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OFFICE OF
WATER AND WATERSHEDS

August 21, 2015

Don Essig
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706

RE: EPA Comments on Idaho's Revised Human Health Toxic Criteria, Preliminary Draft Negotiated Rule, Docket No. 58-0102-1201

Dear Don:

The EPA appreciates the opportunity to provide comments to the Idaho Department of Environmental Quality (DEQ) on its preliminary draft updated human health ambient water quality criteria, as presented at DEQ's August 6, 2015 negotiated rulemaking meeting. The EPA understands there are several options DEQ is still contemplating with respect to the scope and derivation of the criteria. The EPA supports DEQ's ongoing efforts and continues to recognize the challenging work undertaken thus far in consideration of revisions to Idaho's human health criteria.

The enclosed comments reflect many of the issues the EPA identified in our previous comment letters on each of the human health criteria-related topics that DEQ raised over the past year. Please note that, in some instances, the EPA is requesting additional information to better understand DEQ's proposal in order to provide a more detailed review.

The EPA is encouraged that several of DEQ's proposed scientific and policy decisions reflect recommendations consistent with the EPA's latest 304(a) human health criteria as well as the EPA's 2000 Human Health Methodology.[1] However, the EPA is concerned about some of DEQ's proposed decisions in deriving human health criteria and we describe those concerns and provide suggestions for addressing them in the enclosed comments. In particular, the EPA is concerned with DEQ's approach to calculating its fish consumption rate. DEQ has not adequately demonstrated why it believes criteria derived using those fish consumption rates would be scientifically defensible, would be protective of designated uses in Idaho (including uses afforded to tribal consumers with reserved rights), and would ensure the maintenance of water quality standards in downstream states.

Finally, the EPA commends Idaho for its efforts to characterize current fish consumption rates for the general population and anglers in Idaho using state of the art survey methodology. Given the regulatory importance of these survey results, EPA strongly recommends that DEQ have the

[1] See Water Quality Standards Regulatory Revisions Final Rule (80 FR 51019, August 21, 2015)

results peer reviewed by individuals with the necessary expertise, and address peer review concerns prior to fully incorporating this work into a regulatory context.

The EPA appreciates DEQ's efforts to revise Idaho's human health criteria for toxic pollutants and looks forward to continued conversations regarding these important decisions. In addition, EPA remains committed to supporting DEQ's work and is available to provide technical assistance as you develop a proposed rule. If you have any questions or would like to discuss these comments further, please contact me at (206) 553-6511 or Lisa Macchio at (206) 553-1834 or Lon Kissinger at (206) 553-2115.

Sincerely,

Angela Chung

Angela Chung, Manager
Water Quality Standards Unit

Enclosure

EPA Comments on Idaho Department of Environmental Quality's (DEQ)
Preliminary Draft Negotiated Rule
Revisions to Idaho's Human Health Criteria for Toxics
Docket No. 58-0102-1201
August 21, 2015

Idaho's Proposed Fish Consumption Rate (FCR)

As EPA has long acknowledged, it remains our practice to "encourage States and authorized Tribes to make appropriate adjustments to reflect local conditions affecting fish consumption."[2] Thus far, Idaho has not yet presented EPA with a rationale that is adequate to establish that the exclusion of market fish from the FCR is appropriate and will lead to criteria sufficient to protect Idaho's 101(a) uses, as required under 40 CFR 131.11. While reserving final judgment on this issue until we receive Idaho's final submission and supporting rationale, we emphasize that Idaho's approach currently appears to be inconsistent with the CWA and its implementing regulations. We outline our concerns in more detail below, and set forth several issues that we urge Idaho to address if it intends to adhere to its current approach.

1. Exclusion of market fish other than rainbow trout

Clean Water Act (CWA) section 303(c)(2)(A) requires that water quality standards protect "public health or welfare, enhance the quality of water and serve the purposes of [the Act]." CWA section 101(a)(2) establishes as a national goal "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water [wherever attainable]." EPA has previously interpreted the "fishable" language in section 101(a)(2) to refer not only to protecting water quality so the fish and shellfish thrive, but also so that when caught they can be safely eaten by humans. Thus, EPA's view has been that to be consistent with section 101(a)(2), the applicable criteria for such "fishable" designated uses must not only protect the aquatic organisms themselves, but also protect human health through consumption of fish and shellfish.[3]

EPA's recommended 304(a) water quality criteria to protect human health (and EPA's accompanying risk assessment methodologies) reflect this longstanding conclusion about the CWA: consumers of fish and shellfish are to be assured that if criteria are met in a waterbody designated with the uses specified in Section 101(a) of the CWA, then that means they can safely eat fish and shellfish drawn from that waterbody.[4] Thus, EPA has consistently implemented the CWA to ensure that the total rate of consumption of fish and shellfish from inland and near-coastal waters reflects the actual consumption rates that are characteristic of the population of concern. In other words, EPA expects that the standards will be set such that residents can safely consume from local waters the amount of fish they would normally consume from all inland and near shore waters. EPA recognizes that consumers of fish and shellfish might not be limiting their consumption of fish and shellfish to those that were sourced from their own state's fishable

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[2] Id.

[3] EPA's interpretation of the CWA is consistent with years of past practice. As evidence, see memorandum from Geoffrey H. Grubbs and Robert H. Wayland (October 2000) posted at http://water.epa.gov/scitech/swguidance/standards/upload/2000_10_31_standards_shellfish.pdf

[4] See discussion in *Revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, 65 Fed. Reg. 66465 (2000).

waters. But the relevant objective is to assure that they can do so, without concern for their health.

Idaho's approach is to exclude, from the FCR, the fraction of the consumption of freshwater and estuarine fish and shellfish that is currently associated with fish originating from waters outside of Idaho. Based on the information and rationale we have received from Idaho to date, we note the following reasons why we currently believe that Idaho's justification for this approach is not scientifically sound:

- First, the purpose of including consumption from waters outside of Idaho's borders in the FCR is not to support any purported regulation of such waters by Idaho. Rather, the purpose of including this fish consumption in the FCR is so that a determination that a particular Idaho water body is "fishable" will result in adequate health protection for Idahoans should they consume, from local waters, the amount of fish they would normally consume from all inland and near shore waters. Therefore, it does not seem reasonable for Idaho to justify its approach on the grounds that Idaho lacks regulatory authority over fish caught outside of its borders. Idaho should further explain how its approach would be protective.
- Second, since the purpose of the CWA is to restore and maintain the Nation's waters, CWA § 101(a), it does not seem reasonable to EPA to adjust the FCR in a manner that will "outsource" the marketing of clean fish to other states (or other countries) while allowing a level of pollution in local waters to elevate to or remain at a level that would not provide for safe consumption in its own right. Idaho should further explain how its approach to adjusting the FCR would not have the effect of allowing each state to justify more polluted water in its own jurisdiction, inconsistent with CWA § 101(a), on the grounds that less polluted water is still available in another state or country.
- Third, the approach of excluding "market fish" (other than market rainbow trout) appears to assume that there is no exposure from fish that were sourced outside of Idaho. This is because the full allowance for acceptable pollutant levels is given exclusively to local state waters. Consider if every state took this approach. For a non-carcinogenic pollutant with a specified Reference Dose, the criteria development equation would allocate this full dose to fish originating from the individual state. If a person then consumes overall 25 g/day of fish, but 5 g/day each from 5 different states (and each state set a state-specific consumption rate of 5 g/day), then the consumer could potentially receive 5 times the acceptable pollutant dose. Idaho should further explain and demonstrate how pollutant levels in fish sourced from outside Idaho would not contribute to a consumer's exposure to the same pollutants when they consume fish caught in Idaho waters.
- Fourth, EPA has additional concerns, relating to tribal reserved fishing rights, which are described in further detail below.

The most straightforward way for Idaho to remedy EPA's concerns would be to establish protective criteria using a FCR based, at a minimum, on the target population's total freshwater, estuarine and near coastal fish and shellfish consumption rate. Thus, Idaho would be adjusting the FCR based on the characteristics of the relevant local population, but not based on the origins of the particular fish and shellfish that are currently satisfying that local population's

consumption. This approach is consistent with a principle that every state does its share to protect people who consume fish and shellfish that originate from multiple jurisdictions.

Idaho may alternatively elect to adhere to its current approach. While EPA is not at this time rendering final judgment on this matter (since Idaho's final submission and rationale is not before the Agency) we wish to be clear that EPA is unlikely to agree, without a dramatically strengthened rationale from Idaho, that criteria based on FCRs that exclude all market fish but rainbow trout would be adequate to support Idaho's designated 101(a) uses.

2. Exclusion of anadromous fish

EPA recognizes that Idaho has included steelhead, an anadromous species in its FCR. However, EPA continues to have concerns with DEQ's proposed policy decision to exclude all other anadromous fish from the FCR, and recommends that DEQ either include all other anadromous fish in the FCR or provide additional demonstration of how criteria derived using a lower FCR that excludes anadromous fish will protect downstream shared waters in the Columbia River basin.[5]

While EPA's 304(a) recommended criteria account for exposures to non-carcinogens and nonlinear carcinogens in anadromous fish using the relative source contribution (RSC), EPA supports and recommends that states include anadromous fish in the FCR when there are available, scientifically sound regional and/or local data that suggest high consumption of anadromous fish. For example, because of the uncertainties in the sources of salmon contaminant body burdens, the large amounts of salmon consumed by tribes, and the fact that market basket preferences of individuals may vary, Oregon and Washington chose to include salmon in the FCR used to derive human health criteria. EPA approved Oregon's human health criteria in 2011. Similarly, EPA supported Washington's decision to propose human health criteria using a FCR that included anadromous fish consumption. In light of this and the fact that Washington and Oregon are downstream from Idaho, implementation of human health water quality criteria throughout the Pacific Northwest would be facilitated by uniformly including salmon in the FCR for Idaho.

Additionally, because of uncertainty regarding where and how marine species acquire the bulk of their contaminant body burden, EPA recommends that DEQ consider scientific studies in addition to the Hope 2012 study.[6] Further characterization of salmon ocean habitat is warranted and some adult salmon may feed in, and acquire contaminants from, near coastal waters that are under the jurisdiction of the CWA. Also, the Hope paper's conclusions are limited by its focus on PCBs and not other toxics. Central to the modeling, is the assumption that contaminant uptake occurs largely through diet. While this is true for PCBs, depending on a chemical's lipophilicity, direct uptake from water may be a significant contributor to an organism's

[5] EPA reference to anadromous fish in this letter refers to all other anadromous fish except steelhead.

[6] Hope, B.K. 2012. "Acquisition of Polychlorinated Biphenyls (PCBs) by Pacific Chinook Salmon: An Exploration of Various Exposure Scenarios." Integrated Environmental Assessment and Management 8:553–562. Cited by DEQ in: Considerations in Deciding Which Fish to Include in Idaho's Fish Consumption Rate Policy Summary, State of Idaho Department of Environmental Quality.

contaminant body burden (Qiao et al. 2001)[7]. In the case of adult salmon, pollutant accumulation via direct uptake of chemicals from water is possible during their return migration through inland waters. The Hope paper also does not discuss different patterns of contaminant uptake associated with the complex life histories of other salmonids. Finally, EPA recommends that DEQ consult with established experts[8] who have documented that certain adult salmon species from Idaho waters reside in coastal waters of the U.S. (i.e., fall run chinook and coho salmon).

3. Consideration of Tribal Reserved Fishing Rights

As reflected in our May 29, 2015 letter to DEQ, in complying with the CWA and EPA's regulations when setting criteria to adequately protect Idaho's designated uses, it is necessary to consider tribal reserved rights, including tribal treaty reserved fishing rights. In Idaho, certain tribes hold reserved rights to take fish for subsistence purposes, including treaty-reserved rights to fish at all usual and accustomed fishing grounds and stations in waters under state jurisdiction and in unoccupied lands of the United States.[9] In order to protect the treaty reserved right to continue culturally important subsistence fishing practices, the state must adopt criteria that will protect the tribal population exercising the subsistence fishing use.

With these principles in mind, EPA has concerns with whether DEQ's decision to calculate the FCR based only on consumption of Idaho fish and to use a mean FCR for high consuming populations that excludes anadromous fish, will adequately protect the treaty reserved subsistence fishing use. A critical part of deriving criteria that will protect the tribes' subsistence fishing use are the data used to determine the FCR. Those data, where available, must reasonably represent tribal subsistence consumers' practices unsuppressed by fish availability or concerns about the safety of the fish available for them to consume. This approach is consistent with EPA's general recommendation that states and authorized tribes select a FCR that reflects consumption that is not suppressed when sufficient data are available.[10] Accordingly, EPA recommends that DEQ consider selecting a FCR that reflects tribes' unsuppressed fish consumption. If such data are unavailable, EPA recommends using an upper percentile of consumer only data, as that may more accurately reflect consumption that is not suppressed. Additionally, working with affected tribes would inform, among other things, which fish consumption data should be used.

DEQ has presented evidence that suggests fish consumption for the current U.S. population is not suppressed. However, DEQ has not considered suppression for tribal populations. Clearly current average FCRs for the Nez Perce and Shoshone Bannock tribes are below heritage rates documented for both of these tribes, as well as heritage rates for the Kootenai and Coeur d'Alene tribes. EPA requests that DEQ provide additional rationale for how derivation of human health

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[7] Qiao, P., A.P.C. Gobas, and A.P. Farell. 2000. "Relative Contributions of Aqueous and Dietary Uptake of Hydrophobic Chemicals to the Body Burden in Juvenile Rainbow Trout." Archives of Environmental Contamination and Toxicology 39:369–377.

[8] For example, NOAA Fisheries Research Fisheries Biologist Dr. Laurie Weitkamp (see http://www.nwfsc.noaa.gov/contact/display_staffprofile.cfm?staffid=189)

[9] Certain tribes also have a treaty-reserved privilege of hunting on open and unclaimed land that may also include fishing. Also, in addition to treaties, executive orders or federal statutes, such as land claim settlement acts, may also apply to tribal resources.

[10] EPA. January 2013. *Human Health Ambient Water Quality Criteria and Fish Consumption Rates: Frequently Asked Questions*. http://water.epa.gov/scitech/swguidance/standards/criteria/health/methodology/upload/hhfaqs.pdf.

criteria using a suppressed FCR will protect fish consumers in Idaho, including tribes with reserved rights.

Idaho's Other Proposed Human Health Criteria Inputs

1. Risk Level

EPA supports DEQ's proposed policy decision to retain its 10^{-6} cancer risk level to derive human health criteria. However, as noted above in EPA's comments about consideration of tribal reserved fishing rights, EPA is concerned with DEQ's decision to protect high consuming populations, including tribes, at a 10^{-6} cancer risk level using the mean consumption rate of the high consumer only data. Instead, EPA recommends that DEQ consider using a 10^{-6} cancer risk level coupled with a FCR that reflects high consuming populations' consumption unsuppressed by fish availability or concerns about the safety of the fish available for them to consume. Alternatively, if such data are unavailable, EPA recommends that DEQ consider the approach used by Oregon to protect high consuming populations at a 10^{-6} cancer risk level using the 95th percentile of consumer only data.

2. Relative Source Contribution (RSC)

In June 2015, EPA published final updated ambient water quality criteria for the protection of human health for 94 chemical pollutants.[11] These updated recommendations reflect the latest scientific information and EPA policies, including updated body weight, drinking water consumption rate, FCR, bioaccumulation factors, health toxicity values, and relative source contributions. EPA supports DEQ's proposed approach to use RSC values specified in EPA's 2015 final 304(a) human health criteria recommendations.

3. Bioaccumulation Factors (BAFs)

The EPA supports DEQ's proposal to use BAFs consistent with EPA's 2015 final 304(a) human health criteria recommendations. Where EPA did not update a particular pollutant in 2015, EPA recommends that DEQ use the bioaccumulation information associated with EPA's most recent 304(a) recommendations for that pollutant, along with updated exposure factors (FCR, body weight and drinking water intake). DEQ is proposing to use national trophic level specific FCRs and BAFs to develop a single BAF to be used with a single FCR as described in the following formula:

$$(FCR_{TL2} \times BAF_{TL2} + FCR_{TL3} \times BAF_{TL3} + FCR_{TL4} \times BAF_{TL4}) / (FCR_{TL2} + FCR_{TL3} + FCR_{TL4})$$

The national data indicate substantial consumption of trophic level 2 species. However, tribes participating in the Columbia River Intertribal Fish Commission survey consumed almost exclusively trophic level 3 and 4 species. Thus, use of national trophic level specific FCRs would underestimate BAF values appropriate for use with these tribal populations. Trophic level specific FCRs for the Nez Perce and Shoshone Bannock should be evaluated and used along with appropriate trophic level specific BAFs to derive an overall BAF.

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[11] Final Updated Ambient Water Quality Criteria for the Protection of Human Health, (80 FR 36986, June 29, 2015). See also: USEPA, 2015. Final 2015 Updated National Recommended Human Health Criteria. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. http://water.epa.gov/scitech/swguidance/standards/criteria/current/hhfinal.cfm.

4. Body Weight and Drinking Water Intake Assumptions

EPA supports DEQ's proposed policy decision to use either 1) data from Idaho's fish consumption surveys, or 2) data from the Idaho Department of Health and Welfare BRF State Survey, or 3) EPA's 2011 Exposure Factors Handbook/NHANES. At this time, it is still unclear whether or not the approach to use local or regional data is sufficiently reliable. If the data are not sufficient, EPA continues to encourage DEQ to consider the new information used to update EPA's national 304(a) human health criteria recommendations, including EPA's 2011 Exposure Factors Handbook. For example, EPA derived its 2015 final 304(a) recommendations using an updated body weight assumption of 80 kg, the national mean based on a survey of the U.S. population and described in EPA's 2011 Exposure Factors Handbook. EPA supports DEQ's proposed policy decision to use a drinking water intake assumption of 2.4 L/day, consistent with EPA's 2015 final 304(a) human health criteria recommendations.

5. Toxicity Factors (Reference Doses (RfDs) and Cancer Slope Factors)

EPA supports DEQ's proposal to use RfDs and CSFs consistent with EPA's 2015 final 304(a) human health criteria assumptions. Where EPA did not update a particular pollutant in 2015, EPA recommends that DEQ use the toxicity information associated with EPA's most recent 304(a) recommendations for that pollutant along with updated exposure factors (FCR, body weight and drinking water intake).

Idaho's Proposed Pollutant Scope

As noted above, EPA published final 304(a) recommended human health criteria for 94 pollutants in June 2015. EPA's final updated water quality standards regulations at 40 CFR 131.20 require that if a state chooses not to adopt new or revised criteria for any parameters for which EPA has published new or updated criteria recommendations under CWA section 304(a), they must explain their decision when reporting the results of their triennial review to EPA under CWA section 303(c)(1) and 40 CFR 131.20(c). Given this requirement for Idaho to adopt (or explain why it is not adopting) EPA's updated 304(a) human health criteria during Idaho's next triennial review, EPA recommends that Idaho take the opportunity now to revise all of its currently applicable human health criteria to make them consistent with EPA's 2015 updated human health water quality criteria.

Idaho's Use of Probabilistic Risk Assessment to Derive Human Health Criteria

As stated in our previous comments, EPA needs additional detailed information to evaluate whether DEQ's proposal to employ probabilistic risk assessment (PRA) to develop human health criteria is scientifically defensible and protective. EPA's comments above regarding inclusion of market and anadromous fish, and selection of an appropriately protective percentile of high fish consuming populations clearly have implications for DEQ's PRA analysis. Use of a FCR distribution that does not include consumption of market and anadromous fish will result in PRA-based criteria that will produce fish and water based contaminant exposures that exceed acceptable levels. Additionally, DEQ's PRA for high fish consuming populations are derived using the assumption that, at the selected criteria, the mean of the hazard quotient distribution will equal one, and the mean of the risk distribution will equal 1×10^{-6}. This approach will allow for a large fraction of high fish consumers to have exposures that either exceed an acceptable

dose (i.e. the reference dose) for noncarcinogens or exceed a dose associated with risk of 1 x 10^{-6} for carcinogens.

Of particular concern is development of an appropriate tribal fish consumption distribution for PRA. The NCI method cannot be used to characterize consumption of a particular grouping of fish (e.g., fish caught in Idaho waters) if the data necessary for the method are not available. Idaho has used tribal FFQ and NCI data in an attempt to develop "NCI-like" estimates of average tribal consumption of fish caught in Idaho waters. However, the appropriateness of this methodology has not been vetted. In particular, extending this approach to deriving percentiles of a FCR distribution may be problematic.

As previously noted, EPA's position is that it is necessary to include market fish and appropriate to include anadromous species in the FCR used to set Idaho's AWQC. EPA also has methodological concerns about using FFQ and NCI data to derive FCR statistics. Thus, EPA recommends that the NCI group 2 (i.e. anadromous, near coastal and inland fish and shellfish) FCR data for the Nez Perce Tribe be used to develop statistics representing current fish consumption.

EPA also does not understand why DEQ would retain an existing criterion when the existing criterion is less than a PRA-based criterion but greater than a deterministic-based criterion. DEQ should further explain how this approach would be scientifically sound.

Idaho's Proposed Approach to Downstream Protection

EPA is encouraged by DEQ's inclusion of a downstream protection narrative in the proposed rule, and provides specific comments on the language of DEQ's proposed narrative below. However, EPA's *Protection of Downstream Waters in Water Quality Standards: Frequently Asked Questions* suggests that states can consider a more tailored and specific narrative criterion and/or a numeric criterion in certain situations, such as when more stringent numeric criteria are in place downstream and/or environmental justice issues are relevant.[12] As mentioned above, most of Idaho's rivers are in the Columbia River basin and are, therefore, upstream of Oregon's portion of the Columbia River. EPA strongly encourages DEQ to consider adopting numeric criteria (either in addition to or instead of narrative criteria) that ensure the attainment and maintenance of Oregon's downstream water quality standards, or to provide additional rationale detailing how use of a narrative downstream protection criterion alone will protect Oregon's more stringent water quality standards.

The language that DEQ has proposed in its downstream protection narrative closely mimics the language in EPA's "*Templates for Narrative Downstream Protection Criteria in State Water Quality Standards*" (EPA publication No. 820-F-14-002). While the proposed language is in the right direction, without inclusion of the word "downstream," after the word "those", the meaning of "those waters" is ambiguous and could be interpreted in different ways. Additionally, given that several of Idaho's waters flow into waters under tribal jurisdiction, EPA requests that DEQ clarify that this downstream protection provision applies to waters flowing into another state or tribe. To address both issues, EPA suggests the following wording:

[12] EPA. June 2014. *Protection of Downstream Waters in Water Quality Standards: Frequently Asked Questions.* http://water.epa.gov/scitech/swguidance/standards/library/upload/downstream-faqs.pdf

*"All waters shall 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 the waters of another state **or tribe.**"*

Other Specific Comments on Idaho's Preliminary Rule Language

Section 010. Definitions

46. Harmonic Mean. EPA supports DEQ's proposed revisions to this definition. However, EPA suggests DEQ consider including the following equation in the definition for harmonic mean, as it provides additional clarity:

$$Q(harmonic) = n/\sum_{i=1}^{n}\frac{1}{Qi}$$

Section 210. Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use

01.a. Criteria for Toxic Substances. EPA supports DEQ's proposed revisions to the application of the human health criteria for toxics for the protection of consumption of water and organisms such that these criteria no longer apply to aquatic life uses; however, the human health criteria still apply to primary and secondary contact recreation use. Given that the provision in Idaho's water quality standards at Section 100.02 a. and b. states in part that secondary contact recreation may include activities such as fishing, the application of the water and organisms human health toxic criteria to only recreation uses and not aquatic life, is appropriate. The application of the water and organisms human health toxic criteria to aquatic life is likely a remnant from when Idaho was under the National Toxics Rule. As a part of that rule, EPA explained that it had promulgated the water and organisms criteria for waterbodies in Idaho protected for secondary contact and all waterbodies where aquatic life uses were designated and therefore there is a potential fish consumption exposure route.

With respect to DEQ's proposed revision to the headings in the toxics criteria table, specifically for the human health criteria, EPA suggests using the terminology "organisms" instead of "fish". "Organisms" more closely represents the concept that consumption is meant to encompass more than just fish, but rather fish, shellfish, and aquatic life. Therefore, EPA suggests DEQ retain the word "organisms" and not replace it with "fish".

03. b. and v. Applicability. Low flow design conditions.
Design flow for noncarcinogens - Previous EPA guidance recommended the use of the long-term harmonic mean flow to implement criteria for carcinogens and the 30Q5 flow to implement criteria for noncarcinogens.[13] In the 2000 Human Health Methodology, EPA revised its guidance to recommend harmonic mean flow be used to implement both carcinogen and noncarcinogen human health criteria.[14] Therefore, EPA recommends revising the low flow

[13] USEPA. 1991. *Technical Support Document for Water Quality-Based Toxics Control.* Office of Water. Washington DC. EPA/505/2-90/001.
[14] FR Vol 65 No. 214. Pg. 66450. Revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000).

design condition for noncarcinogens in 03.b and 03 c.v. from the 30Q5 to the harmonic mean flow.

The harmonic mean flow is the sum of the reciprocals of individual flow measurements divided into the total number of individual flow measurements, and the 30Q5 flow is defined by the lowest 30-day average that has an expected return frequency of once every five years. Harmonic mean flow should be used to implement human health criteria because, by and large, human health criteria are designed to protect an individual over a lifetime of exposure. Human health criteria based on cancer potencies and risk levels are based on models that extrapolate animal data to a human lifetime. Similarly, a human noncancer criterion is based on an RfD, which is an acceptable daily exposure over a lifetime. Therefore, EPA's approach is to match the longest stream flow averaging period (using harmonic mean) with the criterion which is protective over a human lifetime. In rare instances where a human health criterion or value is based on a short-term toxicological effect (*i.e.*, the critical effect upon which the criterion/ value is based is significantly less than lifetime and may be an acute effect), the design flow should be adjusted accordingly. This does not pertain to RfDs in which a short-term study has been used as the RfD basis and an uncertainty factor has been used to account for less than lifetime study results; that is, the short-term study has been used to estimate a lifetime RfD value. This pertains only to those situations where the critical effect is a short-term effect (and where no additional uncertainty factor has been used to account for less than lifetime exposure). A good example of this is EPA's RfD for nitrate. The critical effect, upon which the RfD is based, is toxicity to infants after a short-term exposure. In this case, harmonic mean flow would be an inappropriate design flow for such a short-term effect. In this case, a 7Q10 or a 4Q3 design flow may be more appropriate.