the laboratory, where invertebrates were sorted from debris, counted, and identified to the lowest practical taxonomic level (most often to the species level). Nu-West analyzed BMI parameters relative to ambient surface water Se

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				concentrations to demonstrate the water column element proposed for No Name Creek is also protective of the BMI community resident to No Name Creek. Figure 1 presents this evaluation. 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 proposed site-specific water column element 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 proposed 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 indicates tolerance of invertebrates to Se and is consistent with information summarized by USEPA (2016), as described below. The data and interpretation of Se toxicity to aquatic life presented by USEPA (2016) clearly shows that invertebrates are tolerant of Se, especially when compared with 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. USEPA (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." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments

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32	287.01 287.02	1	Table 12 and 13. In order to calculate the water column criterion elements for Angus Creek and No Name Creek, Nu-West has combined fish tissue data from two species, cutthroat trout and sculpin. EPA does not recommend combining data from the two species in order to calculate the water column criterion element. Rather, EPA recommends deriving a water column criterion element for each species and then selecting the more conservative value, so that protection of the more sensitive species is assured. EPA recognizes that for Angus Creek limited data were available, but that likely indicates that more data are necessary for deriving this criterion element rather than combining species data.	DEQ supports Nu-West's Response below. Nu-West Response: "Nu-West understands EPA's recommendation against combining data from two species when calculating a water column element. However, Nu-West believes the approach is reasonable for Angus Creek for several reasons. 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 (IDEQ 2016). Similar to sculpin species, juvenile trout feed primarily on invertebrates. Consequently, both species represent trophic level 3 consumers with similar feeding ecologies. For Angus Creek, Nu-West carefully evaluated sculpin and YCT tissue data that were temporally and spatially co-located (i.e., collected from the same location and date in Angus Creek; see Tables 12) and determined that whole-body Se concentrations were not statistically different ($p > 0.05$) between the species. As a result, BAFs are not statistically different between these species in Angus Creek. In addition, Nu-West evaluated the relationship between co-located sculpin and YCT tissue data collected in Sheep Creek (Table 11). The purpose of this analysis was to further understand potential species-specific differences between trout and sculpin using a broader dataset of co-located tissue samples in the UBR watershed. The following figure shows the relationship between whole-body Se concentrations for co- located samples of sculpin and YCT in Sheep Creek and Angus Creek (the solid 1:1 line represents unity). Points to the left of the solid 1:1 line represent sculpin WB Se concentrations that are greater than co- located trout concentrations. These data suggest that sculpin represent a conservative surrogate for trout species when deriving a site-specific water column element for Angus Creek. In contrast, sculpin data were not included in the calculation of the site-specific water column value for

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				Sheep Creek since trout were collected at each sampling location and each year in this stream. Because sculpin and YCT Se concentrations in Angus Creek are similar (not statistically different), and thus specifies-specific BAFs are similar (not statistically different), it is unsurprising that site-specific water column elements calculating from YCT data exclusively or combining YCT and sculpin data are very similar (i.e., 3.4 vs 3.5 µg Se/L, respectively). Therefore, and for the above reasons, Nu-West believes the recommended approach and proposed water-column element for Angus Creek (3.5 µg Se/L) is reasonable and protective to resident YCT." Please see attached Nu-West Response Letter to DEQ Concerning EPA Comments
33	287.01 287.02	1	Table 13. Fish tissue data for the development of the site-specific criterion for No Name Creek were a combination of fish sampled at BAC-2 and BAC-1. While it appears that BAC-2 is just downstream of the confluence of No Name Creek, BAC-1 appears to be much farther downstream. How far is BAC-1 from No Name Creek and why is it appropriate to consider fish tissue from this location in criterion development?	DEQ supports Nu-West's Response. Nu-West Response: "Reaches for fish-sampling locations were established as 30 times the average bankfull width or a minimum of 300 feet per IDEQ protocol (IDEQ 2013). The distance between BAC-1 and BAC-2 over the three years of sampling was approximately 2 miles. Nu-West believes it is appropriate to consider fish tissue from both locations in developing the No Name Creek water column element because each reach is downstream of No Name Creek and receives inflows from No Name Creek, juvenile YCT trout are not sedentary but likely move between reaches (Young 2008), and the site-specific water element for No Name Creek is similar regardless of whether locations are combined. For example, when fish from BAC-1 and BAC-2 are combined, the proposed water column element for No Name Creek is 46.1 µg Se/L. Using only fish from BAC-2, the water column element for No Name Creek is 50.2 µg Se/L."

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				See attached Nu-West Response Letter to DEQ Concerning EPA Comments
34	287.01 287.02	1	Section 6.3 Implementation EPA regulations require states to assemble and evaluate all existing and readily available data and information to make assessment decisions for the 303(d) list. This means considering either water column data or fish tissue data, depending on which are available. If both are available, then the fish tissue data will supersede the water column data. The EPA does not support delaying an assessment decision due to the lack of fish tissue data, although future fish tissue data can be used to refine the assessment or demonstrate that a water body is not impaired. Nu-West has suggested that when new data are collected during compliance monitoring, that they be used to update the site-specific water column criterion element. If this recalculation is conducted, this should be submitted to the EPA for approval if the BAF method is used to calculate the water column criterion elements utilizing the site-specific fish tissue criterion elements rather than the state-wide fish tissue criterion elements.	DEQ clarifies that the intent of the language provided in Section 6.3 of Nu-West's proposal was to affirm the hierarchy of the selenium 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).
35	287.01 287.02	1	Figure 1. Please define what the black lines represent and what the red and black line represents. Also please indicate where the mines are located on this map.	DEQ supports Nu-West's Response. Figure 1 of the revised Nu-West proposal (November 2017) defines black lines as watershed boundaries and red and black lines as state highways. Mine locations also are shown on the revised Figure 1.
36	287.01 287.02	1	Appendix 1. Please include what time of year water samples were collected in this table caption (which periods of time were averaged).	DEQ supports Nu-West's Response. The revised proposal presents the dates of all water samples in Table B-2 of Appendix B.
37	287.01 287.02	1	Attachment 1 and 2. Please provide copies of the actual species lists for the fish surveys. Please clarify whether all fish species identified in these surveys are listed in these tables or only those that were consistently found at these	DEQ supports Nu-West's Response. Appendix A of the Nu-West proposal provides copies of actual species lists (and counts) from the available fish surveys conducted in the Upper Blackfoot

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			sites.	River and Georgetown Creek watersheds. All species identified in these surveys are included in Appendix A tables.
38	210.01 287.01 287.02 287.03 287.04 287.05	2	The Idaho Department of Fish and Game (IDFG) appreciates the opportunity to comment on the proposed rule for statewide and site specific selenium criteria. The proposed rule includes fish size and fish sample size criteria. Based on our analysis of whole body fish tissue concentrations collected in southeast Idaho, IDFG recommends increasing the proposed sample size from 5 to 10 fish and to modify the fish size criteria for trout and char to minimize biases associated with spawning migrations. Detailed information is included in their comment letter.	We would like to thank IDFG for their comment. The data and analyses that IDFG presented in their comment letter are compelling. We agree 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 selenium concentration estimates; however, we have to balance that with what is feasible to collect throughout the state so that we can make for purposes of evaluating water quality. For example, based on the heavy metals monitoring conducted in 2006-2007, fish tissue samples were calculated using a composite sample of an average of 5±3 (SE) individuals of the same species. In lakes, 13 of our 89 samples consisted of less than the desired 10 fish per composite; two were only a single fish. We had to exhaust our entire random draw of 100 lakes to get 50 from which we were able to obtain samples. So while we agree a sample size of 10 individuals would allow for a statistically sound and biologically representative mean value, DEQ is concerned this would have negative impacts on fish populations, especially in streams with low population numbers, and would be logistically unreasonable to implement on a statewide basis. However, nothing in the proposed rule prohibits samples consisting of more than 5 fish. 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 guidance document that details the

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				implementation of this rule. DEQ will collaborate with IDFG to provide guidance that is both feasible and representative of selenium concentrations in a fish population.
39	210.01 287.01 287.02 287.03 287.04 287.05	3	IMA appreciates working the diverse interests that have been gathered to consider the changes to this rule. For months, DEQ and stakeholders have negotiated what IMA considers to be a well written and comprehensive rule that all stakeholders should be able to support. The rule protects aquatic life by creating fish tissue criteria both statewide and in site specific areas that may be more sensitive to selenium concentrations. IMA supports the proposed rule and recognizes the amount of work put into drafting it. Specifically, IMA supports the site-specific criteria proposed by DEQ, which considers a performance-based approach from fish tissue values via mechanistic or bioaccumulation modeling methods as referenced in EPA guidance *Appendix K: Translation of a Selenium Fish Tissue Criterion Element to a Site-Specific Water Column Value.* Further, as we stated in prior comments and conversations, we support the DEQ position to bi- furcate selenium criteria to address surface waters that have no species of white sturgeon present. We believe it is a logical approach in creating a state-wide criterion that is applicable now and in the future, should the DEQ be faced with a similar question on resident aquatic life.	DEQ thanks you for your comments.
40	287.05	4	While KDMC supports the concept of surgeon and non-sturgeon water classifications, it is unclear how the proposed rule would be implemented. State implementation guidance for the proposed selenium criteria has not been publically presented. Kinross is generally concerned with the potential magnitude of sampling requirements that may be associated with this proposed rule, especially for receiving	We appreciate your comment and certainly acknowledge the challenges a fish tissue criterion presents in water quality based permitting. However, we believe this is beyond the scope of this rulemaking, and that implementation of this rule is better addressed in a subsequent guidance document. This follows the practice EPA has established in its national criteria recommendations.

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			waters without assigned waste load allocations, or identified concerns about elevated selenium water concentrations. Kinross is in support of a water column criteria that would apply to such waters rather than requiring an unwarranted exhaustive fish tissue monitoring program for selenium. Kinross looks forward to reviewing implementation guidance for the proposed selenium aquatic life criteria; specifically how the water quality based effluent limits for selenium would be developed.	The proposed criterion does provide a water column criterion element that would apply statewide and is used in the absence of fish tissue data. While fish tissue elements do supersede the water column element, there is no requirement that entities use fish tissue data for ambient monitoring, development of load allocations, or for determining criteria compliance when water column data are available. We will be developing additional guidance, based upon the language in rule.
41	287.05	4	Lastly, it is unclear if the proposed water column criteria applicable to the subbasins listed in the table in 287.05 is expressed as total recoverable or dissolved total selenium. This clarifying factor is not listed in footnote '3' following the criteria in 287.05b as it is stated specifically in footnote 3 for the selenium aquatic life criteria presented in 210.01, footnote 'r.'	The SSC defined in 287.05 is expressed as dissolved total selenium. This information is found in the introductory paragraph of Section 287.
42	287.03 287.04	5	**State-Wide Criteria** Importance of a Fish Tissue (Egg-Ovary) Based Standard The 2016 EPA National Criterion integrates many years of research on selenium and its effects on aquatic biota. As recognized in EPA's criterion document, organisms in aquatic environments accumulate selenium primarily through their diets, and not directly through water. The best science also indicates that selenium toxicity manifests itself in the form of effects to young developing fish primarily through transfer to the eggs. Thus, EPA developed a chronic criterion reflective of the reproductive effects based on selenium concentrations in fish egg-ovary tissues [footnote omitted]. Adoption of an egg-ovary criterion for this bioaccumulative metalloid, which represents the current state-of-the-science, should allow for a more accurate interpretation of when and where potential effects occur due to selenium concentrations (compared to the 1987 water quality based criterion still in use by the state). The adaptation of a fish tissue (egg-ovary) criterion by the	DEQ thanks you for your comments.

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			Department represents the use of "best science" as required by Idaho statute (Idaho Code § 39- 107D(2)).	
43	287.03 287.04	5	**Non-Sturgeon Waters Criterion** Simplot agrees with the Department's proposal to include a non-sturgeon waters criteria. The approach has merit given that sturgeon are only found in select drainages statewide. By proposing a non-sturgeon criteria for selenium, the Department is recognizing that many of the State's waterways simply do not contain sturgeon, and therefore, the sturgeon criteria are not particularly applicable where sturgeon are not present. While the geographic scope of the non-sturgeon criteria is large, it does appear to fit within the State's rules for establishing a site-specific criteria as well as the intent of the language provided in Stephen et al. (1985). Based on the Department's presentation on June 13th, 2017 it appears that the non-sturgeon criteria are both applicable and scientifically defensible. Sturgeon are not a surrogate for other sensitive species where they are not present based on the species deletion process described. Further, the use of the4th field (8 digit) HUCs to expand the watersheds beyond where sturgeon are found and accommodate waters that may flow into sturgeon bearing waters, while conservative, appears to be adequately protective. The resulting chronic criterion elements proposed by the State for non-sturgeon waters appear to also be protective given the species known to be present.	DEQ thanks you for your comments.
44	287.03 287.04	5	**Site Specific Aquatic Life Criteria for Selenium: Subsections of Salt River Basin** The proposed rule contains site-specific criteria for two subsections of the Salt River Basin (Sage Creek watershed and a segment of Crow Creek). Simplot proposed to the Department in April 2017 the establishment of site specific criteria for these waters. This proposal was modified in August 2017 to incorporate information that was developed during the negotiated rulemaking process.	DEQ thanks you for your comments.

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			<u>Appropriateness of Site-Specific Criteria.</u> As described earlier in these comments, Simplot has been very involved in studies examining the toxicity thresholds of selenium on *Oncorhynchus clarki bouvieri* (Yellowstone cutthroat trout) and *Salmo trutta* (brown trout) and has performed extensive monitoring of selenium in fish tissues and other features of the aquatic environment (invertebrates, sediments, etc.). Based on this extensive research and monitoring, Simplot proposed to the Department site-specific criteria for several water segments adjacent to the Smoky Canyon Mine. A site-specific criterion for selenium is especially appropriate, as the research done shows the importance of site-specific conditions [footnote omitted]. "Traditional methods for predicting effects based on direct exposure to dissolved concentrations do not work for selenium; site-specific factorsare highly important in determining whether selenium toxicity will occur. ....Selenium concentrations in eggs are the best predictors of effects in sensitive egg-laying vertebrates. The vulnerability of a species is the product of its propensity to accumulate selenium from its environment as affected by its diet and by site-specific factors controlling the transfer of selenium into and within the food web, its propensity to transfer selenium from its body into its eggs, and its sensitivity to selenium in its eggs."	
45	287.03 287.04	5	<u>Protectiveness of the Egg-Ovary Criterion Element</u> Simplot's studies looking at toxicological effects of selenium on brown and cutthroat trout have been reviewed considerably, especially, the brown trout studies. This included EPA having a couple of peer review of	DEQ thanks you for your comments.

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			Simplot's brown trout work. One reviewer had the followingcomment: "... this study has been vetted to a degree that I have never before encountered."[footnote omitted] EPA derived a chronic effects value for brown trout based on the Simplot study of 21 mg/kg (dry weight). The brown trout value was used by EPA in calculating the National recommended criterion as it has been determined to be one of the most sensitive species in regards to selenium toxicity. Simplot, in accounting for the assemblage of species in the area of the site-specific criterion, took a conservative approach to calculate the proposed criterion which resulted in a value of 19.9 mg/kg dw selenium in egg tissue.	
46	287.03 287.04	5	Protection of Downstream Waters The proposed water column criterion value for the segment of Crow Creek immediately upstream of the Idaho/Wyoming state line is 4.1 micrograms per liter (ug/L). At this time, the State of Wyoming water quality criterion for selenium is 5 (ug/L). Thus the proposed water quality criterion value is more stringent than the current Wyoming standard and will be protective of downstream uses in Wyoming.	DEQ thanks you for your comments.
47	287.03 287.04	6	WDEQ/WQD recognizes that these documents now present a criterion specific to Crow Creek rather than the Salt Subbasin as whole and this new criterion consists of a water column element of 4.1 µg/L that will meet Wyoming's current 5 µg/L chronic selenium criteria. Although this is an important step forward, it is not clear whether the 4.1 µg/L criterion can or will be met given that concentrations of selenium in Crow Creek are currently around 20 µg/L.	The protection of downstream waters was addressed in the negotiated rulemaking summary of response to comments on September 6, 2017 (http://www.deq.idaho.gov/media/60180660/58-0102-1701-negotiated-rulemaking-summary-0917.pdf). We recognize that water quality criteria must be met where they are applied, thus the appropriate aquatic life selenium 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, tools are employed to identify the source of the pollutant and restore water quality (e.g., total

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				maximum daily loads, source identification, point-source permit limits) so that criteria will be met and aquatic life are protected within the waterbody and in downstream waters. 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. The SSCs in Sections 287.03 and 287.04 include values for the water column criterion element based on respective bioaccumulation rates in Sage Creek and Crow Creek. The revised site-specific water column criterion element of 4.2 µg/L for Crow Creek will meet the Wyoming water quality standard of 5 µg/L. The derivation of protective criteria is not dependent on current ambient selenium concentrations.
48	287.03 287.04	6	WDEQ/WQD still has concerns regarding the substantial increase in selenium concentrations that occurred during Simplot's study and how the water quality data collected during this time affect the calculation of whole-body and water column elements of the SSSC. These concerns were not addressed in the revised proposal or the Negotiated Rulemaking Summary and are therefore reiterated below. . . . . **Water column element** As described in the text of the proposal and in Appendix D, the data used for deriving bioaccumulation factors (BAF) and ultimately the	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 selenium concentrations in water appeared stable (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 selenium concentrations in water began to increase after 2008, whole-body fish tissue concentrations collected in Crow Creek were not

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			water column elements were collected in the field from 2006 to 2011. In this dataset, the increase in selenium surface water concentrations is apparent in Crow Creek at site CC-1A beginning in September 2008. Concomitant with these increases in surface water samples, there is a notable increase in the calculated water column element. The pre-September 2008 calculated range is 1.53 to 4.76 µg/L and the post-September 2008 calculated range 3.97 to 12.29 µg/L. A similar but less pronounced trend is also observed at downstream site in Crow Creek (site CC-3A). WDEQ/WQD is concerned since these non- steady-state data can skew the water column element to a less protective value. This is especially notable given the documented decrease in brown trout populations that occurred under these conditions. WDEQ/WQD therefore requests that Simplot evaluate and describe within the proposal how these elevated selenium concentrations affect BAF values and the resulting water column element.	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 selenium 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 values 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 2016)[8]. 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 indicates that a water column criterion of 4.2 µg/l is protective of aquatic life in Crow Creek. Simplot has revised their proposal to incorporate information requested by WDEQ and to clarify their approach. This will include removing the column of estimated water column concentrations in Appendix D that was for comparison purposes only and not used to derive the water column criterion element for this SSC. [8]EPA (US Environmental Protection Agency). 2016. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016 (No. EPA 822-R-16-006). Washington, D.C.: Office of Water. Office of Science and Technology.

Comment #	Rule Section/ Subject Matter	Commenter	Comment	Response
				Please see attached Simplot Response Letter to DEQ concerning WDEQ/WQD Comments.
49	287.03 287.04	6	In addition, WDEQ/WQD is concerned that Idaho will not require their proposed water column element to be met in circumstances where fish tissue elements have been met, thus allowing for water column values that will exceed Wyoming's current criteria. . . . . WDEQ/WQD requests assurance that Wyoming's current selenium criteria will be met in Crow Creek given that Idaho's fish tissue elements have primacy over the water column element, similar to EPA's recommendations. For example, if instream selenium concentrations in Crow Creek are above IDEQ *and* WDEQ/WQD's water column value (>5 µg/L), yet whole-body and/or egg-ovary concentrations in Idaho are below their respective SSSC values, there would be an exceedance in Wyoming, but not in Idaho. WDEQ/WQD therefore requests Simplot identify how this situation would be addressed to ensure that Wyoming's water quality criteria are met.	EPA's recommended criterion is updated based on new understanding of the bioaccumulative properties of selenium in the aquatic environment. Out of all aquatic taxa, fishes have been shown to be most sensitive to elevated levels of selenium. Water column criterion elements are derived from assessing the bioaccumulation responses in fish and other aquatic taxa given this updated understanding of selenium bioaccumulation. 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. We support WDEQ/WQD in considering the EPA's 2016 recommended criterion for selenium for adoption. Please see Responses to Comments 6 and **47** regarding protection of downstream waters. Please also see attached Simplot Response Letter to DEQ concerning WDEQ/WQD Comments.
50	287.03 287.04	6	If Wyoming were to adopt the US Environmental Protection Agency's (EPA) national recommended selenium criterion, WDEQ/WQD questions whether the more stringent 3.1 µg/L water column value can be met.	While we can only address Water Quality Standards that Wyoming has adopted, should Wyoming adopt a new selenium standard then protection of downstream waters still apply. Idaho shares waters with other states and will ensure compliance with their standards at the pour point between states. Please see Response to Comment 6 for more information on protection of downstream waters.

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208 336 2110

October 18, 2017

SENT VIA EMAIL TO: Stephanie.jenkins@deq.idaho.gov

Ms. Stephanie Jenkins
Water Quality Standards Scientist
Idaho Department of Environmental Quality
1410 North Hilton Street
Boise, ID 83706

Dear Ms. Jenkins:

In July 2017, U.S. EPA (EPA) provided comments to the Idaho Department of Environmental Quality (IDEQ or the Department) about updating the selenium water quality criterion; this document also included comments on Simplot's Site Specific Selenium Criterion (SSSC) proposal. On August 1, 2017 Simplot provided responses to those comments and later in August submitted a revised SSSC proposal. The revised proposal included changes to address the comments from EPA and other stakeholders on the SSSC. On October 6, EPA submitted to IDEQ another round of comments, which also included comments on the Simplot's Revised SSSC proposal. Simplot received those comments on October 10, 2017. IDEQ has requested that comment responses be sent back to them by October 18, 2017. The EPA provided additional comments in an email to IDEQ on October 12, 2017 regarding averaging of subspecies (i.e., cutthroat trout species).

EPA, in its October 6 comments, continued to request changes to the species sensitivity distribution (SSD) approach for the SSSC. It is Simplot's opinion that the requested changes make the SSSC less site-specific, and therefore increase uncertainty that any calculated criteria values reflect site-specific conditions. Therefore, Simplot has opted to adjust the proposed SSSC for Hoopes Spring/Sage Creek and Crow Creek to a most sensitive species approach. Using the most-sensitive species approach is consistent with EPA's 2016 National Criterion[1] on selenium as well as recalculation procedure guidance (EPA 1994[2]; 2013[3]). Idaho water quality regulations allow a most sensitive species approach to setting site-specific water quality criteria.[4]

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[1] USEPA. 2016. Aquatic Life Ambient Water Quality Criterion for Selenium-Freshwater 2016. EPA 822-R-16-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. https://www.epa.gov/wqc/aquatic-life-criterion-selenium-documents

[2] USEPA. 1994. Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA-823- B-94-001. Office of Water. Office of Science and Technology. February.

[3] USEPA. 2013. Revised Deletion Process for the Site-Specific Recalculation Procedure for Aquatic Life Criteria. EPA-823-R-13-001. Office of Water. April.

[4] IDAPA 58.01.02, Section 275.01 (h)(ii)(5)(b). Accessed 10/18/2017. http://www.deq.idaho.gov/water-quality/surface-water/standards.aspx

> (b) The data, testing procedures and application factors used to develop site-specific criteria shall reflect the nature of the pollutant (e.g., persistency, bioaccumulation potential, avoidance or attraction responses in fish, etc.), the designated and existing beneficial uses, and the most sensitive resident species of a water body. (8-24-94)

Simplot has invested heavily in study of this Site to minimize uncertainty and ensure that truly site-specific information is available to the state and federal agencies in identifying site-specific criteria. This includes have considerable data (from repeated studies) on fish species present in the stream segments of interest. We believe that the SSSC process should rely first on site-specific information, and only use non-site specific information to fill gaps in information. Therefore, the most sensitive species approach is valid for the stream segments in the proposal. The revised (October) SSSC is based primarily on brown trout which are demonstrably the most sensitive species present at the Site, but also includes whole-body element from rainbow trout. Using this approach, Simplot has defined the following criterion elements:

Hoopes Spring/Sage Creek

Egg/ovary: brown trout – 20.5 mg/kg dw[5]
Whole body: brown trout - 13.6 mg/kg dw[6]
Water: 16.7 ug/L[7]

Crow Creek

Egg/ovary: brown trout - 20.5 mg/kg dw
Whole body: 12.5 mg/kg dw[8]
Water: 4.2 ug/L[9]

Simplot's October revised SSSC approach, using the most sensitive species approach, should obviate several of the EPA comments/concerns provided to IDEQ in its October 6, 2017 letter. Responses to specific comments included in the EPA October 10, 2017 letter are provided below.

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[5] The EC10 value of 20.5 mg/kg dw egg selenium is slightly lower than the USEPA (2016) value of 21 mg/kg dw egg selenium derived for brown trout using Simplot'' study data.

[6] Derived as the geometric mean of the brown trout NOEC in USEPA (2016) which is 13.2 mg/kg dw and the brown trout egg/ovary converted value using the Site-specific conversion factor (CF) (20.5/1.46 = 14.04). This approach is consistent with the derivation of a maximum acceptable toxicant concentration (MATC) which is the geometric mean of NOEC and LOEC. Note: Simplot's monitoring plus all historic monitoring prior to 2006 indicates no presence of rainbow trout in Sage Creek or Hoopes Spring.

[7] Derived by dividing the brown trout egg/ovary criterion by the median of the brown trout whole body BAFs for Hoopes Spring and Sage Creek converted to egg/ovary BAFs (20.5/1.23 = 16.7 ug/L)

[8] A single adult rainbow trout x cutthroat trout hybrid (cutbow) was captured in Crow Creek in 2009. No monitoring data prior to or since 2009 has observed any rainbow trout in Crow Creek, Sage Creek, or Hoopes Spring.

[9] Derived by dividing the brown trout egg/ovary criterion by the median of the brown trout whole body BAFs for Crow Creek converted to egg/ovary BAFs (20.5/4.91 = 4.2 ug/L).

EPA Comment

Executive Summary of the J .R. Simplot revised report

(p. x) "The frequency component for this SSSC proposal is consistent with the overall IDEQ treatment of the frequency component in adoption of the 2016 National Criterion. IDAPA 58.01.02.010.15 defines the frequency of chronic criteria exceedance as follows" ... Chronic criteria are expected to adequately protect the designated aquatic life use if not exceeded more than once in every three (3) years ..."' As mentioned previously, EPA recommends a frequency of "not to be exceeded" for fish tissue criterion elements, consistent with the EPA's 2016 national recommended selenium criterion. The frequency component of the fish tissue elements of the selenium criterion differs from the typical "once-in-three years on average" frequency of water column criteria because selenium is a bioaccumulative and the pathway for exposure is through the food web. Even in lotic systems, selenium is an element that is persistent in the ecosystem. It is expected to be present in the sediments and retained in the system for over some period of time. This creates the potential for selenium to continue to transfer into the food web and impact upper trophic levels, such as fish. A shorter exceedance frequency period will increase the proportion of the population that experiences reproductive effects over time and increases the variability in reproductive success within the population.

There is not a lot of empirical information on which inorganic form of selenium is dominant in lotic systems. There is information in the literature on which selenium form is predominant in different sources of selenium. Fish accumulate selenium primarily via their diet in which the forms of selenium have been largely transformed from inorganic selenium to primarily proteinaceous selenium and seleno-amino acids. The recovery time of the fish population will depend on how fast a system recovers from a population level effect, such as reproductive impacts of selenium.

Simplot has referenced Hardy et al. (2010) to support the rationale that a frequency of 1 in 3 years is appropriate for the fish tissue criterion elements of their proposed selenium criteria. In this study, laboratory fish were switched from a high selenium diet to a control diet and the rate of depuration was observed. In natural situations selenium environmental concentration reductions would likely be a gradual process assuming clean-up efforts resulted in lower selenium inputs into the system. Hardy et al. (2010) concluded that there would be a lower *(of unknown magnitude)* depuration rate in the field that would vary by fish species. Given this information, this study is not comparable to the situation that fish at this site would be experiencing. In addition, this study had a number of treatment groups that only had a sample size of 2 at the completion of the study. This low sample size adds uncertainty to the conclusions of this study. Further, a controlled laboratory body burden depuration study with one food source and no sediment matrix, as reflected in the Hardy et al. (2010) study, may not reflect population level reproductive effects potentially occurring in the environment after sustained selenium exposures. EPA requests additional information justifying the appropriateness of the use of the 1-in-3 years exceedance frequency.

Response
Simplot will follow the State's guidance on the exceedance frequency issue for the tissue criterion element. The Hardy et al. (2010)[10] study was referenced simply to illustrate that depuration occurs, it occurs quickly when the selenium source is removed, and the recovery is not a 10 year time frame in lotic systems as USEPA suggested in its previous comment letter.

EPA Comment
(p. viii, Table ES-1, Footnote 1) The EPA recommends sampling and monitoring recommendations be addressed more comprehensively and separate from the regulatory language for the criteria. As stated previously, the EPA suggests more detailed information on monitoring and sampling considerations would be helpful and that DEQ provide such information in separate technical support materials.

Response
Simplot will be follow the State's guidance and recommendations on sampling and monitoring requirements for the criteria.

EPA Comment
Section 2.3 Geographic Scope of Applicability and Section 5.2.3 North Fork Sage Creek and Pole Canyon Creek
(p. 9 and p. 23-24) The EPA has concerns regarding the application of the proposed SSC to North Fork Sage Creek and Pole Canyon Creek; areas that have not been sufficiently characterized in the SSC documentation. The report lacks the necessary detailed justification for applying the proposed SSC to these two additional water bodies as they were not included in the initial development of the study design and therefore have not been characterized. The EPA continues to recommend inclusion of data and an analysis of those data to corroborate the statement that the SSC is applicable to these streams. Although the revised Simplot report now contains additional citations to several documents, this does not address the EPA's previous comment, as no data were presented directly within the SSC document. Data from the cited CERCLA documents should be included and interpreted by Simplot in light of the SSC application, to ensure that they can be easily evaluated in the context of the proposed SSC. Additionally, an analysis of any applicable data and/or information such as water quality and biological survey results is needed in order to provide support to the stated assumption that the SSC for the downstream waters is also "appropriate" for North Fork Sage Creek and Pole Canyon Creek. Without such an analysis there remains a significant amount of uncertainty regarding whether bioaccumulation of selenium in these waters is similar or different compared to Hoopes Spring, South Fork Sage Creek and Sage Creek and ultimately whether the proposed criteria developed specifically for other waters would be protective of aquatic life in North Fork Sage and Pole Canyon Creeks.

[10] Hardy, R., W. Libbie, L. Oram, and G. Moeller. 2010. Effects of Dietary Selenomethionine on Cutthroat Trout (Oncorhynchus clarki bouvieri) Growth and Reproductive Performance Over a Life Cycle. Arch. Environ. Contam. Toxicol. 58(1): 237-245.

Response

In the revised SSSC proposal submitted to IDEQ in August 2017, Simplot provided references to existing work which the EPA possesses. Additional information on Pole Canyon Creek and North Fork Sage Creek was provided that described the water concentrations of selenium in North Fork Sage Creek as well Pole Canyon Creek (Figure 5 of the revised proposal). Historical documentation about Pole Canyon Creek's lack of fish and the species of fish that have been previously found in North Fork Sage Creek were also provided. Simplot will provide additional information about Pole Canyon Creek and North Fork Sage Creek in its revised SSSC to further address EPA's concerns.

EPA Comment

Section 6.2 Whole Body

In order to determine a whole-body criterion element, a conversion factor (CF) calculated from the brown trout data was used to convert the egg-ovary criterion element into a whole body criterion element. EPA has some concerns about this method of calculating a whole-body criterion element value. Conversion factors are based on physiological processes and tend to be driven more by the species than the site. Therefore, it is more appropriate to create a new species sensitivity distribution (SSD) of whole body species mean chronic values (SMCVs). The whole body SMCVs could be calculated by converting each egg-ovary SMCV to a whole body SMCV using a species-specific CF or a whole body SMCV that was directly measured could be used. This whole-body SSD should be used to calculate the whole-body criterion element using the 4 most sensitive species as described in the 1985 Guidelines (EPA PB85-227049). For purposes of comparison, EPA calculated what the whole body criterion would be after applying EPA's 2016 CFs to the Simplot egg-ovary SSD. Simplot's current proposed whole body criterion is 13.63 mg/kg dw selenium, whereas using the method stated above, the whole-body criterion would be 9.87 mg/kg dw selenium.

The EPA recommends that species specific CFs be utilized to develop a SSD for whole body selenium in order to determine the site specific whole body criterion element. Currently, Simplot is utilizing the brown trout specific CF to convert the egg-ovary criterion element, which was derived from an SSD with multiple species, to the whole body criterion element. As CFs are specific to species, using one species specific CF to convert a criterion element intended for all species at the location is problematic. The influence of site is less important than species when considering CF values.

Simplot contends that the brown trout CF should be utilized because brown trout is the most sensitive species at the site and that the egg-ovary is the most sensitive end point for this species. While it is true that the egg-ovary is the most sensitive end point and brown trout is the most sensitive species with respect to that end point, brown trout is not the most sensitive species with respect to the whole-body endpoint. The genus *Oncorhynchus* is the most sensitive genus with respect to the whole-body endpoint, with rainbow trout being the most sensitive species.

Converting from an egg-ovary number derived from the site specific SSD, which utilizes data from multiple species, to a whole-body number using only the CF from brown trout is not appropriate. The resulting criterion element derived in this manner would not be protective of rainbow trout.

Simplot also contends that the use of the brown trout CF is appropriate because brown trout will be the species sampled for monitoring. While this again may be true, a criterion should be designed to protect all species within a site, not designed to reflect what species will be monitored. The use of species specific CFs is more appropriate for developing a whole-body criterion element that is protective of the entire community.

Response
Simplot maintains that using the brown trout CF and the SSD-derived egg/ovary EC10 is an adequately protective and scientifically defensible method for the species assemblage at this Site. However, given EPA's other comments on the exclusion of other species (noted below) in the primary egg/ovary criterion derivation, as suggested by EPA, Simplot has chosen to utilize a most-sensitive species approach for the SSSC proposal. This approach will eliminate SSD-related factors cited in EPA comments.

The revised whole body criterion elements will be based on the most sensitive species for the respective areas.

- Hoopes Spring/Sage Creek – Whole body criterion = 13.6 mg/kg dw
- Crow Creek - Whole body criterion = 12.5 mg/kg dw (based on rainbow trout).[11]

EPA Comment
Table 1: The presence/absence data presented in Table 1 is useful for demonstrating what species are present at these sites. Is there corresponding abundance data available? Also, what time of year were these fish surveyed and with what methods?

Response:
As noted in the SSSC proposal, all of these data have been documented in the various reports submitted to the SSSC Work Group of which the EPA (Region 10 and headquarters) has been an active participant. The Technical Support Document (Formation 2012)[12] contains all of the data for fish assessments from 2006 to 2008 but does not include data from 2009 to 2011.

From 2006 to 2008, fish were sampled during spring and late summer/fall with sampling beginning in the fall of 2006 and concluding in the fall of 2008. For the 2009 to 2011

[11] The use of the rainbow trout for the whole body criterion value for Crow Creek represents the finding of a "cutbow" (as described earlier) in Crow Creek.
[12] Formation Environmental. 2012. Technical Support Document: Proposed Site-Specific Selenium Criterion, Sage and Crow Creeks, Idaho. Prepared for J.R. Simplot Company, Boise, Idaho.

sampling, all sampling was conducted in late summer/fall. All fish were captured using electrofishing methods as part of three pass removal population survey estimates. As part of its revised SSSC proposal, Simplot will include an additional appendix of fish data to address all of the data considered in this SSSC proposal.

EPA Comment

Table 5: The EPA has several concerns about the SSD that was used to derive the egg-ovary selenium criterion element. First, the EPA has concerns over the use of SMCV s in this SSD as opposed to using genus mean chronic values (GMCVs). When creating an SSD, EPA has recommended, in the 1985 Guidelines methodology document, using GMCVs rather than SMCVs as species within a genus tend to be more similar toxicologically than species in different genera. Using GMCVs rather than SMCVs prevents data sets from being biased by an overabundance of species in one or a few genera and artificially elevating the "N" in the regression analysis. However, if the State believes that all the species present within this site have been identified, then it may be appropriate to use SMCVs to calculate the criterion.

The EPA also has concerns about some of the species that were included in the SSD. Simplot included some species in their SSD that EPA did not include in the criterion derivation due to the inability to effectively characterize an *ECw* value for the species based on currently available data. These species include the Yellowstone cutthroat trout and white sucker.

The EPA found that the Yellowstone cutthroat trout data were highly variable and therefore a clear effect value could not be calculated from these data. While Simplot has indicated that these data have been reevaluated with a modified data set, this new data set also still has a large amount of variability. In addition, the asymptote of the fitted curve shows that the proportion of the larvae that were normal and surviving was about 30%, which is a very low value to establish as a baseline. Also, three data points were removed in order to establish this fit. EPA requests additional statistical analysis to demonstrate that these points were in fact outliers and should be removed from the data set.

The EPA also decided not to include the white sucker data (de Rosemond et al. 2005 study16) in the 2016 selenium criterion derivation, as this study did not have a control and a clear effect level was not observed in this study. The lack of a control treatment in this study complicates the interpretation of this study as certain types of deformities were classified as naturally occurring and were not included in the analyses of effects. Without a control, it cannot be confirmed that the removal of the embryological deformities from the analysis was appropriate. Given these complications, definitive conclusions cannot be drawn from this study. For additional support, Simplot references the Muscatello and Janz 2009 study, where white sucker eggs had concentrations of selenium of 4.86 ± 0.52 mg/kg dw for exposed sites versus 1.94 ± 0.25 mg/kg dw for reference sites. In this study, only edema was higher for fry from the exposed site. As the exposure concentration in this study is much lower than the proposed egg-ovary criterion of 19.9 mg/kg dw, it is

unclear how this study lends support for the use of the white sucker data or the protectiveness of the proposed criterion element.

Regarding the sculpin data, EPA appreciates the additional information included in Appendix B on Lo et al. (2014)18 and the existing sculpin population, age class, and whole body selenium data. EPA remains concerned about the inclusion of the sculpin data in Simplot's SSD. With the limited information that is available, it is difficult to give a comprehensive review. One potential issue is the control group being exposed to 0 mg/kg selenium. Since selenium is a micro nutrient; this would likely result in some decline in fish health unless selenium was supplemented or present in their diet. Additionally, based on Simplot's summary, no significant adverse effects were observed for hatching success, fry survival, or deformities and the authors of the study concluded that the NOEC for egg tissue was greater than 22.0 mg/kg selenium dw (maximum concentration observed in eggs), resulting in an unbounded NOEC. EPA believes that the NOEC should be the mean concentration of all the fish in the exposure group that were no different from the controls, and that it isn't appropriate to use one fish from the exposure group to represent the NOEC. For EPA to fully assess the Lo et al. (2014) study, more details on this study are still needed. For the reasons stated above, EPA does not agree with the inclusion of the sculpin data in Simplot's SSD and subsequent site-specific criterion.

EPA also reviewed the site-specific sculpin data provided in Appendix B of Simplot's proposal. While the field data appears to suggest that sculpin populations are performing similarly in reference vs. selenium impacted sites, EPA has a few questions/comments regarding this assessment:

> 1) EPA would like to know where the Deer Creek monitoring site is and why the Deer Creek data were not used on a more consistent basis across all site comparisons? Figure E2 shows it upstream of impacted sites and a tributary of Crow Creek. Deer Creek is said to be a reference site, but selenium water concentrations are higher there than any of the other sites (Figure 2, App B). This is something EPA would like to see explained in more detail.
>
> 2) EPA is concerned that comparisons between reference sites and impacted sites may not be fully representative. The reference sites are generally only from one creek which is concerning in terms of a lack of experimental replication. In other words, fish populations in one creek may be affected by factors other than selenium levels; therefore, more than one reference location (creek) is important to more reliably determine if selenium has affected fish populations. Additionally, the reference site sampling locations that are closer to impacted areas show higher selenium concentrations in sculpin tissue (e.g., CC-350 has higher selenium concentrations than CC-75). This suggests that some of the reference sites are in fact not truly reference sites.

Response

Simplot's Revised SSSC proposal will eliminate the SSD approach and use the most sensitive species approach to derive the egg/ovary and whole body criterion elements.

Because brown trout is the most sensitive species with respect to the egg/ovary element of the criterion, there should be no concern over the species mentioned above. Based on information in USEPA (2016) Yellowstone cutthroat trout and white sucker indicate no observed effects at selenium concentrations that are greater than 20.5 mg/kg dw.

For the sculpin data, Lo et al. (2014)[13] reports a NOEC value of >22 mg/kg dw eggs. The zero value USEPA commented on is based on nominal addition of selenium to the experimental treatment diet, and could be characterized as "no added selenium'. As far as the NOEC being based on the maximum value rather than the average (as suggested in EPA's Comment), Simplot notes that USEPA (2016) includes numerous instances where EPA cited a single maximum value as the NOEC for studies included in the criterion derivation process and for studies reviewed but excluded in the derivation process. The most notable example is the brown trout whole body value, which is based on a single value and called the highest no observed effect concentration (HNOEC). In the Carolina Power and Light (1997) study, USEPA set the NOEC at 24.6 mg/kg, a single value in the exposure group. By definition, the NOEC is the highest concentration where no effects are observed. At a minimum, the sculpin data indicate that this genus is less sensitive than brown trout. The supporting population data corroborate (based on a whole body basis) that sculpins from the Site are not particularly sensitive to selenium.

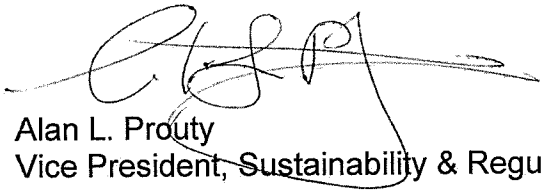
Figure 1 of Appendix B does not show the Deer Creek location. A revised Appendix B Figure 1 will show this location. However, Figure 3 in the main text document does show the location. Deer Creek is a background location, with a naturally present mineralized zone where weathering contributes to occasional increases in selenium in the Deer Creek watershed. It is not considered a reference area. All of this is documented in a previous report (Formation 2012).

There are multiple years of data from reference sites and background sites. The comparisons being made are to CC-350 downstream of Deer Creek because it is the location with the longest most consistent data set. Other reference and background sites have been sample at different times over the past 11 plus years. The Crow Creek site at CC-350 is also an integrative location of natural background selenium and non-selenium related impacts (e.g., sedimentation, grazing impacts, etc.). Using an upstream background site for aquatic ecology and water quality based decisions has long been a standard practice.

[13] Lo, B.P. , V.L. Marlatt, J. Baker, J.R. Elphick, A.M. deBruyn, M. Patterson, B. Leighton, C.J. Kennedy, and H.C. Bailey. Effect of Dietary Selenium on Adult Slimy Sculpin (Cottus cognatus) and Their Offspring. SETAC North America 35th Annual Meeting, Vancouver, British Columbia, November 2014.

Please let me know if the Department has any further questions or comments that need to be addressed.

Sincerely,



Alan L. Prouty
Vice President, Sustainability & Regulatory Affairs

C:
Sean Covington, Formation
Mark Lewis, Formation

Nu-West Response Letter to DEQ Concerning EPA Comments

Response to EPA Comments: Nu-West Industries, Inc. Proposal for Site-Specific Selenium Criteria for the Upper Blackfoot River and Georgetown Creek Watersheds (July 2017)

Nu-West provides the following responses to EPA comments on the Proposal for Site-Specific Selenium Criteria for the Upper Blackfoot River and Georgetown Creek Watersheds (July 2017). This document is organized by specific EPA comments followed by Nu-West responses. It should be noted, however, that some comments provided by EPA pertain to a previous April 2017 version of the proposal, instead of the revised July 2017 version posted on Idaho DEQ's webpage. This is evident by EPA's reference to page numbers that match the April 2017 version. The following responses clarify this.

Section 3.1 Resident Fish in the Upper Blackfoot River Watershed

EPA Comment: The proposed lower site boundary for the selenium SSC for the Upper Blackfoot River is at the river's mouth, where it enters the Blackfoot Reservoir. Given the selenium criteria in the reservoir (a downstream lentic waterbody) are more stringent that the proposed selenium SSC in the river it would be important to discuss how the proposed selenium SSC would be protective of the adfluvial trout in this area. Yellowstone cutthroat trout exhibit three life history strategies: 1) a fluvial life history in which fish feed and grow in larger rivers such as the Blackfoot River and then migrate to tributaries for spawning and rearing 2) an adfluvial life history in which individuals feed and grow in lakes before migrating to tributaries for spawning and rearing, and 3) a resident form in which fish live their entire life cycle in the tributary streams. It is the EPA's understanding the Blackfoot Reservoir provides lacustrine habitat for an adfluvial form of Yellowstone cutthroat trout that resides in the reservoir for most of its life before migrating upstream in the spring to spawn and rear in the upper tributaries. Therefore an important concern is whether the proposed selenium SSC is protective of any resident species with an adfluvial life history and that are or could be present at the site. The EPA recommends that the protectiveness of the proposed SSC to the adfluvial species be addressed and discussed in the report.

Nu-West Response: In the Upper Blackfoot River (UBR) watershed, Nu-West has proposed Se SSC for fish-tissue elements that reflect the resident fish assemblage, and site-specific water-column values for select streams that contain sufficient data to calculate fish bioaccumulation factors (BAFs). For other streams in the UBR watershed not specifically included in the proposal, Nu-West is not proposing site-specific water column values. In these streams, Nu-West understands the statewide water-column value applies. The protectiveness of the proposed Se SSC for tissue elements and the statewide water-column values 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, 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 USEPA (2016) and summarized in the Nu-West proposal, rainbow trout are the most sensitive resident fish in the UBR watershed. Therefore, the proposed tissue-based Se 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 the 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 Se SSC for the UBR watershed are also protective of all salmonids, including adfluvial forms, in the Blackfoot Reservoir.

Nu-West is not proposing site-specific Se water-column values for the Upper Blackfoot River (see above) or the Blackfoot Reservoir. As a result, statewide Se water-column values for lotic and lentic waterbodies will apply to each waterbody. Protectiveness of the EPA-recommended and/or Idaho 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 and other states that adopt the USEPA (2016) Se criteria.

The Nu-West proposal discusses how downstream waters can be assessed for protectiveness, per USEPA and IDAPA regulations:

> *Enforcement of the statewide Se criterion in waters downstream of the Site will ensure the protectiveness of the proposed SSC to those downstream waters. That enforcement could encompass appropriate actions in upstream waters as specified in the IDAPA, including potentially those required by Section 303(d) of the Clean Water Act, if required to protect beneficial uses (includes resident fish species) in the downstream waters.*

Section 3.2 Resident Fish in Georgetown Creek Watershed

EPA Comment: Please provide additional information about the methods that were utilized to conduct each fish survey. Descriptions of several of the surveys only refer to fish surveys being conducted (for both the Upper Blackfoot River watershed and the Georgetown Creek Watershed). Without additional information about how those surveys were conducted, EPA is unable to evaluate how comprehensive the fish surveys were and how appropriate the species data are for developing these site-specific criteria.

(p. 4) Please specify the specific dates (at least to the level of month) and exact locations of surveys used to summarize data for Table 2.

Nu-West Response: The proposal has been revised to include additional information on fish surveys, including sampling methods, dates, and locations as requested. While methods and documentation vary in the fish surveys conducted in the UBR watershed and Georgetown Creek, the list of resident fish at each Site is consistent through time regardless of sampling methods or entity performing the surveys.

Section 4 Proposed Site-Specific Criteria for Selenium

Section 4.1 Summary of Approach to Developing a Fish-Tissue SSC

EPA Comment: (Table 3) Please provide site-specific water column criterion elements that correspond with proposed fish tissue criterion elements. Nu-West is currently proposing site-specific selenium criteria, for which they have proposed modified fish tissue criterion elements. In addition, NuWest is proposing to modify the water column criterion elements after this rulemaking, utilizing the performance-based approach that Idaho is proposing to adopt for site-specific adjustments to the water column elements in the statewide selenium criterion. EPA does not believe this is appropriate. The proposed SSC should reflect all 4 elements of the selenium criterion to be protective of aquatic life at the site. In addition, the performance-based approach is appropriate for modifying water column criterion elements utilizing the state-wide fish tissue criterion at a future date. In this case, when Nu-West is proposing site-specific criteria elements for fish tissue, there appears no reason for Nu-West to be unable to develop and propose site-specific water column translations. In the absence of such water-column elements, the EPA expects that the water column elements applicable statewide would be in effect in the waters covered by this site specific proposal.

Nu-West Response: In the July 2017 Nu-West proposal for SSC, Nu-West proposed site-specific water-column values for streams in the UBR and Georgetown Creek watersheds that were sampled for fish-tissue Se and surface-water Se. In streams without sufficient data to calculate fish BAFs, Nu-West has not proposed site-specific water-column values, and understands the water-column elements applicable statewide would be in effect.

EPA comment: (p. 5, footnote 7) A description of the hydrology at each site would better qualify the statement in this footnote - i.e., 'In streams or reaches of streams where fish are naturally absent due to low flow conditions.'

Nu-West Response: Additional text describing the hydrology of No Name Creek (the fishless stream included in this proposal) has been added to Section 6.2.2.1:

No Name Creek is an intermittent tributary to Angus Creek that does not support fish populations due to persistent low-flow conditions, dry stream channel, and its lack of permanent connection with Angus Creek.

EPA Comment: (p. 5) To perform a recalculation of the 304(a) criterion, the EPA recommends using the 2013 recalculation method (https://www.epa.gov/sites/production/files/2015 08/documents/revised_deletion_process_for_the_site-specific_recalculation_procedure_for_aquatic_life_criteria.pdf) to determine which species should be retained in the SSD, and then calculating the criterion using the four most sensitive genera according to the 1985 aquatic life criterion guidelines (https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-qualitycriteria.pdf). Using this process ensures that an appropriate regression is utilized to derive a criterion that is protective of 95% of the genera. The method often results in a value that is slightly lower than the most sensitive GMCV. For selenium, the dose-response curve is very steep, so a small increase in selenium concentration results in a disproportionately large effect on the organism. Given this, the EPA encourages the use of this conservative methodology for the derivation of the Nu-West fish tissue criterion elements. When this method is used the criterion for Georgetown Creek would be an egg-ovary criterion element of 20.60 mg selenium/kg dw, a muscle criterion element of 13.58 mg selenium/kg dw, and a whole-body criterion element of 10.27 mg selenium/kg dw. The criterion for Upper Blackfoot River using this method would be an egg-ovary criterion element of 22.31 mg selenium/kg dw, a muscle criterion element of 12.9 mg selenium/kg dw, and a whole-body criterion element of 9.86 mg selenium/kg dw. These values are generally more conservative than the currently proposed criteria. The currently proposed criterion for Georgetown Creek is an egg-ovary criterion element of 21.0 mg selenium/kg dw, a muscle criterion element of 12.8 mg/kg dw, and a whole-body criterion element of 12.5 mg selenium/kg dw. The currently proposed criterion for the Upper Blackfoot River is an egg-ovary criterion element of 24.5 mg selenium/kg dw, a muscle criterion element of 12.8 mg/kg dw, and a whole body criterion element of 12.5 mg selenium/kg dw. While EPA recommends this methodology of criterion derivation, the use of the most sensitive species' SMCV may be appropriate if the State believes that all species within these sites have been identified and incorporated in the calculation.

Nu-West Response: The reference to page 5 in this comment is applicable to the April 2017 version of the Nu-West proposal for SSC. The July 2017 revised proposal provided additional rationale for use of the most sensitive species' SMCV (beginning on page 6). The proposed SSC for tissue elements should provide a similar or greater level of protection as criteria calculated from sensitivity distributions (i.e., the SSC is protective of 100% vs 95% of genera using the 5th percentile of a genus sensitivity distribution). Nu-West believes 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 the Nu-West SSC proposal). The most-sensitive species' SMCV is proposed for the UBR and Georgetown Creek watersheds because each Site supports a naturally-limited fish assemblage, as documented by extensive fish surveys, and the sensitivity of all resident fish is documented to demonstrate the protectiveness of the proposed SSC to all residents.

Section 5.3.1 Genus Catostomus

EPA Comment: The EPA would like to encourage Nu-West to use caution when interpreting the data from the de Rosemond et al. 2005 study. No control treatment was present in this study. The lack of controls

complicates the interpretation of this study as certain types of deformities were classified as naturally occurring and were not included in the analyses of effects. Given these complications, it is difficult to draw definitive conclusions from this study. While collectively the studies presented for the family *Catosomidae* add some support to the demonstration that the proposed criteria are protective of this species, this information is not conclusive.

Nu-West Response: Nu-West is unclear what deformities EPA is referring to as not being included in the analysis of effects. All deformities are reported in Table 2 of de Rosemond et al. (2005) and were considered in the Nu-West analysis of effects. EPA is correct that a control treatment was not evaluated in this study and this was pointed out as a weakness in the Nu-West data analysis. Nu-West agrees that this study alone might not be sufficient to conclude Catastomidae will be protected by the proposed SSC. However, the additional studies (see Table 9) collectively provide reasonable evidence that Catastomidae will be protected by the proposed SSC.

Section 6 Site-Specific Water Column Selenium Concentrations

EPA Comment: It appears based on the report that for the derivation of the BAFs, multiple sculpin species were collected, as sculpin were only identified as "sculpin spp." rather than as a specific species. For deriving BAFs it is not appropriate to average together data from different species. If the fish were identified down to species level, then the sculpin data should be divided into its corresponding species.

Nu-West Response: This comment is applicable to fish-tissue data presented for Sheep Creek (Table 11) and Angus Creek (Table 12), as sculpin species are not resident to Georgetown Creek (Section 3.2). Freshwater sculpin species are difficult to differentiate in the field; in fact, morphological differences between some species are so subtle that many sculpin species are rarely differentiated (USFS: https://www.fs.fed.us/rm/boise/AWAE/projects/fish_tissue_collection.html#pubs). It is likely the sculpin species reported for Sheep Creek and Angus Creek between 2014-2016 were either mottled sculpin (*Cottus bairdii*) or Paiute sculpin (*C. beldingii*), as both species have been identified in Angus Creek and Sheep Creek in previous studies (see Attachment 1). Sculpin specimens were collected during Nu-West biomonitoring from these streams, preserved in the field, and subsequently identified as Paiute sculpin in the laboratory under a microscope. However, because both species occur in these streams, are difficult to differentiate in the field, and often occur together within the same stream reaches, it is possible the Se tissue data comprise both species.

C. bairdii and *C. beldingii* exhibit very similar life cycles, habitat preferences, and feeding ecologies. Both species spawn in the spring, are typically found in rubble and gravel riffles of cold-water streams, and feed primarily on aquatic insect larvae (www.fishbase.org; http://calfish.ucdavis.edu/species/?ds=241&uid=63). Given their similar feeding ecologies, the fact that both sculpin species occur in Angus Creek and Sheep Creek and thus feed on the same insect populations (receiving a similar level of Se exposure), and recognizing the difficulty in differentiating these species, Nu-West believes it is appropriate to calculate a sculpin BAF from the existing data, as presented in the proposal.

Sculpin BAFs were not incorporated in the derivation of site-specific water-column elements for Sheep Creek (or Georgetown Creek since sculpin are not resident in this stream). Nu-West included sculpin BAFs in the derivation of the site-specific water-column element for Angus Creek because the existing data suggests sculpin represent a conservative surrogate for juvenile trout (see response to EPA comments on Section 6.2.2.1).

EPA Comment: Nu-West recommends in their report that "to correctly implement these site-specific water column values, it is necessary to utilize average results (i.e., not single values) of ambient dissolved

selenium for comparison to the C_{target} and specifically that those results be averaged in the same way dissolved selenium concentrations were averaged to calculate site-specific BAFs." This language implies that Nu-West expects water concentrations to be averaged over the year from peak flow and base flow events. However, the frequency of the water column criterion value is a 30-day average and will be applicable as such. Assessment of the criterion should reflect the duration component of the criterion and should follow state implementation guidelines. EPA cautions that averaging the peak flow and the base flow water concentrations may result in missing the impacts of a large pulse of selenium. If that pulse occurs prior to a spawning event and affects reproductive females, it may result in reproductive impacts.

Nu-West Response: Nu-West proposed to implement the site-specific water column values by averaging surface water concentrations in the same way surface water concentrations were averaged (over the year) to calculate the fish BAFs. This ensured consistency between evaluating a site-specific water column element with methods used to derive this element.

Nu-West understands that EPA has recommended a 30-d duration component for the water-column element and any SSC will be applicable as such. Therefore, in response to EPA's comment, and to better incorporate Se-runoff periods, Nu-West has revised the site-specific water column element for Angus Creek, Sheep Creek, and Georgetown Creek using BAFs calculated from the 30-d average Se concentration during spring runoff conditions for each stream, as follows.

Georgetown Creek:

Table 10. Summary of surface water, fish tissue, site-specific bioaccumulation factors, and site-specific water-column values for Georgetown Creek.

Location	Surface Water	Whole-Body Fish Tissue				Fish Bioaccumulation Factors		C_{target}	
	Dissolved Se[1] (µg Se/L)	Brook Trout (mg Se/kg WB dw)		Rainbow Trout (mg Se/kg WB dw)		Brook Trout BAF	Rainbow Trout BAF	Brook Trout	Rainbow Trout
		N	Average	*N*	Average				
2015									
BGTC-1	4.85	10	8.95	--	--	1.85	--	6.77	--
BGTC-3	3.15	7	11.47	--	--	3.64	--	3.43	--
2016									
BGTC-1	6.05	10	9.55	10	8.47	1.58	1.40	7.92	8.93
BGTC-3	3.30	9	9.85		--	2.98	--	4.19	--
C_{target}[2]							**BGTC-1 =**	**7.9**	
							BGTC-3 =	**3.8**	

Notes:

[1] Average dissolved Se calculated from spring runoff (e.g., average of May and early June) surface water samples.

[2] Site-specific dissolved Se water-column value for reaches of Georgetown Creek. Reach-specific values were calculated to account for significantly different fish BAFs between BGTC-1 and BGTC-3 (*p*-value <0.001 for brook trout) and hydrologic differences between upper and lower Georgetown Creek.

N = Number of individual whole-body fish replicates.

C_{target} = site-specific dissolved Se water-column trigger (µg/L).

Sheep Creek:

Table 11. Summary of surface water, fish tissue, site-specific bioaccumulation factors, and site-specific water-column values for Sheep Creek.

Location	Surface Water	Whole-Body Fish Tissue				Fish Bioaccumulation Factors		C_{water}
	Dissolved Se[1] (µg Se/L)	Cutthroat Trout (mg Se/kg WB dw)		Sculpin (mg Se/kg WB dw)		Cutthroat Trout BAF	Sculpin BAF	Cutthroat Trout
		N	Average	*N*	Average			
2014								
BSC-1	5.90	9	6.57	10	8.15	1.11	1.38	11.23
BSC-2	6.90	5	7.32	7	6.66	1.06	0.96	11.79
2015								
BSC-1	3.15	8	6.06	10	8.67	1.92	2.75	6.50
BSC-2	4.90	10	4.51	10	8.41	0.92	1.72	13.60
2016								
BSC-1	4.50	7	4.97	10	7.39	1.10	1.64	11.32
BSC-2	6.00	3	4.43	10	7.50	0.74	1.25	16.94
C_{target}[2] =								**11.9**

Notes:

[1] Average dissolved Se calculated from spring (May and early June) surface water samples.

[2] Site-specific dissolved Se water-column element for Sheep Creek (average for locations, years, cutthroat trout)

N = Number of individual whole-body fish replicates.

C_{target} = site-specific dissolved Se water-column element.

Angus Creek:

Table 12. Summary of surface water, fish tissue, site-specific bioaccumulation factors, and site-specific water-column values for Angus Creek.

Location	Surface Water	Whole-Body Fish				Fish Bioaccumulation Factors		C_{target} (µg Se/L)	
	Dissolved Se[1] (µg Se/L)	Cutthroat Trout (mg Se/kg WB dw)		Sculpin (mg Se/kg WB dw)		Cutthroat Trout BAF	Sculpin BAF	Cutthroat Trout	Sculpin
		N	Average	*N*	Average				
2014									
BAC-1	1.55	3	9.20	--	--	5.93	--	2.11	--
BAC-2	2.20	--	--	10	9.32	--	4.24	--	2.95
BAC-3	1.90	3	6.47	7	6.50	3.40	3.42	3.67	3.65
BAC-4	2.95	--	--	6	6.27	--	2.12	--	5.88
2015									
BAC-1	0.92	10	7.44	--	--	8.09	--	1.55	--
BAC-2	1.35	--	--	--	--	--	--	--	--
BAC-3	0.91	--	--	10	8.24	--	9.05	--	1.38
BAC-4	1.50	--	--	10	6.43	--	4.30	--	2.91
2016									
BAC-1	1.90	3	6.30	--	--	3.31	--	3.77	--
BAC-2	2.90	5	7.98	5	8.20	2.75	2.83	4.54	4.42
BAC-3	1.55	3	4.18	10	5.86	2.70	3.78	4.63	3.31
BAC-4	2.85	--	--	6	9.04	--	3.17	--	3.94
C_{target}[2] =								**3.5**	

Notes:

[1] Average dissolved Se calculated from spring (April and May) surface water samples.

[2] Site-specific dissolved Se water-column element for Angus Creek (average of locations for cutthroat trout and sculpin).

N = Number of individual whole-body fish replicates.

C_{target} = site-specific dissolved Se water-column element.

EPA Comment: (Table 10). For Site BGTC-1, EPA would recommend calculating the water column criterion element solely from the brook trout data, rather than combining the brook trout data and the rainbow trout data. As the brook trout BAF is higher than the rainbow trout, this species is more sensitive, and a lower criterion is more appropriate to protect this species. When the data from the two fish species are combined, the resulting water column criterion element is likely not protective of brook trout.

Nu-West Response: It is incorrect to state that brook trout are more sensitive due to a higher BAF. The toxicity data presented in USEPA (2016) show that brook trout are much less sensitive than rainbow trout, and USEPA (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 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.

Section 6.2.1 Sheep Creek

EPA Comment: Please define the specific boundaries of the site-specific water column criterion elements. The water column value for Sheep Creek starts downstream of the confluence with South Fork Sheep Creek, but it is not stated how far down Sheep Creek this criterion applies.

Nu-West Response: The following text has been inserted in Section 6.2.1 to describe the boundary of the site-specific water column element in Sheep Creek:

The site-specific water column value for Sheep Creek is 11.9 µg Se/L. The geographic boundary of this element is Sheep Creek from its confluence with South Fork Sheep Creek to its confluence with Lanes Creek (i.e., the same reach sampled to develop this value).

Section 6.2.2.1 No Name Creek

EPA Comment: The language referenced from Appendix K is intended to help understand the system and the downstream effects of selenium in the context of developing a site-specific criterion. It's not intended to indicate that fish tissue downstream should be used for criterion development in a fishless water, but rather whether the criterion set upstream in the fishless water is going to be protective of the fish communities downstream. In addition, the selenium criterion is an aquatic life criterion that is intended to protect the entire aquatic community, not just fish within the aquatic community. The method that was utilized to derive the water column criterion element for No Name Creek may result in a value that is not appropriate for that water body and is not protective of the entire aquatic community within that fishless water body. EPA requests that Nu-West provide additional information that demonstrates that the proposed water column criterion elements for No Name Creek are protective of the entire aquatic community of this creek.

Nu-West Response: Nu-West appreciates EPA's comment on the language referenced in Appendix K as it relates to the proposed site-specific water column element for the fishless No Name Creek. 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 (USEPA 2016). 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, Nu-West understood that stakeholders might prefer a numeric water column element for No Name Creek and therefore proposed water column values considering the available information of Se toxicity to aquatic life.

Nu-West also understand EPA's request to provide additional information to demonstrate the proposed water column element for No Name Creek is protective of the limited aquatic community resident to No Name Creek. 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 annual Data Summary Reports (GEI 2016a, GEI 2016b, GEI 2016c, Arcadis 2017). The benthic macroinvertebrate community was quantitatively sampled each year according to methods outlined in IDEQ (2013) and agency-approved Work Plans / Quality Assurance Project Plans. In brief, at each No Name Creek reach with water present, three replicate samples of BMIs were collected from riffle habitat using a Hess sampler (to capture small-scale variability of BMI populations and provide additional statistical power in interpreting community results); a sweep sample was also collected from non-riffle habitats to provide additional information on the BMI community. BMI samples were preserved in the field and transported to the laboratory, where invertebrates were sorted from debris, counted, and identified to the lowest practical taxonomic level (most often to the species level).

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. Figure 1 presents this evaluation.

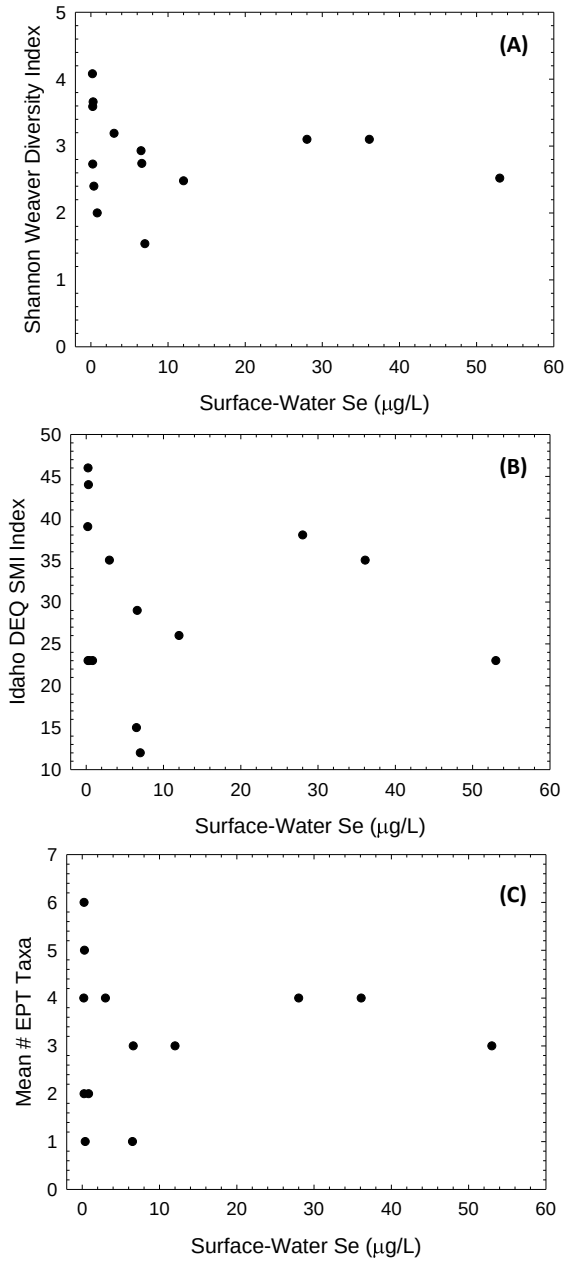


Figure 1. Benthic macroinvertebrate community metrics relative to surface-water Se concentrations in No Name Creek (2013-2016). Panels show (A): Shannon Weaver Diversity Index; (B) Idaho's Stream Macroinvertebrate Index (SMI) score; and (C) mean number of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa.

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 proposed site-specific water column element 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 proposed 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 indicates tolerance of invertebrates to Se and is consistent with information summarized by USEPA (2016), as described below.

The data and interpretation of Se toxicity to aquatic life presented by USEPA (2016) clearly shows that invertebrates are tolerant of Se, especially when compared with 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. USEPA (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.

EPA Comment: (Table 12 and 13) In order to calculate the water column criterion elements for Angus Creek and No Name Creek, Nu-West has combined fish tissue data from two species, cutthroat trout and sculpin. EPA does not recommend combining data from the two species in order to calculate the water column criterion element. Rather, EPA recommends deriving a water column criterion element for each species and then selecting the more conservative value, so that protection of the more sensitive species is assured. EPA recognizes that for Angus Creek limited data were available, but that likely indicates that more data are necessary for deriving this criterion element rather than combining species data.

Nu-West Response: Nu-West understands EPA's recommendation against combining data from two species when calculating a water column element. However, Nu-West believes the approach is reasonable for Angus Creek for several reasons. 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 (IDEQ 2016). Similar to sculpin species, juvenile trout feed primarily on invertebrates. Consequently, both species represent trophic level 3 consumers with similar feeding ecologies.

For Angus Creek, Nu-West carefully evaluated sculpin and YCT tissue data that were temporally and spatially co-located (i.e., collected from the same location and date in Angus Creek; see Tables 12) and determined that whole-body Se concentrations were not statistically different ($p > 0.05$) between the species. As a result, BAFs are not statistically different between these species in Angus Creek. In addition, Nu-West evaluated the relationship between co-located sculpin and YCT tissue data collected in Sheep Creek (Table 11). The purpose of this analysis was to further understand potential species-specific differences between trout and sculpin using a broader dataset of co-located tissue samples in the UBR watershed. The following figure shows the relationship between whole-body Se concentrations for co-located samples of sculpin and YCT in Sheep Creek and Angus Creek (the solid 1:1 line represents unity).

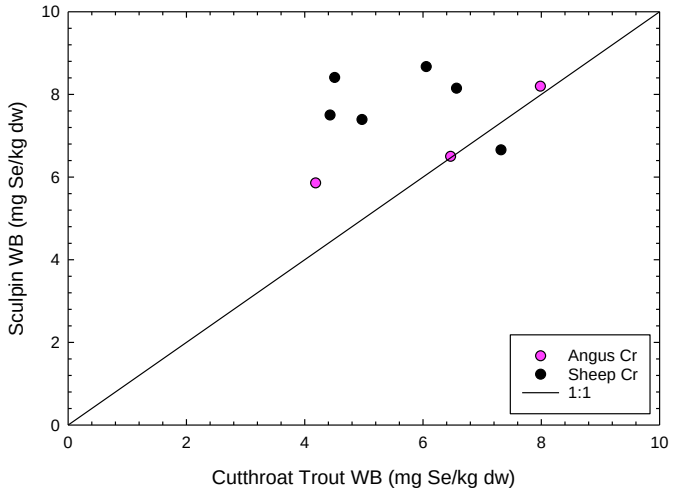


Figure 2. Comparison of whole-body (WB) Se concentrations measured in co-located sculpin and cutthroat trout from Angus Creek and Sheep Creek.

Points to the left of the solid 1:1 line represent sculpin WB Se concentrations that are greater than co-located trout concentrations. These data suggest that sculpin represent a conservative surrogate for trout species when deriving a site-specific water column element for Angus Creek. In contrast, sculpin data were not included in the calculation of the site-specific water column value for Sheep Creek since trout were collected at each sampling location and each year in this stream.

Because sculpin and YCT Se concentrations in Angus Creek are similar (not statistically different), and thus specifies-specific BAFs are similar (not statistically different), it is unsurprising that site-specific water column elements calculating from YCT data exclusively or combining YCT and sculpin data are very similar (i.e., 3.4 vs 3.5 µg Se/L, respectively). Therefore, and for the above reasons, Nu-West believes the recommended approach and proposed water-column element for Angus Creek (3.5 µg Se/L) is reasonable and protective to resident YCT.

EPA Comment: (Table 13) Fish tissue data for the development of the site-specific criterion for No Name Creek were a combination of fish sampled at BAC-2 and BAC-1. While it appears that BAC-2 is just downstream of the confluence of No Name Creek, BAC-1 appears to be much farther downstream. How far is BAC-1 from No Name Creek and why is it appropriate to consider fish tissue from this location in criterion development?

Nu-West Response: Reaches for fish-sampling locations were established as 30 times the average bankfull width or a minimum of 300 feet per IDEQ protocol (IDEQ 2013). The distance between BAC-1 and BAC-2 over the three years of sampling was approximately 2 miles. Nu-West believes it is appropriate to consider fish tissue from both locations in developing the No Name Creek water column element because each reach is downstream of No Name Creek and receives inflows from No Name Creek, juvenile YCT trout are not sedentary but likely move between reaches (Young 2008), and the site-specific water element for No Name Creek is similar regardless of whether locations are combined. For example, when fish from BAC-1 and BAC-2 are combined, the proposed water column element for No Name Creek is 46.1 µg Se/L. Using only fish from BAC-2, the water column element for No Name Creek is 50.2 µg Se/L.

Section 6.3 Implementation

EPA Comment: EPA regulations require states to assemble and evaluate all existing and readily available data and information to make assessment decisions for the 303(d) list. This means considering either water column data or fish tissue data, depending on which are available. If both are available, then the fish tissue data will supersede the water column data. The EPA does not support delaying an assessment decision due to the lack of fish tissue data, although future fish tissue data can be used to refine the assessment or demonstrate that a water body is not impaired. Nu-West has suggested that when new data are collected during compliance monitoring, that they be used to update the site-specific water column criterion element. If this recalculation is conducted, this should be submitted to the EPA for approval if the BAF method is used to calculate the water column criterion elements utilizing the site-specific fish tissue criterion elements rather than the state-wide fish tissue criterion elements.

Nu-West Response: Comment acknowledged. The intent of the language provided in Section 6.3 was to affirm the hierarchy of the Se criteria elements as they are implemented. In the event that new data are collected and used to update a site-specific water column element, Nu-West understands that the updated water column value should be submitted to EPA for approval. However, it is unclear to Nu-West that utilizing a site-specific tissue value instead of a statewide tissue value necessitates special USEPA review and approval as opposed to the performance-based approach.

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October 23, 2017

Sent via email to: Stephanie.jenkins@deq.idaho.gov

Ms. Stephanie Jenkins
Water Quality Standards Scientist
Idaho Department of Environmental Quality
1410 North Hilton Street
Boise, ID 83706

Dear Ms. Jenkins:

The Wyoming Department of Environmental Quality (WDEQ) provided comments on October 6, 2017, to the Idaho Department of Environmental Quality (IDEQ) on Simplot's Revised Site-Specific Selenium Criterion (SSSC). IDEQ has requested that Simplot provide a response to the general comment shown below which is based on the specific comment that follows. Simplot's responses are provided below.

Wyoming Comments

General comment:
"Lastly, WDEQ/WQD still has concerns regarding the substantial increase in selenium concentrations that occurred during Simplot's study and how the water quality data collected during this time affect the calculation of whole-body and water column elements of the SSSC. These concerns were not addressed in the revised proposal or the Negotiated Rulemaking Summary and are therefore reiterated below."

Specific Comment:
"As described in the text of the proposal and in Appendix D, the data used for deriving bioaccumulation factors (BAF) and ultimately the water column elements were collected in the field from 2006 to 2011. In this dataset, the increase in selenium surface water concentrations is apparent in Crow Creek at site CC-1A beginning in September 2008. Concomitant with these increases in surface water samples, there is a notable increase in the calculated water column element. The pre-September 2008 calculated range is 1.53 to 4.76 µg/L and the post-September 2008 calculated range 3.97 to 12.29 µg/L. A similar but less pronounced trend is also observed at downstream site in Crow Creek (site CC-3A). WDEQ/WQD is concerned since these non- steady-state data can skew the water column element to a less protective value. This is especially notable given the documented decrease in brown trout populations that occurred under these conditions. WDEQ/WQD therefore requests that Simplot evaluate and describe within the proposal how these elevated selenium concentrations affect BAF values and the resulting water column element."

Simplot Response:

Background information on Adults used for Reproduction Study

The adult brown trout used to calculate the egg/ovary whole body conversion factors were collected during a narrow time frame in late October to mid-November in 2007. An initial sampling effort was conducted in late October across several stream reaches in Sage and Crow Creeks, as well as reference sites. During this time, it was apparent that while numerous adult males and females were present, the females were not yet ripe. A second effort was made in mid-November in an attempt to capture females ready to spawn. All female fish used for the adult reproduction study were collected during this second effort. During the October event, several females were sacrificed to assess if eggs were present and if they were close to spawning conditions. Eggs and whole body samples from these fish were retained for selenium analysis. Thus, the paired egg and whole body concentration data used to derive the criterion and the egg/ovary to whole body conversion factors all come from a same time window over a broad range of selenium concentrations. Sampling both Sage Creek and Crow Creek provided females from different exposure areas, which allowed for a robust dataset of females with eggs that had different egg selenium concentrations. The egg/ovary and whole body criterion concentrations proposed for this Site will not change as they are not affected by increasing selenium concentrations and exposures.

Bioaccumulation Factors (BAFs) and Resulting Water Quality Criteria

BAFs, if calculated based on individual fish, will always show variability since multiple whole body concentrations can be measured relative to a single surface water concentration. Selenium concentration among individual fish can vary even if the fish are collected from a similar range of selenium water concentrations. This variability, which is greater for lower concentrations, is illustrated in Figure 1.

In Crow Creek downstream of Sage Creek, the variability in whole body concentrations leads to a wide range of BAFs at the lowest selenium concentrations (<3 ug/L). At higher water concentrations, (between 5 and 10 ug/L), the range of BAFs decreases (Crow Creek, Sage, SF Sage) (Figure 2).

Figure 1
Brown Trout BAFs Derived for Background and Reference Sites

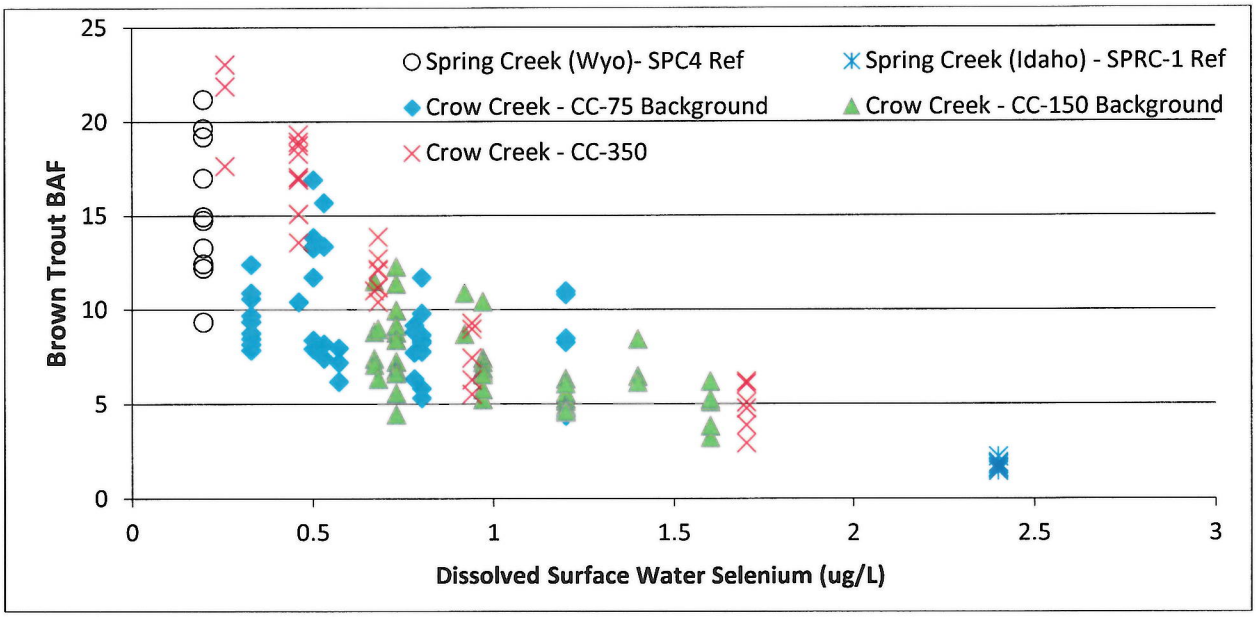
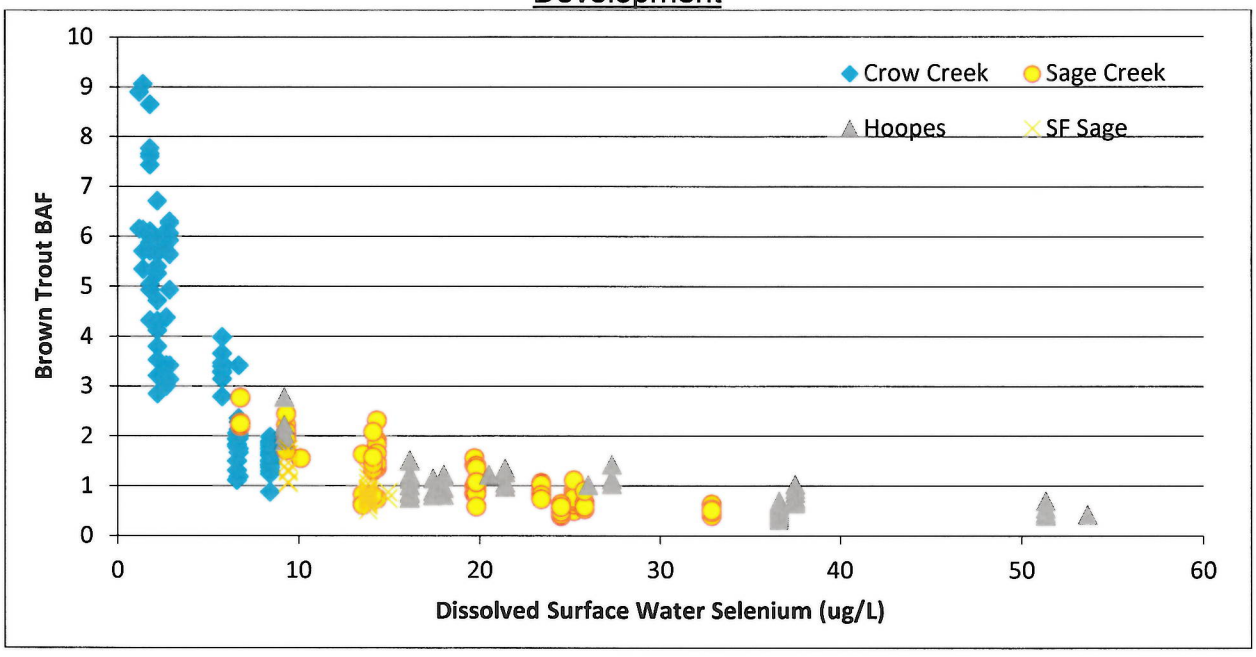


Figure 2
Brown Trout BAFs Derived for Locations Proposed for Site-Specific Selenium Criteria Development



These results show two important trends:

1) BAFs tend to decrease as water concentration increases; and
2) The range and variability of whole body concentrations and BAFs is higher at low water concentrations compared to higher water concentrations.

The first trend is commonly observed in water and other environmental media (Deforest et al. 2007[1]; McGreer et al. 2003[2]). Overall, these trends indicate that when setting the water column element of the selenium criterion, selection of the BAF used should consider the range of potential water column concentrations.

The second trend is important because it affects the ability to identify the effect of water column concentration on whole body (or other tissue) concentrations. When calculating the water column element of the criterion, the selected BAF must be representative of the water and fish tissue concentrations present to ensure that the criterion is protective without being under or overprotective. Stephan et al. (1985)[3] notes that:

> "Criteria should attempt to provide a reasonable and adequate amount of protection with only a small possibility of considerable overprotection or under protection."

Simply using the highest BAF will result in a water concentration (e.g. criterion) much lower than needed to be protective because the highest factors are associated with the lowest exposure concentrations (Deforest et al. 2007).

Simplot's approach for the segment of Crow Creek downstream of Sage Creek, incorporates the median BAF from the 2006 to 2011time frame when selenium concentrations in water ranged from <2 to about 10 µg/L. This approach was based on the observation that there was substantial overlap in the range of whole body concentrations among water concentrations for this stream reach. For example, in looking at three ranges of water concentrations present in Crow Creek at CC-1A, whole body concentrations are not significantly different (one way ANOVA, p = 0.304) among corresponding water concentrations of <2.9, 6.7, and 8.4 ug/L (Figure 3).

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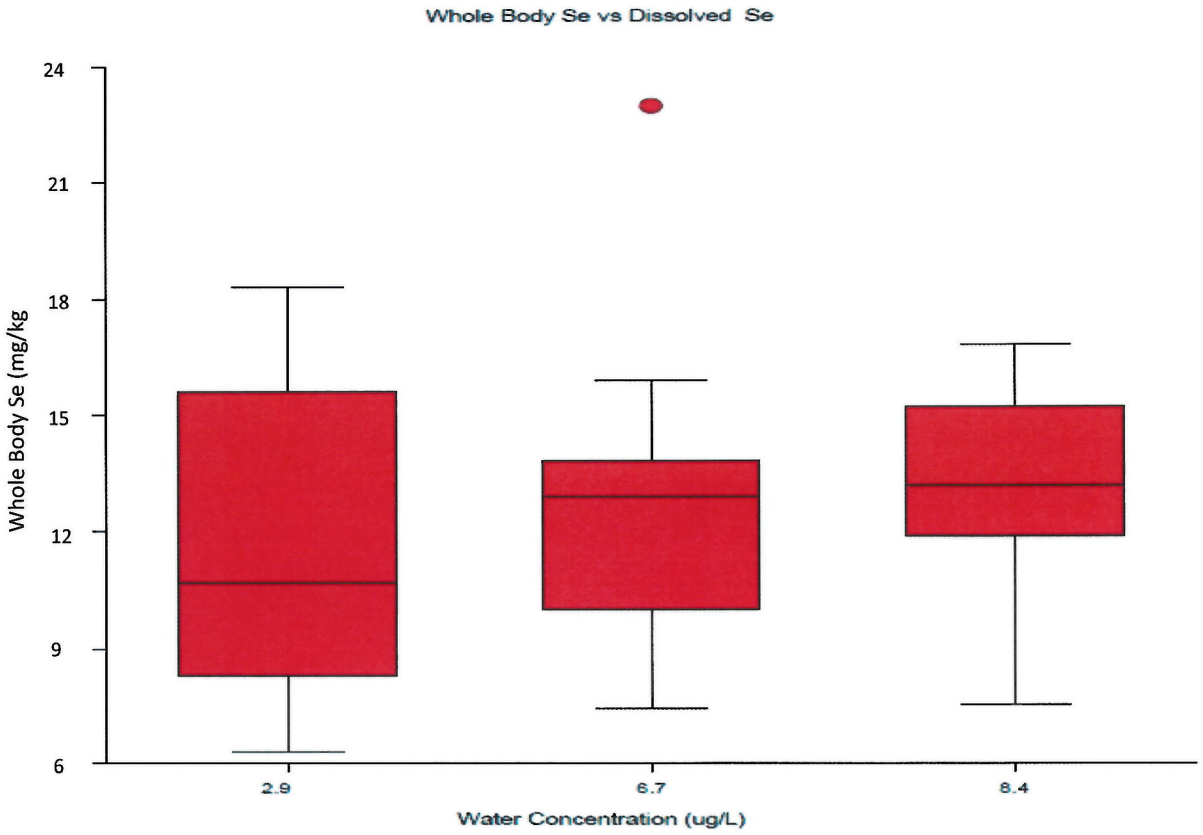
[1] DeForest, D.K., K.V. Brix, and W.J. 2007. Adams. Assessing metal bioaccumulation in aquatic environments: the inverse relationship between bioaccumulation factors, trophic transfer factors and exposure concentration. Aquatic Toxicology, 84(2), 236-246.

[2] Mcgeer, J.C., K.V. Brix, J. M. Skeaff, D.K. Deforest, S.J. Brigham, W.J. Adams, and A. Green. 2003. Inverse relationship between bioconcentration factor and exposure concentration for metals: implications for hazard assessment of metals in the aquatic environment. Environmental Toxicology and Chemistry, Vol. 22, No. 5, pp. 1017–1037.

[3] Stephen, C.E., D.I Mount, D.J. Hansen, J.R. Gentile, G.A. Chapman, and W.A. Brungs. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses. Office of Research and Development, PB85-227049.

Figure 3
Whole Body Selenium at Surface Water Concentrations of Selenium from Location CC-1A



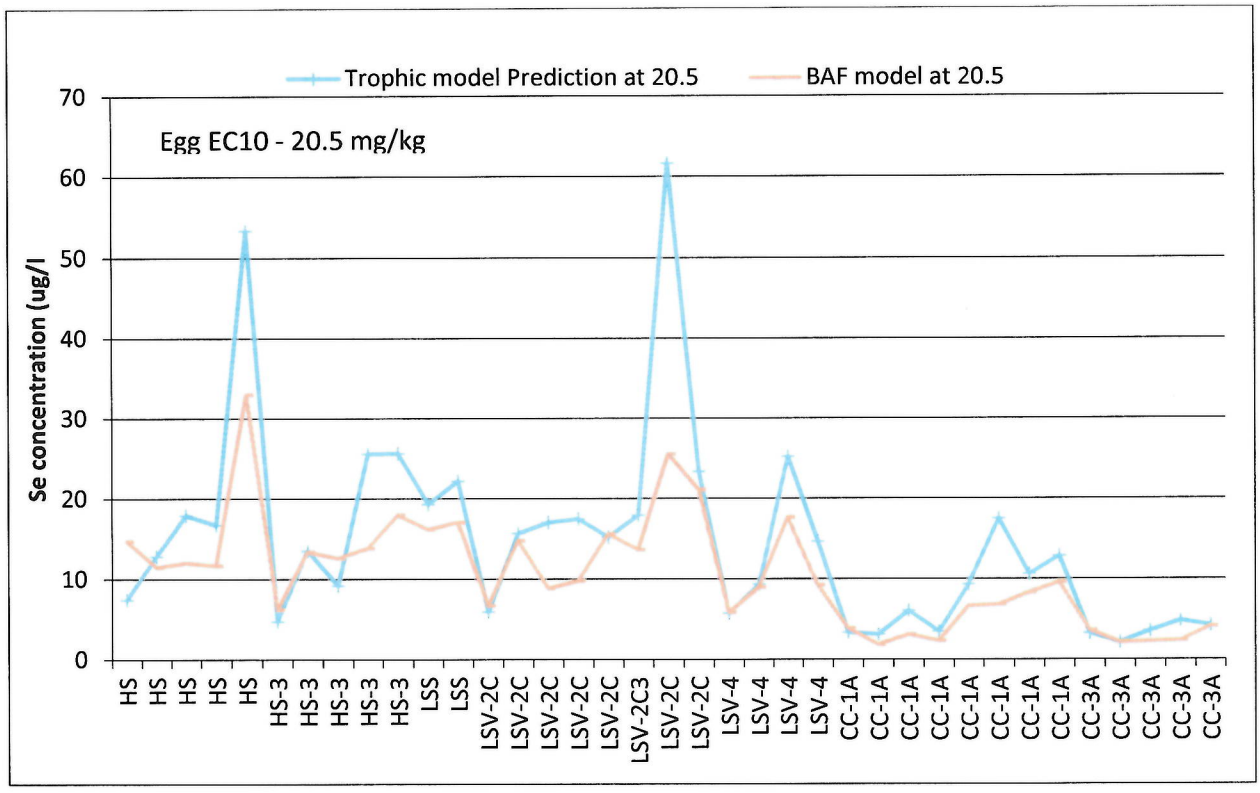
As noted in the Wyoming DEQ comments, the segment of Crow Creek for which a site-specific criterion is proposed has a higher selenium water column concentration now than when the 2006-2011 study was conducted. However, Simplot still believes that the BAF (3.36) used to calculate a water column criterion element of 4.2 µg/L is appropriate. This approach provides a conservative water column element value for Crow Creek that also meets the State of Wyoming selenium water quality criterion. The use of a BAF corresponding to a higher selenium water column concentration would result in a higher water column criterion element value.[4] Furthermore, the water treatment plant on Sage Creek, which is in the process of starting operation, should reduce selenium water column concentrations in Crow Creek similar to the 2006-2011 conditions. Thus, the BAF used and the resulting calculated water column criterion element, is conservative, which will allow the Wyoming water quality standard to be met and reflects anticipated creek conditions.

[4] For example, based on Figure 2, the BAF would be approximately 1 for a 20 µg/L selenium water column value. This would result in a water column criterion element greater than 10 µg/L.

Finally, as noted in the National Selenium Criterion (USEPA 2016)[5], there are two approaches to back calculate from the egg/ovary criterion to a water criterion: the empirical BAF approach as discussed above, and the mechanistic trophic modeling approach. USEPA (2016) derived water concentrations using the trophic model approach with Simplot's data. For CC-1A, the water criterion value was 4.42 ug/L while for CC-3A, the value was 4.37 based on a criterion of 15.1 mg/kg dw egg selenium. The current Simplot proposal for the water criterion element for Crow Creek using an empirical BAF is 4.2 ug/L, a value more conservative than EPA's trophic output model.

When the results of the two models are compared using data from individual locations, as shown in Figure 4, the predicted water criterion values show that the BAF model approach is a more conservative estimate of the water criterion element for data collected from this Site.

Figure 4
Trophic Model vs Empirical BAF Model Predicted Water Criterion Values for Sage Creek, Hoopes Spring, and Crow Creek Downstream of Sage Creek



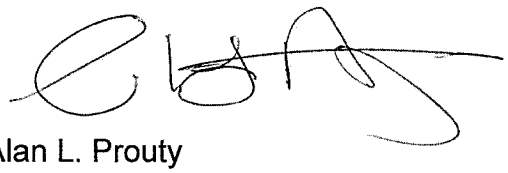
[5] USEPA. 2016. Aquatic Life Ambient Water Quality Criterion for Selenium-Freshwater 2016. EPA 822-R-16-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. https://www.epa.gov/wqc/aquatic-life-criterion-selenium-documents

Summary

Simplot has derived an empirical BAF that integrates a wide range of selenium concentrations both in fish tissue and in the water column. Based on 2006-2011 data, two different methods (empirical and trophic) have been used to calculate a corresponding water column value. As Figure 4 shows, the empirical BAF method provides a more conservative value. Even though selenium water column concentrations have increased in the segment of Crow Creek that is of interest, the proposed water column criterion element is a conservative value that reflects future expected conditions and also meets Wyoming water quality standards.

Please let me know if you have any further questions in regards to this matter.

Sincerely,



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