IDAHO HUMAN HEALTH CRITERIA UPDATE JUSTIFICATION AND COMPLIANCE WITH THE CLEAN WATER ACT

I. Requirements Under the Clean Water Act and Federal Regulations

Idaho DEQ developed the human health criteria for toxic pollutants in accordance with Section 303(c) of the Clean Water Act (CWA) and the federal regulations implementing the CWA, 40 CFR Part 131.

Section 303(c)(2)(A) of the Clean Water Act (CWA) provides that state water quality standards (WQS) must consist of designated uses of navigable waters in the State and water quality criteria for such waters based upon the designated uses. The WQS must protect the public health or welfare, enhance the quality of water and serve the purposes of the CWA. In establishing WQS, States must take into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes and agricultural, industrial and other purposes.

Section 303(c)(2)(B) of the CWA requires States to adopt, as part of the WQS, criteria for all toxic pollutants that EPA has identified under section 307 of the CWA, and for which EPA has published recommended criteria under section 304(a), the discharge or presence of which in the affected waters could reasonably be expected to interfere with designated uses adopted by the State.

Under section 303(c)(3) of the CWA, if WQS are consistent with the minimum requirements in the CWA EPA must, within 60 days of the date of submission, approve the WQS.

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The federal regulations provide more detail regarding the minimum requirements for WQS. 40 CFR 131.11 sets forth the requirements for criteria, such as the human health criteria submitted by DEQ. 40 CFR 131.11(a)(1) provides that criteria must protect the designated use, and must be based on sound science. 40 CFR 131.11(a)(2) specifically provides that criteria for toxic pollutants must be sufficient to protect designated uses.

40 CFR 131.11(b) explains that when establishing criteria, States should base numeric values on 304(a) Guidance, 304(a) Guidance modified to reflect site-specific conditions, or other scientifically defensible methods.

II. 304(a) Guidance and Supporting Documents

In 2002, EPA updated its national recommended water quality criteria, published under Section 304(a) of the CWA. The update included revised human health criteria based upon an updated national default fish consumption rate of 17.5 g/day. The 2002 revised recommended human health criteria were based upon EPA's 2000 Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004, October 2000) (hereafter "2000 Methodology"). On June 29, 2015, EPA again updated recommended human health criteria based upon a number of updated exposure inputs, including an updated national default fish consumption rate of 22 g/day. The 2015 updated criteria are also based upon the 2000 Methodology.

The 2000 Methodology is intended to provide States flexibility in establishing human health criteria, and EPA strongly encourages States to use the Methodology. The 2000 Methodology also defines the factors EPA intends to use in evaluating and determining consistency of State WQS with the requirements of the CWA. (2000 Methodology p.1-1 to 1-2).

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Thus, while there are other EPA publications which are relevant to the evaluation of DEQ's submission of human health criteria (some of which are cited to in this submission) the 2000 Methodology continues to be the principal basis for the 304(a) recommended criteria and EPA's review of State human health criteria submissions.

According to the 2000 Methodology, many of the decisions States must make with respect to the human health criteria are not science based decisions, but rather risk management decisions, which EPA defines as "the process of selecting the most appropriate guidance or regulatory actions by integrating the results of risk assessment with engineering data and with social, economic, and political concerns to reach a decision." (2000 Methodology p. 2-4). EPA recognizes that such risk management decisions are in many cases better made by States. (2000 Methodology p. iii).

Several of the critical decisions in deriving Idaho's human health criteria are risk management decisions, including the choice of cancer risk level and the percentage of the population's fish consumption rate to use. (2000 Methodology p. 2-4).

III. Idaho's Human Health Criteria Rulemaking

A. EPA's 2012 Disapproval

The criteria submitted to EPA today are a result of EPA's 2012 disapproval of criteria DEQ submitted to EPA for review in 2006. EPA's disapproval was based upon the assertion that DEQ did not consider several sources of information regarding local and regional fish consumption before using the national default fish consumption rate of 17.5g/day to set criteria. In its disapproval, EPA stated that in order to meet applicable requirements of the CWA, DEQ must "evaluate local and regional fish consumption information to determine

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whether its statewide criteria are protective of designated uses." (May 10, 2012 EPA letter p. 3). EPA also suggested that Idaho consider undertaking a fish consumption survey. (May 10, 2012 letter p. 5).

B. DEQ's Rulemaking Process

In response to EPA's disapproval, DEQ took the actions EPA specified were needed to remedy the disapproval. DEQ evaluated existing fish consumption data, including all the data referenced by EPA in its disapproval letter. DEQ found that the existing data suggested there are likely fish consuming populations in Idaho that consume more than the national default consumption rate. DEQ also found, however, that the existing data was limited in scope for Idaho residents, old and of questionable quality. Therefore, DEQ determined, as suggested by EPA, to conduct its own fish consumption survey of Idaho residents.

In fall 2012, DEQ began a series of public meetings with stakeholders, including EPA, Idaho Tribes, industry representatives and conservation and environmental groups, to address the human health criteria. With the input from stakeholders, DEQ and its contractor designed the fish consumption survey that was then implemented with the results becoming available in June 2015.

During the period in which the data was being collected through the survey, DEQ continued to meet with stakeholders to discuss important policy decisions regarding the development of human health criteria. In all, 18 meetings were conducted between 2012 and 2015. (The DEQ human health criteria rulemaking record can be viewed at http://www.deq.idaho.gov/laws-rules-etc/deq-rulemakings/docket-no-58-0102-1201/. In addition, all rulemaking records are a part of this submission and provided on a CD.)

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In addition to the Idaho fish consumption survey, EPA sponsored fish consumption surveys of the Nez Perce and Shoshone-Bannock Tribes, as well at "heritage" studies involving the Kootenai, Coeur d'Alene, Nez Perce and Shoshone-Bannock Tribes. DEQ considered the results of both the Idaho survey and the EPA surveys of the current fish consumption rate (FCR) of the Nez Perce and Shoshone-Bannock Tribes and the heritage studies in calculating human health criteria.

The human health criteria rule was adopted by the DEQ Board on December 10, 2015, and approved by the Idaho legislature during the 2016 legislative session. The rule became effective on March 25, 2016. The rule was adopted in accordance with applicable law. (Letter dated December 12, 2016 to Dan Opalski from Idaho Deputy Attorney General Douglas Conde).

IV. DEQ's Human Health Criteria and Compliance with the CWA

A. Equations Used in Calculating Criteria

The equations used by DEQ to derive the human health criteria (Idaho Human Health Criteria, Technical Support Document, December 2015, hereafter "Idaho HHC TSD") are identical to those proposed by EPA in its 2000 Methodology, and used in the 2002 and 2015 national recommended criteria. (2000 Methodology p.1-9). The equations are:

Noncancer Effects:

$$\mathbf{AWQC} = \mathbf{RfD} * \mathbf{RSC} * \left(\frac{\mathbf{BW}}{\mathbf{DI} + (\mathbf{FI} * \mathbf{BAF})}\right)$$

Cancer Effects: Linear Low-Dose Extrapolation:

$$\mathbf{AWQC} = \mathbf{RSD} * \left(\frac{\mathbf{BW}}{\mathbf{DI} + (\mathbf{FI} * \mathbf{BAF}}\right)$$

Where $RSD = \frac{\text{Target Incremental Cancer Risk}}{\text{Cancer Potency Factor}}$

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As outlined below, DEQ followed EPA's 2000 Methodology with respect to each of the inputs used in this equation.

B. Fish Consumption Rate

One of the inputs to the equations used to derive human health criteria is the FCR, which is referred to as FI in the equations. There are a number of decisions States must make with respect to the FCR. These include: use of the national default FCR or local data; what fish to include in the FCR; do you use the fish consumption data for the general population, the fish consumption data for higher consuming sub-populations, or both; and what percentile of the distribution of FCRs in the target population should be used.

1. National Default v. Local FCR Survey Data.

In the 2000 Methodology, EPA suggests a hierarchy of preference with respect to fish consumption data: (1) local data; (2) data reflecting similar geography/population groups; (3) data from national surveys; and (4) EPA's default intake rates.

In accordance with the 2000 Methodology, and as suggested by EPA in its disapproval letter, DEQ used local fish consumption data in the development of the human health criteria. DEQ used both the survey it conducted of the Idaho general population and Idaho resident anglers, and the EPA sponsored tribal surveys.

The fish consumption surveys relied upon by DEQ were peer reviewed and are scientifically and technically supported. (Idaho Fish Consumption Survey, Northwest Research Group (March 31, 2016); NCI Method Estimates of Usual Intake Distributions for Fish Consumption in Idaho (March 31, 2016). EPA has congratulated Idaho "for using state of the

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art survey methodology" in its development of the human health criteria. (November 6, 2015 letter from Angela Chung to Don Essig RE: EPA Comments on Idaho's Revised Human Health Toxic Criteria, Proposed rule, Docket No.: 58-0102-1201 p. 1).

2. What Fish to Include

a. Marine Species

EPA's 2002 national recommended human health criteria were based upon a default fish consumption rate of fresh and estuarine species only; marine species of fish were not included. (2000 Methodology p. 4-25 to 4-26.) In its 2015 recommended criteria, EPA modified this approach slightly to include freshwater and nearshore (estuarine and a fraction of marine fish caught in near shore areas). (EPA Response to Scientific Views from the Public on Draft Updated National Recommended Water Quality Criteria for the Protection of Human Health (June 2015) p.17). EPA's exclusion of marine species appears to be based on the fact marine species are not within Waters of the U.S., and therefore, do not pick up pollutants from waters regulated under the CWA. (Estimated Fish Consumption Rate for the U.S. Population and Selected Subpopulations (NHANES 2003-2010) p. 13: "As marine fish are not harvested from U.S. waters for which states would be developing water quality standards, the issue of importation for these species is not relevant."; EPA Response to Comments, Revision of Certain Federal Water Quality Criteria Applicable to Washington (Docket ID: EPA-HQ-OW-2015-0174) p. 147: "A key consideration in including certain fish species in the FCR used to set water quality criteria is whether they acquire contaminants from waters under CWA jurisdiction."))

EPA treats salmon as a marine species, and therefore, in the development of its national recommended criteria, EPA largely excluded the consumption of salmon. (EPA included 4% of

salmon consumption based on data showing that 4% of salmon consumed was caught in fresh and estuarine waters.) (2000 Methodology p. 4-28 to 4-29; NHANES 2003-2010 at page 9). EPA provides, however, that States may choose to include marine species, but EPA cautions that in doing so States must adjust the relative source contribution (RSC), which takes into account exposure through consumption of marine species, so that marine species are not double counted. (2000 Methodology p. 4-25; 2013 Human Health Water Quality Criteria and Fish Consumption Rates, Frequently Asked Questions—hereafter "2013 FAQ").

In the DEQ rulemaking, EPA commented that DEQ should include salmon in the fish consumption rate because of information that, according to EPA, suggests salmon consumed in Idaho pick up some pollutant load in regional waters within the jurisdiction of the CWA and even in Idaho waters. (EPA Comments on IDEQ October 7, 2015 Proposed Rule Revisions to Idaho's Human Health Criteria for Toxics (November 6, 2015) p. 3 to 6).

In setting human health criteria, DEQ used the reported consumption of tribal group 2 fish from the Nez Perce fish consumption survey. Group 2 fish include near coastal, estuarine, freshwater and anadromous fish. This means DEQ included all salmon species, as well as tilapia and several species of marine shellfish that are not found in Idaho waters. And, DEQ used the marine species in the fish consumption rate without adjusting the RSC. DEQ also reviewed and compared the tribal group 2 fish consumption to the Idaho general population's FCR of all fish, which was the closest comparable fish group from the general population survey and includes anadromous fish. The inclusion of salmon without any adjustment to the RSC results in DEQ being more protective or conservative than the approach to the fish consumption data EPA recommends in its 2000 Methodology and other national guidance.

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As explained in its Response to Comments document, DEQ used the tribal group 2 fish because of the uncertainties, raised by EPA, regarding the source of pollutants in Idaho fish[1]; because of the desire to consider local information regarding the importance of salmon consumption among Idaho tribes; and because using this more inclusive range of fish, and thus higher consumption rate, along with other conservative factors, while using a 10-5 cancer risk level, helps to ensure that DEQ criteria remain protective. (Public Comment Summary p. 10-11).

b. Market Fish

Both the 2002 and the 2015 national recommended human health criteria use the consumption of all freshwater and estuarine (and in 2015 nearshore marine) fish regardless of the source, including fish purchased at the market. EPA included market fish despite the reality that most market fish are not caught in local waters and therefore would not be affected by an individual State's human health criteria. EPA's inclusion of market fish is based upon EPA's belief that WQS should allow residents to safely consume from local waters the amount of fish they would normally consume from all fresh and estuarine (including nearshore) waters. (NHANES 2003-2010 p. 9).

DEQ used the Nez Perce FCR of tribal group 2 fish that includes near coastal, estuarine, freshwater and anadromous fish, regardless of the source. DEQ also took into consideration how this fish consumption rate compares to the general population survey results of all fish, which again includes all fish consumed regardless of the source. Therefore, in this respect, DEQ's fish consumption rate exceeds the approach recommended by EPA.

[1] DEQ believes there are remaining questions regarding the extent anadromous fish obtain pollutants within CWA jurisdictional waters, including Idaho waters.

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3. What Population's Fish Consumption Data to Consider

EPA's 304(a) national recommended human health criteria are aimed at protecting the majority of the population. EPA uses a mix of median, mean and percentile estimates for the human exposure factors in the equation for deriving human health criteria, including using the 90th percentile of fish consumption of the general population. (2000 Methodology p. 2-1, 2-2). EPA also, however, encourages States to ensure that the criteria protect highly exposed populations, with the understanding that the level of consumption and therefore the level of risk will differ among populations. (2000 Methodology p. 4-25). To do so, EPA recommends States use local fish consumption data that includes both high-end consumers and the general population: "If a State or Tribe chooses values (whether the central tendency or high-end values) from studies that particularly target high-end consumers, these values should be compared to high-end fish intake rates for the general population to make sure that the high-end consumers within the general population would be protected by the chosen intake rates." (2000 Methodology p. 4-26; see also 2013 FAQ: "An analysis of protectiveness of the criteria for the general population, recreational fishers and subsistence fishers should be included in the criteria documentation.").

DEQ followed the 2000 Methodology. DEQ used Idaho specific survey results. DEQ considered the survey results for the general population in Idaho. DEQ also considered survey results for the three higher consuming subpopulations for which recent data were available: the Nez Perce Tribe, the Shoshone-Bannock Tribe and Idaho adult anglers. DEQ chose a FCR that reflects the mean FCR from the survey of Nez Perce tribal survey results (the Nez Perc tribe is the highest of the higher consuming Idaho subpopulations for which data was available) and

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the 95th percentile of the general population survey results. In short, DEQ has developed criteria that take into account and protect the general population as well as high-consuming subpopulations in the State, which is exactly what the 2000 Methodology recommends.

It is important to note that DEQ has developed state-wide criteria that apply to all State waters outside tribal jurisdiction, and the Idaho population that uses those waters. For waters outside tribal jurisdiction, the tribal treaty reserved right to take fish at all usual and accustomed places is one shared in common with the rest of Idaho's population. The tribal population that has the opportunity to fish in such waters is a small part of the total population of Idaho to whom the criteria apply. (U.S. Census information for Idaho indicates American Indian and Alaska Natives represent 1.7% of the Idaho population. http://www.census.gov/quickfacts/table/PST045215/16.) [2] Therefore, in developing Idaho criteria, tribal members are clearly a subpopulation of the general population of the State of Idaho targeted by the human health criteria.

4. What Percentile of the Fish Consumption Data to Use

Choosing the percentage of the population to apply the chosen level of protection to is a risk management decision as opposed to a science-based decision. EPA in its 2000 Methodology provides States the flexibility to choose among a range of fish consumption values for a given population, from high-end values (such as the 90th or 95th percentile) to average values. (2000 Methodology p. 1-9; 2-4 and 4-26). In developing the 2002 national recommended criteria, EPA used 17.5 g/day which represents the 90th percentile of the general

[2] At the time the Idaho fish consumption survey was conducted, the Idaho adult population was 1,141,984. In contrast, according to the tribal fish consumption surveys, there were 2,727 adult Nez Perce tribal members (1,574 adult tribal members qualified to participate in the survey) and 3,242 adult Shoshone-Bannock tribal members qualified to participate in the survey.

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population's fish consumption data. EPA also recognized that some States may need to consider highly exposed populations, and provided default values for sport fishers and subsistence fishers which represent the average or 50 percentile consumption values for these groups. (2000 Methodology p. 1-12, 1-13; 4-27). EPA used this same approach with respect to the 2015 national recommended criteria. (2015 EPA Response to Scientific Views from the Public p. 16). In sum, EPA in its national recommended criteria uses the 90th percentile of the general population FCR, and the 50th percentile or average for high-consuming groups such as sport and subsistence fishers.

DEQ used 66.5 g/day as the fish consumption rate. This value represents the mean (70th percentile) of the Nez Perce group 2 fish consumption rate, and approximately the 95th percentile of the Idaho general population consumption rate of all fish.[3] Thus, DEQ's fish consumption rate exceeds, i.e., is more protective than, EPA's recommended FCR because DEQ used what is comparable to the 95th percentile rather than EPA's 90th percentile of the general population FCR, and DEQ used the 70th percentile rather than EPA's average or 50th percentile of the high consumer FCR. DEQ is also 10 times more protective than EPA guidance by virtue of the fact DEQ applied a 10-5 cancer risk level for the 70th percentile of the FCR of the Nez Perce tribe rather than the 10-4 level of protection EPA allows.

As noted, EPA's national recommended criteria use the average FCR to develop default criteria for high consuming subpopulations. In developing the national recommended criteria, EPA treated subsistence fishers, such as tribal groups, as high consuming subpopulations. (2000 Methodology p. 4-25 to 4-28). EPA noted in the 2000 Methodology that its approach to

[3] The "all fish"' category is broader than the group 2 tribal fish, and therefore likely overstates the general population's consumption of group 2 fish. It was, however, the closest category of fish to the tribal group 2 fish.

high consuming subpopulations was consistent with the approach used for the Great Lakes. With respect to the Great Lakes, EPA treated high consuming tribal groups as a subpopulation of the region. Therefore, according to EPA, the tribal subpopulations were adequately protected by the mean of the high consuming population's FCR—15 g/day-- because the criteria would protect tribal members eating up to 150 g/day at a 10-4 cancer risk rate. (Water Quality Guidance for the Great Lakes System: Supplementary Information Document, EPA-820-B-95-001 (March 1995) p. 163).[4]

DEQ's treatment of Idaho Tribes is consistent with EPA's national guidance and reflects the reality that Idaho tribal members are a subpopulation of the State. DEQ's criteria do not apply to waters within tribal jurisdiction. For waters within tribal jurisdiction, tribes can obtain treatment as a State status under the CWA and develop their own WQS to protect those tribal members who harvest and consume fish from such waters. The Idaho human health criteria are aimed at protecting all residents of the State who use waters outside tribal reservations, including those tribal members who have a right in common with other Idaho residents to fish in such waters. In the context of state-wide criteria that are applied outside tribal reservations, DEQ's has correctly treated the Tribes as a higher consuming subpopulation of the State.

5. Suppression

In EPA's comments regarding DEQ's proposed human health criteria, EPA argues FCRs used by DEQ "must reasonably represent tribal subsistence consumers' practices that reflect

[4] EPA recently issued final human health criteria for the State of Washington in which EPA deviated from its own national guidance by treating Washington's tribes as the general population. EPA explained its position in a conclusory fashion by stating that because tribal members have a right in common with others in Washington to harvest fish they must be treated as something factually they are not—the general population of the State of Washington. DEQ disagrees with EPA's treatment of the tribes as reflected in the Washington rulemaking.

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consumption unsuppressed by fish availability or concerns about the safety of available fish." (EPA Comments on Idaho Department of Environmental Quality's (DEQ) October 7, 2015 Proposed Rule Revisions to Idaho's Human Health Criteria for Toxics, November 6, 2015 p. 6 to7). In other words, EPA argues DEQ must predict the amount of fish Idaho residents might consume for subsistence purposes if there were more fish available, they had no concerns about the safety of fish, or other factors that currently suppress fish consumption were not present. EPA's comments in Idaho and actions in Maine and Washington indicate EPA believes States must adopt a designated use that reflects this unsuppressed level of subsistence fish harvest and consumption and then adopt criteria to protect such a use.

The CWA and EPA's implementing regulations contain nothing to suggest that States must adopt a designated use reflecting an unsuppressed fish harvest and consumption use and adopt criteria to protect such a use. Instead, States are given the choice to determine appropriate uses, as long as they protect for section 101(a) uses that include propagation of fish, shellfish and wildlife and recreation in and on the water.

Idaho WQS meet the requirements set forth in the CWA. All waters in Idaho are protected for aquatic life and recreational uses. (IDAPA 58.01.02.100). The recreational use includes fishing on or about the water. (IDAPA 58.01.02.100.02). The human health criteria based on exposure to toxins through fish consumption alone apply to waters designated for a recreation use, while criteria based on exposure to toxins through both fish consumption and drinking water intake apply to waters additionally designated for domestic water supply. (IDAPA 58.01.02.210.01).

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DEQ has not adopted, and is not required to adopt, a use that is intended to protect subsistence harvest and consumption of fish at a level that existed historically before dams, population increases and other factors reduced the numbers of fish available for harvest. DEQ's recreation use is defined to include water quality appropriate for recreational uses on or about the water, including fishing. (IDAPA 58.01.02.100.03.b). No reasonable interpretation of this language suggests that Idaho has adopted a use intended to support or restore historic subsistence fish harvest levels. EPA has approved Idaho's designated uses, finding them to be consistent with the CWA and federal regulations. Therefore, DEQ has no obligation to adopt criteria to protect for some kind of unsuppressed subsistence level of fish harvest and consumption.

While States and Tribes are not required to adopt a use that reflects the return to a historic fish consumption rate, the CWA allows the States and Tribes the discretion to do more than the CWA requires. This is what the Spokane Tribe did by adopting a traditional lifestyle use and criteria to support that use. When EPA approved the Spokane Tribe's criteria, it made a point in emphasizing how this use and criteria were beyond the minimum requirements of the CWA, and therefore, needed to be judged by a different standard. (Technical Support Document for Action on the Revised Surface Water Quality Standards of the Spokane Tribes of Indians (December 11, 2013) p. 20 to 22). Thus, EPA has recognized there is no requirement under the CWA for States to adopt a use that reflects an unsuppressed or historic FCR, rather this is something a State or Tribe may choose to do.

As noted, federal law does not require DEQ adopt human health criteria based upon unsuppressed fish harvest and consumption use. In addition, the 304(a) national

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recommended criteria published by EPA in 2002 and updated in 2015 are not based upon an unsuppressed fish consumption rate, but instead are based upon actual fish consumption data taken from national surveys. DEQ's development of human health criteria followed EPA's national guidance. DEQ used the best fish consumption data available based on current Idaho-specific surveys of the general population, anglers, and Idaho tribal members.

The federal regulations require criteria to be based on sound science, and in its national guidance EPA emphasizes the use of local data collected through surveys using appropriate survey methodology. Even if DEQ desired to base its human health criteria on an unsuppressed FCR it has no data that it could use. In fact, EPA has never defined what an "unsuppressed" FCR is, or how a State should determine such a FCR. EPA refers to the unsuppressed FCR as an "evolving concept."[5]

EPA did sponsor studies of Idaho tribal "heritage fish consumption" which is defined as "estimates of Tribal fish consumption during the period when Tribes had full access to their traditional fisheries". (A Fish Consumption Survey of the Nez Perce Tribe, Volume I: Heritage Fish Consumption Rates of the Nez Perce Tribe p. 7). But, the reported heritage levels do not provide a valid basis for a FCR in Idaho. First, the decline in fish consumption from the reported heritage rate is caused by a number of factors, most of which have nothing to do with water quality and can not be remedied by Idaho's human health water quality criteria. One of the principal factors contributing to a decline in tribal fish consumption is the decline of the fish population. According to the Nez Perce Heritage Study, the decline is due to commercial, recreational and subsistence fishing; habitat alteration due to urbanization, farming, logging,

[5]. Since DEQ adopted its human health criteria, EPA has proposed several methods of measuring suppression. See EPA Draft Guidance for Conducting Fish Consumption Surveys (June 2016).

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and ranching; dams ; water withdrawals; hatchery production; predation by marine mammals, birds and other fish species; competition with other fish species; diseases and parasites and reduction in annual nutrient distribution. (Nez Perce Heritage Study p. 7). In addition, tribal consumption has changed because of changes in cultural practices, including changes in dietary preferences. (Nez Perce Heritage Study at page 1). The majority of these factors are unrelated to water quality.

It must also be emphasized that to the extent fish populations are reduced by poor water quality, the Idaho WQS contain separate criteria to protect aquatic life, which are not at issue here. EPA has approved DEQ's aquatic life criteria, finding them to adequately protect the aquatic life, including fish, in Idaho.

Adopting an unsuppressed FCR would conceivably protect for a future rate of fish consumption that might occur if the factors that are suppressing consumption are remedied. But, many of factors that are suppressing fish consumption from heritage levels can not reasonably be expected to change in the foreseeable future, if ever. For example, the biggest factor in a decline from heritage levels of consumption is the presence of dams that block fish migration. (Nez Perce Heritage Study p.6 to 8). It is unlikely that all the federal dams on the Columbia River system will be removed. In addition, cultural changes have occurred that are not likely to be altered going forward. In short, not only are many of the factors that affect current fish consumption unrelated to and can not be altered by water quality human health criteria, they are also things that will not likely change in the future. Therefore, heritage rates of fish consumption do not reflect any realistic projection of future consumption.

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The bottom line is even if the CWA required DEQ to set human health criteria based upon an unsuppressed FCR, DEQ has no data upon which it could accurately quantify such a FCR.

While DEQ was not required to and did not attempt to calculate an unsuppressed subsistence level of fish consumption, DEQ did take into consideration the entire range of fish consumption data, that captures current subsistence fishing if any exists in Idaho. If tribal members are currently subsistence fishers, then their consumption rates were reflected in the Nez Perce and Shoshone-Bannocks surveys. As noted below in the section on cancer risk levels, DEQ's criteria adequately protects tribal consumers even at the highest levels of consumption recorded in the survey, and therefore, current subsistence fishers are also protected.

EPA should consider several other factors in connection with Idaho's human health criteria and the concept of suppression. First, DEQ does not agree that its failure to consider suppression will lead to a downward spiral wherein less stringent criteria leads to greater fish contamination and then less consumption which then triggers even less stringent criteria. History in Idaho has shown the opposite. That is, here in Idaho over the past twenty years the FCR used in criteria has actually increased three times, from 6.5 g/day in 1992 NTR, to 17.5 g/day in Idaho's 2005 update, to 66.5 g/day in the current update. This increase is consistent with national trends that show an increase in fish consumption. This nation-wide increase is reflected in EPA's increase in the national default FCR based upon nation-wide surveys as well as data compiled by the U.S. Department of Agriculture. (US Census Bureau, Statistical Abstract of the United States: 2012, 131st ed. Washington DC). To the extent criteria values are

dependent on FCRs there is no evidence a downward spiral is about to commence, in fact the evidence is quite the contrary in so far as the human health criteria are concerned.

Second, there is no basis to believe that DEQ's failure to use some kind of unsuppressed FCR will leave higher consumers at too high a risk should they ultimately be able to realize unsuppressed rates of consumption. Idaho's criteria provide a 10-5 incremental risk of cancer for someone consuming 66.5 g/day of fish. This means someone eating 665g/day would have a 10-4 incremental increase in risk. This is a level of risk that EPA considers protective. (See discussion below regarding the cancer risk rate). 665g/day greatly exceeds even the 99th percentile of current tribal fish consumption rates. DEQ has built into the criteria a margin of safety that allows for much greater fish consumption, at levels approximating heritage rates, without incurring unacceptable risk. In addition, should this future be realized, based on past criteria revision history, there is no reason to believe that criteria would not again be revised taking into account higher future consumption rates such as might result from increased availability of fish to be harvested and consumed. Indeed, Idaho is required by the CWA to review its WQS every three years and therefore will have an opportunity to update criteria as necessary.

In summary, Idaho's FCR of 66.5 g/day based on current fish consumption rates is protective today, and into the future. No downward spiral in human health criteria is evident; in fact quite the opposite is true, as the FCR factor used to derive Idaho's human health criteria has increased each time DEQ has revised the criteria.

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C. Cancer Risk Level

For pollutants that are carcinogens, the equation for developing human health criteria includes the increased likelihood of developing cancer. This likelihood is expressed as a probability, such as one in one million (1x10-6).

In the 2000 Methodology, EPA provides that States have the choice of using a cancer risk level of either 10-6 or 10-5 for the general population as long as highly exposed populations do not exceed a 10-4 risk level. (2000 Methodology at page 2-6).

The acceptance of this range of cancer risk is a long-standing EPA policy. See, e.g., National Toxics Rule, 57 FR 60848-01 (1992); Final Water Quality Guidance for the Great Lakes System, 60 FR 15366 (1995). See also, Idaho Fish Consumption Rate and Human Health Water Quality Criteria—Discussion Paper#7, Risk Management and Protection of Human Health and the material cited therein. As EPA explained with respect to its guidance for the Great Lakes: "The choice of 10-5 risk level was recommended by the Initiative Committees and is within a range of risk levels (i.e., 10-4 to 10-6) that EPA considers to be adequately protective and which EPA has historically considered acceptable in making regulatory decisions. The majority of the Great Lakes States traditionally have used 10-5 risk level in setting their water quality criteria." (Water Quality Guidance for the Great Lakes System: Supplementary Information Document, EPA-820-B-95-001 (March 1995) at page 151).

As reflected in EPA's policy, the risk among population groups that consume different amounts of fish will always vary and can never be equalized. EPA explains this in the 2000 Methodology at page 2-7: "When these exposure parameter values change, so does the relative risk. For a criterion derived on the basis of a cancer risk level of 10^{-6}, individuals

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consuming up to 10 times the assumed fish intake rate would not exceed a 10^{-5} risk level. Similarly, individuals consuming up to 100 times the assumed rate would not exceed a 10^{-4} risk level. Thus, for a criterion based on EPA's default fish intake rate (17.5 gm/day) and a risk level of 10^{-6}, those consuming a pound per day (i.e., 454 grams/day) would potentially experience between a 10^{-5} and a 10^{-4} risk level (closer to a 10^{-5} risk level). (Note: Fish consumers of up to 1,750 gm/day would not exceed the 10^{-4} risk level). If a criterion were based on high-end intake rates and the relative risk of 10^{-6}, then an average fish consumer would be protected at a cancer risk level of approximately 10^{-8}. **The point is that the risks for different population groups are not the same.**" (emphasis added).

The inherent variation in risk associated with different fish consumption patterns is also emphasized by EPA with respect to the Great Lakes guidance: "Obviously, as long as there is variability in fish consumption patterns among various segments of the population, it would be impossible for EPA to ensure that all groups would face identical risk from consuming fish. Therefore, EPA has sought to ensure that, after attainment of water quality criteria in ambient waters, no group is subject to increased cancer risks greater than the risk range that the EPA has long considered protective." (Water Quality Guidance for the Great Lakes System: Supplementary Information Document, EPA-820-B-95-001 (March 1995) at page 164).

EPA guidance allows States flexibility in choosing a CRL, and ultimately EPA recognizes that "[t]he choice of an acceptable cancer risk by a State or Tribe is a risk management decision." (2000 Methodology at page 2-4).

DEQ made the risk management decision to use a cancer risk level of 10-5, along with a FCR of 66.5 g/day. This choice was based upon (1) the risk level being within the range that is

considered protective of both the general population and more highly exposed subpopulations; (2) an assessment of the overall protectiveness provided by the criteria, taking into account all the inputs; (3) a view towards developing criteria that are not only protective, but reasonably achievable; and (4) consistency with longstanding EPA guidance. As EPA did with respect to its national recommended criteria, DEQ "has selected parameter values using its best judgment regarding the overall protection afforded by the resulting AWQC when all parameters are combined." (2000 Methodology p. 1-9). DEQ took into consideration the protective nature--in many instances more protective than EPA guidance suggests--of including anadromous fish in the FCR, including market fish in the FCR, not adjusting the RSC, using the 95 percentile of general population and 70th percentile of the highest consuming population's fish consumption data, using the latest bioaccumulation factors (BAFs) and toxicological information, using only consumers of fish in the FCR distribution and employing EPA's recommended drinking water intake and body weight inputs. Given the very conservative nature of all of these inputs, it was reasonable, as a risk management decision, to choose a cancer risk level which is still protective but which is somewhat higher than what was used in the past by DEQ in its human health criteria.[6]

This risk management decision is consistent with EPA policy. First, the general population is protected at a 10-5 risk level. The 66.5 g/day FCR used is approximately the 95th percentile of the general population's consumption of all fish, and therefore, protects a higher percentage of the Idaho general population at the 10-5 level than EPA recommends in its

[6] DEQ's prior human health criteria used a CRL of 10-6. At the time the prior criteria were adopted, DEQ did not have sufficient Idaho specific fish consumption information and used the national default fish consumption rate that largely excluded the consumption of salmon. Idaho has now included salmon in its FCR, calculated using Idaho-specific fish consumption information, without adjusting the RSC and has used other very conservative inputs that warrant the CRL currently used.

national guidance (EPA recommends using either 10-6 or 10-5 and the 90th percentile of the general population FCR. 2000 Methodology p. 2-6; 4-25 to 4-28).

Second, survey results indicate the Nez Perce Tribe FCR is the highest of the higher consuming populations in Idaho for which data is available. Under the criteria DEQ has developed, the Nez Perce Tribe is protected at a 10-5 level using their mean FCR that reflects about the 70th percentile of tribal fish consumption. This means that 70% of tribal fish consumers are protected at this risk level or better. In order to exceed the 10-4 risk level, a tribal member would have to consume more than 665 g/day of fish, all at criteria level of contamination. The Nez Perce survey indicates that the 95th percentile of fish consumption is 234 g/day. While the survey did not report percentiles for higher fish consumption rates, given the numbers reported, DEQ estimates that the 99th percentile of tribal fish consumption is approximately 360 g/day. Thus, it is reasonable to conclude that 99 percent of the higher consuming population in Idaho consumes considerably less fish than the amount that would expose them to an unacceptable risk. EPA conducts an identical comparison of risks and consumption rates to justify using 10-5 cancer risk level in its guidance for the Great Lakes. (Water Quality Guidance for the Great Lakes System: Supplementary Information Document, EPA-820-B-95-001 (March 1995) p. 163).

In sum, DEQ's cancer risk level protects the general population and more highly exposed subpopulations within Idaho at acceptable levels. It is consistent with longstanding EPA 304(a) guidance, and in conjunction with the other exposure factors, results in criteria protective of Idaho's designated uses and meets the requirements of the CWA.

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D. Body Weight and Drinking Water Intake

In its 2015 national recommended human health criteria, EPA used a body weight of 80 kg, and a drinking water intake of 2.4 L/day.

DEQ used the EPA drinking water intake value of 2.4 L/day. The Idaho fish consumption survey indicated a mean body weight of 80 kg. As this closely matched the value used by EPA in its national recommended criteria, this is the value DEQ used. (Idaho Human Health Criteria, Technical Support Document p. 4).

E. Bioaccumulation Rate

In its 2015 national recommended human health criteria, EPA used BAFs which account for chemical accumulation in aquatic organisms from all potential exposure routes.

Where available, DEQ used BAFs derived by EPA for its 2015 national recommended criteria. (Idaho Human Health Criteria, Technical Support Document at p. 2 to 4).

F. Toxicity Values

DEQ used the toxicity values, reference dose and risk-specific dose, recommended by EPA in its 2015 national recommended criteria. (Idaho Human Health Criteria, Technical Support Document).

G. Downstream Protection

40 CFR 131.10(b) provides: "In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters."

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According to EPA, this language does not require States adopt identical or uniform criteria: "The regulations do not compel states to adopt the same criteria and uses, nor do they suggest that this is the only way a state can meet these requirements. The water quality program is structured to provide state with flexibility to determine the best way to meet their obligations under 131.10(b)." (Letter from EPA to Maxine Lipeles, J.D. dated June 25, 2004; EPA Response to Comments, Revision of Certain Federal Water Quality Criteria Applicable to Washington (Docket ID: EPA-HQ-OW-2015-0174) p. 254).

Consistent with EPA's interpretation of 40 CFR 131.10(b), EPA has recommended States include a narrative downstream protection provision in the WQS, and has provided templates for such narrative provisions. (Templates for Narrative Downstream Protection Criteria in State Water Quality Standards (EPA Publication No. 820-F-14-002).

DEQ used one of the templates recommended by EPA. This can be found in the Idaho WQS at 58.01.02.070.08. This section reads as follows: "All waters shall maintain a level of water quality at their pour point into downstream waters that provides for the attainment and maintenance of water quality standards of those downstream waters, including water of another state or tribe." Therefore, DEQ has met its obligation under the federal regulations with respect to downstream protection.

Notwithstanding the fact that DEQ has followed EPA's national guidance, and in fact has used EPA's suggested language in its WQS, EPA urges Idaho to adopt human health criteria based on the same FCR used in Oregon and Washington, which EPA argues is necessary to afford protection to downstream waters. DEQ does not agree that using a FCR identical to

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Oregon and Washington is required or would even ensure attainment of downstream standards. A uniform FCR alone does not guarantee uniform criteria.

First, the FCR is just one of a number of input values used in determining human health criteria. Therefore, using the same FCR alone does not necessarily result in identical criteria or ensure compliance with downstream human health criteria.

Second, EPA emphasizes in its national guidance the need to use local fish consumption data. More specifically, EPA in its 2012 disapproval directed DEQ consider local data in order to remedy the disapproval. Idaho used Idaho-specific data from surveys of the general population, anglers and Idaho tribes. Idaho as an inland State presents different fish harvest and consumption opportunities and patterns than Washington and Oregon, both coastal states, and the Idaho data reflect the differences. Simply picking the FCR used in Washington or Oregon would mean ignoring the Idaho specific data and differences in fishery resources.

Third, attempting to adopt criteria identical to Washington and Oregon was and is impossible. Washington's human health criteria were in a state of flux at the time DEQ adopted its human health criteria in December of 2015. Oregon's human health criteria are based on a different set of inputs than the inputs used in Idaho's current proposal. Idaho used EPA's latest national recommendations for bioaccumulation, relative source contribution, toxicity, body weight, drinking water intake, whereas Oregon's criteria are not based on these latest EPA recommendations. Unless Idaho ignores EPA's latest recommendations, it could not have identical criteria to Oregon.

Fourth, rather than focusing on the FCR alone, it is more important to look at the protectiveness of the actual criteria. A comparison of actual criteria (rather than just one of the

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input factors) reveals some of Idaho's proposed criteria are lower in value than Oregon's, while others are higher. This mismatch is likely to always be the case, or at least often so, as adjacent sates update their criteria on different schedules and with different information and policy decisions each time.

Figures x1 and X2 compare the Idaho and Oregon criteria for fish + water exposure and fish only exposure respectively. In these figures the diagonal lines represents unity, criteria that are the same value in both states would fall on this line. Points above the line reflect a criterion that is higher (less stringent) in Oregon than in Idaho, below the line vice versa. Two things are immediately apparent. First, despite Idaho's FCR of 66.5 g/day being little more than one third of Oregon's 175g/day, many of the Oregon Criteria are less stringent than in Idaho. Second, there is also quite a spread in the criteria values about and below the line, orders of magnitude differences in criteria between the two states, cutting both ways.

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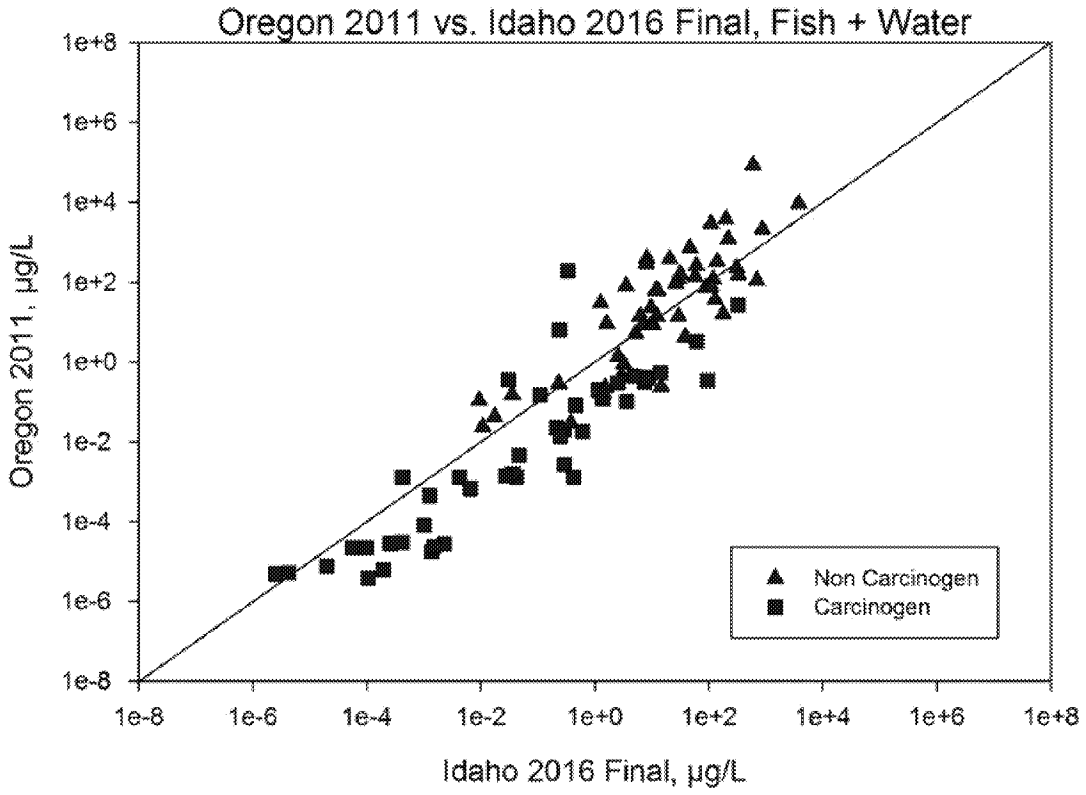

Figure x1. Comparison of Idaho's 2016 human health criteria to Oregon's 2011 criteria for exposure due to fish consumption and drinking water intake.

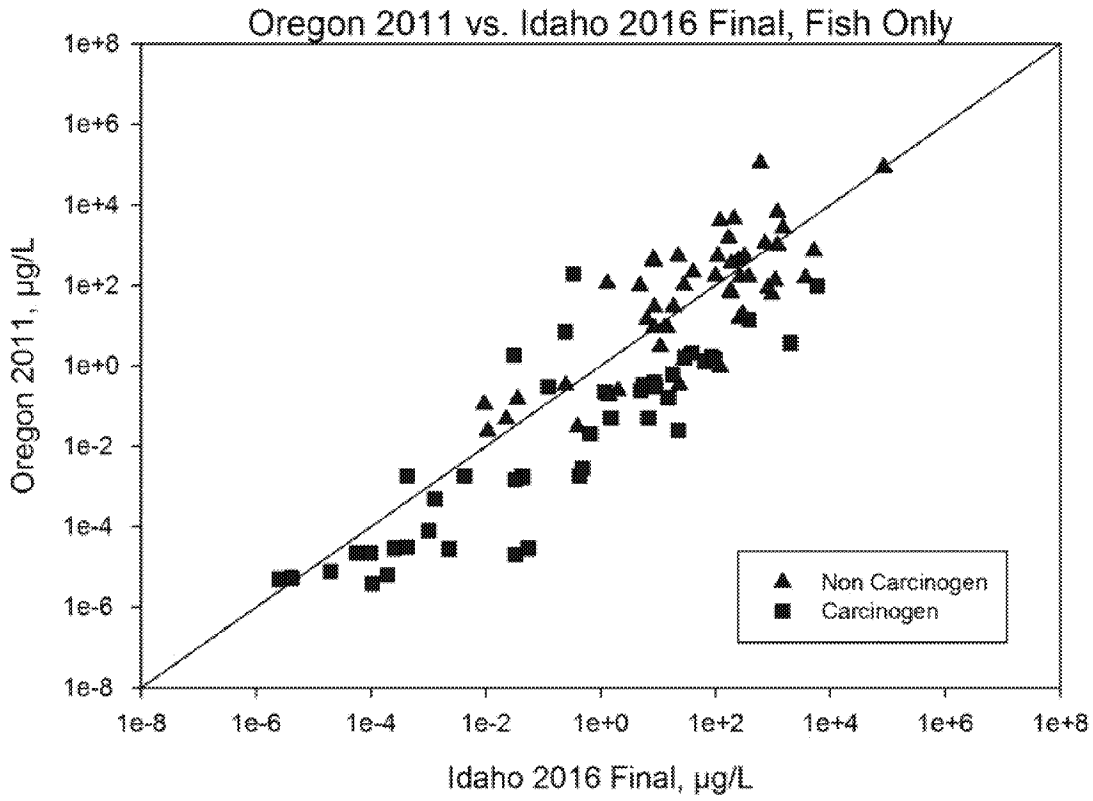

Figure x2. Comparison of Idaho's 2016 human health criteria to Oregon's 2011 for exposure due to fish consumption only.

Fifth, as EPA has provided in its national guidance, uniform criteria across jurisdictional boundaries is not needed to provide downstream protection. Implementing Idaho's narrative downstream protection provision through discharge permits and TMDLs is a more direct and effective means of ensuring downstream protection.

H. Tribal Treaties

EPA in its comments on Idaho's proposed human health criteria states that tribal treaty provisions that reserve to the tribes the right to take fish at all usual and accustomed places in common with Idaho citizens require that Idaho's criteria protect tribal subsistence consumption unsuppressed by fish availability or concerns about the safety of available fish. According to

EPA the treaty reserved fishing rights also require DEQ treat the tribes as the general population of Idaho.

DEQ disagrees with EPA's interpretation of the treaties and the manner in which EPA reads the treaties in conjunction with the requirements of the CWA. In this regard, DEQ requests EPA consider DEQ's response to comments set forth in DEQ's Public Comment Summary.

DEQ particularly disagrees with EPA's view that tribal reserved fishing rights require Idaho to do more than what is already required by the CWA. Under the CWA, human health criteria must protect designated uses. In Idaho, this includes recreational uses that include fishing. This means the criteria must provide a level of water quality that allows the safe consumption of fish taken in Idaho waters. DEQ met the CWA requirements. DEQ specifically considered and used Idaho tribal fish consumption data, and set criteria that ensure tribal consumers, even those consuming fish at the highest levels reported by the tribal surveys, are protected within the range EPA considers safe.

As set out in DEQ's response to comments during the rulemaking, there is no legal basis for EPA's position with respect to tribal treaties. To the extent, however, that the treaties include an implied right to water quality that is relevant to setting human health criteria, any such right would be satisfied by ensuring tribal fish consumers taking fish pursuant to reserved treaty rights are adequately protected. DEQ has done just that.

V. Conclusion

DEQ's human health criteria meet the requirements of the CWA and federal implementing regulations and must be approved by EPA. The criteria protect designated uses

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and are based on sound science. DEQ used 304(a) guidance modified to reflect site-specific conditions. The criteria are consistent with EPA national guidance as reflected in the 2000 Methodology and other national guidance documents. DEQ also took those actions EPA specified were needed to remedy the 2012 disapproval of DEQ's criteria.

The 2000 Methodology defines the factors that will produce human health criteria that meet the requirements of the CWA and federal implementing regulations. Therefore, EPA uses the 2000 Methodology in its review of State human health criteria. (2000 Methodology p. 1-1 to 1-2). Each factor DEQ used in developing its human health criteria meets or exceeds the recommendations set out in the 2000 Methodology.

1. DEQ used the equations to develop the human health criteria set out in the 2000 Methodology and used by EPA in developing its 304(a) national recommended criteria.
2. In accordance with the actions EPA specified were needed to remedy its 2012 disapproval of Idaho's human health criteria, and consistent with EPA's 2000 Methodology, DEQ used local fish consumption information. DEQ used fish consumption information from surveys, conducted using state-of-the-art methodology, of the Idaho general population, Idaho anglers and tribal populations. DEQ also considered heritage studies funded by EPA.
3. DEQ included marine species and market fish in its FCR without adjusting the RSC. Therefore, DEQ was more protective than the approach recommended by EPA in the 2000 Methodology and other national guidance.

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4. DEQ considered the FCR of both the general population and higher consuming populations as recommended by EPA in its 2000 Methodology and other national guidance.
5. DEQ used a FCR that reflects at least the 95th percentile of the general population's fish consumption and the 70th percentile of the highest consuming subpopulation's fish consumption. The use of these values is more protective than the values recommended in the 2000 Methodology and used in the development of EPA's 304(a) national recommended criteria.
6. DEQ used an incremental cancer risk level (CRL) of 10-5, which is within the risk range recommended by EPA in its 2000 Methodology and other national guidance. Also consistent with EPA recommendations, DEQ's human health criteria protects the highest consuming subpopulation at better than a 10-4 CRL.
7. The body weight, drinking water intake, bioaccumulation rate and toxicity factors all reflect EPA's latest recommended values from the 2015 EPA 304(a) national recommended criteria.
8. DEQ included a downstream protection provision that mirrors language recommended by EPA.

As outlined above, DEQ used each of the factors EPA has determined are based on sound science and will produce criteria that are protective of human health and meet the requirements of the CWA. Therefore, the DEQ criteria must be approved. DEQ did not, however, adjust the criteria to reflect the concept of an historic subsistence harvest and consumption use. Such a use, and criteria to protect such a use, are not required by the CWA,

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implementing federal regulations or the 2000 Methodology. In addition, to the extent the Idaho tribal treaties include an implied right to water quality that is relevant to human health criteria (which DEQ does not believe exists) that right to water quality is satisfied by the Idaho human health criteria because the criteria ensure tribal consumers, even those consuming fish at the highest levels reported by the tribal surveys, are protected within the range EPA considers safe.

VI. Documents to be Considered

All documents listed below are hereby incorporated by reference as a part of DEQ's submission of its revised Water Quality Standards and must be considered by EPA in its review of the revised standards. Links to documents are provided where available. The documents are also provided on a CD.

(1) All documents included on DEQ's website for this rulemaking docket. The documents are available at http://www.deq.idaho.gov/laws-rules-etc/deq-rulemakings/docket-no-58-0102-1201/.

(2) Joint Stipulations and Agreement Regarding Certain Documents, Maine v. McCarthy, Civil Action No: 1:14-cv-264-JDL, May 18, 2016.

(3) Proposal of Certain Federal Water Quality Standards Applicable to Maine, 81 FR 23239, April 20, 2016.

(4) Memorandum from Gina McCarthy to All EPA Employees, Subject: Commemorating the 30th Anniversary of the EPA's Indian Policy, December 1, 2014.

(5) Letter to Erica Fleisig, Office of Water, Standard and Health Protection Division, United States Environmental Protection Agency, with comments submitted on behalf of the Northwest Pulp & Paper Association and other entities re: Revision of Certain Federal Water Quality Criteria Applicable to Washington, dated December 18, 2015, and all attachments to these comments, EPA Docket ID No.: EPA-HQ-OW-2015-0174.

(6) *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)*, United States Environmental Protection Agency, EPA-822-B-00-004, October 2000.

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(7) Letter from Michael Bussell, Director Office of Water and Watersheds, United States Environmental Protection Agency, Region 10 to Barry Burnell, Water Quality Division Administrator, Department of Environmental Quality, May 10, 2012.

(8) *Idaho Human Health Criteria*, Technical Support Document, State of Idaho, Department of Environmental Quality, December 2015.

(9) Dennis W. Buckman, PhD, Ruth Parsons, BA and Lisa Kahle, *NCI Method Estimates of Usual Intake Distributions for Fish Consumption in Idaho*, Information Management Services, Inc., March 31, 2016.

(10) Letter from Angela Chung, United States Environmental Protection Agency to Don Essig, Idaho Department of Environmental Quality, re EPA Comments on Idaho's Revised Human Health Toxic Criteria, Proposed rule, Docket No. 58-0102-1201, November 6, 2015.

(11) *EPA Response to Scientific Views from the Public on Draft Updated National Recommended Water Quality Criteria for the Protection of Human Health*, Docket ID No. EPA-HQ-OW-2014-0135, United States Environmental Protection Agency, June 2015.

(12) *Estimated Fish Consumption Rate for the U.S. Population and Selected Subpopulations (NHANES 2003-2010)*, EPA-820-R-14-002, United States Environmental Protection Agency, April 2014.

(13) *Human Health Ambient Water Quality Criteria and Fish Consumption Rates: Frequently Asked Questions,* United States Environmental Protection Agency, January 18, 2013.

(14) Letter to The Honorable Rudy Peone, Spokane Tribe of Indians from Daniel D. Opalski, Director, Office of Water and Watersheds, United States Environmental Protection Agency dated December 19 2013 re attached *Technical Support Document for Action on the Revised Surface Water Quality Standards of the Spokane Tribe of Indians Submitted April 2010*, December 11, 2013.

(15) Nayak L. Polissar, PhD, Anthony Salisbury, Callie Ridolfi, MS, MBA, Kristin Callahan, MS, Moni Neradilek, MS, Daniel S. Hippe, MS and William H. Beckley, MS, *A Fish Consumption Survey of the Nez Perce Tribe,* The Mountain-Whisper-Light Statistics Pacific Market Research Ridolfi, Inc., September 30, 2015.

(16) *Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID)*, United States Environmental Protection Agency, EPA-820-B-95-001, March 1995.

(17) *Idaho Fish Consumption Rate and human Health Water Quality Criteria – Discussion Paper #7*, Idaho Department of Environmental Quality, December 2014.

(18) Letter from Benjamin H. Grumbles, Acting Assistant Administrator, United States Environmental Protection Agency to Maxine I. Lipeles, J.D., Director, Interdisciplinary Environmental Clinic re letter of February 25, 2003,dated June 25, 2004.

(19) *Templates for Narrative Downstream Protection Criteria in State Water Quality Standards*, EPA Publication No. 820-F-14-002, United States Environmental Protection Agency

(20) West, J.E., S.M. O'Neill, and G.M. Ylitalo. 2008. *Spatial extent, magnitude, and patterns of persistent organochlorine pollutants in Pacific herring (Clupea pallasi) populations in the Puget Sound (USA) and the Strait of Georgia (Canada)*. Science of The Total Environment 394:369-378.

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(24) Hope, B. K. (2012), *Acquisition of Polychlorinated Biphenyls (PCBs) by Pacific Chinook Salmon: An Exploration of Various Exposure Scenarios*. Integr Environ Assess Manag, 8: 553–562.

(25) Letter from Paul Wiegand, Vice President, Water Resources & Director, Northern and Western Regions, NCASI to Alex LaBeau, President, Idaho Association of Commerce and Industry (November 2, 2016).

(26) *Life History Factors for Pacific Salmon* (02-13-2015).

(27) *Preliminary Evaluation of the Lo and GOBAS (2015) In-Migration Model*, Arcadis Design & Consultancy, November 2016.

(28) *An Evaluation of the Protectiveness of Idaho's December 2015 Proposed Surface Water Quality Criteria*, Arcadis Design & Consultancy, November 2016.

(29) Jeff Louch, Vickie Tatum & Paul Wiegand, NCASI, Inc. Ellen Ebert, Integral Corp., and Kevin Connor & Paul Anderson, ARCADIS-US, *A Review of Methods for Deriving Human Health-Based Water Quality Criteria with Consideration of Protectiveness*, ARCADIS-US, August 2012.

(30) Vickie Tatum, Paul Wiegand, Steve Stratton, Jeffrey Louch, Ellen Ebert & Paul Anderson, *Derivation of Human Health-Based Ambient Water Quality Criteria: A Consideration of Conservatism and Protectiveness Goals*, Integr Environ Assess Manag, 9999; 1-8 (2014).

(31) *Treatment Technology Review and Assessment*, HDR, Inc., December 4, 2013.

(32) National Center for Health Statistics, *Your Chances of Dying*.

(33) Paul Anderson, Michele Buonanduci & Kate Sellers, *Acceptable Risk: Who are we protecting and did we mean to?*, Arcadis Design & Consultancy, October 20, 2015.

(34) Norman D. Forsberg, Dave Stone, Anna Harding, Barbara Harper, Stuart Harris, Melissa M. Matzke, Andres Cardenas, Katrina M. Waters, and Kim A. Anderson, *Effect of Native*

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(37) Adam M. Finkel, Sc.D., CIH, Professor of Environmental and Occupational Health, School of Public Health, University of Medicine and Dentistry of New Jersey and Executive Director, Penn Program on Regulation, University of Pennsylvania Law School, *There is No "War" on Occupational Cancer*, Invited Presentation before the President's Cancer Panel, Public Meeting on Environmental Factors in Cancer, September 16, 2008.

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(41) *Fish Consumption Rates Used in Human Health Criteria Calculations*, Washington State Department of Ecology, September 9, 2013.

(42) James Tupper and Bradford Doll, *Water Quality Risk Policy for the Protection of Human Health*, Tupper Mack Wells PLLC, September 18, 2013.

(43) *Draft Guidance for Conducting Fish Consumption Surveys,* Environmental Protection Agency, June 2016.

(44) Idaho QuickFacts from the US Census Bureau at: http://www.census.gov/quickfacts/table/PST045215/16.

(45) *Revision of Certain Federal Water Quality Criteria Applicable to Washington*, 81 FR 85417-01 (November 28, 2016).

(46) Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance, 57 FR 60848-01.

(47) *Final Water Quality Guidance for the Great Lakes System*, 60 FR 15366 (1995).

(48) Response to Comments, Revision of Certain Federal Water Quality Criteria Applicable to Washington, United States Environmental Protection Agecy, Docket ID No.: EPA-HQ-OW-2015-0174.

(49) *Idaho Fish Consumption Survey,* Northwest Research Group, LLC, March 31, 2016.

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(50) *Statistical Abstract of the United States*, United States Census Bureau, 2012, 131st ed. Washington DC. at http://www.census.gov/library/publications/2011/compendia/statab/131ed.html.