Comments received in response to Ecology's Draft Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington (Version 2.0)

Received thru October 26, 2012

In August 2012, Ecology released Draft Fish Consumption Rates Technical Support Document (Version 2.0). The document evaluated available data on fish consumption by Washington residents. Comments were accepted on that draft version through October 26, 2012.

In January, 2013 Ecology released the final Fish Consumption Rates Technical Support Document Version 2.0 FINAL (Ecology publication no. 12-09-058) available at https://fortress.wa.gov/ecy/publications/summarypages/1209058.htm

Comments received from:

Governments, Tribes, Schools, and Councils

through October 26, 2012,

regarding

Washington State Department of Ecology's

Draft Fish Consumption

Technical Support Document (Version 2.0)

Denis Law
Mayor

City of Renton
Mayor's Office

October 24, 2012

Adrienne Dorrah
Washington Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

RE: Ecology's Fish Consumption Rates Technical Support Document
Public Review Draft (Version 2)

Dear Ms. Dorrah:

The following are the City of Renton's comments on the second version of the draft Fish Consumption Rates Technical Support Document. We appreciate the work that Ecology has done to prepare this technical document and thank you for the opportunity to provide comments.

The Technical Support Document does not provide a complete and unbiased presentation of the relevant factual and scientific information for Washington's general population. Fish consumption rates should be based upon a comprehensive survey of fish consumption by the entire general population of Washington. The Technical Support Document focuses on fish consumption of specific population segments (Native American and Asian) within Washington. The Technical Support Document should be revised to reflect fish consumption rates of Washington's general population.

The Technical Support Document needs to account for and include information about the source of fish and shellfish being consumed. The regulation of water and sediment quality in Washington only has the potential to affect chemical concentrations in fish and shellfish tissue if they are raised or spend significant periods of their life cycle in Washington waters. The consumption of fish and shellfish reared in other geographical areas, fish that spend relatively short periods of their life cycles in Washington waters, and different species of fish must be accounted for in the Technical Support Document and in future human health risk calculations. The document should acknowledge the limitations of the data, if the source of fish or shellfish is unknown.

The species of fish or shellfish being consumed is important because of the different bioaccumulation rates and application of bioconcentration factors used to establish human health criteria. Some fish species may have higher bioaccumulation rates and thus higher concentrations of toxins in their tissue. However, if that species is not consumed or has a low consumption rate, it should not be the dominant species used when establishing the human health criteria or changing the state's water quality and sediment standards.

As the Technical Support Document acknowledges, the consumption of salmon and other anadromous fish should be addressed differently than consumption of other less mobile, resident fish species. Again, their life cycle and time spent in Washington waters should be accounted for when attempting to associate salmon tissue concentrations with local water and sediment quality standards. The current scientific data and past practice has not supported the application of higher clean-up standards as a way to reduce concentrations of toxins in salmon tissue. The use of salmon consumption rates should be excluded in water and sediment quality (clean-up) standards for these reasons. Due to the popularity of salmon to the consumers in Washington, it is important that the Technical Support Document distinguishes salmon consumption rates separately from consumption rates of other fish species.

The Technical Support Document acknowledges that fish consumers make up a relatively small percentage of the total population, but presents the fish consumption rates in terms of percentiles of fish consumers. This creates confusion and appears to suggest a higher level of fish consumption in the total population. The Technical Support Document should present averages and percentile information for both the entire population and the fish consuming subpopulation to present the information in a complete and unbiased manner.

The proposed change in fish consumption rates is an important factor when considering changes to water quality and sediment clean-up standards. As with any change to regulatory requirements, there are other factors that deserve equal consideration such as the effect of the regulatory requirements on employment and the state's economy, and cost to citizens, businesses, cities, counties and special purpose districts. The change in water and sediment quality standards could result in more streams being listed on the EPA 303(d) list of impaired water bodies, which requires more Total Maximum Daily Load pollutant clean-up plans. This could lead to more stringent stormwater regulatory requirements that are costly and impact existing business, new economic development, jobs and affordable housing. The change in these regulations

could significantly increase the cost of wastewater treatment that would have to be passed on to the rate payers (citizens). The ability to achieve new water and sediment quality standards would be expensive, may not be achievable given current technologies, and may impact the state's economy without significant benefit.

We look forward to continuing to work with Ecology on future rulemaking processes. If you require additional information or have questions, please contact Gregg Zimmerman, Public Works Administrator, at (425) 430-7311.

Sincerely,

Denis Law
Mayor

DL:aa

cc: Renton City Councilmembers
Jay Covington, Chief Administrative Officer
Gregg Zimmerman, P.E., Public Works Administrator
Chip Vincent, Communities and Economic Development Administrator
Suzanne Dale Estey, Economic Development Director
Lys Hornsby, P.E., Utility Systems Director
Ronald J. Straka, P.E., Surface Water Utility Engineering Supervisor

Confederated Tribes of the
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org email: info@ctuir.org
Phone: 541-276-3165 FAX: 541-276-3095

October 26, 2012
Via email: fishconsumption@ecy.wa.gov

Ted Sturdevant, Director
WA Department of Ecology
P.O. Box 47600
Olympia WA 98504-7600

RE: Updated draft of "Ecology's Fish Consumption Rates Technical Support Document," Washington Department of Ecology, Version 2, August 27 2012, Publication no. 12-09-058.

Dear Mr. Sturdevant:

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) offers the following comments on Version 2 of the "Fish Consumption Rates Technical Support Document" (Document) by the Washington Department of Ecology (WDOE), August 27, 2012.

We recognize that WDOE has undertaken revisions to allow additional comment on the Document. Earlier this year, the CTUIR submitted detailed and substantial comments on that document. By reference, the attached CTUIR comments are incorporated, as we consider those concepts relevant and applicable this Document.

The CTUIR commented that the first draft overall reflected a very sound and thorough review and understanding of fish consumption rates based on the scientific information available. That document included a more robust and complete analysis of fish consumption rates. **We encourage WDOE to restore technical information for a default fish consumption recommendation.**

We have supported the immediate adoption of rules that would protect fish consumption of at least 175 g/p/day. That rate is already adopted by Oregon, and has been approved by the EPA. The CTUIR voted to support the Affiliated Tribes of Northwest Indians Resolution No.12-54, which recommends EPA adopt such interim rules – see attachment.

Thank you for your consideration of our comments. If you have any questions, please contact Barbara Harper with our Department of Science and Engineering at (541) 429-7435 or me at (541) 429-7400.

Sincerely,

/s/

Naomi Stacy
Lead Attorney
Office of Legal Counsel

Confederated Tribes of the
Umatilla Indian Reservation

46411 Timíne Way
Pendleton, OR 97801

www.ctuir.org email: info@ctuir.org
Phone: 541-276-3165 FAX: 541-276-3095

January 18, 2012
Via email and U.S. Mail

Dr. Craig McCormack
Toxics Cleanup Program
Washington Department of Ecology
P.O. Box 47600
Olympia WA 98504-7600
fishconsumption@ecy.wa.gov

RE: "Fish Consumption Rates Technical Support Document," Washington Department of Ecology, September 2011, Publication no. 11-09-050

Dear Dr. McCormack:

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) offers the following comments on the "Fish Consumption Rates Technical Support Document" (Document) by the Washington Department of Ecology (WDOE). We recognize and appreciate the substantial effort that you and others have devoted to developing the Document. The CTUIR believes that overall it is a very sound and thorough review and we compliment WDOE on its thoughtful presentation.

As you may know, the CTUIR has worked for two decades on the issue of toxics in water and fish, beginning in the early 1990s. Water and fish are among our First Foods—they are the first of our First Foods served at our ceremonies and in our longhouses. CTUIR members have Treaty Rights to fish that are free from toxic contaminants and that do not pose undue risks when consumed at levels secured by the Treaty of 1855. This includes treaty reserved interests in and beyond the greater Columbia Basin, and ranges across the Columbia River waters and its tributaries managed by Washington State.

Tribal people eat much more fish than "average" as part of our tradition, culture and way of life. Water quality and other standards in the past have utterly failed to incorporate this fact. Thank you for revisiting this issue in the Document and in the standards revision process.

The CTUIR has embraced three formally-approved fish consumption rates (FCRs): 175 grams per day (gpd) (Oregon state-wide standards; Portland Harbor), 389 gpd (on-reservation water quality standards), and 620 gpd (Treaty-based rate or Heritage rate; Hanford site). Our specific comments on the Document are provided below.

Many of the CTUIR interests in minimizing exposure to pollutants through fish consumption are impacted by both the proposed rulemaking for sediment management standards for MTCA and the surface water quality rulemaking. Where applicable the comments should be noted as concerns applicable to both processes, and protecting the treaty right to consume fish and other treaty resources without continued exposure to contaminated and dangerous fish.

P.3 (footnote). The Documents states that "Ecology has the ability to make site-specific decisions and use site-specific information, including fish consumption rates protective of tribal populations." Please clarify which discretionary and mandatory requirements obligate Washington to protect safe consumption rates for fish harvested from treaty reserved usual and accustomed fishing areas. The clarification should also address whether protections at tribal consumption rates are treated as site-specific, or to local waters rather than state-wide.

P.5 (Purpose, second bullet). In addition to the question, "where do current people fish and how much are they eating," please address the issue of whether people follow existing fish advisories. The same comment would apply on P.9, next-to-last bullet ("recent scientific data . . .").

P.6 The section on contemporary surveys should be preceded by an expanded discussion of the fact that there are depressed fish populations based on ESA listed species and suppressed consumption due to federal and state advisories that recommended limiting consumption at the time that the surveys were done. The studies listed on P.6 are worthwhile, but it should be noted that they represent suppressed rates. The Heritage rate should be explicitly recognized even if a lower rate is used for specific applications. Reliance on contemporary rates should mention fish advisories and the presence of contaminants in every major water body as reasons why people may eat less fish than they would if there was less contamination. Inserting a map of those Washington water bodies listed on the Clean Water 303 (d) list for those not meeting sediment management standards, and well those subject to MTCA or CERCLA sites not consistent with the requirements under 40 CFR §430.7 should each accompany that discussion.

The Document is unclear as to identifying how many high-consumers there are, and the adverse risk of exposure for high-consuming population if Washington chooses a less-protective FCR. For example, a large fraction of tribal children, pregnant women and elders would be disparately and adversely affected regardless of their absolute numbers.

P.7. Regarding the preliminary recommendation (157-275 gpd), please clarify what positions are discretionary from those that are required by law or other authorities. Also please clarify what percentile of the populations Washington proposes to protect, and what population of consumers will not be adequately protected (children, tribal members, non-Indian anglers, subsistence fish consumers).

As a stand-alone section, we suggest that more explicitly identifying applicable WDOE and EPA policies and regulations, those who comprise "all people" and those who are not likely to be adequately protected under various proposed rates. In the draft document, there are references to four surveys:

- "consistent with Ecology's current policies regarding the protection . . .";
- "… should be protective of all people in Washington who eat fish";
- "…we think that these rates . . ."; and
- "Ecology's current policies regarding the protection of both the general population and high exposure groups . . ."

P.9 (next-to-last bullet and elsewhere), referring to "recent scientific data[.]" Large statistical surveys are not necessarily "good science"; small tribal surveys may be more accurate because they are more inclusive of traditional lifestyles and for other reasons.

P.4 (current laws) and P.9 (second bullet). Current EPA water quality standards guidance recommends 142.4 gpd for subsistence populations when site-specific or tribe-specific data are not available. We recommend citing the guidance (EPA-822-B-00-004).

P.10 (4th bullet). Treaty Rights are mentioned without much elaboration. Throughout the Document tribes are referred to as population subgroups rather than sovereign nations. This is improper and disingenuous. While the focus of these comments here is more on technical issues and aspects, appropriate consideration of tribes, our rights and interests, and acknowledgement of the state and federal obligations and responsibilities to protect tribal treaty rights is warranted. Regarding these matters, the comments on the Document by the Center for Indian Law and Policy are useful and informative, and we incorporate them herein by reference.

P.10 (Intended Audience) and P.11 (6th bullet). Cleanup actions are a general application, but having a single FCR for MTCA purposes might help some sites (result in more protective cleanups) and hurt others. For example, the CTUIR is already using a higher FCR at Hanford, and other sites have a wide variety of rates. It will be important to involve a wider group of tribes during MTCA revisions. At present there may not be any tribal technical representation on the MTCA Science Panel (P.11, footnote).

P.11 (3rd bullet). The CTUIR Treaty-based rate (620 gpd) is as defensible, if not more so, than the CRITFC-derived rate, so the term "scientifically defensible" should be used with caution. Statistics are "scientific" only if they are applied to data sets that are properly collected and based on the right questions.

P.15 (Washington's fish resources). Harvest data from 2006 may reflect current resources, but are a fraction of the historic rates that tribal, state and federal governments are working to restore. As Puget Sound is restored, more shellfish beds may be available for safe harvest and consumption by the public. The same can be said for the Columbia River and its tributaries in the Basin. The Document includes sections on commercial (non-Indian) and recreational fisheries but not on tribal fisheries. This creates a potential "mismatch" of using tribal fish consumption rates but only commercial and recreational harvest data. Washington needs to ensure consistency among the figures for total Washington population, total consumption and state harvest.

P.24 and Chapter 4. The lower estimate of Washington fish consumers is that only 28% of residents eat any fish at all (about 1.8 million people), which is same as the national percentage of fish consumers. The Department of Health (DOH) survey indicates that many more adults eat fish in WA (77% or about 4.8 million people) than nationally. We recommend using the DOH estimate, since it is based on an actual state-specific evaluation.

Pp.24-25, P.29. It is assumed that 10% of the Washington and national populations are high consumers, defined as eating greater than 250 gpd, because the top 10% of national fish consumers eat at this rate. This may be a reasonable assumption. However, together with the previous assumption, it might also imply that not only more do Washingtonians eat fish than the national average, but that they also eat more fish on average (i.e., that the top 10% of Washington consumers eats more fish than the top 10% of national consumers). This is likely since more fish availability likely results in larger portion sizes, or more fish meals per week.

P.27. The term "traditional fishing areas" does not convey the same weight of authority as does "Usual and Accustomed Areas," which is a legal term of art. It may be that most, if not all, water bodies in Washington are a legally protected and adjudicated Usual and Accustomed Area of one or more tribes. For the CTUIR those rights span up and down the Columbia River and its tributaries.

P.28 (Subsistence fishers). The goal of cleaning waterways, restoring fish, and increasing harvests and consumption rates was not discussed, but should be considered in terms of potential future increases in rates. While the Document mentions future growth and future increased consumption rates, those statements could be strengthened with statements about goals for cleaner and restored waterways.

The Document says that the number of subsistence fishers in Washington is not known. Please address how many people in Washington have the right to be subsistence fishers. Many traditional tribally harvested fish populations are depressed. Current levels of tribal harvest are far under subsistence levels. For many years, tribal fish harvests are closely regulated and often impacted by ESA harvesting constraints and other factors. The adverse impact to tribal treaty rights to fish is compounded where in addition to depressed harvestable populations, those rights are suppressed where fish consumption exposes tribal people to fish unfit for safe consumption.

Rates are currently suppressed due to existing fish advisories, reduced fish numbers, and other reasons. This is a reason why current consumption rates are underestimated. In addition, recreational anglers, commercial fishermen, tribal members, and local fish market consumers can have extremely high seasonal consumption rates, so that acute exposures need to be considered.

As referred to in multiple parts throughout the Document, the two-hundred-fifty gpd falls far short of the treaty based consumption rates. Based on our research, high tribal consumption is a pound or more (454 gpd). This means that all of the subsistence fishers and most of the tribal population falls within this upper 10%. If Washington selects the 90th

percentile as the target, it has already estimated this as 250 gpd. This is roughly supported by the five contemporary studies cited, although there is quite a bit of variation and several statistical problems with those data sets. Again, the Heritage or Treaty-based rate is much higher.

The Document should identify the basis (regulatory or otherwise) for selecting what percentile of the population to protect. Washington should select a single ingestion rate within the top 10% of fish consumers which includes human health criteria that protects the usual and accustomed fishing areas of all tribes, including the CTUIR.

The Document recommends a range of 157 gpd (i.e., the 80th percentile of current statewide consumers and approximately 50% to 93% of the tribal studies) to 267 gpd (i.e., approximately 95%). This comparison suggests that the 90th percentile of national and contemporary tribal consumption is similar, and that contemporary tribal consumption is actually quite similar to national data. On the one hand, this means that Washington can avoid the argument that "special protection" is being provided to tribes, but on the other hand entire tribes (e.g., the CTUIR treaty based rate, or Suquamish) may be inadequately protected because they hold treaty reserved rights to eat much more fish than is protected under the selected rate.

Please clarify if farmed fish be factored into FCR calculations, and if so the nature of tissue concentrations to be tested.

Please confirm Washington's consideration of ethnographic methods as valid for cross-cultural estimates (P.42, Cultural Factors)? Ethnographic methods are required for adequately capturing accurate and defensible results from tribal populations (P.43). Equating "questionnaire" with "defensible" and "ethnographic" with "non-defensible" is incorrect and invalid. Both categories provide numerical and statistical data. "Statistical" refers to precision, not necessarily to accuracy. Some interests may argue and seek to discredit ethnographic methods, traditional environmental knowledge, and Heritage rate data. Those arguments fail to consistently account for the higher fish consumption rates that Washington must protect.

Washington needs to include contextually accurate information about Heritage rates. Washington needs to include methods that are not only computer-based statistical surveys of contemporary rates. It is standard in the public health field to over-sample the population you want specific information about. The State should be explicit that it does not include information about Heritage or subsistence rates in its calculation of FCR (P.28, Tables 24, 25). This also requires Washington to specific any policy determination made concerning whether or not to expressly protect such sub-populations.

The CRITFC consumption survey did not capture data concerning subsistence fishers. We do not know the outcome of the Colville study, but we anticipate that Lake Roosevelt fish consumption rates (kokanee and other species) may not be applicable when considering salmon harvests in the lower Columbia River.

The proper citation for the article discussing problems with tribal fish surveys is: J Donatuto and B Harper (2008). Issues in Evaluating Fish Consumption Rates for Native American Tribes. Risk Analysis 26(6): 1497-1506.

Washington needs to explain its rational for excluding any life stage of salmon and anadromous species from these efforts. Those rationales should address the issue of salmon in standards such as site-specific cleanup requirements and consider use of tribal fish consumption information to inform an approach for anadromous fish in the Columbia River basin.

P. 41 (Survey issues). Please clarify the anticipated implementation activities that would impact fish consumption rates to the Columbia River Basin and its tributaries in reference to surveyed water bodies and other attributes.

P.89 (Table 24). The 620 gpd figure (based on the *Boldt* decision) should be referred to as the traditional, Treaty, or subsistence rate, not the "historical" rate. The term "historic" implies that the rate is no longer applicable or relevant.

Thank you for your consideration of our comments. If you have any questions, please contact Barbara Harper with our Department of Science and Engineering at (541) 429-7435 or Carl Merkle with our Department of Natural Resources at (541) 429-7235.

Sincerely,

/s/

Naomi Stacy
Lead Attorney
Office of Legal Counsel

2012 Annual Convention
Pendleton, OR

RESOLUTION #12 - 54

"REQUESTING THAT THE U.S. ENVIRONMENTAL PROTECTION AGENCY ACCOMPLISH A FISH CONSUMPTION RATE OF NO LESS THAN 175 GRAMS PER DAY FOR HUMAN HEALTH CRITERIA RULEMAKING IN THE PACIFIC NORTHWEST"

PREAMBLE

We, the members of the Affiliated Tribes of Northwest Indians of the United States, invoking the divine blessing of the Creator upon our efforts and purposes, in order to preserve for ourselves and our descendants rights secured under Indian Treaties, Executive Orders, and benefits to which we are entitled under the laws and constitution of the United States and several states, to enlighten the public toward a better understanding of the Indian people, to preserve Indian cultural values, and otherwise to promote the welfare of the Indian people, do hereby establish and submit the following resolution:

WHEREAS, the Affiliated Tribes of Northwest Indians (ATNI) are representatives of and advocates for national, regional, and specific tribal concerns; and

WHEREAS, ATNI is a regional organization comprised of American Indians/Alaska Natives and tribes in the states of Washington, Idaho, Oregon, Montana, Nevada, Northern California, and Alaska; and

WHEREAS, the health, safety, welfare, education, economic and employment opportunity, and preservation of cultural and natural resources are primary goals and objectives of the ATNI; and

WHEREAS, throughout time immemorial we as the first people of the Pacific Northwest have cared for and sustained the First Foods beginning with the pure water that we hold sacred,

and guided by our traditional religious and cultural practices, we are obligated to take action now to care for the water for the next seven generations; and

WHEREAS, numerous robust, valid, reputable scientific studies unfortunately have shown that shellfish and fish, including salmon and resident fish consumed by native people in the Pacific Northwest, exposes them to toxic contaminants and poses a human health risk; and

WHEREAS, scientific surveys have shown that native people in the Pacific Northwest today eat 300 – 500 grams of fish per day which is down from historical rates of more than 800 grams per day reflecting ceremonial, subsistence and other fishing practices which are secured by treaties and executive orders with the United States; and

WHEREAS, ATNI recognizes and appreciates that in 2011 Oregon adopted, and the U.S. Environmental Protection Agency (EPA) approved water quality standards based on a fish consumption rate of 175 grams per day; and

WHEREAS, on May 10, 2012 the EPA disapproved Idaho's request to use a fish consumption rate of 17.5 grams per day when deriving water quality criteria; and

WHEREAS, tribes need immediate assistance from EPA to continue to build capacity to develop and in some cases update tribal fish consumption rates; and

WHEREAS, tribes in the Pacific Northwest are concerned that EPA has long had knowledge of scientifically sound data concerning known tribal fish consumption levels and yet fails to enforce existing laws (i.e., the Clean Water Act) to protect fish consuming populations and acquiesces to the very industries and corporations they regulate; and

WHEREAS, tribes in the Pacific Northwest must coordinate to protect and improve human and environmental health through water quality and sediment standards for the benefit of natural resources, First Foods, and indigenous people everywhere; and

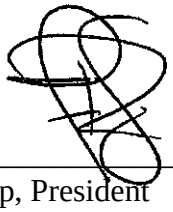
WHEREAS, adopting higher, more accurate fish consumption rates benefits not only tribal people, but all citizens, in the Pacific Northwest who consume fish and value a cleaner and more healthy environment; now

THEREFORE BE IT RESOLVED, that ATNI does hereby request that EPA immediately take necessary and appropriate steps to establish a federal default fish consumption rate of no less than 175 grams per day for Oregon, Washington, and Idaho to support and guide water quality and sediment management standards; and

BE IF FURTHER RESOLVED, and to use the EPA General Assistance Program to fund Tribal capacity efforts to develop and update Tribal fish consumption rates.

CERTIFICATION

The foregoing resolution was adopted at the 2012 Annual Convention of the Affiliated Tribes of Northwest Indians, held at the Wildhorse Resort & Casino in Pendleton, Oregon on September 24 – 27, 2012 with a quorum present.



Fawn Sharp, President

Norma Jean Louie, Secretary

NAVFAC NW Comments on "Fish Consumption Rates Technical Support Document"
Public Review Draft, Version 2.0, August 27, 2012

Page	Comment
4	We appreciate that this document separates data and science from policy decisions.
7	We suggest that, in addition to values for the general population, Ecology consider estimate consumption rates for the identified subpopulations: Native American tribal nations, Asian and Pacific Islanders, and recreational fishers.
11	If "[t]ens of thousands of recreational sport clammers harvest razor clams" and 3,601,000 lbs are harvested annually, on average each clammer will obtain less than 400 lbs annually.
15	Ecology's estimates of fish consumption must be based on some assumptions, e.g., form of the distribution (normal or log-normal) and the characteristics of that distribution. A 90th percentile can be quite different depending on such assumptions, and they should be included in this document.
15 second bullet	This bullet discusses finfish and shellfish in the first sentence and "fish" in the second. It is not clear whether "fish" is meant to be inclusive or only refer to finfish. The glossary (Appendix D) suggests that "fish" does not include shellfish, in which case the method for determining the 90th percentile, as discussed in the first sentence is not complete: The source of information for the shellfish component is not given. Several times, the document states, "As noted, estimates of fish consumption that correspond to the 90th percentile of the distribution may vary depending on the statistical methods used to evaluate the national data." but does not provide the information to clarify what decisions were made. This issues is further obfuscated by the statement on page 17 that the evaluation is of consumption of "finfish and/or shellfish per day".
19	The last paragraph is unclear. Is the high consumption rate the amount that **may be consumed on any given day** or the amount that **high consumers eat every day?** Ecology should clarify this, as EPA's high consumption data are often interpreted as the amount that might be consumed on some, but not every, day. Similarly, this would apply to the comment in the last sentence on the page about high levels of consumption – as well as elsewhere in the document. This should be clarified.
22	Third bullet: Although we understand that the procedures have been reviewed by numerous government scientists, the issue of "technical defensibility" will always be unresolved as long as the methods used for the analyses are not clear and transparent, both by readily available document or within the document itself.
35	Respecting the desire of the tribal organizations to keep their raw data private, nevertheless just a little more data for the summary, in addition to the mean, median, and percentiles, would greatly enhance our ability to understand the data. Two additional data points, i.e., the highest data point and the lowest data point used in each analysis, would allow additional evaluations. Several techniques are available that require knowledge only of the range of the data, not the distributional form, that can enhance our understanding of the data. If Ecology or

	others are not familiar with these techniques, these data should be provided so that others can use those procedures if they wish.
40	Although these comments address the values in Table 17, they also apply to all of the similar tables in this document. • Given that the mean is larger than the median, the data are clearly skewed. Was particular distribution, e.g., a log-normal distribution, assumed? If so, please state both the distribution and the summary metric such as the geometric standard deviation. • Was the distribution truncated, and if so, how were the lower and upper bounds determined. The data look as though the distribution was not truncated. Not only might this affect the mean, but it would have a very significant effect on the 90^{th}, 95^{th}, and 99^{th} percentile values of such a very skewed distribution – as can be seen from the large difference between the 95^{th} and 99^{th} percentile in this table.
41 & 42	Tables 18 & 19; Figures 1 &2: The significantly large differences in the two methods for analysis of the data are not well explained in the text. Thus, the reason for Ecology's choice of method is not clear and transparent to the reader.
45	The text states that the data were weighted by population size, but does not indicate how. At least two methods are possible, e.g., inversely by population size or inversely by the size of the uncertainty in the data. The process should be specified.
50	The exclusion of outliers that "seemed unreasonably high" is a judgment call. It would be useful to know how many outliers were excluded and their range (high and low) so an independent evaluation of the potential effect on the analyses could be performed (see comment for page 35). Furthermore, **this statement is not consistent with the statement on page 21 in Attachment C** [emphasis added], "First, even the *largest consumption rates* reported for these tribes and for other populations covered in the current report *are plausible*. They may be large, but there is no overriding reason to designate them as impossible. The second reason that the rates have been left intact (*with no adjustment for "outliers"*) is the potential for bias in any adjustment. ... If only the highest rates are adjusted downward, then the mean and the high-end percentiles calculated after such adjustments will be biased downward." This inconsistency should be addressed.
53, 59, & 60	• The tables and figures on this page each have one dataset for which the 75^{th} percentile is lower than the mean. • In other datasets **and in other tables**, the mean and 75^{th} percentiles are similar, and with the absence of confidence limits, may be statistically the same. While possible, these observations suggest that the tails of the distributions are very long and not very high. This is another indication that either (1) the distributions should be truncated, (2) the 90^{th} and 95^{th} percentiles may not be reasonable estimates, (3) the data may substantially benefit from analyses that do not assume a mathematically defined distribution (see comments for pages 35 and 40), and (4) the discarded outliers might provide information that would better substantiate these analyses.

65	While the 90th percentile is used as the RME, EPA Region 10 reanalysis uses the 95th. This is confusing, as the 90th percentile is available in the tables. Ecology should be consistent in its evaluation of the RME and include this definition in the glossary to provide clarity.
71	• No reference is provided either in the text nor in the reference list for the NCI "methodology"; please provide one. • Furthermore, the text does not discuss how the procedures differ between that used for the national data and that used for the regional data for the tier two subpopulations. Even if the data cannot be provided, a clear discussion of the differences in the procedures, as well as the implications on the resulting values, should be able to be provided by the experts who participated in the review of these statistical analyses.
77 and following pages	Chapter 5 discusses uncertainty and variability qualitatively. This analysis contains no quantitative indication of how any of these factors may affect results. • Even if an exact uncertainty analysis is not performed, the experts involved in these analyses should be able to provide a rough estimate of the potential effects, e.g., 2-fold, 10-fold, greater than 100-fold. This was done for some national data, as presented near the middle of page 4 in Attachment A. As the raw data are usually not available, such estimates from experts who evaluated the raw data are even more critical. • Such estimates are even more critical if the RME is assumed to be a daily consumption. If, as Harris and Harper (1997) state, that more than a pound of locally harvested fish and shellfish is regularly consumed daily, the analysis of variability and uncertainty should support such statements. • The number of people in each of the surveys of the discrete populations is quite small. Thus, the size of the uncertainty is likely to be proportionately larger, unless the populations are more uniform. A quantitative estimate of the uncertainty and variability in these data would allow readers to determine which of these two options is occurring in each of the datasets. • Notably absent from these analyses is any estimate of a modal value (see footnote, pg 92 of document). • This chapter does not examine the feasibility of the estimates of fish consumption. Several such analyses are possible. o Does the population consuming the seafood multiplied by the amount consumed exceed the ability of the local source to provide that quantity? o Does the amount consumed per person exceed the food mass or calories assumed for a diet for an RME? o Is the amount consumed consistent with information on the height and weight of the population being evaluated?
98	The RAGS equations presented on this page are at best an approximation of reality, and the document should so state. • Risk is not exposure time toxicity, rather risk is a function of exposure and toxicity. If Ecology is improving the parameters for situation-specific risk evaluations, it should consider also improving its models that have

	become standard procedures since the RAGS models were developed in the 1980s. It is axiomatic among risk analysts that the best data can't rescue a faulty model. • If upper and lower bounds of a parameter are used, such as the RME parameters for fish consumption, inverting the risk equation (as done here) is inaccurate. This is easily demonstrated by the use of interval arithmetic. • The acceptable cancer risk for EPA is 1 in 10,000 to 1 in 1,000,000. While MTCA may use one end of the range, this document that discusses other regulatory uses of these data should indicate the range, rather than just the value used in one program which is only stated in the caption of the figure.
Appendix E	• The reference section indicates that a reasonably large number of sources used for this analysis are in draft or preliminary form. These may be altered, and the referenced information changed, in the final version. In particular, the 1981 "Preliminary Report" by Pierce et al. from 1981 should be in final form. If it is not, then the reader must assume that there was a problem with the initial report. • At least 2 of the references are labelled "personal communication". As regulations may be based on these data, it would be appropriate to include these communications in an appendix in this document so stakeholders can review the information. • Finally, several of the references that are available on line and free do not have their associated urls. These should be added for people not familiar with these documents.
	Attachment A
	The numbering of this attachment that contains multiple documents, each with its own numbering system makes commenting difficult.
9 & 10	Tables 2, 3, and 4 are calculated from primary data but are reported to three significant figures. The underlying data are unlikely to support this degree of accuracy. For example, the averaged fish consumption is listed to the tenth of a gram, and it is unlikely that anyone reported consumption rates that accurately. Thus, 19.9 g should be rounded to 20.
10	Typo: The "meat" in footnote "b" of Table 4 should be "fish".
11	Providing references is nice, but as many of these journals are not main-stream, a brief description of the major aspects of the process would be nicer, especially in a technical report in an attachment. Specifically, we recommend that the web sites in footnotes 14 and 15 of Attachment C be included here so that the reader is not required to read all of the attachments to find this information.
5	**Kissinger 2010 is a personal communication but is not labeled as such in the text.** Since it is from the EPA, it should be publically available and therefore should be included in this document.
7	Table 1. Fish and Shellfish Consumption Rates (g/day) for Marine Recreational Fishers in King County, WA: • If the original data only have 2 significant figures, the estimated data can only have 2 significant figures.

	• The standard deviations dwarf the data. The upper-bound estimates are more dependent on the assumption about the underlying distribution than the actual data.
10	Table 2: The standard deviations dwarf the data. The upper-bound estimates are more dependent on the assumption about the underlying distribution than the actual data.
11	Table 3 has the same problems as 1 and 2.
A-2 and following pages	Several of the supporting tables in Appendix A of Attachment A indicate that the tables are "modified" from the referenced source. As these tables are in support of the analyses in the appendix that supports the main document and as there is plenty of blank space on these pages, these footnotes should briefly explain how the data were modified.
B-3	Table B-1 • The column labeled "Count" is confusing. For example, under "Bass" the count for dioxin is 35 while the count for mercury is 403 and for PCB is 20. Were 403 bass caught and only 35 of those sampled for both dioxin and mercury? Alternatively, were 35 + 403 + 20 fish caught and each only sampled for one contaminant? Please clarify. • Several analyses report both dioxin-like TEQs and total PCBs. Were the dioxin-like PCBs included in the TEQ, and if so, doesn't this double count the PCB contamination?
	Attachment C
6	Table E-1: • The small number of people that comprise the samples of this information, as well as the large difference between the 50^{th} and 90^{th} percentile, suggest that the underlying distribution assumed by these analysts was not truncated. Fish consumption is not unlimited; for example, it is highly unlikely that even a subsistent fisher would consume much more than 4 pounds of fish per day. Truncating the data is expected to substantially affect the high-value estimates used for the RME. • Unlike the data provided for recreational fishers, the standard deviations or standard errors are not provided for these data. o If these measures of uncertainty are as large as for recreational fishers, the high-end values would be significantly dependent on the distribution selected and uncertainty would be a major factor in these analyses. o If, as expected, these measures of uncertainty are lower for the more homogeneous population, the uncertainty would be less of a factor in these analyses.
22	This appears to be the only place in the document that the assumption of a lognormal underlying distribution is proffered. • A text search of both "lognormal" and "log-normal" of the main text produced no findings of this term. As mentioned in many of the other comments on this document, choice of the distribution is critical, especially when uncertainty may be high due to low sample numbers.

	• Truncation of the lognormal distribution is critical, as these tend to have long tails, see comment for page 10.
22	The interpolation method is also untruncated and therefore may result in questionable values (see comment 52). The interpolation assumed "the set of percentiles from the standard normal distribution". **The "standard normal distribution", however, has a range from -∞ to +∞; fish consumption does not.** The percentile distribution should use a truncated normal with limits of some small value (not zero as these analyses are only of people who consume fish) to some reasonably high value of fish consumption (perhaps 4 pounds). The effect of this adjustment is unknowable until it is performed, but **as these data are likely to be used for numerous regulatory activities, these should be as accurate as possible; even small changes may be important for some decisions.**
23	Table 3 and other tables on fish consumption: It is unlikely that the data support the use of more than 3 significant figures. The estimates should be edited to reflect this.
52	The results of the validation study "from using the full Tulalip individual-level data vs. the summary statistics that result from using the "means" estimation method" in Table A-3 demonstrate many of the issues raised by previous comments. • The estimation method used to derive values from summary statistics consistently underestimates the value derived from raw data. Such results would be expected when the method does not use a truncated distribution when the actual distribution must be truncated, i.e., the method elongates the tails of the estimated distributions beyond plausible limits. • This lowering of the heights of the tail provides a logical explanation for the observation that the actual means reported from the raw data are occasionally below, and often near, the estimated 75th percentile. If truncating the distribution does not rectify the anomaly, the assumption that the data are lognormally distributed (like the national data) might need to be re-evaluated. • The methods developed for the heterogeneous national population are significantly inaccurate when applied to a more homogeneous population. **It is strongly recommended that the estimates from the tribal nation surveys be recalculated with adjustments.** The two anticipated to have the greatest effect on the results are described below. 1. Whenever an underlying distribution is assumed to estimate a parameter, the distribution is truncated at both ends. The lower bound should be some value above zero and the upper bound should be a plausible limit. From the data presented, an upper bound in the range of 4 pounds seems reasonable. 2. Absent data to the contrary, the variability within the more homogeneous populations would be expected to be tighter than the national population. As with Appendix 4 of Attachment C, perhaps the data from the Squaxin Island Tribe could be used to estimate this variability, as a better approximation than the variability of the national population.

From: Marcia Bailey [mailto:Bailey.Marcia@epamail.epa.gov]
Sent: Tuesday, September 18, 2012 3:10 PM
To: Lon Kissinger
Cc: craig.mccormack@; Bradley, Dave (ECY); Hankins, Martha (ECY)
Subject: Re: Salmon and the EPA Framework in the Ecology Response to Comments on the Ecology TSD

I'm just going to add a bit to Lon's comment, as the salmon decision for the Framework was considerably agonizing and I would like to
add some more detail.

There wasn't a scientific determination that the PCB body burden of salmon caught in the Duwamish Waterway was not related to releases from sites that do or did
release PCBs to the Duwamish. Rather, there was a policy determination to assume that the body burden was due entirely to releases at remote locations.

I did not agree with this decision, for reasons that are iterated in the uncertainty section of the Framework, because there are many ways that releases of PCBs and
other bioaccumulative chemicals can become transported to remote locations and taken up by salmon before they return to the river, but there did
not seem to be any way to scientifically parse percentages of body burden due to local or remote sources of release of the contamination that ends up in
the salmon tissue. Therefore, it seemed we needed to assume 0 percent or 100 percent as a policy matter, as anything in between would essentially
be arbitrary. So.....the policy decision made was to assume zero percent that is due to releases from sites along or close to the Duwamish Waterway.

I like to think that this issue is still up for consideration as we learn more about transportation of bioaccumulative contaminants through various biological, meteorological and mechanical processes that take place in the Waterway. In the meantime, I think the debate regarding 0 percent vs. 100% is also viable (for Ecology if not for Region 10.)

Marcia

-----Lon Kissinger/R10/USEPA/US wrote: -----

To: dbra461@ecy.wa.gov, craig.mccormack@ecy.wa.gov
<craig.mccormack@ecy.wa.gov>, "Hankins, Martha (ECY)" <mhan461@ECY.WA.GOV>
From: Lon Kissinger/R10/USEPA/US
Date: 09/18/2012 02:04PM
Cc: Marcia Bailey/R10/USEPA/US@EPA
Subject: Salmon and the EPA Framework in the Ecology Response to Comments on the Ecology TSD

Hi,

Page 42: It should be noted that in the Framework, that salmon are included, but that the issue is whether or not for a particular contaminant, the body burden is site related. For the Lower Duwamish, the PCB salmon body burden was determined not to be site related, and the PCB dose associated with salmon consumption was not included in the assessment of site risks.

Lon Kissinger
Toxicologist
Office of Environmental Assessment, Risk Evaluation Unit
U.S. EPA - Region 10, Suite 900
Mail Stop: OEA-095
1200 6th Ave.
Seattle, WA 98101

kissinger.lon@epa.gov

206-553-2115 voice
206-553-0119 FAX

PUBLIC WORKS

EVERETT

October 26, 2012

Adrienne Dorrah
Department of Ecology
Toxics Cleanup Program
PO Box 47600
Olympia, WA 98504

RE: Comments on Fish Consumption Rate Technical Support Document 2.0

Dear Ms. Dorrah:

Thank you for the opportunity to comment on the FCR TSD 2.0. Revision of the current FCR in Washington State is an important undertaking which will affect businesses, municipalities, Tribes and fish consumers. Having good background information to utilize during this process will help everyone involved, and we applaud the changes made to version 1.0 to produce version 2.0. We have some further clarifications to the document attached to this letter. Please note that these comments were prepared with the assistance of Mr. Lincoln Loehr, Stoel Rives LLC.

Sincerely,

Heather Kibbey

Heather Kibbey
Surface Water Management

Thank you for the opportunity

CITY OF EVERETT • 3200 Cedar Street • Everett, WA 98201 • (425) 257-8800 • Fax (425) 257-8882

Comments re Ecology's public review draft Fish Consumption Rates Technical Support Document Version 2.0

Page xiii, Executive Summary, Problem statement, paragraph three, change the second bullet as follows:

- The Water Quality Standards for Surface Waters reference the National Toxics Rule (NTR)~~(57 FR 60848-60923)~~ (40 CFR 131.36), which includes Water Quality Standards for human health protection based on a freshwater and estuarine fish consumption rate of 6.5 grams ~~(0.22 ounce)~~ per day (which is about 1 seven ounce serving per month). For cancer risks, the NTR protects the 6.5 grams per day consumers at the one in a million theoretical life time cancer risk, while protecting 65 grams per day (10 seven ounce servings per month) consumers at the one in one hundred thousand risk level and protecting 650 grams per day (100 seven ounce servings per month) consumers at the one in ten thousand risk level. Hence, it protects a range of fish consumers over a range of risk levels. These values are ~~This value is~~ based on technical evaluations completed by the U.S. Environmental Protection Agency (EPA) in the mid-1980's.

The above changes provide a true representation of the NTR, as was understood by EPA and Ecology at its adoption. Failure to have brought this out in past discussions has lead to significant misperceptions and fears of great risks imposed on high consumer groups and has had an unfortunate polarizing effect on various groups.

Page 1, Introduction, second paragraph, change the second bullet the same as shown above for page xiii.

Page 1, Introduction, third paragraph. This paragraph needs to also put in specific references to pages in the federal register notice finalizing the NTR that described how the criteria provide protection for 65 grams per day consumption rate at the 10^{-5} level [See City of Everett's comments to FCR TSD Version 1.0.]

Page 2, Table 2. For the column for 17.5 grams per day, change frequency of 8-ounce meals from "one" to "Two".

Page 12, last sentence in footnote 10. The sentence does not appear to make sense. Data based on 2-day averages would result in estimates at the upper end of the intake distribution to be overestimated, and those would be based on people who ate fish on both of the two days of the survey, which would then be counted as eating fish 30 days a month.

Page 21, Section 3.1, paragraph 3. The last sentence says,

> Regional-specific fish dietary information indicates that Washington State's fish-consuming populations eat more fish than what is reflected in the rates used to establish regulatory standards and, as a result, Ecology wishes to consider whether Washington's fish-consuming populations are adequately protected.

The above is an incomplete representation. Regional-specific fish dietary information actually provides a consumption range that falls within EPA's human health criteria guidance in that average consumers of freshwater and estuarine finfish consuming between 6.5 grams per day and 65 grams per day are protected in the 10^{-6} to 10^{-5} risk range and high consumers as high as 650 grams per day are protected at the 10^{-4} risk level. While these issues will fall under a policy discussion, and the FCR TSD is trying to avoid policy and just provide consumption facts, the last sentence in the paragraph raises the concern that Washington's fish-consuming populations are not adequately protected, and, in accordance with EPA's HHC guidance, they may well be protected.

Page 26, Table 12. Add "* Language barriers" to the Weaknesses column.

Page 39, first complete paragraph, change second to last sentence to read:

> In other words, someone who did not eat fish during the two days of the survey was assumed to consume no fish at all during the year, while someone who ate fish for those 2 days is assumed to eat fish for 365 days a year.

Page 40, Table 17. This table presents descriptive total fish consumption statistics from the USDA Continuing Survey of Food Intakes by Individuals (CSFII) for consumers only. I think that the study will also break out the different consumption rates for marine fish, as well as for freshwater/estuarine fish, and that should be presented.

Page 42, figures 1 and 2. The 90th %tile and the Mean plotted values need data labels.

Page 47, figures 3 and 4. The 90th %tile and the Mean plotted values need data labels.

Pages 53-55, figures 5, 6, 7, and 8. The 90th %tile and the Mean plotted values need data labels.

Pages 59-60, figures 9 and 10. The 90th %tile and the Mean plotted values need data labels.

Page 67, figure 11. The 90th %tile and the Mean plotted values need data labels.

Page 67, figure 11. Why are the grams/day plots higher for the non-anadromous (harvested in KC) than for the grams/day plots for All fish (harvested in KC). Seems like the former should be less than or equal to the later, not greater.

Page 73, figures 12 and 13. The 90th %tile and the Mean plotted values need data labels.

Page 93, an additional option needs to be added for agencies to address the variations in fish consumption rates, regardless of geographic components. That is to adopt a range of fish consumption rates and a corresponding risk range. This recognizes that risks are not and cannot be constant for all fish consumption rates. We suggest adding a bullet item as follows:

- *A range of fish consumption rates coupled with a risk range.* Regulatory agencies may adopt a range of fish consumption rates with an associated range of risk levels. When one examines the history of the decisions by the state and EPA in the National Toxics Rule human health criteria applied to the state, recognition of different risk levels for different consumption rates is clearly what was done.[1] Similarly, EPA's guidance for setting human health criteria clearly recognizes this reality.[2] Consequently, it is correct to say that no carcinogenic human health criteria are based on a single fish consumption rate or a single risk level. Consider the following examples:
    - The current Water Quality Standards for Surface Waters applicable in Washington are based on a risk range of 10^{-6} to 10^{-4} over a fish consumption rate range of 6.5 grams/day to 650 grams/day. Any consumption rate between these values will be protected proportionally (e.g., 65 grams per day protected at 10^{-5}).
    - EPA's National Recommended criteria are based on a risk range of 10^{-6} to 10^{-4} over a fish consumption rate range of 17.5 grams/day to 1,750 grams a day.
    - Oregon's human health criteria are based on a risk range of 10^{-7} to 10^{-5} over a fish consumption rate range of 17.5 grams/day to 1,750 grams a day.

  The importance of this representation is it gets away from the distortion in perception from basing criteria on a single fish consumption rate.

Page 94-95, Section 6.4 Salmon. The TSD identifies four different ways to consider salmon in the fish consumption. The TSD should include one other approach among its options.

- *Salmon (and other anadromous fish) consumption rates are discounted 70 to 80% and then included with freshwater and estuarine fish consumption to identify a more relevant fish consumption rate.* The premise for this fifth approach is that it is incorrect to not count salmon at all, and it is incorrect to count salmon the same as other freshwater and estuarine fish. Rather, it is appropriate to weight the salmon to reflect their relevant exposure to state waters contributing to whatever body burdens the salmon have. Different species will vary, but overall, it seems reasonable to weight salmon and all other anadromous fish consumption rates at about 20% to 30% of the total salmon consumption rate.

---

[1] See Everett's comments re the FCR TSD version 1.0 for details and citations.

[2] 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 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. (EPA human health criteria guidance, 2000.)

Page 99, Section 6.8 Acceptable risk levels. The first paragraph continues the misnomer that Washington's current Water Quality Standards are based on an acceptable cancer risk of 1 in 1 million. As we have emphasized time and again throughout these comments, Washington's standards are based on a 10^{-6} risk level for a fish consumption rate of 6.5 grams per day with the understanding at the time of adoption that it was protective at a 10^{-5} risk level for 65 grams a day, and as such is a range of risk levels over a range of fish consumption rates. This needs to be clearly stated.

Page B-15, change second bullet from "1,000 to 454" to "100 to 454".

Page C-11, graph at bottom of page. Change "PCBs" at top of graph to read "PCBs in Chinook fillets" and identify the year of the data.

Page C-12, graph. Identify the year of the data.

Page C-13, section on hydrodynamic conditions of Puget Sound. The second sentence says that, "The circular pattern of currents combined with reduced current velocity at the sills results in the contaminants being circulated for longer periods of time." The sentence is incorrect because the current velocity is increased at the sills, not decreased. It is also incorrect to describe a circular pattern of currents.

King County

Department of
Natural Resources and Parks
Director's Office
King Street Center
201 South Jackson Street, Suite 700
Seattle, WA 98104-3855

October 18, 2012

Adrienne Dorrah
Washington Department of Ecology
Toxics Cleanup Program
PO Box 47600
Olympia, WA 98504-7600

Dear Ms. Dorrah:

Thank you for the opportunity to comment on the draft (version 2) of the *Fish Consumption Rate Technical Support Document*. The revised scope and purpose of the document are consistent with information communicated by Ecology Director Ted Sturdevant, and as described at a workshop the Department of Ecology (Ecology) held August 8 of this year. We reviewed the document, and appreciate Ecology's hard work assembling a great deal of technical information, as well as incorporating King County's comments on Version 1. We believe you have produced a robust technical resource.

Our technical staff have two comments which we believe will enhance the accessibility and usefulness of technical support document. First, we noticed that "Supplemental Information to Support the Fish Consumption Rates Technical Support Document" white papers are not actually appendices to the formal publication. In our own experience, technical white papers often get forgotten as time passes. To maintain a complete record of all of Ecology's efforts to compile this valuable information—and to minimize the risk of losing valuable background—we request that these white papers be made official appendices to the Document.

Second, Version 1 of the technical support document provided statistical distribution curves for the tribal and Asian-Pacific Islander consumption data. These figures made visualizing the changes in consumption rates across the various target populations easier to understand. Where the data are available to support the development of these curves, we would like them provided as they were in Version 1. We believe the figures foster a more complete understanding of the changes in fish consumption across low, medium and high consumers within the studied populations.

Once again, King County applauds your efforts to compile this large body of local, regional and national fish consumption information. We anticipate the document will serve as an important reference for understanding the fish consumption of all of Washington's citizens and

inform the upcoming state rulemaking processes relating to sediment management and water quality.

As a large regional government, King County has a long history of environmental protection and strong interests in toxics reduction, and at the same time implements large wastewater and stormwater programs subject to these state rules. Being the only local government in Washington with a legislative responsibility to protect water quality, per RCW 35.58, we look forward to continuing to engage with Ecology on these various rulemaking processes, to assist in our mutual goal of developing workable approaches towards achieving cleaner sediment and water.

Again, thank you for the opportunity to comment. If you have any questions, please feel free to contact Dave White, Science and Technical Support Section Manager, in the Water and Land Resources Division of the Department of Natural Resources and Parks, at 206-296-8243.

Sincerely,

Christie True
Director

cc: Melissa Gildersleeve, Watersheds Coordinator, Department of Ecology
Jim Pendowski, Program Manager, Toxics Cleanup Program, Department of Ecology
Pam Elardo, Division Director, Wastewater Treatment Division, Department of Natural Resources and Parks (DNRP)
Mark Isaacson, Division Director, Water and Land Resources Division (WLRD), DNRP
Dave White, Manager, Science and Technical Support Section, WLRD, DNRP

ncasi

NATIONAL COUNCIL FOR AIR AND STREAM IMPROVEMENT, INC.
West Coast Regional Center
Mailing address: PO Box 458, Corvallis OR 97339
Street address: 720 SW Fourth Street, Corvallis OR 97333
Phone: (541)752-8801 Fax: (541)752-8806

Dr. Jeff Louch
Principal Scientist
JLouch@ncasi.org

October 24, 2012

Ms. Adrienne Dorrah
Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504-7600

Dear Ms. Dorrah:

The National Council for Air and Stream Improvement, Inc. (NCASI) is an independent, non-profit membership organization that provides technical support to the forest products industry on environmental issues. An important part of our mission is to ensure that regulatory decision making is based on sound science. In this capacity, NCASI has reviewed the August 1, 2012, Working Draft of Ecology's publication *Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington (Version 2.0)* (hereinafter the TSD) and the associated Technical Issue Papers (TIPs). Our comments on the material presented in these documents can be summarized:

1. Version 2.0 of the TSD inappropriately includes language with the potential to mislead the casual reader into thinking potential contaminant effects on fish and shellfish are relevant to setting a fish consumption rate (FCR) when, in fact, this potential is clearly a distinct issue that should be addressed when setting standards for protection of wildlife, not when setting standards for protection of human health (comment A below).

2. Even though the science clearly demonstrates that >95% of the contaminant body burden found in adult salmon is accumulated in the open ocean, Version 2.0 of the TSD and the TIP *Salmon Life History and Contaminant Body Burdens* contain inappropriate speculation and misleading language having the potential to obscure this reality (comments B through D below).

The following comments elaborate on these two points.

A. The TSD inappropriately addresses the potential effects of contaminants on fish and shellfish.

The potential for contaminants to have adverse effects on fish and shellfish is noted multiple times throughout the TSD and associated TIPs. Given that the subject of this document is fish consumption by human beings, discussion of this potential is, at best, irrelevant. At worst,

addressing this issue in this context is misleading in that it conflates two issues that are absolutely distinct in both scientific and regulatory senses. Ultimately, the appropriate venue for addressing potential effects on fish and shellfish is when setting criteria for the protection of wildlife, and Ecology should expunge all discussion of potential contaminant effects on fish and shellfish from the final version of this TSD and the associated TIPs.

B. The TIP addressing salmon summarizes numerous studies providing evidence that juvenile salmon pick up contaminants in freshwater and estuarine systems without making any effort to place these results in the proper scientific perspective.

A number of the studies summarized in Section II of the TIP *Salmon Life History and Contaminant Body Burdens* address the accumulation of contaminant burdens in juvenile salmon without also providing measures of contaminant burdens in returning adult salmon. The specific papers are:

Giesy et al. 1999
Meadoe et al. 2002
Hardy and McBride 2004
Sethajintanin et al. 2004
Fresh et al. 2005
Johnson et al. 2007a
Johnson et al. 2007b
Kelly et al. 2011
Yanagida et al.2012

The data presented in these papers serve to confirm that some bioaccumulation occurs in freshwater and estuarine systems, but provide no insight into what fraction of the ultimate body burden in adult salmon this represents. As a consequence, these data tell only a fraction of the story.

In order to place these results in the proper scientific context they need to be compared to the body burdens found in returning adult salmon. Without this comparison the experimental results presented in these papers are irrelevant to the central question of what fraction of the ultimate body burden in adult salmon is acquired in fresh or estuarine waters vs. the open ocean.

C. The TIP addressing salmon contains inappropriate speculation concerning the authority of selected peer-reviewed studies of salmon bioaccumulation.

Section II of the TIP *Salmon Life History and Contaminant Body Burdens* summarizes results from studies directly addressing the question of where salmon acquire bioaccumulative contaminants. Section III of the same TIP provides an overview of these results, and correctly concludes that the results from all relevant studies show that the dominant fraction of contaminant body burden in adult salmon is accumulated in the open ocean, and not in freshwater or estuarine waters. Thus, Section III of the TIP includes the following statement:

> *In fact, as a number of authors indicate, almost all salmonids accumulate the vast majority of their body burden at sea; accumulation at juvenile life stages in freshwater and estuarine habitats contributes a very limited proportion of the total accumulation.*

This is consistent with the interpretations offered by the various authors. However, Ecology goes on to speculate (second to last paragraph in Section III):

> *Another factor potentially relevant to this topic, briefly mentioned by a few authors but not investigated in detail, is the lack of understanding of whether there was a threshold response effect on juvenile salmonids exposed to contaminants while in freshwater and estuarine habitats. It is possible that the subadult and adult salmonids sampled for body burden analysis were those fish that did not experience behavioral and physiological abnormalities, post-exposure, that would have reduced their survival to adulthood. In other words, subadult and adult fish sampled may not be entirely representative of the naturally occurring juvenile population.*

Although Ecology's intent is unclear, this language appears to be directed specifically at O'Neill and West (2009). Regardless, this paragraph is nothing more than speculation and cannot be taken as a substantive comment affecting, in any way, the utility of the data or the conclusions offered by any of the original researchers.

A second example of inappropriate speculation is found in the summary of Cullon et al. (2009) on pg. 30 of the same TIP. The first paragraph on that page begins by noting that Cullon et al. (2009) concluded that 97% to 99% of the bioaccumulative chemicals found in adult Chinook salmon were acquired during their time at sea, not in freshwater or estuaries. However, Ecology goes on to speculate that the sample sizes (generally n=6) might have been too small to give an accurate comparison of juvenile to adult body burdens, and then implies that the pooling of hatchery and wild fish in the analysis might also impact the authority of the results. Again, all this is nothing more than speculation on the part of Ecology, and has absolutely no impact on the interpretations offered by the original researchers.

Ultimately, the fact remains that every single study looking at the issue of where salmon acquire contaminants has concluded that >95% of the body burden of bioaccumulative chemicals found in adult salmon is acquired in the open ocean, and not in fresh or estuarine water.

D. Ecology repeatedly misrepresents the science informing where salmon acquire bioaccumulative contaminants.

Sprinkled throughout the TSD and associated TIPs are statements to the effect that there is much uncertainly regarding where salmon accumulate bioaccumulative contaminants. As an example, the Executive Summary of the TSD contains the following statement addressing salmon:

> *Ecology recognizes the complexity of addressing this issue and acknowledges the uncertainty concerning where salmon obtain contaminants.*

However, as noted, the experimental data are anything but "uncertain," in that every single study looking at the issue of where salmon acquire bioaccumulative chemicals has concluded that >95% of the contaminant body burden found in adult salmon is acquired in the open ocean, and not in freshwater or estuarine water.

Please do not hesitate to contact me if you have any questions or concerns about these comments.

Sincerely,

JEFF LOUCH

Jeff Louch
Principal Scientist

ec: Steve Stratton, NCASI
Paul Wiegand, NCASI
Christian McCabe, Northwest Pulp & Paper Association

Northwest Indian Fisheries Commission

6730 Martin Way E., Olympia, Washington 98516-5540
Phone (360) 438-1180 www.nwifc.org FAX # 753-8659

October 26, 2012

Ted Sturdevant, Director
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
ATTN: Toxic Cleanup Program
fishconsumption@ecy.wa.gov

RE: Comments on Fish Consumption Rate Technical Support Document version 2.0

Dear Director Sturdevant,

On behalf of the Northwest Indian Fisheries Commission (NWIFC) and its member tribes, we submit these comments on the Fish Consumption Rate - Technical Support Document Version 2.0 (v.2). In a letter to you from Billy Frank, Jr. dated August 16, 2012, the NWIFC wrote to, "express our deep dissatisfaction over the Department of Ecology's proposed changes to the adoption of revised fish consumption rates (FCR) in Washington state" (attached). In the case of the technical support document, the tribes are opposed to Ecology's decision to remove quantitative recommendations for a default FCR, launch yet another round of review, and the continuing delay in the adoption of protective standards. Ecology's actions ignore tribal treaty rights and expose the people of Washington to prolonged and additional health risk.

NWIFC submitted comments on the first version of the technical support document in January, 2012 (also attached). We summarize and repeat key tribal concerns from that review round as follows:

- Tribes commented that the proposed FCR default range of 157 to 267 grams per day (gpd) would represent a step forward from existing state standards in protecting human health and the environment. Existing standards in Washington are widely acknowledged to be inadequate by health experts, even by the state's own Department of Health, particularly in protecting the most exposed and vulnerable populations. Washington's FCR should be at least as protective as Oregon's approved rate of 175 gpd. However, tribes noted that the recommended range did not fully reflect the suppression of tribal harvest resulting from habitat loss, existing contamination, and lack of access to harvest, and did not reflect traditional harvest and consumption levels.

- Tribes also commented previously that all fish and shellfish species, including salmon, must be included in the application of a fish consumption rate. Tribes have harvested salmon and other species in the rivers and estuaries that are now part of Washington State

for millennia, and continue to consume locally-produced and harvested seafood at high levels. Tribes rely on the commercial harvest of clean seafood for their economies as well as subsistence. Salmon are an essential part of the tribes' nutritional, economic, and cultural needs, and represent a major portion of tribal consumption. There is clear evidence that salmon obtain portions of their body burden of contaminants in Washington waters, and a protective standard for consumption is needed. Instead of using subjectively-derived site use factors and other parameters to reduce the protections within state standards (thereby lowering the responsibility of polluters to cleanup or prevent contamination), the state ought to be operating from the perspective of protecting public health.

Ecology has characterized the recommended default range that was in the Technical Support Document v.1 as a "policy decision" and removed it from the Technical Support Document v.2. The range specified in v.1 was based on expert peer review and statistical analysis, and tribes disagree that the default recommendation constituted a "policy decision." Tribes will be submitting comments on the proposed amendments to the Sediment Management Standards in the next few days. By removing expert recommendations and a default range for the FCR from the Technical Support Document and the proposed standards, Ecology has left the tribes, other communities, and their own staff in a position whereby extensive resources will be spent to slug out decisions over fish consumption rates at each contaminated site. As a result, cleanups will have expensive delays, and inadequate protection for human health and the environment will continue.

It is time for Ecology to stop delaying the FCR revision and to update the FCR to a level that has been scientifically proven to be protective of tribal fish consumers. The dietary surveys have existed for decades and have been duplicated with similar results in other tribal communities, among Asian and Pacific Islanders, and for non-tribal sports fishers. It is also time to stop endless rounds of stakeholder meetings and get on with the business of adopting and implementing protective standards. Serious discussions should be underway on how to change the standards and how to implement these new standards so that they can be protective of consumers in the 95th percentile, which is considered reasonable maximum exposure.

The revised Technical Support Document also fails to provide clarity on other related regulatory concepts, including the Fish Diet Fraction (FDF) and a Site Use Factor (SUF). These factors have the potential to drastically reduce any site specific or default fish consumption rate, even if a reasonable FCR has been selected based on tribal exposure scenarios. Guidance of the application of the FDF and SUF is left to the draft Sediment Cleanup Users Manual II (SCUM), which does not appropriately consider the impact on tribal consumption. Application of these factors will further weaken public health protection and environmental quality associated with aquatic resources.

The tribes have indicated previously that the attacks by commenters on tribal scientific studies represent unfounded and discriminatory perspectives. Tribal studies were approved by the Environmental Protection Agency and went through appropriate peer review. We agree with Ecology's assessment that the tribal dietary studies are valid, and expect Ecology to act

accordingly, without additional delay via unnecessary technical review and analysis or raising inappropriate doubt.

In summary, the Technical Support Document has been stripped of important technical recommendations, in particular the recommended default range, which should be re-inserted. The comments that were submitted on the first version of the TSD by tribes, tribal consortiums, and experts on tribal law and environmental justice remain applicable. Ecology's decision to issue another version of the document, and establish another round of review constitute unnecessary delay and harms high fish-consuming populations, including tribes. In addition to the harm to public health and the perpetuation of environmental injustice, tribes have treaty rights to harvest *and consume* fisheries resources that are being damaged by Ecology's actions on an ongoing basis. Technical recommendations for an appropriate fish consumption rate, based on tribal consumption throughout their usual and accustomed areas and for all consumed species, should be adopted immediately.

Sincerely,

Michael Grayum
Executive Director

Cc: NWIFC Commissioners
EPA Region X: Dennis McLerran, Dan Opalski, Jim Woods, Angela Chung, Matt Szelag, ,

Attachments:

Letter from NWIFC Chairman Billy Frank, Jr. to Ecology Director Ted Sturdevant dated January 3, 2012 regarding the FCR Technical Support Document v. 1

Letter from Billy Frank, Jr. to Ted Sturdevant dated August 16, 2012 regarding Ecology's proposed changes to the Fish Consumption Rate

Northwest Indian Fisheries Commission

6730 Martin Way E., Olympia, Washington 98516-5540
Phone (360) 438-1180 www.nwifc.org FAX # 753-8659

August 16, 2012

Ted Sturdevant, Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Ecology's proposed changes to the Fish Consumption Rate

Dear Director Sturdevant,

On behalf of the Northwest Indian Fisheries Commission (NWIFC) and its member tribes, we write to express our deep dissatisfaction over the Department of Ecology's (Ecology) proposed changes to the adoption of revised fish consumption rates (FCR) in Washington state. Although we strongly support your decision to begin development of human health-based criteria in the surface water quality standards, we are gravely concerned about the changes to the technical support document and sediment management standards.

The ultimate purpose of fish consumption rates is to protect human health. However, as your agency acknowledges, and your website declares: "Washington's current fish consumption rate is not accurate."[1] To rectify this inaccuracy and failure to protect the beneficial uses, your agency set out a pathway to accomplish three essential tasks:

1) develop a technical document that evaluates scientific studies, resolves technical issues, and subsequently recommends a range of FCRs;
2) amend sediment management standards to include an accurate, quantitative default FCR; and
3) adopt human health-based criteria, including a revised FCR, in the state's surface water quality standards.[2]

The tribes were repeatedly assured by Ecology that at a minimum, this pathway would result in revised FCRs in the technical document and the sediment management standards before the

[1] See e.g. http://www.ecy.wa.gov/toxics/fish.html
[2] This position was clearly articulated in the document Washington Water Quality Standards 2010 Triennial Review – Response to Comments, August 2011, pg 14.

completion of the current state administration's term.[3] Unfortunately, Ecology's new approach nullifies these assurances, because Ecology is no longer proposing to establish a default rate in the sediment management standards. It is also our understanding that publication of a revised technical document will be further delayed, and important agency recommendations that support adoption of an accurate, quantitative fish consumption rate will be removed. Moreover, we recognize that adoption of the human health-based criteria will be a long process and it is not likely that it will yield a revised FCR soon. The net result is that Ecology will not establish a default fish consumption rate in either the technical document or rule by the end of the term. The continued delay leaves the residents of Washington exposed indefinitely to inadequate and inaccurate standards for the protection of human health, with tribes at particularly high levels of risk. This delay also leaves Washington's water quality standards noncompliant with the basic mandates of the Clean Water Act, which require water quality standards to be set at levels protective of human health.[4]

The proposed changes to the FCR process will also inhibit regulatory certainty, further contributing to extended delays in cleaning up contaminated sites. As Ecology has stated, "the current [sediment] rule requires case-by-case decisions that cause lengthy cleanup delays, inefficient use of available funds, and continued exposure to unhealthy levels of hazardous substances."[5] Setting a default FCR in the sediment management standards is a straightforward way to address some of these redundant decision-making issues. Ecology has clearly stated that revisions to the sediment management standards were intended to "expedite the removal or capping of contaminated sediments by providing *clear, workable, and predictable requirements* for sediment cleanup actions."[6] However, by discarding the proposal for a default FCR, and instead relying upon a standard which sets FCRs site-by-site, Ecology is reverting to the inefficiencies and delays it has already spent years of precious staff time and funding to rectify.

Ecology's recent proposed changes to the sediment management standards and technical document may also impact the process for establishing a revised FCR in the surface water quality standards. As you are aware, parts of the sediment management standards are Clean Water Act-approved water quality standards.[7] Adoption of the narrative FCR in the sediment standards sets a bad precedent for the development of human health based criteria in the surface water quality standards, because it promotes setting site-by-site FCRs in the water quality standards. Also, if the sediment FCR remains narrative when Ecology adopts a default rate into

---

[3] See e.g. the time table included in the open Letter from Ted Sturdevant to Interested Parties, re: Ecology's Response to Comments –Draft Fish Consumption Rates, February 2, 2012.

[4] See 33 U.S.C. § 1313(C)(2); see also 40 CFR § 131.11

[5] Focus on Reducing Toxics: Reducing Toxics in Fish Sediments and Water, December 2011, Publications Number 11-10-090.

[6] Id *emphasis added*

[7] See Washington Water Quality Standards 2010 Triennial Review – Response to Comments, August 2011, pg 14. See also Letter from Randall F. Smith, Director of Office of Water EPA R10 to Megan White and Jim Pendowski, Ecology, in which EPA discusses exactly which standards are applicable under the CWA, 1999.

the surface water quality standards, then the narrative criteria will cause a regulatory inconsistency. This is unworkable, as was recognized in Ecology's earlier approach to create a single FCR to use agency-wide.

Ecology, tribes, and others have invested years of work to develop an accurate and scientifically sound default FCR, with the goal of revising rates by the end of the current administration's term. The tribes thought that this goal was supported by your verbal commitments (as well as the previous director's). We are cognizant of the strong opposition to creating a more accurate FCR in Washington state. Nonetheless, we are disappointed in the abrupt change in course that Ecology has taken, and the lack of tribal consultation in making these decisions. We therefore respectfully request that you uphold your previous commitments by restoring the technical document, as embodied by the September 2011 draft released to the public, and by completing the sediment management standards with an accurate, quantitative default FCR by the end of this year.

Finally, it is important to note that the tribes remain steadfast in their commitment to revise fish consumption rates in the state's water quality standards, and will work diligently to accomplish this in the near future. Should you have any questions regarding this request, or wish to further discuss this matter, please do not hesitate to call Michael Grayum or Fran Wilshusen at 360-438-1180 directly.

Sincerely,

Billy Frank, Jr.
Chairman

cc:
Tribal Chairs
NWIFC Commissioners
Dennis McLerran, EPA

Northwest Indian Fisheries Commission

6730 Martin Way E., Olympia, Washington 98516-5540
Phone (360) 438-1180 www.nwifc.org FAX # 753-8659

January 3, 2012

Ted Sturdevant, Director
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
fishconsumption@ecy.wa.gov

RE: Comments on Fish Consumption Rate Technical Support Document

Thank you for providing the Northwest Indian Fisheries Commission with the opportunity to comment on Publication no. 11-09-050: "Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington" dated September 2011. The tribes appreciate the serious effort that Ecology staff members have made to meet with tribes throughout Washington on this important issue. Many tribes will also be providing specific comments about the document.

The tribes would like to emphasize the difference between tribal fish consumption rates and the default rates which will be established by the state of Washington.
Tribal governments have the ability to set their own fish consumption rates based on data they collect about the dietary habits of their tribal people. Tribal fish consumption rates are used for establishing standards on the lands and waters that the tribes govern. Tribes with water quality standards are responsible for monitoring, enforcement, and cleanup duties according to the standards they adopt.

Similarly, the state of Washington establishes fish consumption rates for Washington residents. Dietary surveys cited in the Technical Support Document indicate that Washington residents consume fish and shellfish at rates that are likely higher than national averages. Specific groups of Washington residents, such as tribes and Asian/Pacific Islanders, consume fish and shellfish at even higher rates. The state must consider these fish consumption rates in determining standards for water quality and toxic cleanup that are sufficiently protective of all people in Washington. We would like to emphasize that the proposed rates will be state standards, and tribes will continue to set their own standards based on their own fish consumption and availability.

Existing fish consumption rates have been suppressed.
Historical tribal fish consumption rates cited in the Technical Support Document include estimates of approximately 1,000 grams per day prior to dams and other habitat alterations (p 87). The availability of abundant and uncontaminated fish and shellfish is a major concern to tribes, since habitat loss and degradation and other factors have significantly reduced the amount and type of fish that is available for tribes to safely harvest and consume. As noted in the recent workshop on fish consumption rates, tribal consumption has been suppressed by several factors including declining abundance of fish resources, lack of opportunity to go fishing and loss of access to fishing grounds, prohibition of fishing and gathering due to known contamination, and avoidance of seafood consumption due to perceived contamination and risk warnings. In the 1970s, tribes struggled with legal suppression of fishing opportunity, leading to the affirmation of

treaty fishing rights in *U.S. v. Washington* 384 F. Supp. 213 (1974). In recent years, tribal harvest of Chinook and coho salmon has dropped below pre-Boldt levels, and the trend continues downward. The recent report by the Northwest Indian Fisheries Commission, "Treaty Rights at Risk," describes the loss and degradation of habitat throughout western Washington, and the resulting loss of tribal opportunity to fish for subsistence and livelihood. Historical habitat loss for salmon and the pollution of shellfish harvest areas in Puget Sound are further described in the Puget Sound Salmon Recovery Plan and the 2009 State of the Sound Report.

Tribes are constantly working to restore fish and shellfish populations above status quo levels and want to ensure that, once restoration is successful, they can safely consume these traditional and nutritious food sources. Contemporary tribal fish consumption rates of approximately 500 grams per day have been estimated by researchers who have investigated suppression effects. This research is acknowledged in the Technical Support Document (p 96). The state should align fish consumption rates with restoration objectives, and provide a clear path forward and commitment to re-address and adjust the default rate as habitat is restored and improvements to water quality are made. Individual tribal studies already indicate that fish consumption rates are likely to rise in the future as resource availability improves.

Fish consumption rates in Washington apply across many tribal usual and accustomed areas.
Tribal usual and accustomed fishing and harvesting areas were established by treaty; degradation of these areas prevents the full exercise of treaty and trust protected rights. Tribes are unable to adjust the location of fish and shellfish harvest if areas are contaminated or otherwise degraded. The Technical Support Document contains a section about the possibility of site-specific fish consumption rates (p 92) but does not specify criteria or how this option would be applied. Tribes assume that site-specific rates would be more protective than default rates throughout tribal usual and accustomed areas.

Salmon are essential to tribal cultures, economies, and diets and must be included in default fish consumption rates.
The Technical Support Document raises the question of whether salmon should be considered in fish consumption rates because they transit through contaminated and uncontaminated areas during their life cycle. Salmon must be included in fish consumption rates as they accumulate toxins within natal streams, local estuaries, and Puget Sound waters that are within the jurisdiction of Washington State. Salmon are the predominant seafood in tribal and non-tribal communities in the Pacific Northwest and exclusion of salmon from protective standards would create a substantial risk to public health and environmental quality.

Tribes assume that an increase in the fish consumption rate that is protective of human health will not coincide with a reduction of other protective factors affecting the standards.
For example, the target cancer risk level should not be relaxed as a condition of a more protective fish consumption rate. Fish consumption rates are part of a complex formula to address the potential risk from toxic chemicals that is used for toxic cleanup and water quality standards. A statement of assumptions about other relevant risk factors should be included in the document along with the basis for these assumptions.

Tribes support standards that are more protective of the fish-consuming population in Washington.
Existing default rates for fish consumption used in cleanup, sediment management, and water quality standards in Washington State are clearly inadequate to protect public health from persistent toxic contaminants. The proposed range offered in the Technical Support Document

for a range of 157 to 267 grams per day as a default fish consumption rate represents a substantial improvement over existing rates and is thus a step forward. However, many tribes have already documented higher fish consumption rates among tribal citizens and thus support revised state rates that are at or above the high end of the range. The higher end of the range reflects a more protective level, particularly since the proposed range does not account for the suppression factors described above, or the increasing trend of seafood consumption in the state and nation.

The proposed range of 157 to 267 grams per day is based on real consumption in Washington, not an imaginary or artificial standard. The range represents a statistical composite of locally-derived fish consumption data, set at the 80th to 95th percentile of fish-consuming populations. Some of our individual tribes and tribal citizens clearly consume more on a regular basis. The low end of the range (157 gpd) is less than the mean fish consumption rate derived in one Puget Sound tribe's dietary survey. Washington State is required to use local data, establish a high level of protection for populations throughout the state, and protect high-risk populations including tribes. Washington State standards should be at least as protective as the fish consumption rate of 175 grams per day that was recently approved by the EPA for the state of Oregon. In addition to establishing a more protective rate, the key to keeping fish safe for consumption will be a rigorous program of implementation as the standards are applied in the future.

Eating seafood in the Pacific Northwest is a lifestyle choice for most people, but for tribes the consumption of fish and shellfish is their life and legacy. Fish is a first food for tribal children and the foundation for the healthy hearts of the elders. Tribal communities are asking how to reduce the input of toxic chemicals into the environment in order to keep these essential food sources safe. A fish consumption rate that is more realistic and hence more protective of Washington residents will be an important step in protecting this healthy choice in the future.

Sincerely,

Billy Frank, Jr.
Chairman

cc: NWIFC Commissioners
Tribal Fish Consumption Workgroup
Jannine Jennings, EPA
Jim Woods, EPA

Quincy-Columbia Basin Irrigation District

Telephone (509) 787-3591 Fax (509) 787-3906
Post Office Box 188
Quincy, Washington 98848

October 25, 2012

Adrienne Dorrah
Washington Department of Ecology, Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Dorrah,

The Quincy-Columbia Basin Irrigation District appreciates the opportunity to comment on Ecology's *Fish Consumption Rates Technical Support Document, Version 2, Publication No. 12-09-058* which is intended to support discussion on Sediment Management Standards rulemaking and to facilitate considerations in revising Surface Water Quality Standards.

The Quincy-District is concerned with the inherent uncertainty in evaluating and estimating fish consumption rates for northwest fish consuming populations and with how the information in this document will be used to promulgate administrative rulemaking.

In Section 4.2, Ecology states that the regional survey data "...could be used to estimate fish consumption rates protective of Washington State's fish-consuming populations." These surveys do not solely provide for the complexities of this topic and should not be endorsed solely to support regulatory decision making. Such a decision to use the provided fish consumption surveys would be a choice of policy and is contrary to the purpose of the document to only compile available and relevant data. While considering protective fish consumption standards, other factors to be considered include evolving demographics, data gaps, differing datasets, geographic variability, and the consumption of anadromous and non-anadromous species.

The Quincy-District has considerable investments in equipment, employees, and processes, to ensure best management practices are followed during the operation and maintenance of our facilities. The consequences of endorsing and utilizing the findings of a partial assessment as the basis for future rulemaking could be damaging to our business and farm economies.

The Quincy District greatly appreciates the opportunity to comment and respectively asks that these comments be taken into full consideration while drafting the Fish Consumption Rates Technical Support Document.

Sincerely,

Craig Gyselinck
Water Quality Programs Manager

Cc: Darvin Fales, QCBID Manager
Richard Lemargie, Attorney
Tom Myrum, WSWRA
Craig Simpson, ECBID
Dave Solem, SCBID

SCHOOL OF
LAW

Center for Indian Law and Policy
Comments on Ecology's Fish Consumption Rates Technical Support Document Version 2.0

Please accept these comments on the Washington State Department of Ecology's *Draft Fish Consumption Rates Technical Support Document Version 2.0* (August 27, 2012)(FCR TSD 2.0), submitted on behalf of the Center for Indian Law & Policy, Seattle University School of Law. The Center for Indian Law & Policy was established in 2009. Under the Center are the classes, projects, programs and activities that focus on Indian law at Seattle University School of Law. The mission of the Center, beyond emphasizing learning opportunities for law school students, includes assisting Indian tribes and individuals to deal with the variety of unique laws that apply to them and making information about current legal issues available to Indian tribes and people. The Center does not represent any tribe in this process. Indeed, the Center wishes to underscore the importance of working directly with the individual tribes affected, within the context of a government-to-government relationship, as committed to under the terms of the *Centennial Accord between the Federally Recognized Indian Tribes in Washington State and the State of Washington*.[1] Rather, the Center offers these comments in the hope that they will be of value to Ecology as it considers its FCR TSD 2.0 and related rulemakings.[2]

I. Ecology Has Unnecessarily Delayed Protections for Human and Ecological Health

In the first place, Ecology should not be calling for a second round of comments on its Fish Consumption Rate Technical Support Document. As numerous tribes have pointed out, this additional layer of "process" is simply that: an additional layer, manufactured by Ecology.[3] The design and effect of this

[1] WASHINGTON GOVERNOR'S OFFICE OF INDIAN AFFAIRS, CENTENNIAL ACCORD BETWEEN THE FEDERALLY RECOGNIZED INDIAN TRIBES IN WASHINGTON STATE AND THE STATE OF WASHINGTON (1989), *available at* http://www.goia.wa.gov/Government-to-Government/Data/CentennialAccord.htm.

[2] The Center for Indian Law & Policy also submitted formal comments on Ecology's original Draft Fish Consumption Rates Technical Support Document (which is now known as "Version 1.0"). These comments are attached hereto as Appendix A and reiterated and incorporated in their entirety as part of the Center's comments on "Version 2.0" of this Fish Consumption Rates Technical Support Document.

[3] See, e.g., Letter from Merle Jefferson, Executive Director, Lummi Nation Natural Resources Department, to Ted Sturdevant, Director, Department of Ecology (October, 2012); Letter from David Lopeman, Chairman, Squaxin

additional round, of course, is to delay further the protections for human and environmental health that would flow from updating Ecology's current fish consumption rates. The science is – and has been – clear. There is no need to revisit, yet again, the technical defensibility of the various studies on which the recommendations in Ecology's original TSD, published in September of 2011 (FCR TSD 1.0), were based. Indeed, the technical defensibility of these studies had been established *prior to* Ecology's FCR TSD 1.0, because the state of Oregon and the U.S. Environmental Protection Agency (EPA) had considered and affirmed the quality and technical defensibility of the relevant fish consumption surveys.[4] Ecology's task should have been straightforward, given that the studies considered by Oregon and the EPA were studies of *Washington* fish consumers. And Ecology's FCR TSD 1.0, which was already the product of exceedingly careful research and countless hours of staff time, should have been more than sufficient to accomplish this task. Over a year has passed, and Ecology has now circulated "Version 2.0" of its TSD, adding 190 pages of paper but no actual protection for those who eat fish affected by contaminants in Washington waters.

This delay is unconscionable. While Ecology dithers, months and years go by in which people are advised to reduce their fish intake, to avoid harvesting shellfish, and to look "elsewhere" for their sources of food.[5] The fact that Washington is blanketed with fish consumption advisories is a hardship for all those who rely on local fish to put a meal on their family's dinner table – from anglers on our urban bays, to shellfish growers along our inland shores, to commercial fishers on our open waters. But these fish consumption advisories are a particular affront to tribal people. Tribes' rights are tied to *this place*. Tribes' past, present, and future is here. The health and well-being of tribes and their members is inextricably bound up with the fish and all of the lifeways that surround the fish. There is no "elsewhere" for the fishing tribes. So, for the state to delay its already long-overdue update to its fish consumption rate, while it has issued fish consumption advisories warning that the fish is too contaminated to eat, is to ignore the harms that this visits on tribes and their members. Indeed, a generation of tribal children has come of age while Ecology has possessed – but done nothing with – the data supporting an increased fish consumption rate and more protective environmental standards. The delay occasioned by Ecology's latest layer of additional process prolongs their burden yet again.

II. Ecology Retreats from Crucial Determinations Surrounding a Fish Consumption Rate

Ecology's FCR TSD 2.0 inappropriately retreats from the important determinations made in its original FCR TSD 1.0, namely the "technically defensible range" from which "appropriate default fish consumption rates" might be identified, i.e., 157 to 267 grams/day.[6] While the Center continues to

---

[4] OREGON, DEPARTMENT OF ENVIRONMENTAL QUALITY, HUMAN HEALTH FOCUS GROUP REPORT: OREGON FISH AND SHELLFISH CONSUMPTION RATE PROJECT (June, 2008); U.S. ENVIRONMENTAL PROTECTION AGENCY, METHODOLOGY FOR DERIVING AMBIENT WATER QUALITY CRITERIA FOR THE PROTECTION OF HUMAN HEALTH (2000)(relying on tribal fish consumption studies then available, including CRTIFC and Tulalip/Squaxin Island studies as basis for default fish consumption rate for "subsistence" populations); U.S. ENVIRONMENTAL PROTECTION AGENCY, EXPOSURE FACTORS HANDBOOK: 2011 EDITION, 1-4 to 1-7, and Chapter 10 (2011)(reviewing CRITFC, Tulalip/Squaxin Island, Suquamish, and API-King County studies).

[5] Washington State Department of Health, *Fish Consumption Advisories*, available at http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/Advisories.aspx.

[6] WASHINGTON STATE DEPARTMENT OF ECOLOGY, DRAFT FISH CONSUMPTION RATES TECHNICAL SUPPORT DOCUMENT, 111 (September, 2011).

recognize the various deficiencies with the range selected (e.g., the low end of the range reflects the 80th percentile value from the studies canvassed whereas risk-based environmental standards are generally set to protect the most exposed or most vulnerable among us; the studies canvassed document contemporary consumption rates, which are distorted by suppression; etc.)[7], the Center nonetheless supports the fact that Ecology's original FCR TSD 1.0 effectively established a range below which a fish consumption rate would not be considered scientifically defensible for environmental standards in Washington.

The Center also supports the fact that the recommended range in Ecology's original FCR TSD 1.0 included all species of fish and did not exclude salmon, a determination that is both scientifically defensible and in accord with our sister state of Oregon. The Center is dismayed, however, to see that Ecology's FCR TSD 2.0, together with the associated *Technical Issue Paper: Salmon Life History and Contaminant Body Burdens*, (Salmon TIP),[8] fails to lend clarity to the discussion of salmon contaminant body burdens, despite comments from the Center and others on point. Specifically, the Center and other commenters had pointed out that Washington asserts jurisdiction over "waters of the State of Washington," which comprise considerable expanses of marine waters, including the Puget Sound, the Straits of Juan de Fuca, and the open ocean and bays along the Pacific coast (extending three miles seaward along the coast). The Center also urged care in discussing the results of the various studies cited by Ecology, given the potential for inconsistent usage of the terms "marine," "saltwater," and "estuarine" when referring to the environments or locations at issue. While the Salmon TIP mentions the first of these points, it fails to heed the second. For example, the Salmon TIP describes the O'Neill and West (2009) study as "one of the most important papers for understanding body burden accumulation of Chinook salmon,"[9] and states that "[w]hen comparing regions of body burden accumulation, the analysis of O'Neill and West(2009) indicated that, even in the most highly PCB-contaminated river draining into Puget Sound, the Duwamish River, the vast majority (>96 percent) of PCB accumulation occurred in the marine environment, with little freshwater contribution. They note that these findings are not surprising, given that Chinook salmon typically gain 99 percent of their total mass in marine habitats."[10] Ecology and industry commenters frequently misquote this finding as support for the claim that salmon uptake "the vast majority (>96 percent) of" their contaminants *at sea*

---

[7] *See* Center for Indian Law & Policy, *Comments on Ecology's Fish Consumption Rates Technical Support Document, Version 1.0* (January, 2012), attached hereto as Appendix A. The most recent data continue to underscore the point that Ecology's recommended range, while an improvement over its current FCR, understates rather than overstates tribal consumption. The Lummi Nation surveyed tribal members about consumption practices in 1985 – a year in which the fish consumption was able to be more robust than at present, although still "not comparable to historic (heritage) levels" – and found average consumption among survey respondents to be 383 g/day, with consumption at the 90th percentile at 800 g/day. LUMMI NATION SEAFOOD CONSUMPTION STUDY 2, 14 (August 31, 2012). While this study was published after Ecology published its FCR TSD 2.0, and so could not have been considered by Ecology, its results support and augment the previous tribal studies before Ecology.

[8] WASHINGTON STATE DEPARTMENT OF ECOLOGY, TECHNICAL ISSUE PAPER: SALMON LIFE HISTORIES AND CONTAMINANT BODY BURDENS (July 20, 2012), available at https://fortress.wa.gov/ecy/publications/publications/1209058part1.pdf.

[9] *Id*. Appendix A, at 24.

[10] *Id*. Appendix A, at 26.

or *in the open ocean*[11] – that is, presumably outside of Washington's regulatory jurisdiction. But a reading of the O'Neill and West (2009) study itself shows the claim to be unsupported there.[12] Rather, O'Neill and West use the term "marine" to include the inland marine waters of Puget Sound. Similarly, they use the term "saltwater" to refer to "the Puget Sound and the Pacific Ocean."[13] Thus, the oft-cited finding from their 2009 study does not absolve Washington of its regulatory responsibilities – considerable portions of Washington's waters are "marine" waters, as this term is employed by O'Neill and West (2009).

While Ecology's original FCR TSD 1.0 effectively established a range below which a fish consumption rate would not be considered scientifically defensible for environmental standards in Washington, Ecology's FCR TSD 2.0, by contrast, simply punts this determination to some later date. The proffered reason for this deferral is that various considerations of "regulatory context" ought to inform Ecology's determination – that is, presumably, Ecology will want to consider how a particular fish consumption rate functions as part of sediment cleanup standards or as part of water quality standards. This reasoning, however, doesn't hold up. First, Ecology's original FCR TSD 1.0 provided a range, not a single value. Ecology remained free to select a default fish consumption rate during rulemakings that was attuned to any considerations of regulatory context from within this range. Second, although Ecology claims to have retreated from establishing an FCR range on the grounds that it is more appropriate to consider the relevant questions of science and policy by rule, Ecology's proposed Sediment Management Standards (SMS) reveal this claim to be a charade. Rather than set forth a default fish consumption rate by rule, Ecology punts once more – this time, leaving the crucial determination of the applicable FCR to be made anew at each site. By this move, Ecology further delays actual environmental protection, as experience shows that PLPs will engage in protracted fights the secure lenient cleanup standards at each site. Moreover, Ecology abdicates its responsibility to ensure a minimal level of protection across the state, to attend to aggregate risks from multiple sites (including multiple sites in a tribe's Usual & Accustomed (U&A) area), and to set up a transparent and efficient regulatory process.[14]

Relatedly, Ecology's FCR TSD 2.0 punts on other crucial policy determinations, including the appropriateness of employing a Fish Diet Fraction (FDF) and a "source contribution" or Site Use Factor (SUF). Each of these regulatory concepts has the potential to gut a more protective FCR, in effect reducing it to a fraction of its face value. This potential – and its deleterious impact on human and ecological health – is not made clear to public. Instead of elucidating these technical concepts, Ecology

---

[11] See, e.g., NCASI, *Comments on Ecology's Fish Consumption Rates Technical Support Document 2.0* (October, 2012)(asserting that "the science clearly demonstrates that >95% of the contaminant body burden found in adult salmon is accumulated in the open ocean.") Note that NCASI also does not limit its claim to PCBs, but enlarges it to all contaminants.

[12] Sandra M. O'Neill & James E. West, *Marine Distribution, Life History Traits, and the Accumulation of Polychlorinated Biphenyls in Chinook Salmon from Puget Sound, Washington*,138 TRANSACTIONS OF THE AMERICAN FISHERIES SOCIETY 616 (2009).

[13] *Id.* at 624.

[14] These and other points are elaborated in the Center for Indian Law & Policy's Comments on Ecology's Proposed Sediment Management Standards Rule, which is attached hereto as Appendix B and incorporated in their entirety as part of the Center's comments on "Version 2.0" of this Fish Consumption Rates Technical Support Document.

devotes just a few lines to each, essentially repeating their definitions.[15] Ecology then leaves it to the reader to figure out how these concepts would fit into the risk assessment equations it provides, and to discern their multiplicative effects (e.g., if Ecology were to apply an FDF of 0.5 and a SUF of 0.5, the effect would be to halve and then halve again the FCR). While declining to explain or engage these concepts and their implications in its FCR TSD 2.0, Ecology's SMS rulemaking embraces them.[16] The proposed SMS rule states that the FCR be selected by reference to a "reasonable maximum exposure," (RME) scenario, which it appropriately defines as "tribal consumption of fish and shellfish." However, the proposed SMS dictate that Ecology "shall consider" both a FDF and a SUF when selecting or approving site-specific exposure parameters. Precisely *how* Ecology ought to consider this information is left to a separate guidance document – the *Draft Sediment Cleanup Users Manual II* (SCUM) – on which Ecology is not accepting public comment.[17] The SCUM guidance presumes that the FDF and SUF are appropriate devices to be applied at sites around the state, and provides instructions for enlisting them to reduce the FCR. But the SCUM guidance does so in a vacuum, that is, as if cleanup determinations were not being made here in Washington – in a place that affects tribal rights to take fish and tribal resources in U&A areas. Thus, these controversial regulatory concepts are slipped in through the back door, with no actual consideration of the interplay of science, law, and policy that ought to govern their use.

As well, Ecology's FCR TSD 2.0 adds statistical analyses of fish consumption data for the general U.S. population – data that have little relevance to regulatory decisions in Washington. In fact, Ecology expressly acknowledges as much, citing scientific studies documenting that "people who live in coastal areas consume fish at higher rates than those living in other areas" and citing EPA guidance directing states to use "regional-specific data, when available." Yet Ecology includes analyses that appear to support any and all claims – including arguments for minimally protective environmental standards. The 90th percentile point estimates from Tables 17-19 are illustrative: those in the general U.S. population consume fish at rates of 248 g/day, 128 g/day, or 43.3 g/day. While these additional analyses may be "responsive" to the requests of industry stakeholders, they are not benign: by providing more data, but retreating from a decisive recommendation regarding the data, Ecology simply supplies ammunition for future volleys. Looking at the bigger picture, Ecology continues to facilitate a debate that largely misses the point. Rather than haggle over how much fish people in Nebraska *did eat* in 1974 or 1996 or 2006, shouldn't we ask how much fish people in Washington *would like to be able to eat* in a future in which our waters are uncontaminated and our fisheries restored to health?[18]

---

[15] WASHINGTON STATE DEPARTMENT OF ECOLOGY, DRAFT FISH CONSUMPTION RATES TECHNICAL SUPPORT DOCUMENT, VERSION 2.0, 95 (August 27, 2012).

[16] This and other points are elaborated in the Center for Indian Law & Policy's Comments on Ecology's Proposed Sediment Management Standards Rule, which is attached hereto as Appendix B and incorporated in their entirety as part of the Center's comments on "Version 2.0" of this Fish Consumption Rates Technical Support Document.

[17] WASHINGTON STATE DEPARTMENT OF ECOLOGY, DRAFT SEDIMENT CLEANUP USERS MANUAL II: GUIDANCE FOR IMPLEMENTING SEDIMENT MANAGEMENT STANDARDS, CHAPTER 173-204 WAC (August, 2012). See also Washington State Department of Ecology, *SMS Rulemaking* (August 15, 2012), available at http://www.ecy.wa.gov/programs/tcp/regs/2011-SMS/2011-SMS-hp.html (stating that the draft guidance "is not part of the public comment process").

[18] The years indicated, of course, correspond with years during which the general U.S. population has been surveyed about its fish consumption practices (the data were gathered, respectively, in the years 1973-73; 1994-

III. Ecology Fails to Acknowledge the Relevance of Tribal Rights

Ecology's FCR TSD 2.0 fails to acknowledge the relevance of tribal rights, including tribes' rights to take fish. Tribes comprise distinct *peoples* with inherent rights. Tribes' status as self-governing sovereign entities pre-dated contact with European settlers. Today, tribes are recognized to have a unique political and legal status – one that sets them apart from every other "subpopulation" or group that might warrant particular consideration in a risk assessment or in decisions about environmental standards more broadly. Tribes' rights and interests, moreover, are protected by a constellation of laws and commitments that are unique among groups affected by Ecology's decisions. These include protections secured by treaties, laws, and executive orders that speak to the rights of tribes and their members.[19] While Ecology asserts that the TSD is not the place to resolve questions of law and policy, as Ecology recognizes, it is often not possible in environmental regulatory decisions to separate questions of "science" from those of "law and policy." In fact, Ecology's TSD raises and engages a host of questions at the intersection of science, law and policy – for example, its willingness to entertain application of a fish diet fraction in a geographic landscape that is comprised of adjudicated tribal U&A areas. There is no way that agency decision makers can evaluate the appropriateness – and legality – of a FDF unless they account for the existence of U&A areas. While Ecology's original TSD at least acknowledged the issue of tribal rights (albeit in a brief appendix), the FCR TSD 2.0 is silent on this essential feature of the legal and policy landscape here in Washington. Nor is this issue certain to be taken up later, during rulemaking, as the discussion of Ecology's proposed SMS and SCUM guidance, above, demonstrates.

Indeed, it is in the legal, rather than the scientific, realm that there have been developments that warranted attention by Ecology, given Oregon's and EPA's respective conclusions about the appropriateness and scientific defensibility of the relevant fish consumption surveys. While tribes' fishing rights are rooted in aboriginal practices that pre-date European contact, federal courts have recently reiterated and elaborated the contours of these rights from the perspective of the United States in a subproceeding of *U.S. v. Washington* known colloquially as the "culverts" case.[20] In this case, the court addressed a threat to the tribes' treaty rights posed by environmental degradation. Specifically, the tribes cited evidence that the state of Washington had improperly maintained culverts around the state, with the result that miles of salmon habitat were blocked, contributing to a decline in salmon numbers and thus an erosion of tribes' ability to exercise their treaty-guaranteed right to take fish. Thus, the district court in the culverts case considered the question "whether the Tribes' treaty-

---

96; and 2003-06) for use in Ecology's current WQS and its FCR TSD 2.0. As noted by the Center in previous comments, various surveys of tribal consumption practices have considered the question about future consumption, with tribal members overwhelmingly responding that they would like to consume more fish in the future than they currently are able to do. Given tribes' rights to take fish, tribal members are also entitled to consume more fish in exercise of their rights.

[19] See, Center for Indian Law & Policy, *Comments on Ecology's Fish Consumption Rates Technical Support Document, Version 1.0,* attached hereto as Appendix A, elaborating the legal basis of these rights.

[20] Order on Cross-Motions for Summary Judgment, United States v. Washington, No. 9213RSM, slip op. (W.D. Wash. 2007)(Subproceeding 01-1, docket number 392).

based right of taking fish imposes upon the State a duty to refrain from diminishing fish runs by constructing or maintaining culverts that block fish passage."[21]

The court ruled in favor of the tribes' request for a declaratory judgment to this effect. As the Center noted in its comments on the FCR TSD 1.0, in finding that the state indeed had the duty urged by the tribes, Judge Martinez considered carefully the intent of the parties to the treaties. He quoted at length from expert testimony that focused explicitly on the role of the fish as food, forever – testimony that emphasized that among the points of "taking" fish was, ultimately and obviously, eating fish.

> Stevens specifically assured the Indians that they would have access to their normal food supplies now and in the future....
>
> [T]he representatives of the Tribes were personally assured during the negotiations that they could safely give up vast quantities of land and yet be certain that their right to take fish was secure. These assurances would only be meaningful if they carried the implied promise that neither the negotiators nor their successors would take actions that would significantly degrade the resource.[22]

Although the tribes brought their claim to the court in the context of a discrete set of facts – and Judge Martinez decided the question in this particularized context, thus avoiding a broad, acontextual pronouncement – the "culverts" decision sends an unmistakable signal.[23] As successors to the negotiators, federal and state governments may be held to account for the actions they take – or permit others to take – that significantly degrade the treaty resource. Given the court's concern with the *function* of the treaty resource, moreover – its role in securing food and livelihood for the tribes – governments may be held to account for actions that compromise the treaty resource whether by depletion or by contamination.

The tribes' treaty-protected rights encompass geographical areas and species that will be affected by environmental standards (e.g., cleanup standards, water quality standards) premised upon the analysis in the FCR TSD 2.0. As such, its failure even to mention the tribes' treaty-secured rights is legally untenable. Particularly glaring is the omission of any mention of the culverts decision and its discussion of treaty-guaranteed fish as a source of food in perpetuity, given the evident implications of the court's holding and rationale for Ecology's FCR TSD 2.0 and future regulatory decisions. The timing of the culverts decision is also worth noting, inasmuch as pre-culverts understandings of the contours of the treaty-guaranteed rights must be read in light of their vintage. For example, to the extent that the FCR TSD 2.0 references state policies and standards crafted prior to the August 2007 culverts decision, these may reflect a crabbed view of the state's treaty-based obligations that is no longer supportable.

---

[21] Subproceeding 01-1, slip op. at 5.

[22] Subproceeding 01-1, slip op. at 11.

[23] Indeed, the court specifically repudiated the state of Washington's argument that the Ninth Circuit, in vacating the district court's opinion in Phase II, had rejected the existence of a treaty-based duty to avoid specific actions that impair the salmon fisheries by impairing their environment. Subproceeding 01-1, slip op. at 5-7.

So, while Ecology's TSDs rehash well-settled scientific ground, they fail to acknowledge important recent legal developments and their interplay with the relevant science and policy. These legal developments mean that various science-policy options, such as the fish diet fraction, should be off the table. Ecology declines to engage the legal landscape here in its FCR TSD 2.0, but it doesn't take it up elsewhere.

IV. Ecology Appropriately Corrects Flawed Assertions, Yet Debate Remains Clouded

Ecology is to be applauded for again affirming the soundness and technical defensibility of the relevant studies, particularly the tribal studies. As noted above, this undertaking is redundant. However, as evidenced by the public comments received by Ecology on the FCR TSD 1.0, industry and other commenters continue to question the technical defensibility of the tribal studies, in some instances going so far as to question the credibility of tribal respondents. For example, one commenter questioned the maximum values for the portion sizes indicated in the Suquamish survey:

> "For bivalves (i.e., crabs, mussels, oysters), the maximum reported portion sizes range from 1,349 g (2.5 pounds) for mussels to an incredible 2,720 g (6 pounds) for geoduck. I have a hard time envisioning anyone eating 6 pounds of geoduck clams in one meal....[t]hese extreme portion sizes certainly raise the question of whether the responses given by the individual(s) reporting such portion sizes are believable."[24]

Such comments are of a piece with a long and unfortunate history in which the work of tribal technical and scientific staff is doubted, while the work of other government and private scientists receives deference (even where the latter are the product of guesstimates or "best professional judgment") and in which the word of tribal members is deemed suspect whereas the word of non-tribal members is to be taken at face value.[25] Ecology, of course, is not the source of such ill-informed comments and, moreover, must accept those comments it receives. Ecology does, however, have a responsibility to correct flawed assertions and it is to be commended for doing so and setting the record straight. Indeed, Ecology should respond to broadsides against tribal science in the strongest of terms. One hopes that, in the future, such flawed assertions and insinuations will no longer mar our public debate, and the technical defensibility of tribal studies will not have to be proven and proven again.

---

[24] Lawrence McCrone, *Comments to Ecology on FCR Technical Support Document 1.0* (January, 2012).

[25] *See, e.g.*, Catherine A. O'Neill, *Restoration Affecting Native Resources: The Place of Native Ecological Science*, 42 ARIZONA LAW REVIEW 343 (2000). This article chronicles examples in which tribal science is dismissed or subjected to greater scrutiny than non-tribal science, "even when the sources and methods may be similar." *Id*. at 353-56. Notably, these examples include the EPA's willingness to rely on the recollections of federal agency staff to fill in the gaps regarding fish consumption species data that had gotten lost in the process of arriving at its 6.5 g/day national default rate. Regarding these "unclassified" species, an internal EPA memorandum recounts that "Ms. Betty M. Hackley of National Marine Fisheries Service has worked with the survey data for years and she feels that most of the unclassified group consists of cod, pollock, and whiting (silver hake). Since all of these species would be considered marine, this whole group was considered marine." *Id*. at 354. Interestingly, the classification of these species as "marine" had the effect of decreasing the final default fish consumption rate (which excludes marine species).

In a related vein, Ecology could do more to clarify usage with respect to important science and policy concepts such as uncertainty and variability.[26] Although Ecology's FCR TSD 2.0 describes these concepts, it fails to correct misunderstandings or to elucidate their implications for Washingtonians. As a consequence, Ecology permits debate to be clouded by false claims and misusage of terms. Industry and other commentators, for example, are fond of characterizing the choice of a relatively protective FCR – say, the 90th percentile value from the tribal and API studies – as a *conservative* choice.[27] But the selection of a FCR is not a matter of choosing a more or less conservative response in the face of uncertainty. We don't lack certainty that actual people are consuming fish at this rate in the real world here in Washington. We know that they are. The FCR is an exposure parameter that here is characterized not by uncertainty, but by variability. The judgment that we make (at the intersection of science, law, and policy) is not how to respond given our lack of knowledge about the true value for the FCR, but how to respond given what we know to be the case about the true value for the FCR: it varies, with certain groups (tribes among them) consuming the greatest quantities of fish. A choice in the face of variability is a matter of deciding *whom* to protect. Because we know the identities of those groups that consume the most fish in Washington, the implications of our choice are clear. And, given the rights that belong to the fishing tribes here in Washington, our choice is also legally constrained. We cannot simply pretend to be opting for a "less conservative" choice in the face of uncertainty, the costs of which will fall on some identitiless, statistical people.

Conclusion

Ecology's original FCR TSD 1.0 was exceedingly well-researched and –documented. It set forth important determinations regarding a minimum range for technically defensible fish consumption rates for the state of Washington – a range that, appropriately, did not exclude salmon. Ecology's FCR TSD 2.0 defers this and other crucial determinations to some later date, while signaling that it will entertain numerous controversial devices for undermining a more protective fish consumption rate. Ecology's FCR TSD 2.0, moreover, fails to acknowledge the relevance of tribal fishing rights – rights that fundamentally alter the landscape for regulatory decisions affecting our aquatic environment in Washington.

The Center is distressed that Ecology has retreated from recommending a more appropriate fish consumption rate – one that, at long last, would make strides toward protecting tribal members and

---

[26] *See generally*, NATIONAL RESEARCH COUNCIL, SCIENCE AND JUDGMENT IN RISK ASSESSMENT (1994)(differentiating between uncertainty and variability, and setting forth the implications of various regulatory responses to these features of exposure data); see also Catherine A. O'Neill, *Variable Justice: Environmental Standards, Contaminated Fish, and "Acceptable" Risk to Native Peoples*, 19 STANFORD ENVIRONMENTAL LAW JOURNAL 3, 34-36, 64-116 (2000)(discussing at length the implications of variability in the context of fish consumption practices).

[27] *See, e.g.*, National Council for Air and Stream Improvement, Inc., *Comments to Ecology on FCR Technical Support Document 1.0* (January, 2012)(positing the "multiple conservative assumptions" that comprise Ecology's estimates of exposure and giving, as an example, the default assumption that people consume fish over the entirety of a 70-year lifetime – an exposure parameter that is characterized primarily by variability, not uncertainty). This default value is intended to be a protective choice for a quantity that is known to vary; and we know that actual tribal members live here and fish here and consume their harvest for their entire lives.

other Washingtonians. The Center is also troubled that Ecology has unnecessarily permitted further delay by seeking yet more comments on its technical analyses. The Center hopes that Ecology will henceforth have the leadership and vision to uphold its responsibilities to protect Washington's people and resources and to honor its obligations to the fishing tribes.

Respectfully submitted,

Catherine A. O'Neill
Professor of Law, Seattle University School of Law
Faculty Fellow, Center for Indian Law & Policy

SCHOOL OF
L A W

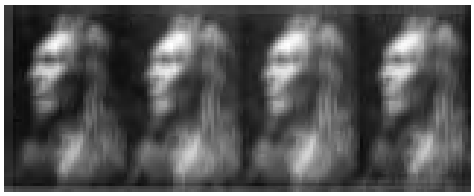
Comments of the Center for Indian Law and Policy

Please accept these comments on the Department of Ecology's draft *Fish Consumption Rates Technical Support Document: A Review of Data and Information About Fish Consumption in Washington* (September 2011)(hereinafter "draft TSD"), submitted on behalf of the Center for Indian Law and Policy, Seattle University School of Law. The Center for Indian Law and Policy was established in 2009. Under the Center are the classes, projects, programs and activities that focus on Indian law at Seattle University School of Law. The mission of the Center, beyond emphasizing learning opportunities for law school students, includes assisting Indian tribes and individuals to deal with the variety of unique laws that apply to them and making information about current legal issues available to Indian tribes and people. The Center does not represent any tribe in this process. Indeed, the Center wishes to underscore the importance of working directly with the individual tribes affected, within the context of a government-to-government relationship, as committed to under the terms of the *Centennial Accord between the Federally Recognized Indian Tribes in Washington State and the State of Washington*.[1] Rather, the Center offers these comments in the hope that they will be of value to Ecology as it refines its draft TSD.

I. Tribes' Unique Political and Legal Status and Rights to Fish

Tribes comprise distinct *peoples* with inherent rights. Tribes' status as self-governing, sovereign entities pre-dated contact with European settlers. This status, nonetheless, was affirmed by the nascent United States. Among other things, the United States viewed the Indian tribes as

[1] WASHINGTON GOVERNOR'S OFFICE OF INDIAN AFFAIRS, CENTENNIAL ACCORD BETWEEN THE FEDERALLY RECOGNIZED INDIAN TRIBES IN WASHINGTON STATE AND THE STATE OF WASHINGTON (1989), *available at* http://www.goia.wa.gov/Government-to-Government/Data/CentennialAccord.htm.



CENTER FOR INDIAN LAW & POLICY
901 12th Avenue, Sullivan Hall P.O. Box 222000 Seattle, WA 98122-1090 www.law.seattleu.edu www.indianwills.org Tel.: (206) 398-4284 Fax: (206) 398-4077

nations, capable of entering into treaties.[2] Today, tribes are recognized to have a unique political and legal status – a status that sets them apart from every other "subpopulation" or group that might warrant particular consideration in a risk assessment or in decisions about environmental standards more broadly.[3] Tribes' rights and interests, moreover, are protected by a constellation of laws and commitments that are unique among groups affected by Ecology's decisions. These include protections secured by treaties, laws, and executive orders that speak to the rights of tribes and their members.

The Treaty-Secured Fishing Rights

The starting place for an analysis of tribal fishing rights is a recognition that, prior to European contact, fishing, hunting, and gathering were vital to the lives of Indian people. Indians' aboriginal title to this land included the right to engage in these practices.[4] When tribes entered into treaties and agreements ceding lands to the United States, they often nonetheless reserved a suite of important rights, including their aboriginal fishing rights.[5] For its part, upon entering into treaties and agreements with the various tribes of the Pacific Northwest, the United States bound itself and its successors to protect the tribes' right to take fish in perpetuity.[6] The Treaty of Point Elliott, for example, provides that "[t]he right of taking fish at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the Territory ...."[7] Although the precise language of the fishing clauses varies somewhat in the different treaties, U.S. courts have interpreted these provisions to secure to the tribes a permanent, enforceable right to take fish throughout their fishing areas for ceremonial, subsistence and commercial purposes.[8] The treaties, moreover, have the status, under the Constitution, of "supreme law of the land."[9]

---

[2] Worcester v. Georgia, 31 U.S. (6 Pet.) 515 (1832).

[3] *See, e.g.,* U.S. v. Mazurie, 419 U.S. 544, 557 (1977)(rejecting lower court's characterization of tribe as mere association of U.S. citizens and finding, instead, that "Indian tribes are unique aggregations possessing attributes of sovereignty over both their members and their territory ..."); *see also* Williams v. Lee, 358 U.S. 217 (1959); Morton v. Mancari 417 U.S. 535 (1974).

[4] FELIX COHEN, HANDBOOK OF FEDERAL INDIAN LAW 1120-24 (1982).

[5] Tribes' reserved fishing rights have been recognized, from the U.S. perspective, through various means, including treaties, agreements, and executive orders. *See, e.g.,* U.S. v. Anderson, 6 Indian L. Rep. F-129 (E.D. Wash. 1979). These comments recognize the aboriginal origin of tribes' fishing rights, and do not mean to exclude any of the various forms of recognition for these rights by use of the terms "rights," "fishing rights," and "treaty-secured" rights, unless the context suggests otherwise. Indeed, the rights themselves pre-exist the treaties or other agreements – these treaties and agreements "secure" or "guarantee" the pre-existing, aboriginal rights. Thus, these comments use the terms "treaty-secured" or "treaty-guaranteed" to emphasize this point.

[6] The term "fish," here and throughout, is understood to include all species of fish, including shellfish.

[7] Treaty with the Duwamish, Jan. 22, 1855, U.S.-Duwamish, art. V, 12 Stat. 927 (1859).

[8] *See, e.g.,* Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F. Supp. 553 (D. Or. 1977)(finding that a proposed dam on Catherine Creek would infringe rights guaranteed to the Umatilla tribe by the Treaty with the Walla Walla and stating "[f]urther, while the 1855 treaty spoke only of "stations", it is clear that the government and the Indians intended that all Northwest tribes should reserve the same fishing rights. 'It is designed to make the same provision for all the tribes and for each Indian of every tribe. The people of one tribe are as much the people of the Great Father as the people of another tribe; the red men are as much his children as the white men.'"(quoting Governor Stevens)).

[9] Worcester v. Georgia, 31 U.S. (6 Pet.) 515 (1832)("The constitution [declares] treaties already made, as well as those to be made, the supreme law of the land . . .").

Importantly, all of the rights not expressly relinquished by the tribes were retained. This is a crucial tenet of federal Indian law. As affirmed by the U.S. Supreme Court, the treaties represent "not a grant of rights to the Indians, but a grant of rights *from* them – a reservation of those not granted."[10] The historical record, from both sides, is very clear on the point that protections for the tribes' pre-existing fishing rights were crucial to obtaining tribes' assent to enter into the treaties.

> Governor Stevens and his associates were well aware of the 'sense' in which the Indians were likely to view assurances regarding their fishing rights. During negotiations, the vital importance of the fish to the Indians was repeatedly emphasized by both sides, and the Governor's promises that the treaties would protect that source of food and commerce were crucial in obtaining the Indians' assent. It is absolutely clear, as Governor Stevens himself said, that neither he nor the Indians intended that the latter 'should be excluded from their ancient fisheries,' and it is accordingly inconceivable that either party deliberately agreed to authorize future settlers to crowd the Indians out of any meaningful use of their accustomed places to fish.[11]

Accordingly, for more than a century, the courts have regularly interpreted the fishing right to encompass the subsidiary rights necessary to render it of continued relevance for tribal fishers. Among the facets of the treaty guarantees affirmed by the courts relevant to Ecology's draft TSD are the points that: (1) "The treaty clauses regarding off-reservation fishing . . . secured to the Indians rights, privileges and immunities distinct from those of other citizens."[12] (2) The rights secured to tribes by treaty are permanent, such that "[t]he passage of time and the changed conditions affecting the water courses and the fishery resources in the case area have not eroded and cannot erode the right secured by the treaties . . ."[13] (3) "[N]either the treaty Indians nor the state . . . may permit the subject matter of these treaties [i.e. the fisheries] to be destroyed."[14] (4) The treaty fishing rights encompass the right to fish in all areas traditionally available to the tribes, and "[agencies] ... do not have the ability to qualify or limit the Tribes' geographical treaty fishing right (or to allow this to occur ...) by eliminating a portion of an Indian fishing ground ...," except as necessary to conserve a species.[15] (5) The treaty fishing rights encompass all available species of fish found in the treating tribes' fishing areas. As the court explained in a subproceeding of *United States v. Washington* addressing shellfish, "[b]ecause the 'right of taking fish' must be read as a reservation of the Indians' pre-existing rights, and because the right to take *any* species, without limit, pre-existed the Stevens Treaties, the Court must read the 'right of taking fish' without any species limitation."[16] These features of tribes' rights are important in part because they continue to inform tribes' aspirations for and entitlements to a future in which the exercise of their rights is robust, and tribal members' consumption and use of the resources on which they have historically depended is restored.

---

[10] United States v. Winans, 198 U.S. 371, 381 (1905)(emphasis added).
[11] Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658, 676 (1979).
[12] U.S. v. Washington, 384 F. Supp. 312, 401 (W.D. Wash. 1974).
[13] *Id.*
[14] U.S. v. Washington, 520 F.2d 676, 685 (9th Cir. 1975).
[15] *See, e.g.*, Muckleshoot v. Hall, 698 F. Supp. 1504, 1513-14 (W.D. Wash. 1988)(enjoining construction of a marina in Elliott Bay that would have eliminated a portion of the tribes' usual and accustomed fishing areas); *see also* United States v. Oregon, 718 F.2d 299, 305 (9th Cir. 1983) (holding that "the court must accord primacy to the geographical aspect of the treaty rights").
[16] 873 F. Supp. 1422,1430 (W.D. Wash. 1994)(emphasis in original).

The "Culverts" Case

The U.S. courts' most recent affirmation of the treaty guarantees is of a piece with these previous cases. In what is known colloquially as the "culverts" case,[17] the court addressed a threat to the tribes' treaty rights posed by environmental degradation. The culverts case is an outgrowth of *United States v. Washington*, in which Judge Boldt divided the questions before the court into two "phases." In Phase II, the district court considered "whether the right of taking fish incorporates the right to have treaty fish protected from environmental degradation."[18] The court found that "implicitly incorporated in the treaties' fishing clause is the right to have the fishery habitat protected from man-made despoliation....The most fundamental prerequisite to exercising the right to fish is the existence of fish to be taken."[19] On appeal, the district court's opinion was vacated on jurisprudential grounds. The Ninth Circuit found its "general admonition" inappropriate as a matter of "judicial discretion" and stated that the duties under the treaties in this respect "will depend for their definition and articulation upon concrete facts which underlie a dispute in a particular case."[20] So, in the culverts case, the tribes brought to the court's attention such a set of concrete facts. Specifically, the tribes cited evidence that the state of Washington had improperly maintained culverts around the state, with the result that miles of salmon habitat were blocked, contributing to a decline in salmon numbers and thus an erosion of tribes' ability to exercise their treaty-guaranteed right to take fish. Thus, the district court in the culverts case considered the question "whether the Tribes' treaty-based right of taking fish imposes upon the State a duty to refrain from diminishing fish runs by constructing or maintaining culverts that block fish passage."[21]

The court ruled in favor of the tribes' request for a declaratory judgment to this effect. In finding that the state indeed had the duty urged by the tribes, Judge Martinez again considered carefully the intent of the parties to the treaties. He quoted at length from expert testimony that focused explicitly on the role of the fish as food, forever – testimony that emphasized that among the points of "taking" fish was, ultimately and obviously, eating fish.

> Stevens specifically assured the Indians that they would have access to their normal food supplies now and in the future....
>
> [T]he representatives of the Tribes were personally assured during the negotiations that they could safely give up vast quantities of land and yet be certain that their right to take fish was secure. These assurances would only be meaningful if they carried the implied promise that neither the negotiators nor their successors would take actions that would significantly degrade the resource.[22]

Although the tribes brought their claim to the court in the context of a discrete set of facts – and Judge Martinez decided the question in this particularized context, thus avoiding a broad,

---

[17] Order on Cross-Motions for Summary Judgment, United States v. Washington, No. 9213RSM, slip op. (W.D. Wash. 2007)(Subproceeding 01-1, docket number 392).
[18] United States v. Washington, 506 F. Supp. 187, 190 (W.D. Wash. 1980)(Phase II) *vacated by* United States v. Washington 759 F.2d 1353 (9th Cir. 1985).
[19] 506 F. Supp. at 203.
[20] 759 F.2d at 1357.
[21] Subproceeding 01-1, slip op. at 5.
[22] Subproceeding 01-1, slip op. at 11.

acontextual pronouncement – the "culverts" decision sends an unmistakable signal.[23] As successors to the negotiators, federal and state governments may be held to account for the actions they take – or permit others to take – that significantly degrade the treaty resource. Given the court's concern with the *function* of the treaty resource, moreover – its role in securing food and livelihood for the tribes – governments may be held to account for actions that compromise the treaty resource whether by depletion or by contamination.

The tribes' treaty-protected rights encompass geographical areas and species that will be affected by environmental standards (e.g., cleanup standards, water quality standards) premised upon the analysis in the draft TSD. As such, the draft TSD's abbreviated discussion of tribes' treaty-secured rights is legally untenable. Particularly glaring is the omission of any mention of the U.S. District Court's recent "culverts" decision and its discussion of treaty-guaranteed fish as a source of food in perpetuity, given the evident implications of the court's holding and rationale for Ecology's draft TSD and future regulatory decisions. The timing of the culverts decision is also worth noting, inasmuch as pre-culverts understandings of the contours of the treaty-guaranteed rights must be read in light of their vintage. For example, to the extent that the TSD references state policies and standards crafted prior to the August 2007 culverts decision, these may reflect a crabbed view of the state's treaty-based obligations that is no longer supportable.

Other Sources of Rights Unique to Tribes and Their Members

When the rights of tribes and their members are affected, as they are here, there is a particular constellation of laws and commitments that comes into play. This constellation is unique to tribes – it would not be relevant were only other groups' interests affected, but it must be considered given that tribes' rights are at stake. In addition to the treaties and agreements between the U.S. and the Pacific Northwest tribes discussed above, numerous state and federal legal commitments recognize the unique duties owed to tribes and their members. Among these are federal civil rights laws that prohibit recipients of federal funds (including state environmental agencies such as Ecology) from administering their programs in a way that discriminates against American Indians;[24] U.S. commitments under international law to protect the rights of indigenous peoples, including rights to traditional resources and to hunt, fish, and gather; [25] federal and state commitments to work with tribes on a government-to-government basis, in furtherance of tribal self-determination;[26] and federal and state commitments to further environmental justice, including specific mention of the need to protect subsistence fishing.[27]

---

[23] Indeed, the court specifically repudiated the state of Washington's argument that the Ninth Circuit, in vacating the district court's opinion in Phase II, had rejected the existence of a treaty-based duty to avoid specific actions that impair the salmon fisheries by impairing their environment. Subproceeding 01-1, slip op. at 5-7.

[24] Civil Rights Act of 1964 sec. 106, 42 U.S.C. sec. 2000d (1988); 40 C.F.R. sec. 7 (1999).

[25] UNITED STATES MISSION TO THE UNITED NATIONS, ANNOUNCEMENT OF U.S SUPPORT FOR THE UNITED NATIONS DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES 6, 8 (2011) *available at* http://usun.state.gov/documents/organization/153239.pdf (recognizing that the Declaration calls upon the U.S. to acknowledge the "interests of indigenous peoples in traditional lands, territories, and natural resources," and recognizing "that many indigenous peoples depend upon a healthy environment for subsistence fishing, hunting and gathering" and that various Declaration provisions address the consequent need for environmental protections).

[26] *See, e.g.*, CENTENNIAL ACCORD, *supra* note 1.

[27] *See, e.g.*, EXECUTIVE ORDER 12,898: FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (Feb. 11, 1994)(singling out the issue of "subsistence consumption of fish and wildlife" in section 4-4, the only subject matter issue receiving specific mention in the Executive Order).

As governments, of course, the tribes manage and set environmental standards for the lands and waters over which they have authority. However, because tribes' rights, including treaty-secured rights, are impacted by environmental standards set by the state of Washington, Ecology must consider these rights when it issues standards and considers the technical and policy inputs to these standards.

II. Historical Fish Consumption Practices and Contemporary, "Suppressed" Rates

The tribes of the Pacific Northwest are fishing peoples. Historically, fish were vital to tribal life – a central feature of the seasonal rounds by which food was procured for ceremonial, subsistence, and commercial purposes. This fact is self-evident to tribal people. It has also been recognized by U.S. courts, which have observed that, at treaty times, "fish was the great staple of [Indians'] diet and livelihood,"[28] and thus fishing rights "were not much less necessary to the existence of the Indians than the atmosphere they breathed."[29]

Historical Fish Consumption Practices and Rates

There are ample data documenting the role of fish as a dietary mainstay for Indian people prior to contact and at the time of the treaties. There were differences, of course, in the species relied upon and the quantities consumed, from group to group and from year to year. Nonetheless, there is no doubt that fish comprised a staple source of calories, protein, and other nutrients for tribal people throughout the Pacific Northwest. These data, moreover, drawn from multiple lines of scientific and social scientific evidence, have supported quantified estimates of historical consumption rates. For example, Deward Walker has estimated pre-dam fish consumption rates for the Columbia River tribes (Umatilla, Yakama, and Nez Perce), based on a review of the ethnohistorical and scientific literature. Walker has quantified total fish consumption for these peoples at 1000 grams/day.[30] Earlier estimates, for example, by Gordon Hewes, produced figures of similar magnitude. Hewes estimated salmon consumption rates for the Cayuse at 365 pounds/year (453.6 grams/day) and for the Umatilla and Walla Walla at 500 pounds/year (621.4 grams/day).[31] Hewes' estimates for the Puget Sound tribes were similar. For example, he estimated salmon consumption rates for the Lummi and Nooksack tribes at 600 pounds/year (745.6 grams/day), for the Clallam at 365 pounds/year (453.6 grams/day) and for the Puyallup, Nisqually, and various other tribes at 350 pounds/year (435 grams/day).[32] These and other data have been enlisted in peer-reviewed methodologies for quantitative exposure estimates for various Pacific Northwest tribes. For example, Barbara Harper, et al. concluded that "[h]istorically, the Spokane Tribe consumed roughly 1,000 to 1,500 grams of salmon and other fish per day."[33]

---

[28] Fishing Vessel, 443 U.S. at 665 n.6 (citations and internal quotation marks omitted).
[29] United States v. Winans, 198 U.S. 371, 381 (1905).
[30] A. SCHOLTZ, ET AL., COMPILATION OF INFORMATION ON SALMON AND STEELHEAD TOTAL RUN SIZE, CATCH, AND HYDROPOWER- RELATED LOSSES IN THE UPPER COLUMBIA RIVER BASIN, ABOVE GRAND COULEE DAM, Fisheries Technical Report No. 2., Upper Columbia United Tribes Fisheries Center, Eastern Washington University (1985).
[31] Gordon W. Hewes, *Indian Fisheries Productivity in Pre-Contact Times in the Pacific Salmon Area*, 7 NORTHWEST ANTHROPOLOGICAL RESEARCH NOTES 133, 136 (1973).
[32] *Id.*
[33] Barbara L. Harper, et al., *The Spokane Tribe's Multipathway Subsistence Exposure Scenario and Screening Level RME*, 22 RISK ANALYSIS 513, 518 (2002). Harper, et al., improved upon the earlier estimates, among other things by accounting for the greater caloric requirements of an active, subsistence way of life. Thus, for example, while

The substantial degree to which fish were relied upon by the tribes at treaty time was emphasized in evidence before the court in *U.S. v. Washington.* Among the findings of fact in that case, Judge Boldt cited the following figure: "Salmon, however, both fresh and cured, was a staple in the food supply of these Indians. It was annually consumed by these Indians in the neighborhood of 500 pounds per capita [i.e., 621.4 grams/day]."[34]

These historical, original, or "heritage" rates, moreover, have ongoing relevance for the fishing tribes, given that the treaty guarantees are in perpetuity and given that the tribes in fact seek to resume fish consumption practices and rates consonant with the treaty guarantees. Thus, for example, the Umatilla tribe looked to "original consumption rates along the Columbia River and its major tributaries" in developing a fish consumption rate for environmental regulatory purposes "because that is the rate that the Treaty of 1855 is designed to protect and which is upheld by caselaw. It also reflects tribal fish restoration goals and healthy lifestyle goals."[35] In a similar vein, recent surveys of Swinomish tribal members showed that they sought to reinvigorate more robust fish consumption practices and to increase their fish intake.[36] The forward-looking nature of Ecology's regulatory decisions to which the FCR proposed in the draft TSD is relevant (e.g., determinations of future uses of contaminated sites, restoration of waters to unimpaired, "fishable" status), makes the matter of tribes' future aspirations vital.

Contemporary, "Suppressed" Fish Consumption Rates

In contrast to estimates of historical fish consumption rates, recent surveys of tribal populations produce estimates of contemporary fish consumption rates. It is important to recognize that these snapshots of contemporary practices will be distorted due to suppression.

> "A 'suppression effect' occurs when a fish consumption rate (FCR) for a given population, group, or tribe reflects a current level of consumption that is artificially diminished from an appropriate baseline level of consumption for that population, group, or tribe. The more robust baseline level of consumption is suppressed, inasmuch as it does not get captured by the FCR."[37]

Note that suppression effects may infect attempts to assess consumption practices for various subpopulations or for the general population as well. For example, consumption surveys of women of childbearing age may reflect a current level of consumption that is diminished from levels that women in this group *would* consume, but for the existence of fish consumption

---

Hewes' estimates assumed a 2000 kcal/day energy requirement, Harper, et al., used a 2500 kcal/day figure, "based on a moderately active outdoor lifestyle and renowned athletic prowess" of Spokane tribal members. *Id.* at 517.

[34] U.S. v. Washington, 384 F. Supp. at 380 (discussing Yakama consumption).

[35] STUART G. HARRIS & BARBARA L. HARPER, CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION, EXPOSURE SCENARIO FOR CTUIR TRADITIONAL SUBSISTENCE LIFEWAYS app. 3 (2004).

[36] JAMIE DONATUTO, WHEN SEAFOOD FEEDS THE SPIRIT YET POISONS THE BODY: DEVELOPING HEALTH INDICATORS FOR RISK ASSESSMENT IN A NATIVE AMERICAN FISHING COMMUNITY, 85-89 (Ph.D. dissertation, University of British Columbia 2008)(summarizing survey of Swinomish Indian Tribal Community members, finding multiple causes of suppressed consumption, and finding that 73% of respondents stated that they would like to eat more fish than they do now).

[37] NATIONAL ENVIRONMENTAL JUSTICE ADVISORY COUNCIL, FISH CONSUMPTION AND ENVIRONMENTAL JUSTICE, 43-45 (2002)

advisories due to mercury contamination.[38] However, when tribes are affected, there are two important differences. First, the "appropriate baseline level of consumption" is clear for tribes, whereas it may be subject to debate for other groups. Only tribes have legally protected rights to a certain historical, original, or heritage baseline level of consumption. Second, the causes of suppression have exerted pressure on tribes for a longer period, and in more numerous ways, than on the general population. Whereas those in the general population may have begun to reduce their intake of fish in response to consumption advisories once these became more prevalent in the 1970s and thereafter, tribal members have been excluded from their fisheries, and harassed and imprisoned for exercising their fishing rights, from shortly after the ink on the treaties dried. Indeed, the forces of suppression, often perpetrated or permitted by federal and state governments, have included inundation of fishing places; depletion and contamination of the fishery resource; and years of prosecution, intimidation, and gear confiscation.

As a consequence, contemporary surveys of tribal populations produce fish consumption rates that are artificially low compared to the appropriate, treaty-guaranteed baseline. The bias introduced by suppression effects, together with tribes' treaty-secured right to catch and consume fish at more robust historical rates, means that it is inaccurate to refer to contemporary figures as "tribal fish consumption rates." Indeed, the snapshot of contemporary consumption practices provided by recent surveys arguably represents a nadir – a low point from which tribes are working to recover as environments are restored and traditional practices reinvigorated.

Rather, contemporary surveys of tribal populations are properly viewed alongside other surveys used to document fish consumption by the general population and relied upon by government agencies in the environmental regulatory context. These studies are generally conducted in accordance with the conventions of western science, and have been found to be technically defensible by federal and state governments. These studies of tribal populations have been conducted under governmental or inter-governmental auspices, and subjected to internal and external peer review. As such, these studies follow the practice of studies of the national population that have been relied upon by EPA to set its default fish consumption rate for the general population.[39] The particular studies cited by Ecology's draft TSD (surveys of the Tulalip and Squaxin Island tribes; the Suquamish tribe; and the Columbia River tribes) have explicitly been found technically defensible by the EPA and the state of Oregon and are relied upon by these governments for regulatory fish consumption rates; these studies have also implicitly been deemed technically defensible by other states and tribes that have adopted the EPA's default subsistence consumption rates.[40]

In fact, to the extent that contemporary surveys of tribal populations have erred on the side of following western scientific conventions, they tend to underestimate even contemporary tribal

---

[38] Emily Oken, et al., *Decline in Fish Consumption Among Pregnant Women After a National Mercury Advisory*, 102 OBSTET GYNECOL 346 (2003)(finding that pregnant women with access to obstetric care decreased fish consumption in response to publication of federal advisory warning of mercury contamination in certain species of fish).

[39] *See* U.S. ENVIRONMENTAL PROTECTION AGENCY, METHODOLOGY FOR DERIVING AMBIENT WATER QUALITY CRITERIA FOR THE PROTECTION OF HUMAN HEALTH (2000).

[40] *Id.*; OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, OREGON FISH AND SHELLFISH CONSUMPTION RATE PROJECT (2008)

consumption rates.[41] Thus, for example, the study of the Tulalip and Squaxin Island tribes and the study of the Columbia River tribes both hewed to the statistical convention that "outliers" – in this case, representing high-end fish consumption rates – are treated as likely the source of error (for example, in recording a respondent's fish consumption rate) rather than a true value. As such, it is common practice for such outlier data points to be omitted from the dataset that then forms the basis of population values (e.g., the mean, the 90th percentile) or to be "recoded" to coincide with a number closer to the bulk of the population, such as a number equal to three standard deviations from the mean. But, as has been recognized, some tribal members – particularly those from traditional and fishing families – in fact consume very large quantities of fish, even in contemporary times. Tribal researchers at Umatilla, for example, identified a subset of interviewees (35 of 75) who are "traditional fishers" and who confirmed eating fish "two to three times a day in various forms."[42] The average consumption rate for this group was found to be 540 g/day. Notably, the relatively high fish consumption rates indicated by this subset of tribal members reflect *actual* contemporary consumption, not – as assumed for so-called outliers – error. When outliers are treated according to statistical convention, the effect is to depress the various percentile values and, importantly, to fail to reflect the consumption practices of those tribal members whose practices today are most consonant with practices guaranteed to tribes by treaty and to which tribes, in an exercise of cultural self-determination, seek to return. A host of other conventions, detailed by tribal researchers, similarly operate so that, together, these surveys likely underestimate even contemporary tribal fish consumption rates.[43]

In sum, the draft TSD cites studies of tribal populations that reflect surveys of contemporary, suppressed fish consumption consistent with the methods and approaches used by EPA, Oregon and other governments for setting regulatory standards. These surveys, conducted in accordance with and technically defensible by western scientific standards likely underestimate even contemporary, suppressed tribal consumption rates. The resulting fish consumption rates, of course, are not equivalent to treaty-guaranteed practices and rates; indeed, they grossly understate the rates at which tribes are entitled to consume fish.

III. Salmon

Salmon are vital to the health of tribal people in the Pacific Northwest, just as tribal people are vital to the survival of the salmon: the two are inextricably linked. The significance of the salmon is difficult to overstate. They are what might be termed "cultural keystone species," at the center of physical, social, economic, spiritual, and political well-being for the tribes.[44] As one tribal member explains:

> *People need to understand that the salmon is part of who the Nez Perce people are. It is just like a hand is a part of your body....*

---

[41] *See, e.g.*, Jamie Donatuto and Barbara L. Harper, *Issues in Evaluating Fish Consumption Rates for Native American Tribes*, 6 RISK ANALYSIS 1497 (2008).
[42] Stuart G. Harris and Barbara L. Harper, *A Native American Exposure Scenario*, 17 RISK ANALYSIS 789 (1997).
[43] See, e.g., Donatuto and Harper, *supra* note 41.
[44] COAST SALISH GATHERING, SUMMARY OF CSG CLIMATE CHANGE SUMMIT (2010).

--Del White (Nez Perce)[45]

Salmon Uptake Contaminants in Environments for which Washington has Regulatory Responsibility

Freshwater, estuarine, and marine environments are all necessary to the various salmon species and each of these environments is relevant to Ecology's regulatory responsibilities. The unique features of these various environments within Washington merit attention. Notably, the Puget Sound comprises a vast inland marine environment unlike any other in the continental United States. The Columbia River Basin and Estuary, too, is remarkable among river and estuarine systems. And, of course, the "waters of the State of Washington" also include portions of the marine environments of the Straits of Juan de Fuca and the open ocean and bays along the Pacific coast. Among other things, the unique and diverse characteristics of the environments affected by the draft TSD mean that care should be taken in considering descriptive terms such as "marine" encountered in both scientific and regulatory contexts. More generally, the uniqueness of these environments underscores the importance of Ecology's effort to consider locally relevant data, policies, and laws.

Salmon uptake contaminants in waters affected by Washington's environmental decisions. Different salmon species have different lifecycles. All species of salmon, however, live for some duration in Washington's freshwaters, estuaries, and inland and/or coastal marine waters. Some of these species dwell for considerable periods in these waters. Some chinook are resident here for their entire lives. And some species of salmon spend considerable time in the nearshore marine waters along Washington's coast.

Contaminants to the waters or sediments in these various environments may also move, that is, become dispersed, resuspended, or transported. Contaminants present in sediment reservoirs may be disturbed and redistributed through a host of mechanisms, including benthic species such as annelids, mollusks and crustaceans; storm events; and tidal influences. Models and empirical data demonstrate that sediment contaminants can be remobilized, resuspended to the water column, and then redeposited to distant areas. Additionally, given the unique geological and other features of the Puget Sound, contaminant resident times are extended relative to other estuaries, with greater opportunities for contaminant trapping and mixing as a consequence.

The result of these phenomena is that salmon come in contact with contaminants for which Washington has regulatory responsibility at various points in their lifecycle, if not throughout their entire lifecycle. These contaminants, studies have shown, bioaccumulate in salmon.[46] Ultimately, these contaminants – including mercury, PCBs, dioxins, and others – contribute to salmon body burdens that have adverse effects for the humans that consume salmon. Many of these contaminants also have adverse effects for the salmon themselves, as these toxins impair essential behaviors and threaten reproductive success.

Ecology's draft TSD correctly recognizes the diverse salmon lifecycles and survival strategies, as well as the occasions for contaminant dispersal, resuspension and transport, and appropriately

---

[45] DAN LANDEEN & ALLEN PINKHAM, SALMON AND HIS PEOPLE: FISH & FISHING IN NEZ PERCE CULTURE 156 (1999).

[46] *See, e.g.*, U.S. ENVIRONMENTAL PROTECTION AGENCY, COLUMBIA RIVER BASIN FISH CONTAMINANT SURVEY (1996-98).

concludes that Ecology must reduce the resulting threats to the salmon and those (including humans) that depend on the salmon for food. The draft TSD's determination that salmon not be excluded from the default FCR reflects the most defensible interpretation of the data and consideration of the relevant scientific, policy, and legal context.

Indeed, Ecology's determination that salmon not be excluded rests on even more robust support than suggested by the draft TSD. Although the draft TSD correctly recognizes the complexities involved in connecting the source of environmental contaminants with their presence in salmon consumed by humans, it gives undue emphasis to dated and/or localized scientific data and to regulatory determinations based on this data.

The draft TSD relies heavily on a study of Puget Sound estuaries by Sandra O'Neill, et al. from 1998, quoting its observation that "chinook and coho salmon accumulate most of their PCB body burden in the marine waters of the Puget Sound and the ocean ..." and its further suggestion that the "contaminant body burden attributable to freshwater and estuarine environments was negligible compared with the residency time, growth patterns, and feeding habits of the salmon at sea." In doing so, the draft TSD may give the misimpression that all "marine waters of the Puget Sound" and at least some of the "marine waters of ocean" are irrelevant for Washington's default FCR – which is not the case given Ecology's responsibility for regulating the Puget Sound and substantial stretches of coastal marine waters. The draft TSD also neglects to cite more recent work by these same researchers published in 2009 that found PCB contamination in subadult and maturing chinook salmon collected from Puget Sound in concentrations "3–5 times higher than those measured in six other populations of Chinook salmon on the West Coast of North America," and that led these researchers to "hypothesize[] that residency in the contaminated Puget Sound environment was a major factor contributing to the higher and more variable PCB concentrations in these fish. This hypothesis was supported with an independent data set from a fishery assessment model, which estimated that 29% of subyearling Chinook salmon and 45% of yearling out-migrants from Puget Sound displayed resident behavior."[47] The draft TSD similarly could be strengthened by citing several more recent studies by other researchers buttressing the conclusion that outmigrant chinook uptake contaminants in the Lower Columbia River Basin and Estuary and in Puget Sound at levels of concern (for salmon survival and for human health). Thus, the TSD cites Johnson, et al.'s findings from 2007 respecting selected pesticides and persistent organic pollutants (POPs), but should also cite the recent work of Sloan, et al., from 2010 (PBDEs); and Yanagida, et al., from 2011 (PAHs).[48]

---

[47] Sandra M. O'Neill & James E. West, *Marine Distribution, Life History Traits, and the Accumulation of Polychlorinated Biphenyls in Chinook Salmon from Puget Sound, Washington*, 138 TRANSACTIONS OF THE AMERICAN FISHERIES SOCIETY 616 (2009); *see also* James E. West, et al., *Spatial extent, magnitude, and patterns of persistent organochlorine pollutants in Pacific herring (Clupea pallasi) populations in the Puget Sound (USA) and Strait of Georgia (Canada)* 394 SCIENCE OF THE TOTAL ENVIRONMENT 369 (2008)(finding significantly higher concentrations of PCBs and DDT in herring – an important food source for salmon – from Puget Sound than in herring from the Strait of Georgia).

[48] Catherine A. Sloan, et al., *Polybrominated Diphenyl Ethers In Outmigrant Juvenile Chinook Salmon From The Lower Columbia River And Estuary And Puget Sound, WA*, 58 ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY 403 (2010); Gladys K. Yanagida, et al., *Polycyclic Aromatic Hyrdocarbons and Risk to Threatened and Endangered Chinook Salmon in the Lower Columbia River Estuary*, __ ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY __ (2011) *available at* http://www.ncbi.nlm.nih.gov/pubmed/21894559.

In a related vein, although the draft TSD appropriately details the variation in salmon life cycles and behaviors, it prominently features earlier regulatory determinations premised upon the assumption that salmon migrate quickly through contaminated sites and feed heavily in the open ocean, where they obtain most of their chemical contaminants.[49] However, recent data have highlighted the importance of the nearshore marine environment, and have led scientists with the Pacific Estuary Research Society to debunk several "fallacies" about salmon behavior, including the notion that "[w]hen leaving natal streams, juvenile salmon enter Puget Sound, head north, and then out through the Strait of Juan de Fuca to the Pacific Ocean."[50] Rather, research "clearly reveals that salmon use the Puget Sound basin widely, and migrate back and forth within it, heavily."[51] In fact, "[m]any authors reported finding extensive juvenile salmon use along the estuarine and nearshore landscape, as well as strong evidence from coded-wire tag data of cross-Sound migration. Fish from north Puget Sound areas are found in central and south Puget Sound studies, and vice versa."[52]

In turn, the draft TSD gives undue emphasis to regulatory determinations and regulatory guidance that were based on earlier scientific understandings of salmon life cycles and contaminant uptake. The 2007 EPA Region X/Department of Ecology Human Health Risk Assessment for the *Lower Duwamish Waterway Remedial Investigation*, for example, supported its exclusion of salmon from the FCR in its exposure assessment by stating that "bioaccumulative chemical concentrations in adult salmon are believed to be largely attributable to uptake during their migrations far beyond the [Lower Duwamish Waterway]."[53] The 2007 EPA Region X *Framework for Selecting and Using Tribal Fish and Shellfish Consumption Rates for Risk-Based Decision Making at CERCLA and RCRA Cleanup Sites in Puget Sound and the Strait of Georgia* presents the option of excluding salmon from exposure assessments and notes that this option "has been based on the assumption that adult salmon spend most of their lives in the open ocean and take up bioaccumulative and persistent contaminants almost exclusively via the food chain in that environment" and also on the "presum[ption] that site-related chemicals are not transported to that relatively distant aquatic environment, where adult salmon might be exposed to them through the food chain."[54] The 2007 Region X *Framework* supports these assumptions by reference to the dated 1998 O'Neill, et al., study.

Regulatory Guidance and Precedent with Respect to Salmon

The most relevant regulatory precedent – that of the Oregon Department of Environmental Quality – included salmon in its FCR. This regulatory determination is not only the most recent, it is also the result of a comprehensive assessment by an independent panel of experts constituted

---

[49] *See, e.g.*, Ecology draft TSD, at 17 (citing Lower Duwamish Waterway Remedial Investigation).
[50] PACIFIC ESTUARY RESEARCH SOCIETY, SALMON IN THE NEARSHORE: WHAT DO WE KNOW AND WHERE DO WE GO? 2 (2004).
[51] *Id.*
[52] *Id.* at 1.
[53] U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION X AND WASHINGTON DEPARTMENT OF ECOLOGY, LOWER DUWAMISH WATERWAY REMEDIAL INVESTIGATION, APP. B: BASELINE HUMAN HEALTH RISK ASSESSMENT 91 (2007).
[54] U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION X FRAMEWORK FOR SELECTING AND USING TRIBAL FISH AND SHELLFISH CONSUMPTION RATES FOR RISK-BASED DECISION MAKING AT CERCLA AND RCRA CLEANUP SITES IN PUGET SOUND AND THE STRAIT OF GEORGIA 10 (2007).

by ODEQ, i.e., the Human Health Focus Group. The ODEQ regulatory determination is relevant inasmuch as the fish consumption surveys on which the Human Health Focus Group based its conclusions are the same studies that inform Ecology's draft TSD – studies specifically focused on consumers and practices in Washington and on those affected by Washington's environmental standards. The ODEQ precedent, moreover, is the most clearly analogous to the regulatory context presented by Ecology's draft TSD, given that it applies broadly to freshwater, estuarine, and marine waters regulated by ODEQ – as is the case with the default FCR range proposed by Ecology. In fact, given that Oregon has no equivalent to the large inland marine environment of Washington's Puget Sound, Oregon's determination that salmon be included in its FCR is of even greater moment. If Oregon's comparatively small inland marine responsibilities supported the inclusion of salmon, then the more extensive inland marine environment for which Washington has regulatory responsibility makes an even stronger case for retaining salmon in the default FCR. And, both Washington and Oregon include their nearshore and coastal marine waters (to a distance extending three miles into the open ocean) in the waters for which they have regulatory responsibility.

Nor should EPA guidance be misconstrued as mandating that salmon be excluded.[55] Neither the 2007 EPA Region X *Framework* nor the 2000 EPA *Ambient Water Quality Criteria Methodology* supports this claim. First, as a preliminary matter, both of the documents are guidance documents; as such, they do not impose legally binding requirements. Second, the EPA Region X *Framework* does not require that salmon be excluded, even in the contexts for which it provides guidance (i.e., CERCLA and RCRA cleanups in Puget Sound); rather, it poses the question whether salmon should be included or excluded, and sets forth considerations for making this determination. And, as noted above, it poses this question based on assumptions about salmon residency and life cycles and about contaminant movement that may give undue emphasis to now-dated scientific understandings. Third, the EPA *AWQC Methodology*, which provides guidance to agencies setting water quality criteria under the federal Clean Water Act, sets forth a four-part hierarchy that directs states and tribes to prefer data representative of the local population and watersheds being addressed and to enlist national default FCRs only as a last resort.[56] The fact that EPA's national default values classify salmon as a "marine" species and exclude all marine species from the national default tally says nothing about whether state and tribal agencies should do so in considering their local circumstances. In fact, EPA's guidance *emphasizes precisely the opposite*, "strongly" urging these agencies to "protect highly exposed populations groups" affected by their decisions and to "use local or regional data over the default values." EPA's guidance thus directs Ecology to prefer local data and to account for local environmental conditions, including the fact that a significant portion of regulated waters in Washington are marine, and the fact that salmon spend time in and uptake contaminants in freshwater, estuarine, and marine environments. The EPA's recent approval of Oregon's standards, which, as noted above, rely on local data and decline to exclude salmon, underscores this point and suggests that an alternative interpretation of EPA's guidance is not correct.

Salmon and Tribal Members' Unique Consumption Practices

---

[55] This assertion was voiced at the public workshop on Ecology's draft TSD, held at the University of Washington, School of Public Health, Seattle, WA (December 12, 2011).

[56] U.S. ENVIRONMENTAL PROTECTION AGENCY, AMBIENT WATER QUALITY CRITERIA METHODOLOGY, *supra* note 39.

Pacific Northwest tribal members often consume a different mix of fish species and parts, and use different preparation methods than the general population. This is the case for salmon, as studies have demonstrated. Suquamish tribal members, for example, report consuming salmon with the skin on 26% of the time, and salmon eggs 18% of the time.[57] The National Environmental Justice Advisory Council recognized that these different practices often do not get accounted for in environmental standard-setting, and recommended that agencies do a better job of accounting for the resulting increased exposures to contaminants in fish.[58] Yet scientific studies measuring contaminant burden frequently measure fish muscle tissue (i.e. skin-off fillet) only,[59] which likely understates exposures to lipophilic contaminants. As well, agencies often assume that humans will not be exposed to lipophilic contaminants that have been "depleted" to salmon eggs. The draft TSD discusses the fact that the lipid redistribution that occurs as salmon reach reproductive maturity and ascend to their spawning grounds leads to the concentration of lipophilic contaminants in salmon roe. But the TSD does not connect this fact to human health impacts. Indeed, gram for gram, salmon roe would be expected to be a highly concentrated source of lipophilic contaminants. Thus, retaining rather than excluding salmon in the default FCR (including all parts of the salmon consumed by tribal people) is the appropriate, health protective response.

Moreover, tribal members' consumption practices can only be understood in light of their cultural context. The tribes have reiterated this point in various public fora and documents (for example, the Suquamish fish consumption survey). The draft TSD also appropriately weighs the cultural significance of salmon to the tribes as it considers the totality of the circumstances relevant to its decision to include salmon consumption in its estimates of total fish consumption. Among other things, this particular solicitude for the cultural importance of salmon to the tribes is necessitated by Washington state's commitment in the Centennial Accord, which states that "[t]he parties share in their relationship particular respect for the values and culture represented by tribal governments."[60]

In sum, the salmon, including all parts consumed by tribal people, are contaminated. The most recent data show that salmon get some or all of these contaminants from waters and sources for which Washington has regulatory responsibility. If Ecology were to omit salmon from its calculation of the FCR, it would be ignoring this undeniable source of exposure to all those who consume salmon. The relevant regulatory precedent and guidance, correctly interpreted, does not support artificially excluding salmon. In fact, it suggests the opposite. Moreover, given the centrality of salmon to tribal life, it is unacceptable to exclude salmon from the tally of fish that will be protected and kept fit for human consumption under our environmental standards.

IV. Risk, "Reasonableness," and Rights

Although Ecology's draft TSD focuses on a default fish consumption rate, it raises, explicitly or implicitly, several policy assumptions and value judgments that affect *who* is protected by

---

[57] THE SUQUAMISH TRIBE, FISH CONSUMPTION SURVEY OF THE SUQUAMISH INDIAN TRIBE OF THE PORT MADISON INDIAN RESERVATION 42 (2000).
[58] NEJAC, FISH CONSUMPTION REPORT, *supra* note 37.
[59] *See., e.g.*, O'Neill & West, *supra* note 47 (although a few measurements were taken of "whole body" samples, the bulk of the data on contaminant body burden were derived from "skin-off fillet" samples).
[60] CENTENNIAL ACCORD, *supra* note 1.

environmental standards. In the regulatory context, these protections are theoretically meant to apply to all. As environmental agencies have come to recognize, however, we are not "all" the same from a public health perspective. Agencies have recognized that, in order to protect public health, environmental standards would need to be set so as to protect even the most "vulnerable" members of the population (i.e., most exposed, most susceptible, or most sensitive due to the coincidence of lifestage and characteristics of particular contaminants, e.g., neurodevelopmental toxins such as mercury). In doing so, of course, those less vulnerable would *also* be protected. However, recognizing the multiplicative nature of quantitative exposure assessment, agencies sought to avoid setting standards that were protective of non-existent individuals – phantom composites of maximum assumptions for the various parameters in the exposure equation. EPA, for example, uses the concept of "reasonable maximum exposure" (RME) in its guidance under CERCLA to capture this focus on *actual* high-end exposures rather than phantom exposures beyond the high end of a distribution of all those exposed. A related device enlisted by environmental agencies targets regulatory standards at the 90th or 95th percentile of an exposure distribution for the relevant population. The result is to protect the bulk of the population – all but the most-exposed 10 or 5 percent.

The value judgments involved in such determinations and their implications for particular highly-exposed groups were often not made explicit, a point brought to the fore by the National Academy of Science's important review of risk assessment in the regulatory context.[61] Among other things, the plausibility of these value judgments may have stemmed from an early assumption – now recognized to be inaccurate – that the population to be protected was more or less homogenous for purposes of exposure assessment, i.e., that variability was small for the relevant parameters (e.g., FCR, exposure duration, etc.) in the exposure equation. Indeed, some discussions in this context assume that we are all equally likely to occupy the high end of an exposure distribution.[62] On this assumption, of course, the regulatory choice to target protection at, say, the 50th versus the 90th percentile of an exposure distribution is effectively abstracted – a decision about identitiless, statistical lives. But tribes and other highly-exposed groups have documented the fact that it is they who occupy the high end of such exposure distributions – thus, we now know the identities of those whose fish consumption practices place them among the maximally exposed. Too, the plausibility of these value judgments may have found support in the general public's lack of awareness of tribal fish consumption practices, particularly the relatively high fish consumption rates these produced. This disbelief was reflected, for example, in comments to earlier amendments to Washington's MTCA regulation: "*Who in the world* would expect their fish diet to come from the same contaminated source?"[63] In short, we are now aware that we are not debating probabilities; there are *actual* people who consume fish at (and who would consume above, but for the forces of suppression) the very highest rates, and we know who they are. A regulatory determination to set the FCR, say, at the 80th percentile of contemporary consumption surveys (as is the case for the lower end of the range proposed by the draft TSD) or some lower number, is thus a choice to deny protection to the actual people consuming at rates above this value, virtually all of whom will be tribal people or members of Asian/Pacific Islander or other higher-consuming groups.

---

[61] NATIONAL RESEARCH COUNCIL, SCIENCE AND JUDGMENT IN RISK ASSESSMENT (1994).

[62] Catherine A. O'Neill, *Variable Justice: Environmental Standards, Contaminated Fish, and "Acceptable" Risk to Native Peoples*, 19 STANFORD ENVIRONMENTAL LAW JOURNAL 3, 74 (2000).

[63] WASHINGTON DEPARTMENT OF ECOLOGY, RESPONSIVENESS SUMMARY ON THE AMENDMENTS TO THE MODEL TOXIC CLEANUP CONTROL ACT CLEANUP REGULATION: CHAPTER 173-340 WAC, 218 (1991)(emphasis added).

Relatedly, it is not appropriate for Ecology to increase its default FCR but then redefine the level of risk it would find "acceptable," thereby tolerating an order or two of magnitude greater risk for those most exposed. This end-run around the more protective environmental standards that would result from an increased FCR has been suggested in public comments.[64] Such an argument might be entertained, again, if we thought everyone were equally likely to be exposed to this greater risk. But here in Washington we know that this is not the case. We know precisely who it is that consumes greater quantities of fish. In this case, an argument for redefining the acceptable level of risk becomes unconscionable.

Moreover, when these policy determinations are made in a context affecting tribes' treaty-secured rights, as is the case in Washington, the calculus must be different than were tribes' rights and resources unaffected. That is to say, agencies may be free to "balance" the public health and other relevant considerations when making a policy determination whether to accommodate the very high-end exposures of a group such as soil pica children.[65] Agencies in such cases ought to undertake this balancing in a manner that is scientifically and morally defensible. But where those affected are tribes and their members, agencies are also governed by the particular laws and policies that are unique to this group. Agencies' work here must also be legally defensible, viewed in light of the rights secured to tribes and their members by the Constitution, treaties, laws, and executive commitments to tribal self-determination and to environmental justice. Indeed, in the context of rights secured by treaty, as U.S. courts have held, agencies are not free to balance away these tribal rights.[66] As the court explained in *United States v. Michigan*, a case addressing treaty-secured fishing rights in the Great Lakes, tribes' rights are "distinct from the rights and privileges held by non-Indians and may not be qualified by any action of the state ... except as authorized by Congress."[67] Tribes' treaty-secured rights are guaranteed to all tribal members, not some. Notably, when environmental standards are keyed to lower percentile values, or when "acceptable" risk levels are manipulated to tolerate greater risks for the most highly exposed, it is the most traditional subset of the tribal population – those families whose practices are most consonant with the practices guaranteed by treaty – that are left unprotected. The consequences for tribes who have been working to reinvigorate such traditional practices are plain.

Conclusion

Tribes' rights, including treaty-secured rights, are impacted by environmental standards set by the state of Washington. Ecology must therefore consider these rights when it issues standards and considers the technical and policy inputs to these standards. As successors to the treaty negotiators, state governments such as Washington may be held to account for the actions they take – or permit others to take – that significantly degrade the treaty resource. This point has received emphasis by United States courts, particularly in the recent *Culverts* decision. Given

---

[64] *See* Stoel Rives, Comments on Washington Department of Ecology's Water Quality Standards Triennial Review (Dec. 17, 2010) *available at* http://www.ecy.wa.gov/programs/wq/swqs/TriennialRevComm/Stoel_Rives_Loehr.pdf.

[65] This example was erroneously suggested as being analogous to agencies' determination in the tribal context, when treaty and other tribal rights are in issue, at the public workshop on Ecology's draft TSD, held at the University of Washington, School of Public Health, Seattle, WA (December 12, 2011).

[66] *See, e.g.*, Cappaert v. United States, 426 U.S. 128, 138-39 (1979); United States v. Michigan, 471 F. Supp. 192, 281 (W.D. Mich. 1979).

[67] United States v. Michigan, 471 F. Supp. at 281.

courts' concern with the *function* of the treaty resource, moreover – its role in securing food and livelihood for the tribes – the state may be held to account for actions that compromise the treaty resource whether by depletion or by contamination.

Contemporary surveys of tribal populations produce fish consumption rates that are artificially low compared to the appropriate, treaty-guaranteed baseline. The bias introduced by suppression effects, together with tribes' treaty-secured right to catch and consume fish at more robust historical rates, means that it is inaccurate to refer to contemporary figures as "tribal fish consumption rates." Historical, original, or "heritage" rates are also of ongoing relevance for the fishing tribes inasmuch as the tribes in fact seek to resume fish consumption practices and rates consonant with the treaty guarantees.

The fish consumption surveys cited by Ecology's draft TSD, conducted in accordance with and technically defensible by western scientific standards likely underestimate even contemporary, suppressed tribal consumption rates. The resulting fish consumption rates, of course, are not equivalent to treaty-guaranteed practices and rates; indeed, they grossly understate the rates at which tribes are entitled to consume fish.

Salmon are of utmost importance to the tribes. Salmon should not be artificially excluded from the estimates of total fish consumption for Washington's default FCR because to do so would undermine tribes' rights, including treaty-secured rights.

Salmon should be retained in the default FCR because the most recent science does not adequately support the exclusion of salmon. Ecology's draft TSD correctly recognizes the diverse salmon lifecycles and survival strategies, as well as the occasions for contaminant dispersal, resuspension and transport, and appropriately concludes that Ecology must reduce the resulting threats to the salmon and those (including humans) that depend on the salmon for food. The draft TSD's determination that salmon not be excluded from the default FCR reflects the most defensible interpretation of the data and consideration of the relevant scientific, policy, and legal context. Indeed, Ecology's determination that salmon not be excluded rests on even more robust support than suggested by the draft TSD.

Ecology's determination in its draft TSD to retain salmon in the default FCR is further strengthened by the fact that the most analogous recent regulatory precedent – that of Washington's sister state of Oregon – similarly retains salmon in its statewide fish consumption rate. EPA's approval of Oregon's standards lends further weight to the technical and legal appropriateness of including salmon in Washington's FCR.

Regarding the regulatory context for Ecology's consideration of the default FCR, we are now aware that we are not debating probabilities; there are *actual* people who consume fish at (and who would consume above, but for the forces of suppression) the very highest rates, and we know who they are. A regulatory determination to set the FCR, say, at the 80th percentile of contemporary consumption surveys (as is the case for the lower end of the range proposed by the draft TSD) or some lower number, is a choice to deny protection to the actual people consuming at rates above this value, virtually all of whom will be tribal people or members of Asian/Pacific Islander or other higher-consuming groups. Relatedly, if agencies manipulate "acceptable" risk levels so as to tolerate greater risks for the most highly exposed, protections for these groups will be short-circuited. Importantly, while agencies may be free to "balance" the public health and

other relevant considerations when making a policy determination whether to accommodate the very high-end exposures of a group such as soil pica children, agencies' work is different where tribes are among the most exposed: it is governed by a unique panoply of laws protecting tribes and their members. As a consequence, agencies cannot simply balance away these tribal rights.

For too long, polluting sources in Washington have gotten a free "pass" – at the expense of all Washingtonians who eat fish or who sell fish for a living. Ecology has a responsibility to protect these people and their livelihoods. Until Ecology adopts a new FCR and updates its environmental standards, it leaves people who eat Washington finfish and shellfish exposed to unacceptable levels of risk from PCBs, mercury, dioxins, and other toxic contaminants. Ecology must act to remedy this unacceptable situation, and uphold its obligations to tribal and non-tribal people alike.

Respectfully submitted,

Catherine A. O'Neill
Professor of Law, Seattle University School of Law
Faculty Fellow, Center for Indian Law & Policy

SQUAXIN ISLAND TRIBE

26 October 2012

Adrienne Dorrah
Toxics Cleanup Program
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
[fishconsumption@ecy.wa.gov]

RE: Comments on Version 2 of the Fish Consumption Rate Technical Support Document

Dear Ms Dorrah,

The Squaxin Island Tribe concurs fully with all the details the comment letter being submitted by the Northwest Indian Fisheries Commission to Director Sturdevant. In their summary, they state that the Technical Support Document has been stripped of important technical recommendations, in particular the recommended default range, which should be re-inserted.

Ecology's decision to issue another version of the document, and establish another round of review constitute unnecessary delay and harms high fish-consuming populations, including the Squaxin Island Tribe. In addition to the harm to public health and the perpetuation of environmental injustice, Squaxin Island has Treaty Rights to fisheries resources that are being damaged by Ecology's actions on an ongoing basis. Technical recommendations for an appropriate fish consumption rate, based on Tribal consumption throughout all of our usual and accustomed areas and for all consumed species, should be adopted immediately. As an interim measure, Ecology should move to adopt a default FCR in sediment management standards and water quality standards, at a level of at least 175 grams/day, as has been federally approved for Oregon.

Sincerely,

John Konovsky
Environmental Program Manager

Natural Resources Department / 2952 S.E. Old Olympic Hwy. / Shelton, WA 98584
Fax (360) 426-3971 / Phone (360) 426-9781

PHONE (360) 598-3311
Fax (360) 598-6295
http://www.suquamish.nsn.us

THE SUQUAMISH TRIBE
PO Box 498 Suquamish, WA 98392-0498

October 26, 2012

Adrienne Dorrah
Washington State Department of Ecology
Toxics Cleanup Program
PO Box 47600
Olympia, WA 98504-7600
fishconsumption@ecy.wa.gov

RE: Fish Consumption Rates Technical Support Document, Version 2
August 27, 2012
Publication No. 12-09-058

The Suquamish Tribe (the Tribe) has reviewed the changes to the original document (FCR TSD V1), as well as information presented in this document (FCR TSD V2) and Ecology's Responses to Public Comments on Fish Consumption Rate Issues. It is disappointing and frustrating that the Department of Ecology abruptly reversed direction on this key issue in August 2012 and chose to remove recommendations for a default fish consumption rate from the document. The FCR TSD V2 does no more than present currently available consumption data.

The Department of Ecology has known for years that the current fish consumption rates do not protect Washington residents—and that tribal communities are at particular risk of toxic exposure because of their traditionally high consumption rates. Numerous studies and surveys, including the August 2000 *Fish Consumption Survey of the Suquamish Indian Tribe Of The Port Madison Indian Reservation, Puget Sound Region*, demonstrate that the current consumption rates used to establish Washington Water Quality Standards (6.5 grams/day) and as the basis for the Sediment Management Standards (54.5 g/day) are neither accurate nor protective.

While the tribes, EPA and Ecology recognize the validity of tribal consumption data, little substantive progress has been made to address the inadequacies of the current consumption rates and regulatory standards that are intended to be protective of human health. Indeed, the same tribal health issues related to fish consumption were raised a decade ago during the 2002-2003 review of state water quality standards. Failure to act on this issue subjects all Washington residents to potentially increased risks associated with contaminated fish and shellfish. It is also not consistent with Ecology's mission to protect, preserve and enhance Washington's environment, and to promote the wise management of our air, land and water for the benefit of current and future generations.

The Suquamish Tribe again recommends the following changes be incorporated into the FCR TSD V2:

- Recommend a default fish consumption rate, or range of rates, based on current data which demonstrates that a significant number of Washington residents consume fish and shellfish at higher rates than those currently used for regulatory purposed. By selecting a default rate or range, Ecology could move forward to revise state regulations and rules to be more protective for all Washington residents. It would be a significant step in the right direction.

  (Note that this FCR or range of rates should not be used when site-specific tribal surveys are available and appropriate for use. Fish and shellfish consumption surveys of local watersheds representative of the people being addressed for the particular water body are recognized as the highest preferred source of data.)

- Do not adjust other risk assessment parameters and risk management levels, such as exposure duration, fraction ingested, site use factors, exclusion of salmon or other species, or current conditions, to effectively reduce fish consumption rates.

  Treaty-reserved rights to safely access and harvest seafood are legal obligations. Tribes reasonably expect that harvest will increase as water quality and habitats improve.

The Suquamish Tribe remains committed to supporting the development of environmental standards that incorporate more protective fish consumption rates. We look forward to making measurable progress on this issue without further delay.

Sincerely,

Denice Taylor
Environmental Programs
Fisheries Department
Suquamish Tribe
360-394-8449
dtaylor@suquamish.nsn.us

Phone (360) 466-3163
Fax (360) 466-5309

Swinomish Indian Tribal Community

A Federally Recognized Indian Tribe Organized Pursuant to 25 U.S.C. § 476
11404 Moorage Way
LaConner, Washington 98257-0817

October 25, 2012

Ted Sturdevant, Director
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
ATTN: Toxic Cleanup Program
martha.hankins@ecy.wa.gov

RE: Comments on Fish Consumption Rate Technical Support Document version 2.0

Dear Director Sturdevant,

Version 2.0 of the Technical Support Document (TSD) is a step backwards. By omitting the proposed FCR default range and requesting a second round of comments, Ecology has unnecessarily watered down and delayed publication of a key document that could aid in revising Washington's current, woefully under-protective standards. While Ecology continues to stall the already years behind "tri-annual review" of standards, the health of Washington State's citizens continues to suffer.

1. Reinsert the proposed FCR default range of 157 to 267 gpd. The range is supported by several scientifically defensible fish consumption rate documents, as well as the independent statistical review Ecology requested (The-Mountain-Whisper-Light analysis). This proposed rate isn't protective of all of Washington residents, and in particular many tribal peoples who actively engage in traditional practices, yet we feel that it is an important step in the right direction.

2. Salmon must be included in the fish consumption rates.

We attach our comment letter for Version 1 here in order to reiterate our positions regarding this document.

The Affiliated Tribes of Northwest Indians passed Resolution #12-54 at the 2012 Annual Convention calling for a fish consumption rate of no less than 175 gpd for human health criteria rulemaking in the Pacific Northwest (www.atnitribes.org/sites/default/files/res_12_54.pdf). As a member Tribe of ATNI, we stand by this Resolution and request that Ecology adopt a default rate of 175 gpd in the

Phone (360) 466-3163
Fax (360) 466-5309

Swinomish Indian Tribal Community

A Federally Recognized Indian Tribe Organized Pursuant to 25 U.S.C. § 476
11404 Moorage Way
LaConner, Washington 98257-0817

water quality standards and sediment management standards, as well as reinstating the default rate language in the TSD.

Sincerely,

Barbara J James

Barbara James, Vice Chair
Swinomish Indian Tribal Community

THE TULALIP TRIBES

Board of Directors:

Mel Sheldon Jr., Chairman
Deborah Parker, Vice-Chairman
Chuck James, Treasurer
Glen Gobin, Secretary
Marlin Fryberg Jr., Board Member
Mark Hatch, Board Member
Don Hatch Jr., Board Member
Sheryl Fryberg, General Manager

NATURAL AND CULTURAL RESOURCE DEPARTMENT

6406 Marine Drive
Tulalip, WA 98271-9694
(360) 716-4480
FAX (360) 716-0642

The Tulalip Tribes are the successors in interest to the Snohomish, Snoqualmie, and Skykomish tribes and other tribes and band signatory to the Treaty of Point Elliott

October 24, 2012

Ted Sturdevant, Director
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Comments on Department of Ecology Update of Technical Support Document for Fish Consumption Rates

Dear Director Sturdevant,

As you know, the Tulalip Tribes completed the first tribal fish consumption survey in Washington State, together with the Squaxin Island Tribe in 1996. This study, which was reviewed scientifically, indicates how much higher fish consumption rates are at Tulalip than those currently established for Washington. Our intent then, as it is now, sixteen years later, is to protect the health of our members who consume, and who have always consumed, much larger portions of fish than is reflected and protected by Washington State's sediment and water quality standards. As it stands, our tribal members continued to be at risk by consuming one of the most culturally central and important food resources to us -- our local fish and shellfish.

Tulalip's study, as well as those from other regional tribes, were analyzed and included in the Department of Ecology's Technical Support Document (TSD). In reviewing the recently released "update" to the TSD, we offer these brief comments:

- Tulalip believes that the first draft of the technical support document released for review in October, 2011, was a more comprehensive document than this updated version which leaves out key information needed for the adoption of accurate default fish consumption rates in Washington.
- We are very disappointed that a default FCR recommendation, contained in the original technical document, has been removed from this version, and would like to see it restored in the TSD.
- We continue to support tribal comments and input to the original draft TSD, and believe that these tribal comments continue to be relevant to this round of public review and commenting.

The Tulalip Tribes remain committed to ensuring the revision and adoption of a new Fish Consumption Rate that is protective of our members' health, and again implore you to move forward expeditiously in the establishment and adoption of a new and accurate fish consumption rate for the State of Washington.

Sincerely,

Ray Fryberg, Executive Director
Natural Resources Department

Cc: Terry Williams, Libby Nelson, Treaty Rights Office

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

October 26, 2012

Ted Sturdevant
Director
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Re: Comments on the Fish Consumption Rates Technical Support Document Version 2.0

Dear Mr. Sturdevant,

Thank you for the opportunity to comment on the Fish Consumption Rates Technical Support Document Version 2.0. The fish consumption rate used by the state of Washington is an important issue to the Yakama Nation. From the letter sent by our chairman on January 17, 2012, Yakama Nation supports a fish consumption rate that is protective of all Yakama People, not just a portion of them. I have attached that letter for your review because the update of this technical support document has not changed the relevance of those comments.

The TSD Version 2.0 has been stripped of important guidance that is essential for the cleanup our environment and protection of our people. As you know from the letter from our chairman on October 3, 2012 Yakama Nation helped develop the science eighteen years ago that shows the State's current Fish Consumption Rate is putting Yakama people at undue risk. Ecology should be making the TSD as strong as possible with recommendations for a default fish consumption rate that is protective of all people.

Ecology should reconsider its second version of the TSD and restore the crucial elements such as a default fish consumption rate range and inclusion of salmon in a fish consumption rate. The technical and policy level reasons for this have been laid out in previous comments from Yakama Nation and other tribes.

If you have any questions please direct them to McClure Tosch in our Fisheries Program. Mr. Tosch can be reach at 509-865-5121 ext. 6413 or tosm@yakamafish-nsn.gov.

Sincerely,

Andrea J Spencer

for Phil Rigdon, DNR Deputy Director
Yakama Nation

Attached: January 17, 2012 Letter to Ecology
October 25, 2012 Letter to Ecology

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

January 17, 2011

Ted Sturdevant, Director
Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Re: Washington's Fish Consumption Rate

Dear Mr. Sturdevant,

I am writing on behalf of the Yakama Nation in response to your request for input on the new fish consumption rate that Ecology will use to determine water quality and cleanup standards. While we appreciate the opportunity to comment, we are concerned that the rate proposed in the Fish Consumption Rate Technical Support Document will subject Yakama tribal members to serious health risks because they consume a healthy, traditional, and Treaty protected diet. Detailed technical comments are provided in the attached document.

A century ago, when the United States Supreme Court first confirmed the Yakama Nation's Treaty Rights to take fish in all "Usual and Accustomed Places", the Court observed that for the Indians who signed the Treaty, the right to take fish from the river was "not much less necessary to the existence of the Indians than the atmosphere they breathed." That is as true today as it was then. Just as we have a basic right to breathe clean air, we have a basic human right, guaranteed by the Treaty of 1855, which the U. S. Constitution identifies as the Supreme Law of the Land, to harvest fish, which are the lifeblood of our culture, that will not make us sick when we eat them. And, just as we should not be asked to breathe unhealthy air in order to promote economic or industrial development, we do not believe that it is appropriate for Washington state to trade industry's costs for pollution prevention against the health and well-being of the Yakama People.

While much has changed in the last century, not all of it for the better, the unifying thread running through our culture is our reliance on and reverence for the native foods and medicines that have sustained our people since time immemorial. Tragically, much of that sacred resource has been destroyed in the past century and much of what remains is in a degraded condition. It is a sad irony that, while modern science has extolled the health benefits of eating salmon, pollution has rendered this staple potentially toxic. We are faced with trading decreased risk of heart disease against increased risk of cancer and other serious diseases.

We support Ecology in its effort to upgrade the indefensible fish consumption rate it currently uses. We have seen the studies showing realistic fish consumption rates nearly 100 times the

current 6.5 grams/day. We have read Ecology's recommendation that only five to ten percent of the population should be subjected to high levels of health risk. While that improvement may seem like a good compromise to some, please consider it from our point of view. Asking us to accept health risk at the 90th percentile is the same as asking us to accept that over 1000 Yakama tribal members will be subjected to increased health risk because they choose to eat a traditional diet. Even at the 99th percentile, the lives and health of over 100 Yakama people would be treated as an acceptable risk in the name of externalizing the costs of pollution control from the industry to the resource users. Paradoxically, the healthier they eat, the greater the risk to their health. If I were to name all the Yakama tribal members who have died of cancer after spending their lives harvesting and eating salmon, this would be a much longer letter.

We point out that the 1994 Environmental Protection Agency's survey of Columbia River Tribal Members describes unusually low fish consumption numbers as a reflection of the extreme depression of fish runs at that time. Current numbers would be higher, and as we continue our comprehensive efforts to restore resident and anadromous fish including Lamprey, tribal fish consumption will rise accordingly.

Tribal Council members are not elected to decide how many Yakama people should be subjected to increased health risks to allow for industrial and agricultural development. I cannot explain to the people I represent why some of them or their children should be asked to sacrifice their health for the economic benefit of others. The Yakama Tribal Council has a solemn obligation to protect the health and welfare of each and every tribal member, including those yet unborn.

While we truly appreciate Ecology's efforts to upgrade the existing deficient standard, we cannot accept a standard that continues to subject our people to elevated risks of cancers and other diseases. Whatever number Ecology eventually lands on, we reserve all rights and remedies to protect the health and welfare of our people from the ravages of water pollution and soil contamination. If you have any questions or wish to discuss this important matter further, please contact Philip Rigdon, Department of Natural Resources Deputy Director at (509) 865-5121 extension 4655.

Sincerely,

Athena Sanchey

Harry Smiskin, Chairman
Yakama Tribal Council

cc: Craig McCormack, WADOE
Paul Lumley, CRITFC

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

DETAILED COMMENTS FROM THE YAKAMA NATION REGARDING WASHINGTON DEPT OF ECOLOGY'S FISH CONSUMPTION RATE TECHNICAL SUPPORT DOCUMENT

Thank you for the opportunity to review and comment on the Fish Consumption Rate Technical Support Document. It is our understanding that Ecology will consider the comments of tribal co-managers and the public to determine an appropriate fish consumption rate for the state of Washington. As reflected in the cover letter from Chairman Smiskin, the Yakama Treaty of 1855 with the United States reserved to the Yakama Nation the right to harvest 50 percent of harvestable fish, the right to have fish present to catch and, by extension, the right to have fish present in a condition that is safe to eat. After careful review and consideration, the Yakama Nation submits the following comments. These comments are supplemental to those in the cover letter accompanying this document.

A new fish consumption rate should protect all Yakama tribal members.

The fish consumption rate Washington currently uses does not reflect fish consumption rates for Yakama tribal members and therefore does not adequately protect the health of those who consume many times that amount. Ecology's proposed rate range of 157 – 267 grams of fish per day is based on percentiles (80^{th} – 95^{th} percentile) of a model that represents "high fish consumption" populations of the state. While certainly a more defensible proposal than the status quo, this protocol ensures that a significant portion of the tribal population most in need of protection will still be exposed to health risk. It is unclear how WDOE reconciles its choice to knowingly allow a portion of a population to be subjected to risk with its stated mission "…to protect, preserve and enhance Washington's environment, and promote the wise management of our air, land and water for the benefit of current and future generations." Ecology needs to select a fish consumption rate that is protective of all Yakama tribal members, not just a portion of them.

The 1994 EPA study is no longer accurate

Ecology references a 1994 study of fish consumption patterns among Columbia River tribes by the Environmental Protection Agency (EPA) to determine a tribal fish consumption rate. This study was conducted during a period when fish returns and tribal fisheries were among the lowest on record. Small runs and reduced tribal harvests consequently limited the amount of fish consumed by tribal members at the time of the study. There is little doubt that recent increases in fish abundance due to improved environmental conditions and extensive rebuilding efforts throughout the Pacific Northwest have allowed significant increases in fish consumption rates among tribal members . If EPA conducted a survey today, the rate would be much higher because of the increased availability of relatively abundant fish. Even without a new survey we are confident that a rate based on the 1994 study would not be protective of all Yakama members. Accordingly, the conclusions of the 1994 EPA study, if considered at all, should be viewed as minimum estimates of tribal fish consumption.

Salmon must be included.
Ecology currently includes salmon in its fish consumption rate calculation. However, the Technical Support Document dedicates an entire appendix to a discussion of excluding salmon in Washington's fish consumption rate calculations based on the supposition that salmon are transient in state jurisdictional waters and pick up most contaminants in the ocean. There are several reasons salmon must be included in the calculation of a fish consumption rate:

a. Salmon are a crucial part of Yakama tribal members' diet, culture, and way of life. The right to these fish was reserved in the Treaty of 1855 and has been upheld in numerous court decisions. Under the U. S. Constitution, Yakama's treaty with the United States is the supreme law of the land (O'Neill 2011). If salmon are excluded, Washington will be ignoring contaminant issues that affect Yakama Nation's way of life and our rights to clean healthy fish.

b. Salmon are encountering and acquiring contaminants in waters that are under Washington State Jurisdiction (O'Neill, 2011). While we recognize that salmon acquire contaminates in the ocean, science shows that juvenile salmon also pick up contaminates on their journey through the Columbia River basin to the Pacific Ocean (LCREP 2007). In fact some studies suggest that the more time a juvenile salmon spends in the estuary the higher its probability of injury or mortality (Loge et al. 2005). Washington can't ignore its responsibilities to ensure these fish are safe for everyone to eat.

c. Washington State has made a commitment to salmon recovery, as expressed and confirmed by Governor Gregoire. Excluding salmon as part of the fish consumption rate is in direct opposition to that commitment. Without setting appropriate water quality and cleanup standards, the salmon will not have the toxic free environment they require for recovery.

Additional considerations are necessary.
We understand that the fish diet fraction (FDF) is "the percentage of the total fish and/or shellfish in an individual's diet that is obtained or has the potential to be obtained from the site (WAC 173-340-200)." Currently, Ecology arbitrarily chooses a default FDF of 50% in the formula incorporating fish consumption rate and exposure duration used to calculate cleanup standards at a contaminated site. In order for cleanups to be adequately protective of tribal members, Ecology must use a FDF of 100% because tribal people generally get 100% of their fish from "usual and accustomed fishing places" within state jurisdictional waters. Failure by Ecology to adjust its FDF to 100% effectively reduces by half the health protection value of any selected fish consumption rate.

Additionally, we understand that the exposure duration is the factor that determines how long a person would be theoretically subjected to the risk associated with eating contaminated fish. The state currently uses an exposure duration of 30 years, based on information that indicates 90 percent of Americans live in a particular residence for less than 30 years. This assumption is not valid for tribal populations who may move around within a region but who still rely on fish from their usual and accustomed fishing areas. For tribal fish consumers, a lifetime exposure duration is most appropriate.

We are also voicing our support of the technical comments from Catherine O'Neill titled, "Comments on Ecology's Fish Consumption Rate Technical Support Document (December, 2011)". This document supports and expands upon several of the comments included in this letter.

References

Catherine A. O'Neill. Comments on Ecology's Fish Consumption Rate Technical Support Document. Seattle University Center for Indian Law & Policy. December, 2011.

Lower Columbia River Estuary Partnership (LCREP). 2007. Lower Columbia River and Estuary Ecosystem Monitoring: Water Quality and Salmon Sampling Report.

Frank J. Loge, Mary R. Arkoosh, Timothy R. Ginn, Lyndal L. Johnson, and Tracy K. Collier. Impact of Environmental Stressors on the Dynamics of Disease Transmission. Environmental Science & Technology 2005. 39 (18), 7329-7336

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

October 3, 2012

Ted Sturdevant
Director
Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Dear Mr. Sturdevant,

Thank you for your invitation to the Delegates Table of the Policy Forum on Washington State's Water Quality Standards rulemaking. However, we are disappointed to see Ecology's change in direction on updating the fish consumption rate to wait for a new administration to fix this issue. Yakama Nation will not be participating in the delegates forum for such an important issue. We expect our concerns to be heard and considered at a much higher level than a "Delegates Table".

In the Treaty of 1855 Yakama Nation reserved the right to clean water and healthy fish. Recognizing federal and state governments were ignoring human health risk to tribal members from pollution in the Columbia River Basin we began work to address this issue. In 1991 collaboration with EPA and CRITFC we planned and participated in a fish consumption survey of the Umatilla, Nez Perce, Yakama, and Warm Springs tribes of the Columbia River. In 1994 the results of our study showed that our people eat significantly more fish than Washington's Fish Consumption Rate, putting tribal people at risk. Yet in 2012, eighteen years after publishing the results of our study, Ecology is still putting off correcting the undue risk to our people and resources.

The Yakama Nation wants an outcome, not just a number. The fish consumption rate that is selected must be protective of all Yakama people, not just a percentage of them. We have voiced our concerns to the state of Washington and federal government with no result.

Yakama Nation does not plan on participating in the delegates table on water quality as we are a sovereign nation, not a stakeholder. This fish consumption rate issue is very important to Yakama Nation and we request a government to government consultation.

Please coordinate this consultation with McClure Tosch. Mr. Tosch can be reached at 509-865-5121 ext. 6413 or tosm@yakamafish-nsn.gov

Sincerely,

Harry Smiskin, Chairman
Yakama Nation Tribal Council

cc: Dennis McLerran, EPA Region 10 Administrator

Comments received from:

Businesses and Associations

through October 26, 2012,

regarding

Washington State Department of Ecology's

Draft Fish Consumption

Technical Support Document (Version 2.0)

October 26, 2012

Adrienne Dorrah
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-47600

Dear Ms. Dorrah:

This letter is in response to the Department of Ecology's request for comments on its *Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington (Version 2.0)* (TSD). The Association of Washington Business (AWB) appreciates the opportunity to review and provide comments on the revised TSD.

As you know, Washington uses fish consumption rates (FCR) as part of the basis for environmental cleanup and pollution control. The current rates provide default values used in setting regulatory standards. Thus, all actions taken by the Department of Ecology (Department) to update the FCR should be based on credible science and avoid absurd results.

AWB supports Ecology's efforts to separate policy considerations from the technical/scientific information on fish consumption and to remove a default FCR rate or range from the TSD. Policy discussions or opinions do not belong in a "technical" support document. Rather, the TSD should identify what the Department knows about local/regional fish consumption and what additional information is needed for the Department to develop a revised and defensible FCR.

While the revised TSD is a significant improvement on the original draft, there are still opportunities for revision. AWB offers the following general comments on the revised TSD.

1. **The TSD should be technical in nature and avoid discussion of broader legal or policy issues.**

The Department has indicated that the TSD is designed to compile and evaluate available information on fish consumption in Washington. AWB agrees. The TSD should not be used to resolve policy issues associated with the FCR. Rather, the TSD should establish the

factual and scientific foundation on fish consumption, which will be used by the Department to inform subsequent rule-making efforts.

Since the Department intends to use the TSD to develop new water quality standards, it is imperative that the TSD presents information that is accurate, comprehensive, and unbiased. The TSD should avoid making conclusions that are blended statements of both science and policy. For example, the TSD continues to state that the current FCRs do not accurately reflect how much fish people in Washington eat. Such statements are policy conclusions.

The Department is well aware that selecting a default FCR requires a much more thorough analysis of several policy considerations. In fact, the TSD has an entire chapter (Chapter 6) devoted to some, but not all, of the policy questions that must be addressed before revising the current FCR. If the TSD is to be credible, the Department cannot start with the conclusion that the current FCRs are inaccurate or fail to adequately protect fish consumers. Rather, the TSD should present all relevant scientific/technical information concerning what is currently known about fish consumption in Washington.

2. **The TSD should acknowledge that information relevant to selecting an appropriate FCR is missing or incomplete.**

While the revised TSD fills some of the data gaps that were in the original draft, the TSD fails to acknowledge that critical information is still missing. The TSD presents information gathered in fish consumption surveys of Native Americans and Asian and Pacific Islanders. The TSD acknowledges that recreational fishers may consume more fish than the general Washington population. Additionally, the TSD states "some population groups consume especially large amounts of finfish and shellfish as part of traditionally influenced diets." (*TSD, Page xiv*).

Despite the Department's acknowledgement that some population groups consume higher-than-average amounts of fish, the TSD has no data concerning fish consumption among Washington's general population. There is no data concerning fish consumption among Washington's general population because no survey has been conducted. At a minimum, the Department and the TSD should acknowledge that the lack of a general population fish consumption survey is a significant data gap.

Further, the TSD should be more exact when discussing currently available fish consumption studies. The TSD frequently refers to individual tribal surveys as "regional" fish consumption data without defining the term "regional." The use of the term "regional" is imprecise and misleading since the TSD relies on surveys of high-consuming population subgroups and surveys of individual tribal populations.

3. **The TSD includes many references to Oregon but fails to consider approaches taken by other states.**

The TSD includes several references to Oregon and some discussion of the policy questions faced by Oregon when it revised its FCR. First, the Department should consider whether these references or discussion of Oregon's process is appropriate within a technical document concerning Washington's fish consumers.

If the Department determines that references to Oregon's process are relevant and appropriate for inclusion in the TSD, the TSD should also include references to and analysis of other states' processes. For example, Idaho is currently reviewing its FCR and performing analysis of available fish consumption surveys. Notably, Idaho is also considering whether to conduct an Idaho-specific general population fish consumption survey prior to revising its FCR. Florida has also produced a technical support document on fish consumption which uses a different approach than Washington and Oregon to avoid compounding levels of conservatism when determining exposure risks to the general population. If the references to Oregon remain in the TSD, other states that have evaluated their FCRs should be included in the TSD.

Finally, AWB continues to encourage the Department to consider how it communicates with the public on fish consumption and the process to revise the FCR. The Department must be cautious when discussing the current risk, if any, to public health. Clear communication is necessary to provide a context for any revision to water quality criteria and also protect against misinformation about the risks and benefits of consuming fish or shellfish.

We thank you for the opportunity to submit comments on the revised TSD for your consideration. We will continue to closely monitor the efforts of the Department in revising the FCR and adopting related regulations.

Sincerely,

Gary Chandler
Vice President Government Affairs
Association of Washington Business

Boise White Paper, L.L.C.
Wallula Mill
31831 West Highway 12
Wallula, WA 99363-0500
Telephone: (509) 547-2411
Fax: (509) 545-3338

VIA E-Mail: fishconsumption@ecy.wa.gov

October 26, 2012

Ms. Adrienne Dorrah
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Boise White Paper, LLC comments on *Fish Consumption Rate Technical Support Document, A Review of Data and Information About Fish Consumption In Washington (Version 2)* August 1, 2012

Dear Ms. Dorrah,

Boise White Paper, LLC operates a paper mill on the Columbia River at Wallula, Washington. We represent 419 jobs directly at our paper mill, container plant and transportation operations and numerous suppliers and others are employed in the community as a result of our operations. We appreciate the opportunity to offer comments on the *Fish Consumption Rate Technical Support Document, A Review of Data and Information About Fish Consumption in Washington (Version 2) (TSD).* While this document is not intended to set policy it will support and influence decisions that could significantly affect the welfare of the fish-consuming public and businesses in Washington.

Setting representative fish consumption rates is extremely important to the operation of our mill and future investment in our business. The National Council of Air and Stream Improvement for the forest products industry is a non-profit organization of research scientists who evaluate scientific information for our mill. The attached summary of the NCASI comments reflects the concerns of Boise and are submitted on our behalf to emphasize comments related to future consideration and interpretation of the TSD. Specifically, it is Boise's position that fish consumption rates used to establish fresh water quality standards should not include anadromous fish that spend a small portion of their life in the fresh waters of Washington. Secondly, it is believed that some of the information in the TSD related to bioaccumulation of toxics within certain fish can be easily misinterpreted by the public.

We appreciate that Ecology has made this study and hope that all of the comments will be addressed fully. Our goal is to continue to do business in Washington in an environmentally sustainable manner.

Please do not hesitate to contact me if you have any questions concerning these comments.

Sincerely,

Paul Butkus
Environmental Manager

Attachment

NATIONAL COUNCIL FOR AIR AND STREAM IMPROVEMENT, INC.
West Coast Regional Center
Mailing address: PO Box 458, Corvallis OR 97339
Street address: 720 SW Fourth Street, Corvallis OR 97333
Phone: (541)752-8801 Fax: (541)752-8806

Dr. Jeff Louch
Principal Scientist
JLouch@ncasi.org

October 24, 2012

Ms. Adrienne Dorrah
Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504-7600

Dear Ms. Dorrah:

The National Council for Air and Stream Improvement, Inc. (NCASI) is an independent, non-profit membership organization that provides technical support to the forest products industry on environmental issues. An important part of our mission is to ensure that regulatory decision making is based on sound science. In this capacity, NCASI has reviewed the August 1, 2012, Working Draft of Ecology's publication *Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington (Version 2.0)* (hereinafter the TSD) and the associated Technical Issue Papers (TIPs). Our comments on the material presented in these documents can be summarized:

1. Version 2.0 of the TSD inappropriately includes language with the potential to mislead the casual reader into thinking potential contaminant effects on fish and shellfish are relevant to setting a fish consumption rate (FCR) when, in fact, this potential is clearly a distinct issue that should be addressed when setting standards for protection of wildlife, not when setting standards for protection of human health (comment A below).

2. Even though the science clearly demonstrates that >95% of the contaminant body burden found in adult salmon is accumulated in the open ocean, Version 2.0 of the TSD and the TIP *Salmon Life History and Contaminant Body Burdens* contain inappropriate speculation and misleading language having the potential to obscure this reality (comments B through D below).

The following comments elaborate on these two points.

A. The TSD inappropriately addresses the potential effects of contaminants on fish and shellfish.

The potential for contaminants to have adverse effects on fish and shellfish is noted multiple times throughout the TSD and associated TIPs. Given that the subject of this document is fish consumption by human beings, discussion of this potential is, at best, irrelevant. At worst,

addressing this issue in this context is misleading in that it conflates two issues that are absolutely distinct in both scientific and regulatory senses. Ultimately, the appropriate venue for addressing potential effects on fish and shellfish is when setting criteria for the protection of wildlife, and Ecology should expunge all discussion of potential contaminant effects on fish and shellfish from the final version of this TSD and the associated TIPs.

B. The TIP addressing salmon summarizes numerous studies providing evidence that juvenile salmon pick up contaminants in freshwater and estuarine systems without making any effort to place these results in the proper scientific perspective.

A number of the studies summarized in Section II of the TIP *Salmon Life History and Contaminant Body Burdens* address the accumulation of contaminant burdens in juvenile salmon without also providing measures of contaminant burdens in returning adult salmon. The specific papers are:

Giesy et al. 1999
Meadoe et al. 2002
Hardy and McBride 2004
Sethajintanin et al. 2004
Fresh et al. 2005
Johnson et al. 2007a
Johnson et al. 2007b
Kelly et al. 2011
Yanagida et al.2012

The data presented in these papers serve to confirm that some bioaccumulation occurs in freshwater and estuarine systems, but provide no insight into what fraction of the ultimate body burden in adult salmon this represents. As a consequence, these data tell only a fraction of the story.

In order to place these results in the proper scientific context they need to be compared to the body burdens found in returning adult salmon. Without this comparison the experimental results presented in these papers are irrelevant to the central question of what fraction of the ultimate body burden in adult salmon is acquired in fresh or estuarine waters vs. the open ocean.

C. The TIP addressing salmon contains inappropriate speculation concerning the authority of selected peer-reviewed studies of salmon bioaccumulation.

Section II of the TIP *Salmon Life History and Contaminant Body Burdens* summarizes results from studies directly addressing the question of where salmon acquire bioaccumulative contaminants. Section III of the same TIP provides an overview of these results, and correctly concludes that the results from all relevant studies show that the dominant fraction of contaminant body burden in adult salmon is accumulated in the open ocean, and not in freshwater or estuarine waters. Thus, Section III of the TIP includes the following statement:

> *In fact, as a number of authors indicate, almost all salmonids accumulate the vast majority of their body burden at sea; accumulation at juvenile life stages in freshwater and estuarine habitats contributes a very limited proportion of the total accumulation.*

This is consistent with the interpretations offered by the various authors. However, Ecology goes on to speculate (second to last paragraph in Section III):

> *Another factor potentially relevant to this topic, briefly mentioned by a few authors but not investigated in detail, is the lack of understanding of whether there was a threshold response effect on juvenile salmonids exposed to contaminants while in freshwater and estuarine habitats. It is possible that the subadult and adult salmonids sampled for body burden analysis were those fish that did not experience behavioral and physiological abnormalities, post-exposure, that would have reduced their survival to adulthood. In other words, subadult and adult fish sampled may not be entirely representative of the naturally occurring juvenile population.*

Although Ecology's intent is unclear, this language appears to be directed specifically at O'Neill and West (2009). Regardless, this paragraph is nothing more than speculation and cannot be taken as a substantive comment affecting, in any way, the utility of the data or the conclusions offered by any of the original researchers.

A second example of inappropriate speculation is found in the summary of Cullon et al. (2009) on pg. 30 of the same TIP. The first paragraph on that page begins by noting that Cullon et al. (2009) concluded that 97% to 99% of the bioaccumulative chemicals found in adult Chinook salmon were acquired during their time at sea, not in freshwater or estuaries. However, Ecology goes on to speculate that the sample sizes (generally n=6) might have been too small to give an accurate comparison of juvenile to adult body burdens, and then implies that the pooling of hatchery and wild fish in the analysis might also impact the authority of the results. Again, all this is nothing more than speculation on the part of Ecology, and has absolutely no impact on the interpretations offered by the original researchers.

Ultimately, the fact remains that every single study looking at the issue of where salmon acquire contaminants has concluded that >95% of the body burden of bioaccumulative chemicals found in adult salmon is acquired in the open ocean, and not in fresh or estuarine water.

D. Ecology repeatedly misrepresents the science informing where salmon acquire bioaccumulative contaminants.

Sprinkled throughout the TSD and associated TIPs are statements to the effect that there is much uncertainly regarding where salmon accumulate bioaccumulative contaminants. As an example, the Executive Summary of the TSD contains the following statement addressing salmon:

> *Ecology recognizes the complexity of addressing this issue and acknowledges the uncertainty concerning where salmon obtain contaminants.*

However, as noted, the experimental data are anything but "uncertain," in that every single study looking at the issue of where salmon acquire bioaccumulative chemicals has concluded that >95% of the contaminant body burden found in adult salmon is acquired in the open ocean, and not in freshwater or estuarine water.

Please do not hesitate to contact me if you have any questions or concerns about these comments.

Sincerely,

JEFF LOUCH

Jeff Louch
Principal Scientist

ec: Steve Stratton, NCASI
Paul Wiegand, NCASI
Christian McCabe, Northwest Pulp & Paper Association

To whom it may concern,

I am writing on behalf of Citizens for a Clean Columbia and appreciate the opportunity to provide public comment on the document entitled "Fish Consumption Rates Technical Support Document: *A Review of Data and Information about Fish Consumption in Washington*".

Overall, *consistency and clarity about the purpose of the document is needed.* For example, in the preface it is stated that the document will focus "specifically on the issue of how much and what types of fish are consumed by the people of Washington, and what data are available about fish consumption rates." In the section on purpose in the executive summary, the document states that you will "compile and evaluate available information on fish consumption in Washington State" (also restated in chapter 1) but will not identify a fish consumption rate for use in a particular context. In the section on Fish consumption surveys in the executive summary the document states that "Statistical methodology used by the National Cancer Institute (NCI) was applied to the national survey data to better estimate long-term consumption rates using short-term dietary records" so this makes it seem like the purpose is to propose consumption rates.

At the same time in the preface, three questions are raised: "How should the data be combined in a statistically correct manner? Is it appropriate to establish a single default rate for use in multiple settings? and, How should salmon be included in the default fish consumption rate?" This leaves the reader expecting answers to these questions in this document.

Overall, there are excellent tables on strengths and weaknesses of different survey methodologies, both in general and specifically applying to the various surveys discussed. The size of the document is daunting and eliminating some of the redundancy would be helpful.

Specific comments with respect to the rest of the document are numbered below.

1. In the Executive Statement, problem summary, there is mention of past consumption rates used. While the document notes the basis of the 54 g (1.9 oz/day) rate (a 1981 anglers survey) it is not clear how the water quality standard fish consumption rate of 6.5 grams (0.22 ounce/day) was established beyond that the EPA completed technical evaluations. *A bit more information or a reference here would help or later in chapter 1. Clarifying the denominator here - total population and not fish consumers - is important.*
2. Executive Summary, WA fish resources, *the specific types of commercially and recreationally caught fish presented is incomplete and not easily understood by the public*. If this document is to be used by multiple groups, definitions of all of the types of fish considered by category (for example, which fish are groundfish?) are needed. For example, a footnote to Table 3 should be considered. I was surprised that the data presented were from the 2006 study. Is the 2010 citation not useful?
3. Executive Summary, WA fish consumers, *it seems that you can state with greater confidence that recreational fishers consume more fish than the general Washington population (omit may).* This would make it clearer that different advisories may be needed for different populations of consumers.
4. Executive Summary, Fish consumption surveys, *the document should be modified to include the National Health and Nutrition Examination Survey (NHANES), National*

Cancer Institute (NCI) results and the draft results of the RI/FS Recreational Consumption and Resource Use and Tribal Resource Use surveys issued after this work was completed. It actually seems that the two former sources are used despite the footnote 8 in section 2.3.1 as section 4.2.2 notes use of these surveys and presents data in Table 19 from NHANES 2003-2006. NHANES likely provides better estimates of the total population, particularly because the CSFII surveyed low-income individuals. The applicability of NHANES data is highlighted in the discussion on p. 43 and in Table 20. The latter two provide the latest information from direct survey of the local population along the Upper Columbia River. Although this will delay the report, it seems that it is in the best interests of presenting a complete list of available data.

5. Chapter 1, 1.2, Table 2: *Please add meal size*. An important metric is meal size and not weight and the importance of visual aids is noted in section 3.4.5. In the Recreational Consumption and Resource Use Survey, for example, photographs were used to help people report on meal size that was then translated into weight. We believe this to be a far more accurate estimate than asking about weight although it is clear that weight is needed for risk estimates.
6. Chapter 3, 3.1, bottom p.21-22, *the document states "The fish dietary estimates for the U.S. general population estimates may provide fish consumption estimates for the general population in Washington" but the previous section clearly demonstrates that WA state has a higher consumption rate*. This seems contradictory.
7. In Chapter 3, 3.2.1, Table 9, *as another weakness, consider mentioning that it is not clear that the individual will consume all the fish present in the creel vs. feed neighbors or the dog for that matter*.
8. In Chapter 4, section 4.2.2 above Table 18, it is stated that "Currently, there are no fish dietary data available for the general fish-consuming populations in Washington State." *Does this mean that there are no data from exclusively fish-consuming general populations or that NHANES and CSFII do not provide adequate information on Washington State fish consumers*?
9. *The daily consumption rates presented for tribal members on pages 46 and 52 seems low* (I did not find an adjusted g/day in the Squamish dietary data), particularly in light of the Harris and Harper (1997) report of a fish consumption rate of 540 g/day and a CRITFC mean fish consumption rate of 108 g/day noted on p. 45 for summer months (I think). I did finally find an explanation for this in footnote 30 but it would have been helpful to see this written in the text. The rate still seems low and may represent bias in study enrollment and certainly whether the denominator includes non-fish consumers.
10. Key findings 4.7 might be better placed at the beginning of the document.
11. Overall chapters 5 and 6 as well as the rest of the document illustrates the difficulties in surveying populations, defining a target population for advisories, and determining which consumption percentile from what population should be used for advisories. *We think that for the purpose of setting standards to use in fish advisories, the optimal denominator is fish consumers. Also, we think that different advisories are needed for different populations that could be tailored so as to increase relevance, cultural sensitivity, and awareness for these populations (State of WA general public fish consumers, anglers, and tribal populations*.

Sincerely, Mindy Smith, MD, MS; secretary for Citizens for a Clean Columbia

Georgia-Pacific

Georgia-Pacific LLC
133 Peachtree Street NE (30303-1847)
P.O. Box 105605
Atlanta, Georgia 30348-5605
(404) 652-6874 office
(404) 654-4701 fax

Via Email - fishconsumption@ecy.wa.gov

Ms. Adrienne Dorrah
Washington State Department of Ecology
Toxics Cleanup Program
PO Box 47600
Olympia, WA 98504-7600

Re: Comments on Ecology Publication No. 12-09-058
Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington, Public Review Draft (August 27, 2012)

Dear Ms. Dorrah

These comments are provided in response to Ecology's publication of the August 2012 public review draft of "Fish Consumption Rates Technical Support Document" (Publication No. 12-09-058). Although the preface states that the Technical Support Document does not address policy questions, the document will nonetheless have direct and profound implications for the Sediment Management Standards (SMS; WAC 173-204), the State Water Quality Standards (WAC 173-201a), and the Model Toxics Control Act (MTCA; WAC 173-340), changes to all of which are being or will be considered by Ecology. Because of the pending rule SMS amendments, this letter discusses more extensively the implications of the Technical Support Document for the SMS process, however, as further explained below, the implications for the State Water Quality Standards are equally significant and troublesome. In addition to the comments specifically set forth in this letter, Georgia-Pacific is a member of the National Council for Air and Stream Improvement, Inc. and fully supports the October 24, 2012 comments submitted by that organization.

Extensive public comment and stakeholder input has been provided previously on earlier SMS rule development and fish consumption rate documents. Multiple federal and state sediment cleanup sites have already addressed human health protection using fish consumption rates protective of high-consuming populations where appropriate to site conditions. Current rules allow for this to be considered as part of risk assessment and cleanup decision-making.

As the draft document correctly points out, there is no need at this time to impose a set of default fish consumption rates in order to progress SMS cleanups or to finalize the SMS rule revision. During previous comments on the SMS rule revision, several alternative methods

to address human health protection and fish consumption rates were considered. Four options were discussed in previous stakeholder comments:

1) An updated SMS narrative standard for human health protection.

2) Guidance materials for use with SMS decision-making.

3) Criteria for site specific determinations.

4) Default fish consumption rates and modifying factors.

The current draft Technical Support Document does a better job than previous Ecology documents in providing information on the complexity of the fish consumption rate issue. Some of these important issues include:

- The challenge of reflecting the different types and quantities of seafood noted in various surveys of fish consumption;

- The importance of site use factors and fish diet fraction in MTCA and SMS cleanup decision-making;

- The differences among the various regulatory programs;

- The importance of the "salmon problem" in converting gross fish consumption rates for use in site-specific decision-making.

Requiring the use of high fish consumption rates (e.g., above 100 g/day) would represent a significant change to current default assumptions under the MTCA rules, and such high rates are inappropriate to apply at many SMS cleanup sites. These high rates would also result in dramatically more stringent surface water quality standards, many of which would be impossible or infeasible to achieve, thereby almost certainly plunging Washington's regulatory programs into gridlock as more and more of our stated performance criteria result in unattainable standards. Moreover, for pollutants whose principal sources are outside the state's regulatory control—for example, legacy and naturally occurring pollutants and pollutants that originate outside the state's borders—these more stringent standards will impose disproportionate burdens on regulated sources without substantially reducing environmental concentrations or benefitting human health.

We do not use the word "gridlock" lightly. We believe that the State's setting of standards that are literally impossible to achieve will open the floodgates to litigation that will result in no benefit to human health or the environment, but which will result in the redirection of resources away from truly beneficial measures to the legal battlefield. As has been pointed out in previous stakeholder comments provided during the SMS rule-making process:

- No rule changes are required to address protection of high-consuming populations, as sufficient flexibility is already included in MTCA to address this concern.

- Existing standards are based on conservative factors, such as the use of a 1-in-1-million risk level, to ensure the protection of both average and high-consuming populations. If regulations and regulatory decisions will now be based on the exposure level of high-consuming populations, the justification for these conservative factors will be undermined and must be reconsidered.

- If Ecology's goal is to better clarify agency expectations and streamline cleanup decisions, this can be addressed with an updated narrative standard accompanied by development of appropriate regulatory guidance.

If -- despite the serious challenges they will pose -- Ecology decides to incorporate higher consumption rates into the regulations, then sufficient detail will be required to clarify the different types of seafood associated with each consumption rate for a variety of potential receptor populations and site conditions, and site-specific adjustments of the consumption rates (both upward and downward) and diet fractions may be required. For example, we offer two specific recommendations to limit the damage caused from the unintended consequences of such an action:

1) Overall Fish Consumption Rates, Sources and the "Salmon Problem": The fish and shellfish consumption rates should be specific to the species being consumed and the origin of the fish. For example, the discussions of consumption of fish purchased in stores, fish markets and restaurants contain no underlying data on the origin of the purchased fish. The document presents no data that the fish and shellfish sold at local stores and restaurants come exclusively, or even significantly, from Washington waters. Additionally, as the draft document correctly points out, salmon make up the overwhelming portion of the total fish and shellfish consumed in the Pacific Northwest, and numerous studies have shown that salmon accumulate much of their body burden of bioaccumulative contaminants such as PCBs and dioxins/furans during the portion of their life cycle while they are at sea. Therefore, changing Washington's regulations will not improve the quality of our salmon. The appropriate focus of the fish and shellfish consumption rate for both the water quality and cleanup programs should be on shellfish and non-migratory finfish species that will potentially benefit from managing our water quality. This distinction in emphasis between salmon and shellfish/non-migratory finfish needs to be made very clear in Ecology's document.

2) Need for Reasonable Diet Fraction and Modifying Assumptions: Any use of fish consumption rate values needs to appropriately consider the context for those numbers, and reasonable diet fraction and other modifying assumptions must be considered along with the gross fish consumption rates. The water quality and cleanup programs need to adopt consumption rates that are relevant to the geographic areas that are the focus of these programs. In most cases, it is not realistic to assume that an individual would obtain 100 percent of their diet of these species from a single, small geographic area. At many of the cleanup sites addressed under SMS, the sites could never support the types and quantities of fish and shellfish production

contemplated by the high consumption rates proposed as the new default range. The document should explicitly emphasize the importance of diet fraction and other modifying assumptions in ANY application of a fish consumption rate.

In the interest of continuing real progress towards improving environmental quality in the region, we urge Ecology to revise the draft Technical Support Document to address the issues identified above. Moreover, Ecology should reconsider making any changes to the current fish and shellfish consumption rates. The proposed changes will likely result in regulatory gridlock and drastically impact businesses and local public agencies while producing no real-world benefit for human health or the environment.

Thank you for your consideration.

Sincerely,

Traylor Champion

Traylor Champion
Vice President – Environmental Affairs
Georgia-Pacific LLC

cc: Clay Patmont, Anchor QEA, LLC

J.R. SIMPLOT COMPANY ONE CAPITAL CENTER 999 MAIN STREET SUITE 1300
P.O. BOX 27 BOISE, IDAHO 83707 (208) 336-2110 FAX (208) 389-7515

CORPORATE HEADQUARTERS

October 26, 2012

SENT VIA EMAIL TO: fishconsumption@ecy.wa.gov
ORIGINAL TO FOLLOW VIE CERTIFIED MAIL #7009 0080 0001 0391 6303
RETURN RECEIPT REQUESTED

Mr. Ted Sturdevant
Director
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Director Sturdevant:

The Department is seeking comments on *Fish Consumption Rates Technical Support Document* (version 2.0) as consideration is given to revising human health criteria found in the Surface Water Quality Standards (WAC 173-201A). The J.R. Simplot Company (Simplot) is a privately held agribusiness company with a number of operations in the State of Washington including: farming, beef cattle, potato processing, fertilizer distribution, fertilizer warehouses and a port facility. The human health criteria established as a part of the Surface Water Quality Standards are of direct interest to our operations in the State of Washington. After reviewing the Technical Support Document (TSD), Simplot has the following recommendations:

The State of Washington Should Conduct a State-Wide Fish Consumption Survey

The TSD discusses, with some detail, four studies (CRITFC, 1994; Toy et al. 1996; The Suquamish Tribe, 2000; and Sechena et al., 1999) which are focused on the fish consumption patterns of four sub-groups which have relatively high consumption rates. The TSD also reviews data from the National Health and Nutrition Examination Survey (NHANES) to estimate fish consumption rates for the general population of the State of Washington. As noted in the TSD, "Information about fish consumed by the general Washington population is available only through estimates."[1] Section 6 of the TSD discusses the following: the level of protection that should be provided in the revised standards (Section 6.8), the fish species to include when developing the standard (Sections 6.4 and 6.5) and several other factors the Department must consider when selecting the FCR. The Department does have flexibility in regards to level of protection used to establish a FCR. However, to properly do so, the Department not only needs data for high-consuming sub-populations but for the population in general. We believe

[1] Ecology. 2012, *Fish Consumption Rates Technical Support Document* (version 2.0) p.12.

that Ecology, as part of this rulemaking, should initiate a state-wide fish consumption survey.

FCR Studies Need to Have and Disclose Key Information

To accurately establish FCR a number of variables need to be accounted for such as:

- Origin of the fish (local fish vs. commercial fish);
- Type of fish: shellfish, finfish, marine, fresh-water, anadromous or non-anadromous; and
- Preparation method.

To accurately use such survey data, all data (including Tribal data) need to be available for the public and stakeholders to review. For example, one of the drawbacks of the CRITFC 1994 study was that certain data elements were not made available for public review. This limits the usefulness of the survey data particularly if the Department decides to use those data to estimate long-term fish consumption behavior.

Locally Caught, Non-Anadromous Freshwater Fish Should Be Used to Establish a FCR

Local, non-anadromous, freshwater fish are those that have been exposed to water conditions governed by the Washington Surface Water Quality Standards. The same is not true of marine fish, anadromous fish and shellfish. That is why conducting a state-wide general fish consumption survey, along with all data from all surveys being available for review are necessary to establish a technically sound FCR that is protective of the different fish consumption groups (sub-populations and general) in the State of Washington.

Attached are detailed comments on the TSD and further discussion of the recommendations.

We appreciate the opportunity to comment on the TSD. I can be reached at 208.389.7365 if you have any questions.

Sincerely,

Alan L. Prouty
Vice President
Environmental and Regulatory Affairs

C:
Association of Washington Business
Northwest Food Processors Association.
Northwest Pulp and Paper Association

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

J.R. Simplot Company

Review of the Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington

Public Review Draft
August 27, 2012
Version 2.0

Toxics Cleanup Program
Washington State Department of Ecology
Olympia, Washington

October 2012

ARCADIS

Review of the Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington

Paul D. Anderson, Ph.D.
Vice President, Principal Scientist

Nancy Bonnevie
Principal Scientist

Serese Marotta
Senior Scientist

Michele Buonanduci
Scientist

Prepared for:
J.R. Simplot Company

Prepared by:
ARCADIS U.S., Inc.
1 Executive Drive
Suite 303
Chelmsford
Massachusetts 01824
Tel 978 937 9999
Fax 978 937 7555

Our Ref.:
ME000167.0000

Date:
October 2012

1. Introduction

ARCADIS has reviewed the "Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington, Public Review Draft, August 27, 2012, Version 2.0" (TSD) prepared by the State of Washington Department of Ecology. Comments on select key findings are presented herein.

Before presenting those comments, some context is needed. The comments focus on the information presented in the TSD and not on how fish consumption rate (FCR) information could or should be used to derive statewide ambient water quality criteria (AWQC). The FCR is just one of many factors used in deriving an AWQC. All the factors need to be viewed in combination to assure that the appropriate and desired level of protectiveness is achieved by the AWQC. Indeed, perhaps the most important decision that needs to be made in setting a statewide AWQC is the level of protectiveness associated with the AWQC and how that varies between the general population and more highly exposed subpopulations. Because those other factors have not yet been identified by the State of Washington, nor does the TSD recommend a specific FCR for derivation of an AWQC, it is not possible to comment on whether any one of the several specific FCRs presented and discussed in the TSD is more or less appropriate for the derivation of a statewide AWQC. Thus, these comments focus on the technical basis of the FCRs presented in the TSD and limitations of those FCRs in the derivation of a statewide AWQC for the State of Washington.

2. General Comments

Several general observations about the FCRs discussed in the TSD are presented first. Some of these comments arise only a few times in the TSD and others occur repeatedly. In the interest of brevity, neither the general nor the specific comments (which are presented after the general comments) identify every instance in the TSD where a particular comment may be relevant.

2.1 Fish Consumption Rate for the General Population of Washington State

The TSD notes on page 41 of Section 4, "Currently, there are no fish dietary data available for the general fish-consuming populations in Washington State." Given that one of the key goals of an AWQC is to ensure the general population of Washington State is adequately protected, and given all of the uncertainties and limitations discussed in Section 4, including the use of short-term national fish consumption data

to establish long-term regional FCRs, the State of Washington should conduct a state-wide FCR survey. Such a survey could be designed to collect the information necessary to understand the various sources of fish its residents consume, as well as how to extrapolate short-term FCR information to long-term fish consumption rates appropriate for a statewide AWQC representative of and protective of lifetime exposures.

2.2 Using Short-Term Data to Estimate Long-Term Exposure

All the surveys reviewed by the TSD are based upon relatively short-term dietary surveys (generally one or a few days to a few weeks in duration). The data from those surveys are then used to establish FCRs, or a distribution of FCRs, representative of a lifetime of fish consumption.

As the TSD correctly recognizes, short-term dietary data are not representative of the fish consumption behavior of people in the lower and upper tails of the distribution of the population. For the reasons described on pages 84 and 85 of the TSD as well as in the technical issue paper "Estimating Annual Fish Consumption Rates Using Data from Short-Term Surveys," this is a critical consideration. The State of Washington is to be commended for including discussion about the importance of short-term to long-term extrapolation in the TSD and for pointing out the substantial effect this may have on FCRs based only upon short-term data. Comparison of Tables 18 and 19 of the TSD indicates that when long-term FCRs are extrapolated from short-term FCR data, directly accounting for some of the limitations of short-term dietary surveys, the estimated FCRs drop by 3- to nearly 10-fold depending upon type of fish (i.e., all fish, finfish, shellfish). The lower long-term FCR appears to be consistent throughout the distribution of FCRs. In other words, the mean, median and upper percentiles of the long-term FCR distribution are all lower than the corresponding statistical metrics of the short-term FCR distribution.

Surprisingly, however, after clearly demonstrating the importance of accounting for the limitations of short-term data to extrapolate to long-term behaviors for the general population using the national U.S. Environmental Protection Agency (USEPA) survey results, the TSD does not go on to adjust the FCRs developed by the regional Tribal surveys (see also the specific comment 3.8 below) . The Tribal surveys are also based upon relatively short-term dietary surveys. Therefore, the FCRs resulting from those surveys also need to be adjusted to better reflect long-term fish consumption behavior and are not appropriate to use directly in the setting of a statewide AWQC. If the information necessary to appropriately extrapolate short-term to long-term FCR

information is not available for the Tribal surveys, then such information needs to be developed prior to use of the Tribal survey data in a statewide AWQC.

2.3 The Distinction between Consumers and Non-Consumers

Throughout the TSD, reference is made to consumers and non-consumers. Fish (both finfish and shellfish) are a widely consumed dietary item. On page 13, the TSD indicates that only about 28% of adults living in the state of Washington are assumed to currently eat fish. This percentage is based upon a relatively short duration national U.S. Department of Agriculture (USDA) survey (two non-consecutive 24-hour periods separated by between 3 and 10 days, page 40 of the TSD). As discussed above, and noted several times in the TSD, short-term dietary surveys are not representative of long-term dietary behaviors. Most AWQC are designed to be protective of a lifetime of fish consumption, not behaviors that occur over the period of a week, a month, or even a year. Just because a person who responds to a one-day or one-week dietary recall survey indicates that he or she did not eat any fish in the past day or week, does not mean that he or she does not eat any fish. Yet, based on his or her response to the short time interval survey, he or she would be categorized as a non-consumer. For many, if not most, people such a categorization would be incorrect. When viewed over a year, and especially a lifetime, the vast majority of people likely eat some fish.

The repeated discussions in the TSD that refer to consumers and non-consumers need to be revised to better reflect the shortcomings and uncertainty associated with this dichotomy. Further, in those discussions the TSD should make clear how the consumer versus non-consumer classification was created and the uncertainties associated with it. In particular, Section 6.6, which discusses the distinction between "consumer versus per capita" FCRs, needs to be substantially revised to account for the likelihood that the distinction between consumers and non-consumers may largely be a false dichotomy when fish consumption is viewed over a lifetime.

2.4 Source of Fish

In several places, the TSD discusses the proportion of total fish consumed that is comprised of locally caught fish. As noted above, these comments do not discuss whether an FCR should include only locally caught fish (i.e., only those fish that are potentially affected by changes in AWQC adopted by Washington State) or be based on an FCR that includes all fish. The selection of one of those FCRs, or an FCR that is some combination of local and non-local fish, is affected by the selection of all the parameters used to derive the AWQC, and discussion regarding that selection process

should occur at the time of the derivation of the AWQC. That said, the TSD would be greatly improved by clearly discussing and presenting FCRs that are based upon total fish consumption and also FCRs that represent only consumption of locally caught fish. Understanding the difference between these two sets of FCRs will be critical when developing statewide AWQC because it is only the locally caught fish that have potential to be affected by chemicals in waters of the State of Washington. The concentration of chemicals in fish from other sources will not be affected by AWQC set by Washington State.

Additionally, marine, shellfish, and freshwater fish consumption rates can vary significantly, and these differences should be addressed in the development of AWQC. Specifically, consumption rates for marine finfish and shellfish are generally higher than those for freshwater fish, and the majority of finfish consumed by Americans are marine species (USEPA 2000). USEPA (2000) recommends that FCRs used to develop AWQC be based only on consumption of freshwater/estuarine species and that consumption of marine species be accounted for as an alternative source of exposure in the relative source contribution (RSC; used in derivation of AWQC) to avoid double-counting consumption. Notably, USEPA has classified salmon as a marine species (USEPA 2000). This is important because coastal state consumption includes marine species that would not necessarily be affected by releases to surface waters governed by AWQC. As such, as part of the TSD discussion it would be helpful to distinguish between fish harvested from fresh waters of Washington versus coastal waters. Fish caught from the former, with the exception of most anadromous fish, are likely to have concentrations of chemicals consistent with AWQC while fish caught from coastal waters where much greater dilution is present are not likely to have concentrations of chemicals consistent with AWQC.

Given that the vast majority of commercially landed fish (Table 3), recreationally caught fish (Table 4), and recreationally caught shellfish (Table 5) are from coastal or ocean waters and are unlikely to be affected by changes in the AWQC, the TSD should present FCRs for fish actually caught from fresh waters of Washington State. The consumption rate of such fish is likely to be substantially lower than the FCRs currently presented in the TSD. Moreover, while the TSD does make a distinction between FCRs for anadromous and non-anadromous fish in several places, to truly understand the consumption rate of non-anadromous fish caught from fresh waters (i.e., fish whose body burden of chemicals is most likely to be affected by changes in the AWQC), the TSD should include and discuss FCRs that represent consumption of only non-anadromous, locally caught, freshwater fish.

3. Specific Comments

This section provides specific comments on selected portions of the TSD. The comments are presented in the order that they arise in the TSD. As noted above, some of the issues discussed by the general comments arise repeatedly in the TSD. In order to keep these comments relatively brief, specific comments presented below do not identify each instance in the TSD where a particular general comment is applicable. The same is true for the specific comments; some of the issues addressed by a specific comment also arise repeatedly in the TSD and are only discussed a single time.

3.1 Change in the Size of the Population of Washington State

Section 2.3 of the TSD discusses the current size of the population of Washington State and the expected increase in the next 20 years. The purpose of the discussion of the change in population needs to be clarified and probably would be best linked with a discussion of the expected changes in the availability of fisheries resources. If the purpose of the discussion in Section 2.3 is to point out that ever more people will be eating fish at the FCRs described later in the TSD, such an assumption hinges on a concomitant increase in the productivity of fisheries resources. It's unclear if the harvest of naturally occurring fisheries resources (i.e. wild fish and shellfish) can be expected to increase at such a rate.

Alternatively, the purpose of the discussion could be to point out that the sustainable productivity of fisheries resources is currently at or near its maximum and that FCRs of fish harvested in Washington are likely to decrease in the future. A decrease in FCRs would be expected if the increase in population of 27% (between 2010 and 2030) is not matched by a similar increase in fishery resource productivity. In such a case, the FCRs listed in the TSD would not be representative of long-term fish consumption rates. Indeed, if extrapolated to expected population growth over the next 70 years, it may well be that use of the FCRs reported in the TSD in the derivation of statewide AWQC would overestimate potential fish consumption exposures by far more than just 27%. The TSD needs to discuss the potential effects of expected population growth on the FCRs reported from existing dietary surveys and how such FCRs should be adjusted prior to use in a statewide AWQC.

3.2 Custody of Tribal Fish Dietary Survey Data

The TSD points out (pages 34 and 35) that the Tribes generally do not share their detailed FCR data. If the State of Washington decides to use Tribal data to establish a statewide AWQC, then those data need to be made available to all interested parties. If the State were to commission a statewide fish consumption survey, we expect that all of those data would be made available to the general public. The same disclosure expectation should be applied to all FCR data (i.e., Tribal data, or data developed by other stakeholders).

3.3 Review of Recommended Subpopulation Fish Surveys

The fish consumption studies of high consuming subpopulations identified in the TSD (i.e., CRITFC 1994, Toy et al. 1996, The Suquamish Tribe 2000, Sechena et al. 1999) are not appropriate for setting statewide AWQC without additional evaluation of the data. Key aspects of each of the surveys are briefly reviewed below followed by a summary of the reasons why the surveys, as currently described in the TSD, are not appropriate for setting a statewide AWQC.

The four dietary recall surveys of subpopulations identified in the TSD were selected by Washington Ecology because they met measures of technical defensibility and contained data directly applicable to Washington populations groups. The Columbia River Inter-Tribal Fish Commission (CRITFC) Consumption Survey (1994) was conducted in 1991/1992 and was based on a relatively large sample size (n = 513 adults and 204 children) comprised of four tribes. Uncertainty associated with this study concerns the origin of consumed seafood, i.e., locally harvested or commercial source(s). The survey questionnaire asked the respondent to identify what percentage of fish consumed is locally harvested versus obtained from a commercial source (e.g., supermarket). The questionnaire did not ask for locally harvested percentages for individual fish groupings (e.g., anadromous, non-anadromous). The survey results indicated that 88% of fish is from the Columbia River system. This 88% was then applied to the derivation of FCRs for all species groups including all finfish, non-anadromous fish, and anadromous fish (95th percentile FCRs were 171 g/day, 87.9 g/day, and 82.8 g/day, respectively; Table 21 of TSD). Use of the 88% locally harvested fraction in the derivation of FCRs may overestimate actual percentages for each species group. The weighted mean consumers only FCR for adults was 63.2 g/day, which would decrease to 40 g/day if contribution of salmon to Tribal diets (50%) was considered. Also, this survey was conducted in 1991/1992 and as such, may not reflect current conditions.

The *Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region* (Toy et al. 1996) was conducted in 1994 with a sample size of 190 adults and 69 children. This survey identified a number of unusually high consumption rates. These elevated consumption rates were treated as outliers and surrogate values equal to the mean consumption rate plus three standard deviations were used to replace outlier consumption rates prior to the calculation of FCRs. (Note that the presence of outlier data may represent an overall bias in the results of this survey; a bias that remains uncorrected for all of the non-outlier data that the FCRs for the Tulalip and Squaxin Island Tribes reported in the TSD rely upon.) Resulting Tulalip Tribal FCRs (95th percentiles) for locally harvested finfish, non-anadromous fish, and anadromous fish from Puget Sound were 146 g/day, 145 g/day, and 148 g/day, respectively (means = 31.9, 35.5, and 30.4 g/day, respectively). Resulting Squaxin Island Tribal FCRs (95th percentiles) for locally harvested finfish, non-anadromous fish, and anadromous fish from Puget Sound were 143 g/day, 41.2 g/day, and 137 g/day, respectively (means = 45.0, 12.3, and 44.1 g/day, respectively). This study indicates that consumption rates were adjusted for individual body weight, which may skew resulting statistics for "average" consumption. For example, if a person consumes 1 gram of fish per day annually and that person's body weight is 70 kilograms, then the resulting FCR would be 0.014 g/kg/day (365 servings x 1 gram portion/365 days x 70 kg body weight). Likewise, if a person consumes 1 gram of fish per day and that person's weight is 87 kilograms, then the resulting FCR would be 0.011 g/kg/day. Other studies (i.e., Suquamish Tribe 2000; discussed below) have indicated no correlation between consumption rate and body weight. Therefore, adjusted consumption rates for body weight may lead to an overestimation or underestimation of FCRs. USEPA (2000) recommends using a default body weight of 70 kg for calculating AWQC. This is consistent with the methodology used to derive cancer slope factors and maintains consistency between the dose-response relationship and exposure factors (USEPA 2000). The age of the survey (1994) calls into question the applicability of these data with regards to current conditions.

The *Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation, Puget Sound Region* (The Suquamish Tribe 2000) was conducted in 1998 and had a sample size of 92 adults and 31 children. Similar to the CRITFC (1994) study, this survey consisted of a 24-hour dietary recall. Survey timing coincided with Tribal participation in finfish and shellfish fisheries for subsistence, ceremonial, and commercial purposes (i.e., times of year when consumption would be expected to be high). Interestingly though, even during this time, 55% of respondents reported no seafood consumption the day before the interview. Consumption rates were computed for "in season" and "during the rest of the year" separately, and the sum of these two

time periods yielded an annual consumption rate. Consumption weights were standardized by body weights although the amount of fish consumed and body weight did not show a statistically significant relationship. In fact, the report states "Given that body weight may not play a particular role in consumption, the body weight should be carefully selected as a factor if the consumption rate per unit body weight reported in this survey is converted to total consumption for risk assessment or other purposes" (page 71). The FCRs derived from this study also incorporated salmon, which was the most commonly consumed finfish. Another uncertainty associated with this study is that up to three children from the same home could be included in the survey so long as they resided in the same home as an adult respondent. This may skew the child FCRs. It is unclear from the study if the consumption data for children were weighted to circumvent possible bias in the dataset. Similar to the two studies described above, data generated from this survey may not reflect current conditions.

The Asian and Pacific Islander (API) Seafood Consumption Study (Sechena et al. 1999) focused on ten API groups in King County, Washington (n = 202 respondents), which make up roughly 10% of Washington's total population. The proportion of seafood harvested by API ranged from a low of 3% to a high of 21%, indicating that the majority of API's seafood comes from commercial sources. Overall, the harvested portion of fish consumed by API accounted for less than one-fourth of the total consumption, but resulting FCRs do not account for this nor do they adjust for inclusion of anadromous fish such as salmon. Similar to CRITFC (1994) and Suquamish Tribe (2000) surveys, the resulting FCRs from this study were adjusted for the respondent's body weight, which may bias reported FCRs. A number of respondents reported unusually large consumption rates and these identified outlier consumption rates were replaced with surrogate values equal to the mean plus 3 standard deviations prior to calculation of FCRs. Data generated from this survey may not reflect current conditions. As noted above for the Tulalip and Squaxin Island Tribes survey, the survey protocol that led to the presence of data may represent an overall bias in the protocol of the survey that affects all reported FCRs, not just the highest that were judged to be outliers. Lastly, because the survey was conducted more than a decade ago, the results may not represent current conditions.

The key findings of the review of these four studies that suggest the data developed by the studies may not be appropriate for deriving FCRs for use in a statewide AWQC include:

- These studies target specific subpopulations and are not applicable to the general population.

- Many of these FCRs incorporate data for anadromous fish whose chemical concentration likely does not reflect the concentration of chemicals in the water from which they are caught and to which AWQC would be applied; .

- Several of these FCRs were adjusted for respondent body weight, which may bias resulting FCRs.

- Many of these FCRs do not consider the contribution of non-local sources of fish (e.g., outside Washington State) to the reported FCRs.

- All of these surveys are based on relatively short recall periods and, therefore, likely do not reflect long-term (i.e., lifetime) fish consumption behavior. As indicated in the TSD, when FCRs based on short-term recall data are adjusted to reflect longer term consumption, the FCRs decrease substantially.

- All of these surveys are more than 10 years old and some are now more than 20 years old. The age of these surveys would not represent current conditions if fish consumption behaviors have changed over the past one to two decades.

3.4 Loss of Weight during Cooking

On pages 66 and 67, the TSD presents FCRs that are adjusted for the assumed decrease of weight of fish during cooking. While the increase in FCR after adjustment for cooking loss is relatively minor, this is an excellent example of an assumption/adjustment that needs to be considered together with all the other assumptions used to derive an AWQC. In many cases, regulatory agencies do not consider the decrease in chemical concentrations associated with cooking of fish, even though such decreases are well established for certain classes of chemicals (i.e., chlorinated organic compounds). If, when deriving the AWQC, Washington State decides to include the change in weight of fish associated with cooking, then it should also include the change in chemical concentration associated with cooking of fish.

3.5 National Consumption Surveys May Underestimate Coastal State Consumption Rates

The first key finding on page 71 indicates that national survey data may underestimate fish consumption in coastal states because such states have large fish resources available for harvest and consumption. While that may be true for total fish consumption, as noted above in the general comments, a great deal of the fish caught in coastal states may be from coastal and ocean waters that are not affected by

changes in the AWQC and, therefore, fish from such waters may not be appropriate to include in the FCR used to establish the AWQC.

3.6 Food Frequency Questionnaire

On page 81, the TSD mentions the value of a food frequency questionnaire in improving the confidence of calculating the upper percentiles of the FCR distribution. The TSD should be revised to point out how many of the surveys reviewed therein included a food frequency questionnaire and, if not part of a particular survey, whether collected information was commensurate with that provided by a food frequency questionnaire. This should be included as an additional criterion in determining the quality of available fish consumption surveys.

3.7 Extrapolation of FCRs between Subpopulations and Water Bodies

The subpopulations evaluated by the studies reviewed above are typically small communities that consume fish from specific areas or water bodies (e.g., Puget Sound, Lake Coeur D'Alene, Columbia River). Their consumption rates are often directly related to the availability and abundance of specific, desirable species of fish. As described in Section 5.2.2, the TSD assumes these consumption rates are transferable to other areas of Washington State and that individuals will simply substitute other species if the preferred species is not available. This is likely to result in an overestimate of FCRs for individuals outside of these communities where the preferred and desirable fish and shellfish may either not be available or be less accessible. As noted in Section 6.3, considerable variation exists in the amount of fish and shellfish consumed throughout the state based on the characteristics of the water bodies and the types of fish available. For example, to assume that the rate of salmon consumed by Tribal members living in close proximity to Puget Sound is transferable to an individual primarily consuming fish caught from smaller inland rivers or ponds is unrealistic.

3.8 Estimating Lifetime Consumption Rates and Concept of "Regression to the Mean"

Upper percentile estimates of fish consumption rates are often used in risk-based models in order to establish conservative levels of protection for exposed populations. As discussed in the TSD, the approach of using short-term dietary surveys to characterize long-term consumption behavior works well when the arithmetic mean consumption rates are used. However, short-term survey results have been shown to overestimate the upper percentiles of FCR distributions compared to actual long-term

consumption rates. USEPA acknowledges this in its *Exposure Factors Handbook* (USEPA 2011) and states that "the distribution of average daily intake rates generated using short-term data (e.g., 2-day) does not necessarily reflect the long-term distribution of average daily intake rates. The distributions generated from short-term and long-term data will differ to the extent that each individual's intake varies from day to day; the distributions will be similar to the extent that individuals' intakes are constant from day to day."

The term "regression to the mean" (page 85) refers to the phenomenon by which high variability over the short-term tends to decrease over the long-term. While the underlying *population* mean is generally revealed by short-term data, the distribution generally is not—it is only over the long term that each *individual's* consumption habits approach an underlying mean and thus reduce the overall variability for the population. The Department of Ecology provides an example in the technical issue paper *Estimating Annual Fish Consumption Rates Using Data from Short-Term Surveys* (Ecology 2012) in which the 95th percentile intake rates collected by Mertz and Kelsay (1984) were 87.7 g/day over a 7-day period and 51.1 g/day over a 365-day period. The short-term survey results therefore overstated long-term rates by 72%. Similarly, the TSD presents two sets of consumption rates derived for the general population of Washington State. Both sets are based on 2003-2006 National Health and Nutrition Examination Survey (NHANES) data; one set is derived using the methodology outlined by USEPA's *Exposure Factors Handbook* (Table 18 of the TSD), and the other set of lower long-term FCRs is derived using the National Cancer Institute (NCI) statistical methodology developed by Tooze et al. (2006; Table 19 of the TSD). Moreover, if the consumption rates were further extrapolated to a lifetime (i.e., 70 or 80 years), which is the exposure duration assumed by most AWQC, and not just a 365-day consumption rate, the FCR would likely be further reduced from the 51.1 g/day reported for 365 days, though the exact amount of the additional reduction in FCR is unknown currently.

Short-term dietary survey data are also used to distinguish consumers from non-consumers. The USEPA methodology defines "consumers" as those respondents who ate fish on one or both dietary recall days. It draws in survey data only from those respondents, calculating their daily consumption rate as their total intake over the two days divided by two. However, as discussed by Polissar et al. (2012), this approach tends to "underestimate the number of consumers and overestimate consumption rates." Statistically, individuals who are frequent fish consumers are much more likely to have consumed fish on one or both dietary recall days. Therefore, data for infrequent consumers—individuals who are likely to have been non-consumers on both

recall days—are excluded from analysis, deflating the resulting consumer count. Furthermore, given that there may be a correlation between consumption frequency and consumption amount (i.e. individuals who frequently consume certain foods are likely to do so in larger amounts) (Tooze et al. 2006), the resulting consumption rates are likely to be positively skewed.

The NCI methodology outlined by Tooze and others accounts for several of the factors that tend to overestimate the upper percentile consumption rates when extrapolating from short-term dietary survey data. The NCI methodology has a more inclusive definition of "consumers"—respondents were excluded only if they indicated on their food frequency questionnaire that they never consume fish (regardless of whether they actually consumed fish on the two dietary recall days). The NCI statistical model incorporates within-person daily variability in fish consumption as well as the positive correlation between consumption frequency and amount.

Polissar et al. (2012) states that the consumption rates derived using the NCI methodology are based on realistic assumptions and have been demonstrated to well approximate "true" consumption rates, particularly at the upper percentiles of the distribution. Polissar also states that while the consumption rates derived using the NCI methodology are considerably more accurate than those derived using the USEPA methodology, "there will always be some demand for rates that are not based on modeling, no matter how realistic the modeling is. For this reason in this report the rates calculated by the NCI method are presented along with the rates calculated by the method used in the Exposure Factors Handbook." This is a key point, and one that appears to be missing from the TSD. The TSD presents the results of the USEPA methodology first, followed by the results of the NCI methodology, which are simply described as a secondary "reevaluation" of the NHANES data. The executive summary indicates that the NCI methodology was applied in order to "better estimate long-term consumption rates using short-term dietary records." However, the substantial improvement in accuracy and representativeness of actual fish consumption behavior that is obtained using the NCI methodology is not sufficiently emphasized. As noted above in the general comments, the TSD should be revised to include expanded discussion of the importance and effect of appropriate extrapolation of short-term FCRs (from both general population and Tribal surveys) to long-term consumption behavior prior to consideration in a statewide AWQC.

3.9 Characterizing and Estimating the Number of People Exposed

In Section 6.2, the TSD correctly notes that the selection of a summary measure to characterize population exposure reflects a policy choice on the appropriate balance between over and underestimating exposure levels. However, the TSD incorrectly refers to the mean Tribal fish consumption rates as representative of the "middle of the distribution". While those FCRs may represent the mean of the Tribal subpopulation, they reflect the upper bound of the general population. As previously noted, the most important decision that needs to be made in setting an AWQC is the level of protectiveness to be achieved. When making that decision, reliance primarily on data representative of small populations of high end consumers represents a policy choice to overestimate exposure to the majority of individuals.

3.10 Historic vs. Current Consumption Patterns

Additionally, on page 87 the TSD states that "While, historically fish provided the main source of dietary protein, this is true today for only a small subset of the Tribal population." This raises a series of questions about how many Tribal members are represented by the Tribal FCRs presented in the TSD. Specifically, how many Tribal members, on a statewide basis, actually consume fish and shellfish at the consumption rates in the TSD? How have those consumption rates changed in the past 20 years? And, how are consumption rates expected to change in the future? The discussion in the TSD should be expanded to include these data about potentially exposed subpopulations. Such information should provide important perspective about levels of protection and the number of people potentially exposed when Washington State begins the process of selecting an FCR for a statewide AWQC.

3.11 Summary of FCRs

The TSD indicates that Table 33 presents "credible" FCR information. For all the reasons stated above, most of the FCRs shown in this table are not representative of long-term fish consumption behavior. This is especially true for the Tribal FCRs which represent FCRs based on short-term fish consumption behavior and have not been adjusted to reflect long-term behavior. Further, Table 33 presents the FCRs for all finfish and shellfish. The TSD needs to be revised to present parallel summary tables of: (1) FCRs representing consumption of fish harvested only from waters of Washington State; (2) fish harvested only from fresh waters of Washington State; and (3) only non-anadromous fish harvested from fresh waters of Washington State. The

latter FCRs would be most representative of the concentrations of chemicals in fish most affected by changes in a statewide AWQC.

4. Biographies

Dr. Paul Anderson is a Vice President and Principal Scientist at ARCADIS and is also an adjunct professor in the Center for Energy and Environmental Studies within Boston University's Geography Department. Dr. Anderson has over 28 years of experience in human health and ecological risk assessment. Dr. Anderson received his B.A. in biology from Boston University in 1978, his M.A in biology from Harvard University in 1981 and his Ph. D. in biology from Harvard University in 1983. He was a postdoctoral fellow in the Interdisciplinary Programs in Health at the Harvard School of Public Health from 1983 until 1986. Dr. Anderson has performed numerous multimedia, multichemical and multipathway risk assessments for federal and state superfund sites throughout the United States including operating and abandoned chemical and manufacturing facilities, landfills, former wood treating sites, and pulp and paper mills. Dr. Anderson has, on a regular basis, been called upon to review proposed State and Federal regulatory initiatives by a variety of organizations. Dr. Anderson has reviewed and provided comment on general human health and ecological risk assessment guidance, on proposed toxicity factors for several chemicals, on proposed criteria for specific chemicals, on the Great Lakes water quality guidance, and on proposed methods to develop ambient water quality criteria including states in the southeast, mid-Atlantic, northeast, mid-west and northwest. Dr. Anderson has managed the development of a watershed based model that predicts environmental concentrations of pharmaceuticals and related compounds in United States surface waters and overseen a database containing all the information available in the peer-reviewed literature on the aquatic toxicity, fate and removal of active pharmaceuticals ingredients in surface waters. Dr. Anderson is a leading advocate of advanced risk assessment techniques such as Monte Carlo analysis, has written over 30 papers and lectured widely on ecological and human health risk assessment, and has testified throughout the United States on the potential risks posed by dioxin and other chemicals.

Ms. Nancy Bonnevie has more than 20 years of experience in ecological and human health risk assessment. An environmental scientist specializing in aquatic ecology and sediment quality evaluations, she has effectively managed teams on tasks ranging from preliminary site characterizations to multi-tasked field sampling programs, ecological risk evaluations and environmental impact statements. Ms. Bonnevie participated in the development of the ecological risk guidance for the American Society of Testing and Materials (ASTM) and has served as a peer-reviewer for

Environmental Toxicology and Chemistry on issues related to ecological risk assessment and sediment quality evaluations. She has designed and implemented a wide variety of field studies including sediment and surface water quality evaluations, benthic community analyses, and habitat assessments. In support of these investigations, she has critically evaluated varying approaches for deriving site-specific sediment quality criteria. In addition to her demonstrated expertise in the evaluation of risks to ecological communities, Ms. Bonnevie also has experience in human risk assessment. She has participated in the development and implementation of several fish consumption surveys, and has conducted numerous evaluations focusing on potential risks posed by consumption of fish and shellfish.

Ms. Serese Marotta has more than 13 years of experience in human health and ecological risk assessment. Ms. Marotta has managed numerous complex, multipathway human health risk assessments for project sites in the Midwest and eastern United States under the CERCLA and RCRA programs, many of which involved an evaluation of the fish consumption pathway and calculation of site-specific sediment cleanup goals. In addition, Ms. Marotta has also managed ecological risk assessments that involved site-specific biological studies and consideration of food chain exposures to higher trophic-level terrestrial and aquatic fauna.

Ms. Michele Buonanduci received her B.A. in environmental science from Boston University. Ms. Buonanduci is a Scientist at ARCADIS with experience supporting both human health and ecological risk assessments.

5. References

CRITFC. 1994. *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin. Technical Report 94-3.* Portland, Oregon.

Ecology. 2012. *Supplemental Information to Support the Fish Consumption Rates Technical Support Document.* Washington State Department of Ecology, Olympia, Washington. July 20.

Mertz, W. and J.L. Kelsay. 1984. Rationale and design of the Beltsville one-year dietary intake study. *Am. J. Clin. Nutr.* 40(6):1323-1326.

Polissar, N.L., M. Neradilek, A.Y. Aravkin, P. Danahar, and J. Kalat. 2012. *Statistical Analysis of National and Washington State Fish Consumption Data.* Draft. Prepared for

the Washington State Department of Ecology by The Mountain-Whisper-Light Statistics, Seattle, Washington. July 22.

Sechena, R., C. Nakano, S. Liao, N. Polissar, R. Lorenzana, S. Truong, and R. Fenske. 1999. *Asian and Pacific Islander Seafood Consumption Study in King County, Washington.* EPA 910/R-99-003. May.

Tooze, et al. 2006. A new statistical method for estimating the usual intake of episodically consumed foods with application to their distribution. *J. Am. Diet. Assoc.* 106:1575-1587.

Toy, K.A., N.L. Polissar, S. Liao, and G.D. Mittelstaedt. 1996. *A Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region.* Tulalip Tribes, Department of Environment, Marysville, Washington.

The Suquamish Tribe. 2000. *Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation.* Puget Sound Region. August.

USEPA. 2000. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health.* EPA-822-B-00-004. October.

USEPA. 2011. *Exposure Factors Handbook: 2011 Edition.* National Center for Environmental Assessment. Office of Research and Development. EPA/600/R-090/052F. September 2011.

NORTHWEST FOOD PROCESSORS ASSOCIATION

Via email: fishconsumption@ecy.wa.gov

October 26, 2012

Mr. Ted Sturdevant
Director
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Fish Consumption Rates Technical Support Document

Dear Director Sturdevant:

The Northwest Food Processors Association (NWFPA) submits the following comments on the *Fish Consumption Rates (FCR) Technical Support Document* (TSD) (version 2.0). NWFPA represents the food processing industry in Oregon, Washington, and Idaho; and over 400 companies in the food processing supply chain throughout the U.S. Any changes to Surface Water Quality Standards, such as those that might arise from a change in the fish consumption rate used to set human health criteria, are of direct interest to NWFPA and our members. After reviewing the TSD we have three recommendations for your consideration as the process moves forward.

First, the TSD includes an extensive discussion of four studies that provide details of fish consumption rates for several subpopulations, as well some discussion of general/national fish consumption studies. However, there are no State of Washington specific fish consumption rates. **NWFPA strongly recommends that Ecology undertake a general fish consumption survey.** This data is critical for establishing the necessary state protection levels.

Second, there is much discussion about the sources of fish including the differences between marine, freshwater, shellfish, finfish, anadromous and non-anadromous fish. **NWFPA recommends that the FCR be based on the consumption of local, freshwater, non-anadromous fish.** Local, non-anadromous, freshwater fish are solely exposed to water conditions that are regulated by the State of Washington; the same is not true of marine fish, anadromous fish and shellfish.

Third, section 6.1 of the TSD acknowledges that agencies must decide what population groups a standard such as Ambient Water Quality Criteria (AWQC) should be designed to protect. Policy choices may focus on the general population, recreational anglers, high exposure population groups, and/or susceptible populations (p. 90 and 91). The TSD states that "…a uniform level of protection should be maintained for all fish-consuming populations of Washington State" (p. 95), but the TSD does not acknowledge that equal protection of all population groups is impossible because all people do not have identical FCR and behaviors. USEPA (2000) states that 1×10^{-6} and 1×10^{-5} may be acceptable target risk levels for the general population as long as highly exposed populations do not

8338 NE Alderwood Rd, Suite 160 : Portland, OR 97220 : Web: nwfpa.org
Phone: 503.327.2200 : Fax: 503.327.2201 : Email: nwfpa@nwfpa.org

exceed a target risk level of 1 x 10^{-4} (p. 1-12).[1] Generally speaking, risk-based screening levels and cleanup goals are not based on the protection of a receptor with exposures at the extreme end of the spectrum (e.g., soil ingestion by a pica child). Because FCRs may differ significantly between the general population and high-end consumers in sensitive subpopulations, equal protection is not possible. Hypothetically, if an AWQC were based on a sensitive subpopulation with high FCRs at a target risk level of 1 x 10^{-6}, the target risk level for the general population might be two orders of magnitude less than that level (e.g., 1 x 10^{-8}). In other words, the general population would be protected at a level 100 times more stringent than the high end population. **NWFPA recommends that Ecology look at different levels of risk, as allowed by EPA guidance, when establishing FCRs.**

We appreciate the opportunity to comment on the TSD.

Sincerely,

David McGiverin
Environmental, Sustainability & Productivity Manager
Northwest Food Processors Association

cc: NWFPA Environmental Committee **X**

[1] U.S. EPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health. EPA-822-B-00-004. October.

NORTHWEST PULP&PAPER

Northwest Pulp & Paper Association
212 Union Ave SE, Suite 103
Olympia, WA 98501-1302
(360) 529-8638, Fax (360) 529-8645

VIA E-mail: fishconsumption@ecy.wa.gov

October 25, 2012

Ms. Adrienne Dorrah
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Ecology Fish Consumption Rate Technical Support Document Version 2.0

Dear Ms. Dorrah:

On behalf of the Northwest Pulp and Paper Association (NWPPA) and its eight Washington member mills, we respectfully submit for the Department of Ecology's review and consideration the comments of the National Council for Air and Stream Improvement (NCASI) dated October 24, 2012. NCASI's comments were submitted in response to the agency's *Fish Consumption Rate Technical Support Document Version 2.0*.

NWPPA fully supports the comments and issues raised in the NCASI letter in response to the agency's version 2.0 of the TSD and Director Ted Sturdevant's letter of August 30, 2012.

Thank you for your time and consideration of this information.

Sincerely,

Christian M. McCabe
Executive Director
Northwest Pulp and Paper Association

Attachment: National Council for Air and Stream Improvement (NCASI) comment letter of October 24, 2012

ncasi

NATIONAL COUNCIL FOR AIR AND STREAM IMPROVEMENT, INC.
West Coast Regional Center
Mailing address: PO Box 458, Corvallis OR 97339
Street address: 720 SW Fourth Street, Corvallis OR 97333
Phone: (541)752-8801 Fax: (541)752-8806

Dr. Jeff Louch
Principal Scientist
JLouch@ncasi.org

October 24, 2012

Ms. Adrienne Dorrah
Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504-7600

Dear Ms. Dorrah:

The National Council for Air and Stream Improvement, Inc. (NCASI) is an independent, non-profit membership organization that provides technical support to the forest products industry on environmental issues. An important part of our mission is to ensure that regulatory decision making is based on sound science. In this capacity, NCASI has reviewed the August 1, 2012, Working Draft of Ecology's publication *Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington (Version 2.0)* (hereinafter the TSD) and the associated Technical Issue Papers (TIPs). Our comments on the material presented in these documents can be summarized:

1. Version 2.0 of the TSD inappropriately includes language with the potential to mislead the casual reader into thinking potential contaminant effects on fish and shellfish are relevant to setting a fish consumption rate (FCR) when, in fact, this potential is clearly a distinct issue that should be addressed when setting standards for protection of wildlife, not when setting standards for protection of human health (comment A below).

2. Even though the science clearly demonstrates that >95% of the contaminant body burden found in adult salmon is accumulated in the open ocean, Version 2.0 of the TSD and the TIP *Salmon Life History and Contaminant Body Burdens* contain inappropriate speculation and misleading language having the potential to obscure this reality (comments B through D below).

The following comments elaborate on these two points.

A. The TSD inappropriately addresses the potential effects of contaminants on fish and shellfish.

The potential for contaminants to have adverse effects on fish and shellfish is noted multiple times throughout the TSD and associated TIPs. Given that the subject of this document is fish consumption by human beings, discussion of this potential is, at best, irrelevant. At worst,

addressing this issue in this context is misleading in that it conflates two issues that are absolutely distinct in both scientific and regulatory senses. Ultimately, the appropriate venue for addressing potential effects on fish and shellfish is when setting criteria for the protection of wildlife, and Ecology should expunge all discussion of potential contaminant effects on fish and shellfish from the final version of this TSD and the associated TIPs.

B. The TIP addressing salmon summarizes numerous studies providing evidence that juvenile salmon pick up contaminants in freshwater and estuarine systems without making any effort to place these results in the proper scientific perspective.

A number of the studies summarized in Section II of the TIP *Salmon Life History and Contaminant Body Burdens* address the accumulation of contaminant burdens in juvenile salmon without also providing measures of contaminant burdens in returning adult salmon. The specific papers are:

Giesy et al. 1999
Meadoe et al. 2002
Hardy and McBride 2004
Sethajintanin et al. 2004
Fresh et al. 2005
Johnson et al. 2007a
Johnson et al. 2007b
Kelly et al. 2011
Yanagida et al.2012

The data presented in these papers serve to confirm that some bioaccumulation occurs in freshwater and estuarine systems, but provide no insight into what fraction of the ultimate body burden in adult salmon this represents. As a consequence, these data tell only a fraction of the story.

In order to place these results in the proper scientific context they need to be compared to the body burdens found in returning adult salmon. Without this comparison the experimental results presented in these papers are irrelevant to the central question of what fraction of the ultimate body burden in adult salmon is acquired in fresh or estuarine waters vs. the open ocean.

C. The TIP addressing salmon contains inappropriate speculation concerning the authority of selected peer-reviewed studies of salmon bioaccumulation.

Section II of the TIP *Salmon Life History and Contaminant Body Burdens* summarizes results from studies directly addressing the question of where salmon acquire bioaccumulative contaminants. Section III of the same TIP provides an overview of these results, and correctly concludes that the results from all relevant studies show that the dominant fraction of contaminant body burden in adult salmon is accumulated in the open ocean, and not in freshwater or estuarine waters. Thus, Section III of the TIP includes the following statement:

> *In fact, as a number of authors indicate, almost all salmonids accumulate the vast majority of their body burden at sea; accumulation at juvenile life stages in freshwater and estuarine habitats contributes a very limited proportion of the total accumulation.*

This is consistent with the interpretations offered by the various authors. However, Ecology goes on to speculate (second to last paragraph in Section III):

> *Another factor potentially relevant to this topic, briefly mentioned by a few authors but not investigated in detail, is the lack of understanding of whether there was a threshold response effect on juvenile salmonids exposed to contaminants while in freshwater and estuarine habitats. It is possible that the subadult and adult salmonids sampled for body burden analysis were those fish that did not experience behavioral and physiological abnormalities, post-exposure, that would have reduced their survival to adulthood. In other words, subadult and adult fish sampled may not be entirely representative of the naturally occurring juvenile population.*

Although Ecology's intent is unclear, this language appears to be directed specifically at O'Neill and West (2009). Regardless, this paragraph is nothing more than speculation and cannot be taken as a substantive comment affecting, in any way, the utility of the data or the conclusions offered by any of the original researchers.

A second example of inappropriate speculation is found in the summary of Cullon et al. (2009) on pg. 30 of the same TIP. The first paragraph on that page begins by noting that Cullon et al. (2009) concluded that 97% to 99% of the bioaccumulative chemicals found in adult Chinook salmon were acquired during their time at sea, not in freshwater or estuaries. However, Ecology goes on to speculate that the sample sizes (generally n=6) might have been too small to give an accurate comparison of juvenile to adult body burdens, and then implies that the pooling of hatchery and wild fish in the analysis might also impact the authority of the results. Again, all this is nothing more than speculation on the part of Ecology, and has absolutely no impact on the interpretations offered by the original researchers.

Ultimately, the fact remains that every single study looking at the issue of where salmon acquire contaminants has concluded that >95% of the body burden of bioaccumulative chemicals found in adult salmon is acquired in the open ocean, and not in fresh or estuarine water.

D. Ecology repeatedly misrepresents the science informing where salmon acquire bioaccumulative contaminants.

Sprinkled throughout the TSD and associated TIPs are statements to the effect that there is much uncertainly regarding where salmon accumulate bioaccumulative contaminants. As an example, the Executive Summary of the TSD contains the following statement addressing salmon:

> *Ecology recognizes the complexity of addressing this issue and acknowledges the uncertainty concerning where salmon obtain contaminants.*

However, as noted, the experimental data are anything but "uncertain," in that every single study looking at the issue of where salmon acquire bioaccumulative chemicals has concluded that >95% of the contaminant body burden found in adult salmon is acquired in the open ocean, and not in freshwater or estuarine water.

Please do not hesitate to contact me if you have any questions or concerns about these comments.

Sincerely,

JEFF LOUCH

Jeff Louch
Principal Scientist

ec: Steve Stratton, NCASI
Paul Wiegand, NCASI
Christian McCabe, Northwest Pulp & Paper Association

The Boeing Company
P.O. Box 3707
Seattle, WA 98124-2207

October 26, 2012

BY EMAIL

Ms. Adrienne Dorrah
Washington Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Subject: Fish Consumption Rates Technical Support Document

Dear Ms. Dorrah:

The Boeing Company ("Boeing") appreciates the opportunity to submit comments on the public review draft of *Fish Consumption Rates: Technical Support Document, Version 2.0* issued by the Washington Department of Ecology ("Ecology") on August 27, 2012.

Boeing is committed to working with Ecology and other stakeholders to ensure that meaningful progress is made in developing an effective, efficient, and sustainable means for achieving a cleaner environment and improved levels of human and environmental health. Today, Boeing employs more than 86,000 people in Washington. We build the 737 and P-8, 747-8, 767 and KC-46 Tanker, 777 and 787 here and are increasing production rates on all commercial airplane models. In 2011, we paid more than $4.3 billion to over 2,000 suppliers in Washington. And Boeing and our employees contributed nearly $50 million to local charitable organizations.

We are committed to creating a cleaner future. We are continually challenging ourselves to make our products, services, and operations more environmentally progressive, while at the same time saving energy, conserving water, and eliminating waste.[1] We are building the next generation of efficient aerospace products. We are pioneering research into cleaner fuels. We are improving the efficiency of the global air traffic management system to reduce the global carbon footprint of air travel. And we are investing in bold, new technologies to reduce our environmental footprint and create a brighter future.

[1] In 2007, Boeing established five year environmental targets to reduce Energy Consumption, Greenhouse Gas emissions, Water Consumption, and Hazardous Waste by 1% on an absolute basis. Boeing is currently on track to meet or beat all of these targets during a time of tremendous business growth. During this same period Boeing hired an additional 12,000 employees, added over 1 million square feet of manufacturing and office space and increased production by 25%.

We are also operating in an increasingly competitive international market for large commercial aircraft. Environmental stewardship and the cost of doing business are both important factors in our ability to compete. As such, it is critical that the Technical Support Document be accurate, complete and objective. If not done thoughtfully, a change in the state's fish consumption rate and associated rulemakings could, with minimal, if any, benefit to water quality, the environment or human health, drive hundreds of millions of dollars in costs to Boeing, disrupt our current operations and severely limit our ability to expand in Washington in the future. Boeing will not be alone—other industries, municipalities, counties, and ultimately, taxpayers, would likewise be negatively impacted. We believe our mutual investments must be predictable and targeted to real and achievable improvements. Therefore, we urge the Department to carefully consider the impacts on the state's economy and quality of life before moving forward with this document and proceeding with the associated rulemakings.

Executive Summary

The purpose of the Technical Support Document is to present accurate scientific information in a comprehensive and objective way to inform the legal and policy decisions that will follow. The second draft of the document significantly improves upon the original draft; however, Boeing has concerns that need to be addressed prior to finalizing the document.

Boeing applauds Ecology's decision to focus on separating technical information from policy decisions and to remove a default fish consumption rate from the Technical Support Document. Nevertheless, important information is missing from the second draft or is presented in a non-objective (biased) manner. Furthermore, multiple policy opinions remain in the document and should be removed. When presenting factual information and fish consumption survey results, the document should be clear about the source and species of consumed fish when it is known and should acknowledge the limitations of data when the source or species is not known. For example, the Technical Support Document should present population and subpopulation information in a clear and complete way. The document should include accurate information about the fish consumption of Washington's general population and should indicate the statistical relevance of data from subpopulation surveys.

Ecology should also acknowledge that significant information gaps remain. Critically, a fish consumption survey of Washington's general population has not been conducted. Ecology should conduct a state-wide fish consumption survey before finalizing the Technical Support Document and before undertaking the process of revising water quality standards, which will significantly impact the regulated community and the state economy.

Boeing respectfully requests that Ecology defer the Technical Support Document until the Department conducts a state-wide fish consumption survey and addresses the concerns raised in this letter.

Comments

I. The Technical Support Document should provide a comprehensive and objective presentation of the relevant factual and scientific information.

The Technical Support Document should be comprehensive and it should present information in an objective manner in order to inform future legal and policy discussions. In the second draft, Ecology filled some of the information gaps found in the original draft; however, some important information is still missing. In addition, the document often presents information in a non-objective (biased) manner that is particularly misleading to the lay reader. The following sections identify particular topics that should be addressed more comprehensively and even-handedly.

A. Washington Fish Consumption Survey

A fundamental assumption of Ecology's undertaking in producing the Technical Support Document is that it is important to understand how much fish Washington residents eat in order to develop criteria that protect human health. These criteria will be developed using a mathematical formula, one input of which is the fish consumption rate. In order to develop human health criteria that are based on sound science, Ecology must have defensible scientific data on the fish consumption patterns of Washington residents. Unfortunately, no such data exists. A fish consumption survey of Washington's general population has not been conducted.

The Technical Support Document acknowledges the lack of Washington data, but then presents national survey data in Section 4.2. It simply is not clear whether or not these national data are reflective of fish consumption patterns in Washington. Ecology has also included two attachments to the Technical Support Document that address that national survey data. A paper by Nayak Polissar and others entitled *Statistical Analysis of National and Washington State Fish Consumption Data* explains:

> We do not know of a representative survey that covers fish consumption among the general adult population in Washington State. We have developed consumption rates from the NHANES study for the USA as a whole, but we do not know how similar fish consumption rates are between the USA and Washington State.

See TSD Attachment C at 30. It is impossible to determine whether the national data is similar because there has been no survey of Washington's general population.[2] Before undertaking the process of significantly revising water quality standards, Ecology should take the time to conduct such a survey and gather needed data about current fish consumption patterns.

Noting a similar lack of survey data in Idaho, the Idaho Department of Environmental Quality (DEQ) is contemplating conducting its own fish consumption survey. The

[2] A recent review of the Polissar paper by Casey Olives, Ph.D. suggests without explanation that "there is strong reason to believe that the US data are NOT representative of WA State." *See* Attachment D to the Technical Support Document. Without any Washington data, however, there is no way to know whether national data are representative, and if not, how Washington consumption patterns might differ from national patterns.

Idaho DEQ determined that an ideal survey should provide a distribution of long-term fish consumption rates, account for seasonality, characterize consumption for the general population and high-consuming subgroups, and identify sources and species of consumed fish.[3]

Significantly, Ecology has also failed to take steps to evaluate data that is available to better understand Washington consumption patterns. As noted in the Polissar paper, it may be possible to obtain the NHANES study data and focus on various subsets of that data, such as data from Washington, the Pacific Northwest, or coastal states. *See* TSD Attachment C at 30-31. Ecology should make an effort to evaluate existing data before finalizing the Technical Support Document.

B. The Source of Fish

In considering fish consumption rates, the source of the fish being consumed is important for several reasons. First, the regulation of water and sediment quality in Washington has the potential to only affect tissue chemical concentrations in fish and shellfish raised in Washington waters. The consumption of fish raised in other geographic locations (e.g. salmon from Alaska, swordfish from the Grand Banks) has no relevance to the policy decisions surrounding Washington's sediment management standards or water quality standards.

The Department will eventually use fish consumption rates to perform complex risk calculations. Those calculations can be performed properly only if the source of fish being consumed is understood properly. Furthermore, in order for the public to properly understand how water and sediment quality regulations may affect the safety of the fish and shellfish they consume, it is important to be clear about the source of seafood.

Second, the Department will eventually have to make important policy decisions about how to regulate water and sediment quality. Among other things, the Department will have to decide whether human health criteria should be established on a site-specific basis, an intra-state regional basis, a state-wide basis, or in some other way. Understanding not only how much of the fish consumed is raised in Washington, but where it is raised is necessary to inform those policy decisions.

For these reasons, we believe that the Technical Support Document should provide as much information as possible about the source of fish being consumed. The document should be clear about the source when it is known and should acknowledge the limitations of data when the source is not known.

We have identified the following places in the Technical Support Document where source information is not provided:

- Pages 8-9. The Technical Support Document presents data on commercial fish landings in Washington, but no information about where this fish is sold and

[3] The Idaho DEQ initiated negotiated rulemaking to evaluate local and regional information in September 2012. The Department's presentation from the first public negotiated rulemaking meeting on October 4, 2012 is available at http://www.deq.idaho.gov/media/904469-58-0102-1201-negotiated-rulemaking-deq-presentation-1012.pdf.

consumed. The document implies that this fish is consumed in Washington, but provides no data to support that implication. The document should provide information about the percentage of fish and shellfish sold in commercial outlets that is from Washington versus imported from other states or countries. When discussing commercial fish landings, the document should also distinguish between the harvest of wild fish and the harvest of pen-raised fish that may be more affected by feed provided than the surrounding water quality.

- Page 13. In the discussion of the "High Estimate," the document notes that the Department of Health concluded that "in 2002 and 2004, 78 percent and 74 percent, respectively, of adults in Washington consumed store-bought fish. In 2005, 57 percent of the adults surveyed reported eating fresh fish purchased at a local grocery store or fish market (frozen fish excluded)." It then states that "Ecology estimated that between 2.9 and 3.8 million Washington adults currently consume some amount of finfish and/or shellfish." These estimates focus on the consumption of fish, not the consumption of fish raised in Washington waters. No factual information is provided to demonstrate that significant amounts of store-bought fish, even fish bought at local grocery stores or fish markets, were raised in Washington waters.

- Pages 14-16. Section 2.3.2 discusses overall fish consumption rates without identifying the source of the fish and shellfish being consumed. The consumption rates presented in this section often include seafood purchased in stores, which is less likely to have been raised in or harvested from Washington waters.

- Page 15. The first sentence states: "Information elsewhere in this report infers that many people in Washington consume fish from local waters—for example, recreational anglers and people shopping from local markets." This statement contains unsupported assumptions regarding the source of fish sold in local markets. The document presents no data indicating that local markets sell exclusively, predominantly, or even significant amounts of fish raised in Washington waters.

- Page 16. Section 2.3.2, Table 7, and the associated text should note that the Washington State Department of Health survey (the Behavioral Risk Factor Information Surveillance System) information used to define the percentage of fish consumers, and then extrapolated to the larger Washington population, does not differentiate between fish and shellfish from Washington versus other locations. A significant number of self-identified consumers might not consume any fish or shellfish from Washington waters. If information on the source of fish was collected in this survey, it should be presented. If not, the fact that the source of fish and shellfish is unknown should be stated clearly.

- Page 20. The last paragraph states: "Many Washington residents consume finfish and shellfish, with a significant amount likely coming from local sources (WDFW, 2008a, 2012)." This statement is unsupported. No data regarding the source of fish consumed is presented. The term "local sources" is also potentially misleading. Many residents may consume fish that is purchased

from a local store or local restaurant, but the fish may have been raised and harvested in another state.

- Page 63. In discussing the results of an Asian and Pacific Islander survey, the text notes that "79-97 percent of the seafood consumed came from either groceries/street vendors or restaurants." By itself, this provides no indication of whether or not the fish was raised or harvested in Washington waters. Table 28 should have indicated (on the table, not just in text) that most (79 to 97%) of the seafood consumption reported in the API survey was purchased from stores and markets.

- Page 95. The third paragraph concludes with the statement "locally or regionally harvested finfish and shellfish represents 67 to 96 percent of total finfish and shellfish reported in studies of tribal populations." The document should be more precise and distinguish between local and regional harvest. Washington water quality standards will have no impact on fish that are raised in other states within the region. The document should also note that these rates were found in studies of tribal populations *living on or near reservations*. The document should examine whether tribal members living in urban areas consume less locally harvested fish.

C. Fish Species

Which species of fish are consumed by Washington residents is important information that will be relevant to many of the policy questions that the Department will ultimately face. The Technical Support Document acknowledges that it is important to understand the type of fish consumed in order to characterize risks because different fish have different contaminant levels. *See* TSD at 31. In fact, the type of fish or shellfish can make a significant difference in the lipid content of the organism and the application of bioconcentration factors (BCFs) used to develop human health criteria.

Bioaccumulation differs substantially across species. Figure 1 shows the concentrations in several seafood types from non-urban locations in Puget Sound. Mean whole-body concentrations in the Puget Sound samples vary by over eight-fold across the species shown. In the calculation of human health criteria, bioaccumulation estimates for all these species consumed should be done using species-specific information weighted by tissue mass consumed. The type of fish or shellfish being consumed makes a big difference for exposures and risk.

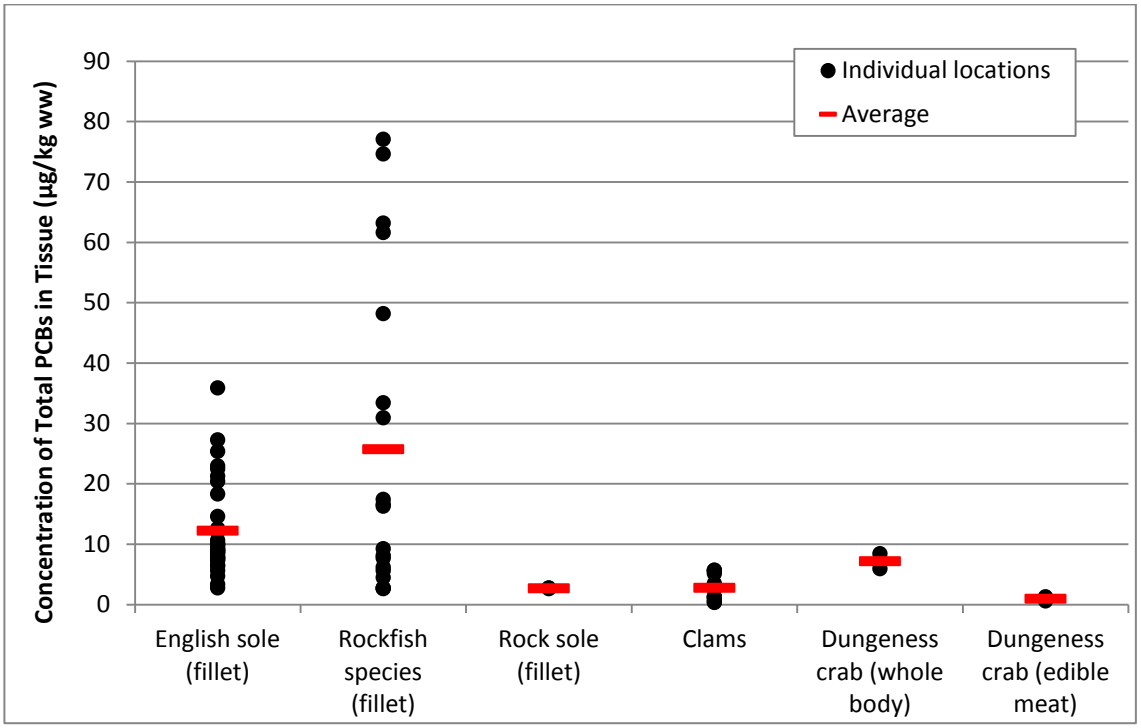


Figure 1. Total PCB concentrations in various seafood types from non-urban non-point source locations in Puget Sound

PCB BCF estimates vary widely (EPA 1980),[4] including BCFs from 13,000 L/kg for eastern oyster to over 200,000 L/kg for some fish. For hydrophobic organics, which tend to accumulate in lipids, bioaccumulation is substantially impacted by the lipid fraction of the organism. Lipid fraction is highly variable across species and contributes to the wide range of concentrations observed in different species with similar environmental exposures (Figure 1).

The BCFs used by EPA, including the BCF for total PCBs, assume 3% lipid concentration. This may be reasonable for finfish, which may constitute the majority of fish and shellfish consumed in the general US population. However, lipid concentrations in shellfish tend to be much lower, more often 1% or less (FDEP 2012). Thus, for any portion of the diet that is shellfish, the accumulation of PCBs may be overestimated by at least three-fold. The diets for some of the groups considered, such as Asian Pacific Islanders, the Suquamish Tribe, and the Tulalip Tribes, are more than 40% shellfish (based on mean consumption), which could contribute to a substantial overestimation of exposure to hydrophobic organic chemicals and therefore unnecessarily stringent water quality criteria.

Different species of fish are also found in different geographies and different types of waterbodies. As a result, different criteria might be protective of human health in different geographies. For example, it might be appropriate to develop a human health criteria for waterbodies that have active shellfish fisheries using shellfish consumption data and shellfish bioconcentration rates, while developing a different criteria for

[4] EPA advocates use of bioaccumulation factors (BAFs), which include exposure through prey and water rather than BCFs, which account only for water exposure (EPA 2000b). However, BAFs are unavailable for most chemicals.

waterbodies that have active finfish fisheries using finfish (or species specific) consumption data and bioconcentration rates.

The current draft of the Technical Support Document provides much more information about the types of fish consumed than the first draft. However, we have identified numerous places in the Technical Support Document where fish type or species information is not provided or addressed:

- Page xvi. Table 1 should provide consumption information by seafood category.

- Page 41. Although the general population information provides data broken down by species group, detailed information by species is not presented. Tables 18 and 19, for example, only provide information regarding consumption of finfish and shellfish.

- Page 63. Although the second paragraph provides some information about the kind of fish Asian and Pacific Islanders reported eating, detailed information is not presented. Table 28, for example, groups all types of fish together.

- Page 72. Table 33 should provide a summary of consumption information by seafood category rather than grouping all types of fish together to present fish consumption patterns.

D. Salmon and Other Anadromous Fish

As indicated in Appendix C of the Technical Support Document and the technical issue paper on salmon, the association of salmon tissue concentrations with local water and sediment concentrations is much more complex than for less-mobile species, and therefore, consumption of salmon should be addressed differently than consumption of other finfish. Attachment 1 to this letter, a memorandum prepared by Windward Environmental LLC, entitled "Exclusion of Salmon Consumption from the Fish Consumption Rate," addresses salmon issues in much greater detail. Its conclusions are summarized here.

The question of whether to include salmon in the fish consumption rate has previously been addressed in connection with the derivation of sediment cleanup standards for contaminated sites. EPA's tribal framework did not include salmon in the consumption rates of the Tulalip Tribes or Suquamish Tribe for risk-based decision making at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites.

> For sites in Region 10, particularly PCB-contaminated sediment sites, salmon have typically been excluded from the fish consumption rate used to estimate site-related risks. This exclusion has been based on the assumption that adult salmon spend most of their lives in the open ocean and take up

> bioaccumulative and persistent contaminants almost exclusively via the food chain in that environment.[5]

Section 4.4.1 of the Technical Support Document also notes that salmon were excluded from EPA's reanalysis of the API survey data because attributing salmon body burden to a specific site is problematic. *See* L. Kissinger, Application of Data from an Asian and Pacific Islander (API) Seafood Consumption Study to Derive Fish and Shellfish Consumption Rates for Risk Assessment (2005).

Page C-1 of Appendix C states that for cleanup decisions, Ecology has chosen to recognize that a default scenario based on a tribal reasonable maximum exposure should include salmon. This statement is provided without technical discussion, and should be deleted because it is a policy decision that is not appropriate in the Technical Support Document. Furthermore, currently available science does not support the concept that remediation of specific cleanup sites would result in lower body burdens in salmon consumed by people or wildlife.

We also believe that salmon should be excluded from any fish consumption rate used to develop human health criteria for Washington's water quality standards. Hope summarizes the tradeoff implicit in inclusion of salmon in water quality criteria as follows:

> If exposure occurs in waters within the State's jurisdiction ("waters of the state"), then more stringent [water quality standards] generated by a higher [fish consumption rate] may reduce both contaminant loads in anadromous fish and risk to humans from subsequent consumption of these fish. This benefit of lower risk, and thus increased availability for consumption, would partially offset regulatory costs associated with what are significantly more stringent [water quality standards]. If, however, anadromous species are primarily contaminated in waters beyond the State's jurisdiction (e.g., in the open ocean), then more stringent [water quality standards] may simply impose economic and legal costs on the State's economy without the offsetting benefits of reductions in contaminant loads and associated risk.[6]

As Hope and others have concluded, water quality standards would have little effect on the concentrations of hydrophobic compounds, such as PCBs, in most returning adult salmon.

Given the large amount of salmon consumed by those in Washington, it is particularly important that the Technical Support Document present fish consumption data in a way

---

[5] EPA, Framework for Selecting and Using Tribal Fish and Shellfish Consumption Rates for Risk-Based Decision Making at CERCLA and RCRA Cleanup Sites in Puget Sound and The Strait Of Georgia (2007).

[6] B.K. Hope, Acquisition of Polychlorinated Biphenyls (PCBs) By Pacific Chinook Salmon: An Exploration of Various Exposure Scenarios, 8 Integrated Environmental Assessment Management 553-562 (2012).

that distinguishes salmon consumption from other fish consumption. If consumption rates are properly understood, Ecology can then make science-based policy decisions about how to address salmon consumption in clean-up decisions and water quality standards development.

E. Population and Subpopulation Information

The Technical Support Document fails to provide important human population information, and often defines subpopulations in a narrow way that biases the fish consumption rate information that is presented. Ultimately, the State will have to make important policy decisions about relative health risks. In order to make those decisions, and to facilitate meaningful public input in the decision making process, the Technical Support Document should present population and subpopulation information in a clear and complete way.

1. General Population Fish Consumption Data

The Technical Support Document generally fails to provide population and subpopulation information necessary to put fish consumption into perspective. As a result, readers may not understand how many people are consuming fish at which rates. If Ecology is to have a meaningful discussion of the policy issues surrounding fish consumption rates, the Technical Support Document must present population numbers clearly and accurately.

For example, at page xiv, the Technical Support Document states that "Ecology estimates that between 1.4 and 3.8 million Washington adults and 290,000 children consume some amount of fish on a regular basis." Similar statements are made throughout the document. These statements should be put into perspective by providing statewide population numbers, which are presented at page 11 of the document but never referenced when the fish consumption rate is discussed. The Technical Support Document should explain, for example, that of the approximately 5.1 million adults and 1.7 million children living in Washington, Ecology estimates that between 1.4 and 3.8 million adults and 290,000 children consume some amount of fish.[7]

2. Population versus Consumer-Only Data

Whether fish consumption rates are described in terms of the entire population or just the subset of the population that consumes fish makes a significant difference. The Technical Support Document acknowledges that "[h]igh fish consumers make up a relatively small portion of the whole population, and may represent extreme upper percentiles in a distribution that includes both consumers and non-consumers of fish." TSD at 81. Nonetheless, the document typically presents fish consumption data solely in terms of percentiles of the fish consumers. This misleads the casual reader and creates a consistent bias suggesting a higher level of fish consumption in the general population than in fact exists.

In order to illustrate this point, consider the national fish consumption data presented in the Technical Support Document. According to a referenced EPA study, only 28% of

[7] More recent census data is available at http://quickfacts.census.gov/qfd/states/53000.html.

the U.S. adult population consumes fish. *See* TSD at 13. As a result, the 50th percentile of fish consumers in the United States would be the 76th percentile of the entire population, and the 90th percentile of fish consumers would be the 97th percentile of the entire population. Even though the EPA study estimated the mean fish consumption rate among fish consumers in the U.S. to be 121.8 g/day, it estimated the mean consumption rate of the *entire* population to be only 16.88 g/day. EPA, Estimated Per Capita Fish Consumption in the United States (Aug. 2002).

The issue is further complicated by differences in the way the term "fish consumer" is defined. Both Attachments C and D to the Technical Support Document identify this problem. If "fish consumer" is defined broadly to include infrequent consumers and so-called "sparse" consumers, surveys may show a greater number of fish consumers, but lower average fish consumption rates. A narrower definition would result in fewer consumers, but higher average fish consumption rates.

When subsequent policy discussions focus on average consumption rates or consumption rates at a particular percentile, it is essential that everyone understand what those rates mean, and how they would change if the entire population were considered or if fish consumers were defined differently.

The State may ultimately have to decide as a legal or policy matter whether it is appropriate to focus on all Washington residents or solely those who consume fish, but that will plainly be a policy decision. The Technical Support Document should present the information comprehensively, showing averages and percentile information for both the entire population and the fish consuming subpopulation.

We have identified the following specific changes that should be made to the Technical Support Document:

- Pages xvi, 72 and 91. Tables 1, 33 and 37 are misleading. They present fish consumption rates in terms of percentiles for fish consumers only, but do not state so clearly. The tables should be changed to include both fish consumer only and entire population percentiles.

- Page 15. The third paragraph states: "Based on EPA's *Estimated Per Capita Fish Consumption in the United States*, the 90th percentile of the estimated national fish consumption rate for adult fish consumers corresponds to 250 g/day (U.S. EPA, 2002a)." This statement is misleading because it provides a percentile that refers only to fish consumers. In fact, when the entire population is considered, the 90th percentile consumption rate is only 17.5 g/day. *See* TSD at 96. The document should provide both numbers.

- Pages 40-42. Tables 17-19 and Figures 1 and 2 present fish consumption data in terms of fish consumers only. It should also present percentile rates relative to all survey respondents.

3. Geographic Information

The consumption of fish and shellfish varies by location, as shown in the Attachment 2: Map Fish Consumption Rates,[8] which illustrates general consumption patterns based on tribal survey information. Consumption is influenced by population patterns, cultural practices, and availability of habitat to support fish and shellfish. Section 5.2 of the Technical Support Document acknowledges the influence of geographic differences; however, this section should also cite EPA Region 10's tribal framework document, which uses habitat consideration, in particular the availability of high-quality intertidal habitat, in the selection of seafood consumption rates for cleanup decisions.[9]

The variability in Washington State waters by location is an important factor in determining the types of fish and shellfish available for consumption and the quantity consumed. For example, a river or lake in eastern Washington would not support the same shellfish consumption rates as those reported for the Suquamish Tribe or even Tulalip Tribes. Although Section 6.3 of the Technical Support Document discusses geographic variability, the fish consumption data presented throughout the document is often presented in a way that does not highlight geographic distinctions.

4. Individual Tribal Populations

The Technical Support Document presents information gathered in fish consumption surveys of individual tribal populations in the Northwest. This information, however, is not always presented clearly and completely, and therefore, may mislead many readers.

First, the Technical Support Document should be clear when it is referring to these surveys. In several places the document refers to "regional" fish consumption information when in fact it is referring to studies focused on specific high-consuming tribal populations. When no qualifier is provided, most readers are likely to assume that regional fish consumption information is information about the typical fish consumption of the general population in the region. In fact, the Technical Support Document acknowledges that no general population surveys have been conducted in Washington or the region. We note the following specific statements that should be revised:

- Page 4. The fourth bullet should be revised to read: "In Version 1.0 of this Technical Support Document, Ecology provided the results of a statistical evaluation from ~~regional-specific~~ fish dietary surveys <u>of various high-</u>

[8] Fish consumption information in Attachment 2 was taken from the Technical Support Document, the EPA Framework for selecting and using tribal fish and shellfish consumption rates for risk-based decision making at CERCLA and RCRA cleanup sites in Puget Sound and the Strait of Georgia (2007), and the fish consumption survey of the Tulalip and Squaxin Island Tribes referenced in the Technical Support Document.

[9] As part of the Framework, Region 10 recommends, as a policy decision, that for CERCLA and RCRA sites in Puget Sound or the Strait of Georgia with extensive intertidal habitat, the consumption rate derived by EPA from data collected by the Suquamish Tribe represents a sustainable consumption rate suitable for estimating site-related risks. Again, as a policy decision, for sites in Puget Sound and the Strait of Georgia that lack extensive intertidal habitat, the consumption rate derived by EPA from data from the Tulalip Tribes represents a sustainable consumption rate.

consuming population subgroups in the region." Likewise, the fifth bullet should be revised to read "This Technical Support Document is focused on finfish and shellfish resources in the Pacific Northwest, Washington State fish-consuming populations, and information from ~~regional-specific~~ fish dietary surveys of various high-consuming population subgroups in the region."

- Page 21. The fourth paragraph should be revised to state "in the absence of a statewide fish dietary survey, Ecology believes that the fish dietary information from ~~regional~~ fish-consuming tribal populations is useful and relevant for making sound risk management decisions that protect Washington State's residents."

- Page 22. The first full paragraph uses the phrases "[t]hese regional surveys" and "[t]hese regional fish dietary surveys" to refer to surveys that address small high-consuming populations. They should be revised to refer to surveys of individual tribal populations.

- Page 71. Heading "2. Regional Survey Data" should be revised to read "2. Northwest Tribal Survey Data. Likewise, the text should read "… the following regional tribal surveys . . ."

- Page 95. The third paragraph begins by referring to "four key fish consumption surveys conducted in the Pacific Northwest. It should refer to "four key tribal fish consumption surveys…"

Second, the Technical Support Document should present population data concerning American Indians and Alaskan natives in Washington when discussing fish consumption rates. At page 17, the document indicates that there are 103,869 American Indians and Alaskan natives in Washington (73,523 adults and 33,599 children), but does not indicate the number who live on or near reservations, or the number who live subsistence lifestyles. Ecology appears to be suggesting that the various surveys of tribal members living on or near tribal reservations can be used to estimate the fish consumption rates of all American Indians and Alaskan natives who live in Washington. Assuming it were appropriate to draw such inferences, it would be important for readers to understand how many of the American Indians and Alaskan natives live on or near reservations or live lifestyles comparable to the subsistence lifestyles described in some of the published surveys. It seems likely that American Indians and Alaskan natives who live away from reservations may eat a larger proportion of fish that is not locally raised or harvested, particularly if they live in urban areas.

Third, when presenting tribal fish consumption rate survey data in terms of percentiles, the Technical Support Document should include tribal population numbers. This would allow the reader to understand how many tribal members consume fish at or above the rates associated with various percentiles.

Fourth, Ecology should consider noting in the Technical Support Document that the highest individual consumption rates reported in the regional studies presented have been treated differently. In the Columbia River Inter-Tribal Fish Commission (CRITFC), and API data summaries presented in the Technical Support Document,

consumption rates that were deemed unreasonably high based on comparison with the population mean or distribution were either corrected or not used in calculations. None of the data were excluded and no corrections to the highest reported consumption rates were made in the analyses presented of the Suquamish, Tulalip Tribes, and Squaxin Island Tribe data. Inclusion of these highest rates strongly influences the mean and upper percentile estimates (e.g. 95th percentile and above) for these groups, making them much higher.

a. CRITFC Study

Section 4.3.1 of the Technical Support Document discusses the CRITFC fish consumption survey, which involved "adult tribal members who lived on or near the Yakama, Warm Springs, Umatilla or Nez Perce Reservations." The document should clearly state how many adult tribal members live on or near these four reservations. Membership information provided on tribal websites indicates that these four tribes have a total membership of approximately 17,000 (Yakama 6,300, Warm Springs 4,000, Umatilla 2,800. and Nez Pierce 3,363).[10]

When fish consumption is presented in terms of percentiles, the document should also indicate the number of tribal members associated with each percentile to demonstrate the statistical relevance of the survey data. For example, if the total population of these tribes is 17,000, and 7% of tribal members do not consume fish, then the 50th percentile consists of approximately 8,000 members, and the 95th percentile includes approximately 800 members. When consumption rates are presented without these population numbers, readers are likely to assume erroneously that many more individuals consume fish at the high rates shown.

Likewise, when the Technical Support Document provides consumption rates associated with subsistence lifestyles it should describe the lifestyle and indicate the number of people who live comparable lifestyles. At page 50, the document states that "Harris and Harper (1997) report that a fish consumption rate of 540 g/day represents a reasonable subsistence fish consumption rate for CRITFC's member tribes who pursue a traditional lifestyle." In order to understand the significance of this consumption rate, the document should indicate how many tribal members live the subsistence lifestyle represented by this rate, and how many other Washington residents have a similar subsistence lifestyle.

b. Tulalip and Squaxin Island Tribe

Section 4.3.2 discusses a survey of the Tulalip and Squaxin Island Tribe. This discussion should also include tribal population information. According to the websites of these tribes, the total membership of these two tribes is less than 4,700 (Tulalip 4,000 and Squaxin Island 650).[11] The numbers associated with the percentile consumption rates should be displayed on Tables 23 and 24. If the total population is

[10] *See* http://www.yakamanation-nsn.gov/history3.php; http://warmsprings.com/warmsprings/Tribal_Community/; http://www.umatilla.nsn.us// ; http://nezperce.org/Official/FrequentlyAskedQ.htm#7. population of the NPT

[11] http://www.tulaliptribes-nsn.gov/; http://www.npaihb.org/member_tribes/tribe/squaxin_island_tribe/.

4,700, for example, there would be 235 people consuming fish at or above the 95th percentile rate.

c. Suquamish Tribe

Section 4.3.3 discusses the Suquamish tribal fish consumption survey. This survey focused on tribal members who live on the reservation. According to the Technical Support Document, 425 tribal members live on or near the reservation. TSD at 57. Consequently, 212 people are above the 50th percentile and consume 58 g/day or more of Puget Sound fish; 47 people are above the 90th percentile and consume more than 397 g/day; and 21 people are above the 95th percentile and consume more than 767 g/day. If policymakers and stakeholders are to understand the data presented in the Technical Support Document, they need this population information.

The presentation of population numbers is particularly important for the Suquamish Tribe survey data. As illustrated by Figure 12 on page 73, the 95th percentile for the Suquamish Tribe is almost 3 to 4 times the 95th percentile rate found in surveys of the other high-consuming tribes. In considering this data, it is important to understand that 4 people surveyed were at or above the 95th percentile, and even if it were appropriate to conclude that this was the 95th percentile consumption rate for the entire tribe, 21 people would consume that amount or more.

5. Asian-Pacific Islander Fish Consumption

According to the Technical Support Document, the number of Asian Pacific Islanders living in Washington is more than five times the number of American Indians and Alaskan natives. TSD at 17-18. Yet, the Technical Support Document focuses relatively little attention on the fish consumption rates of Asian Pacific Islanders. It is not clear why Ecology has apparently concluded that surveys of a few tribes should be used to provide statewide fish consumption information, yet a survey of Asian and Pacific Islander populations should not be applied statewide. *See* TSD at 71.

F. Cooking and Preparation

Ecology acknowledges that cooking and preparation methods are important. *See* TSD at 32. There are two different issues related to cooking and preparation methods and fish consumption rates.

The first issue is whether errors in the estimation of fish consumption have been made based on survey information for cooked weights, when uncooked weight is needed to apply bioconcentration factors and bioaccumulation factors. The Technical Support Document discusses this issue and appears to have properly corrected survey data where necessary so that results are presented in terms of uncooked weights.

The second issue is whether cooking and preparation affect concentrations of contaminants in fish tissue. The Technical Support Document does not include a discussion of preparation and cooking methods. Some preparation and cooking methods may dramatically decrease concentrations of some chemicals, particularly hydrophobic chemicals such as PCBs. For example, the concentrations of PCBs in raw fillet tissue have been shown to decrease by approximately 50% through the removal of the skin (EPA 2000a). Cooking may also reduce PCB concentrations in tissue, in some

cases by as much as 87%, depending on the cooking method (Wilson et al. 1998). Preparation methods such as skin removal and filleting are recommended practices to reduce chemical exposures in several pamphlets produced by the Washington State Department of Health. Of course, many of these recommendations are already common practice for consumers based on their consumption preferences. Although these preferences may differ among different population subgroups, the API and tribal studies indicate that most fish and shellfish consumed undergo some preparation (e.g., filleting, trimming) and some sort of cooking prior to consumption.

G. Information About Other States

Given the legal and policy decisions that the Department will ultimately have to make, it would be useful if the Technical Support Document provided more information about the fish consumption rates used in developing water quality standards in other states. In order to assist the Department, we have provided as Attachment 3 to this letter a matrix providing examples of fish consumption rates used in other states. We believe this information would be useful in informing further policy decisions. The final Technical Support Document should take a comprehensive look at the default fish consumption rates used in other states.

The current draft of the Technical Support Document is problematic because it repeatedly discusses policy decisions made in Oregon, without acknowledging different approaches taken by other states. The document references Oregon as an example in at least nineteen places, but does not mention the approaches taken by any other state. *See* TSD at xi, 12, 19, 22, 32, 48, 56, 61, 64, 69, 81, 86, 91, 94, 95, 99 and A-4. Other states' approaches may be relevant to the Department's ultimate policy decisions.

For example, the Idaho Department of Environmental Quality ("DEQ") reviewed nineteen fish consumption surveys and performed a quality review analysis to determine the surveys' relevance to a fish consumption rate for the Idaho general population.[12] The Idaho DEQ believes an Idaho-specific fish consumption survey would provide valuable information to support the development of water quality criteria.[13]

The Florida Department of Environmental Protection ("DEP") has determined that a probabilistic approach that directly incorporates risk levels is a more realistic and accurate assessment of the exposure risk to the general population than the more typical deterministic approach that relies on conservative estimates of key variables (e.g., body weight, fish consumption rate, water intake rate) in standard equations.[14] The probabilistic approach avoids the compounding levels of conservatism inherent in the

[12] The Idaho DEQ's presentation from the first public negotiated rulemaking meeting on October 4, 2012 contains a summary of the Department's quality review analysis. The presentation is available at http://www.deq.idaho.gov/media/904469-58-0102-1201-negotiated-rulemaking-deq-presentation-1012.pdf.

[13] Letter from Barry N. Burnell to Mike Bussell dated August 6, 2012 (response to EPA disapproval of Idaho DEQ's submitted human health criteria for toxic pollutants).

[14] Florida DEP, Technical Support Document: Derivation of Human Health Criteria and Risk Assessment (Draft July 2012), *available at* http://www.dep.state.fl.us/water/wqssp/docs/tr_review/hhc_tsd_071112.pdf.

deterministic approach. The Florida DEP technical support document also benefits from a state-wide fish consumption survey and a baseline risk analysis that described fish consumption probability distributions for the state's general adult population.

A policy decision may ultimately be made to follow the example set by one state rather than another. At this stage, however, the Technical Support Document should present a complete picture rather than singling out a particular state as more relevant than all of the others.

II. The Technical Support Document should present facts, not legal or policy opinions or conclusions.

The Technical Support Document should focus on facts and science. It should not express or imply opinions, recommendations or conclusions on legal and policy issues. Indeed, the preface to the second draft states emphatically: "This Technical Support Document . . . does not address the policy questions. It focuses quite specifically on the issue of how much and what types of fish are consumed by the people of Washington, and what data are available about fish consumption rates." TSD at xi.

In response to comments on the first draft of the Technical Support Document, Ecology Director Ted Sturdevant announced the Department's intention to publish a second draft that would focus on facts rather than policy:

> This is a technical document. It is designed to compile and evaluate available information on fish consumption in Washington State. It is not designed to resolve the policy issues associated with using that information to make regulatory decisions. Those issues will be dealt with in separate rulemaking documents and processes. We will change the document to more clearly highlight this distinction.

Letter from T. Sturdevant to Interested Parties dated July 16, 2012.[15] Boeing agrees with the Department's decision. Legal, regulatory or policy decisions of this magnitude should be made after a robust debate and an appropriate process. Indeed, the Department is legally obligated to follow APA rulemaking procedures when

[15] Director Sturdevant's letter announcing the publication of the second draft of the Technical Support Document echoed this same theme:

> [W]e have revised the document to focus more clearly on the scientific and technical issues associated with estimating the amount of fish and shellfish eaten by people in Washington. . . . Ecology agrees that policy decisions are appropriately addressed during the process for revising the state's water quality standards, in the sediment management standards, or through the preparation of cleanup action plans for individual sites. Consequently, the recommendations on selecting a default fish consumption rate for one or more programs (Chapter 7) have been removed. Other sections have been revised to better distinguish science issues and regulatory decisions associated with the scientific data.

Letter from T. Sturdevant to Interested Parties dated Aug. 30, 2012.

making these decisions. *See Simpson Tacoma Kraft Co. v. Ecology*, 119 Wn.2d 640, 835 P.2d 1030 (1992).

Boeing appreciates the Department's efforts to remove many of the policy statements that were found in the original draft. However, the current draft continues to contain many policy-laden opinions, recommendations and conclusions that should be removed. In particular, we have identified the following:

- Page xiii. The last sentence of the second paragraph states: "Current fish consumption rates used by the Washington State Department of Ecology (Ecology) to make regulatory decisions are not consistent with what we know about how much fish people in Washington eat." This is a policy conclusion that should be deleted. If the fish consumption rate is intended to reflect the average daily consumption of locally-harvested, non-anadromous fish by the average person in Washington, the current fish consumption rates used in connection with the sediment management standards and water quality standards are fairly consistent with the data presented in the Technical Support Document. Instead, this statement expresses a conclusion that reflects different assumptions about many legal and policy issues that have yet to be resolved.

- Page 21. The last sentence of the third paragraph states: "Regional-specific fish dietary information indicates that Washington State's fish-consuming populations eat more fish than what is reflected in the rates used to establish regulatory standards and, as a result, Ecology wishes to consider whether Washington's fish-consuming populations are adequately protected." Again, this statement expresses a conclusion that reflects assumptions about many legal and policy issues that have yet to be resolved. It should, therefore, be deleted.

- Page 71. The fourth paragraph states "Ecology believes that these surveys provide credible information about fish consumption in Washington and could be used to estimate fish consumption rates protective of Washington State's fish-consuming populations." This sentence refers to three surveys of tribal members living on or near reservations. Although those surveys provide information about the fish consumption of the surveyed tribal populations, it is a significant policy question whether the consumption rates of those individual tribal populations should be used to determine rates that are protective of Washington residents, most of whom consume fish at much lower rates. The Technical Support Document should not include this kind of policy-laden conclusion.

- Pages 89-100. Chapter 6 of the Technical Support Document addresses policy questions that Ecology may be considering in future proceedings. The Technical Support Document begins the chapter by stating that "[i]t is a technical document and is not designed to resolve policy issues associated with using that information to make regulatory decisions." This is correct. It is unclear, however, why this chapter discussing policy issues is included in the document at all. A much longer chapter would be required to fully and fairly place the fish consumption rate issue within its legal and policy context. This

document should stick to the facts and science associated with fish consumption, and therefore, this chapter should be deleted.

- Page 93. Section 6.3 identifies three options for addressing variations in fish consumption rates: a single statewide rate, multiple regional rates, and site-specific rates. This is clearly a policy position, and should be removed from the document. There are certainly other available options. For example, Ecology could use different consumption rates for different fish species or different categories of fish. Ecology could also use different rates for different types of waterbodies.

- Page 95. The first paragraph in section 6.5 ends with the statement: "in protecting waters of Washington State, a uniform level of protection should be maintained for all fish-consuming populations in Washington State." This is a legal and policy conclusion that does not belong in a purely technical document.

- Page 97. The last sentence of the fifth paragraph includes a parenthetical implying that an exposure scenario must fall between the 90th and 99th percentile of the exposure distribution in order to be "reasonable." The parenthetical should be deleted to avoid presenting a policy conclusion.

- Page C-1. The first paragraph concludes with the sentence: "MTCA provides greater flexibility for site-specific modifications to regulatory standards, whereas the CWA requirements are rigid and site-specific adjustments to human health criteria are rare." This is an opinion or conclusion about legal and policy issues that should not be included in this technical document.

III. The Technical Support Document should present scientific information accurately.

If the Technical Support Document is to fulfill its objective of informing future policy discussions, it must present scientific information accurately. An accurate presentation must acknowledge any limitations of the data or studies being discussed. Although the Technical Support Document generally presents the scientific information it discusses accurately, there are some inaccuracies that should be corrected.

- Page xiv. The fifth paragraph states: "Ecology estimates that between 1.4 and 3.8 million Washington adults and 290,000 children consume some amount of fish *on a regular basis*." (Emphasis added.) However, at page xvi, the document states "Ecology estimates that between 1.4 and 3.8 million adults in Washington eat finfish or shellfish *at least occasionally*." (Emphasis added) The second statement appears to be more accurate.

- Page 5. The first paragraph states: "Available information indicates that Washington residents consume some amount of local finfish or shellfish." This statement is inaccurate and imprecise. It incorrectly implies that all residents eat local fish. According to data elsewhere in the document, between 27% and 72% of adults in Washington eat some fish occasionally, and only 18% of children eat some fish occasionally. A significant portion of Washington's population eats no fish. No data are presented that establish rates of locally

raised or harvested fish. We suspect that a much greater percentage of the population eats no fish raised or harvested in Washington, particularly if salmon is excluded.

- Page 7. The first paragraph states: "Most Washington residents consume some local finfish or shellfish." There does not appear to be any support in the document for this statement.

- Section 4.1 of the Technical Support Document should cite EPA's tribal framework document and the Kissinger reinterpretation of API data rather than referencing solely Windward Environmental's Lower Duwamish Waterway remedial investigation as the source of agency decisions regarding the seafood consumption rate selection. The rates used in the Lower Duwamish Waterway Remedial Investigation are site-specific EPA and Ecology policy decisions and should be cited as such.

- Page A-7. Appendix A.3 of the Technical Support Document, Table A-7 should note that the Asian Pacific Islander data are for the consumption of King County fish and shellfish only, and that the rates are based on Kissinger's work for EPA's Office of Environmental Assessment. Kissinger should be referenced instead of Windward Environmental.

- Attachment D, page 5. The uncertainties associated with the upper percentiles of seafood consumption, particularly for studies with smaller sample sizes, should be acknowledged and explored. This point is raised in Attachment D by Dr. Casey Olives. He states, "In most cases, published tribal data are not accompanied by estimates of uncertainty and individual-level data is in general not available. At the very least, a full treatment of uncertainty for the national data and for the Tulalip tribe data would provide some benchmarks which could help the reader understand the order of magnitude of uncertainty in the reported rates." We agree with Dr. Olives that this simple analysis would be very useful in helping people understand the uncertainty associated with these values. It should be done for all data sets considered, or at *the very least, for* the national and Tulalip data sets, which are available to Dr. Polissar.

Conclusion

Thank you again for the opportunity to comment on the *Fish Consumption Rates: Technical Support Document, Version 2.0*. The second draft of the document significantly improves on the first, but, as expressed in this letter, many concerns remain. Boeing requests that Ecology defer the Technical Support Document until these concerns are addressed and Ecology conducts a state-wide survey to accurately determine fish consumption across all Washington populations.

The Technical Support Document should present accurate, comprehensive and objective scientific information and data to properly inform future legal and policy decisions on water quality and cleanup standards. Boeing applauds Ecology's decision to focus on separating technical information from policy decisions and to remove a default fish consumption rate from the Technical Support Document. Nevertheless, important information is missing from the second draft or is presented in a non-

objective (biased) manner. A key component missing from the Technical Support Document is a lack of sufficient data or information about the fish consumption patterns of Washington's general population. In order to properly inform the policy decisions, the document should present factual information, including both population information and fish survey results in context. The Technical Support Document should be clear about the source and species of consumed fish, and the geographic distribution of fish consuming populations throughout the state. And, the document should acknowledge where significant information gaps remain. Without these changes, we are very concerned that the Department's plan to drive a major increase in the fish consumption rate will result in unachievable standards that will negatively impact both our operations in Washington, the state's economy and quality of life, with little to no improvement to water quality. We urge Ecology to carefully consider these impacts before moving forward with this document and proceeding with the associated rulemakings.

Boeing remains committed to working with Ecology and other stakeholders on these significant issues. Please do not hesitate to contact me or Lori Blair at (425) 965-9776 on this important matter.

Sincerely,

Terry Mutter
Director Enterprise Strategy
Environment, Health & Safety
The Boeing Company
PO Box 3703 MC 9U4-08
Seattle, WA 97124
(425) 237-1940
terry.m.mutter@boeing.com

Attachments:
1 – Exclusion of Salmon Consumption from the Fish Consumption Rate
2 – Tribal Consumption Rates Map
3 – State Fish Consumption Rate Table

ATTACHMENT 1

Windward environmental LLC

200 West Mercer St. • Suite 401 • Seattle, WA 98119
Phone: 206.378.1364 • Fax: 206.973.3048 • www.windwardenv.com

MEMORANDUM

To: Perkins Coie

From: Windward Environmental

Subject: Exclusion of salmon consumption from the fish consumption rate

Date: October 24, 2012

This memorandum presents an overview of the available information regarding the question of whether to include salmon consumption in the fish consumption rates (FCRs) to be used in the derivation of water quality criteria (WQC) as well as the determination of site-specific sediment cleanup standards.

The Washington Department of Ecology (Ecology) recognizes that this issue is highly complex and controversial, and thus an appendix to the *Supplemental Information to Support the Fish Consumption Rates: Technical Support Document* (Ecology 2012b), hereafter referred to as the Technical Support Document (TSD), and a technical issue paper (TIP) (Ecology 2012c) were devoted to its evaluation.

Based on a review of this information as well as a review of salmon consumption information, we conclude that salmon should not be included as a default in the FCR for either purpose (WQC derivation or setting sediment cleanup standards). Inclusion of salmon may be considered under highly specific circumstances, which would require site-specific technical arguments.

PROBLEM STATEMENT

In Section 6.4 of the TSD, Ecology (2012b) identified two key questions in deciding whether and how salmon consumption should be incorporated into FCRs used in regulatory decision-making.

- How should the default rates take into account the consumption of fish species such as salmon that spend much of their life outside of Washington waters?

- How should the complex life cycle and biology of the different anadromous fish such as salmon be considered when making regulatory decisions?

Ecology (2012b) then laid out four options for consideration:

- Include salmon consumption in statewide FCR (e.g., Oregon State Department of Environmental Quality [ODEQ])
- Include salmon in regional FCR that reflects the diversity of water bodies, species, and fish consumption patterns
- Evaluate the inclusion of salmon in the FCR on a site-specific basis for cleanup sites or specific dischargers based on the site's contribution to salmon body burdens
- Exclude salmon consumption from the statewide FCR (e.g., EPA Region 10 framework, federal ambient water quality criteria [AWQC] for the protection of human health)

In the TSD (Ecology 2012b), Ecology did not state a preference for one option or another.

However, in Appendix C (p. C-1) of the TSD (Ecology 2012b), Ecology made the following statement:

> "For cleanup decisions Ecology has chosen to recognize that a default scenario – based on a tribal RME – should include salmon in the FCR, but that the regulatory framework should recognize that some of those fish spend time outside of WA waters and that this should be addressed on a site-specific basis. This choice – to include salmon for cleanup decisions – also highlights that the solutions depend on the question. Because of the flexibility afforded by the MTCA Cleanup Regulation, this answer is appropriate for cleanup decisions."

Thus, Ecology appears to imply that the policy decision has been made for the Model Toxics Control Act (MTCA)/Washington State Sediment Management Standards (SMS), although no mention of this decision is presented in the *Draft Sediment Management Standards (SMS) Rule Proposed Amendments* (Ecology 2012a), and the TSD "was not designed to resolve policy issues"(Ecology 2012b).

Appendix C of the TSD (Ecology 2012b) goes on to state, "Questions of using FCRs in the context of human health-based water quality criteria have a separate set of policy choices that could lead to a different solution."

We agree that derivation of WQC and site-specific sediment cleanup standards are quite distinct from one another. We disagree that salmon should be included by default in either case, and thus, the above text from Appendix C of the TSD should be deleted because:

- The TSD is not a policy document; and
- Currently available science does not support the concept that remediation of site-specific cleanup sites would result in lower body burdens in salmon consumed by people or wildlife.

For cleanup sites, special consideration of salmon was made in the US Environmental Protection Agency's (EPA's) tribal framework document (2007). In that document, salmon were not included in the consumption rates for the Tulalip Tribes or Suquamish Tribe for risk-based decision-making at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites.

> "For sites in Region 10, particularly PCB-contaminated sediment sites, salmon have typically been excluded from the fish consumption rate used to estimate site-related risks. This exclusion has been based on the assumption that adult salmon spend most of their lives in the open ocean and take up bioaccumulative and persistent contaminants almost exclusively via the food chain in that environment. "

Furthermore, Section 4.4.1 of the TSD, the Washington State Department of Ecology (Ecology) (2012b) notes that salmon were excluded from EPA's reanalysis of the Asian and Pacific Islander (API) survey data because attributing salmon body burden to a specific site is problematic (Kissinger 2005).

In deriving WQC, Hope (2012) summarizes the tradeoff implicit in the inclusion of salmon in WQC, as follows:

> "If exposure occurs in waters within the State's jurisdiction ('waters of the state'), then more stringent WQS generated by a higher FCR may reduce both contaminant loads in anadromous fish and risk to humans from subsequent consumption of these fish. This benefit of lower risk, and thus increased availability for consumption, would partially offset regulatory costs associated with what are significantly more stringent WQS. If, however, anadromous species are primarily contaminated in waters beyond the State's jurisdiction (e.g., in the open ocean), then more stringent WQS may simply impose economic and legal costs on the State's economy without the offsetting benefits of reductions in contaminant loads and associated risk."

TECHNICAL ANALYSIS REGARDING SALMON EXPOSURE

Before FCR policy can be set, several key technical questions need to be resolved. The most important technical question is:

- What is the potential for water quality standards (WQS) or site cleanups to affect body burdens of bioaccumulative chemicals in anadromous fish, such as salmon, that are consumed by people?

To address this question, Ecology has compiled a great deal of information in the TSD (Ecology 2012b) and salmon TIP (Ecology 2012c) demonstrating that salmon represent a diverse group of fish with a wide range of life history characteristics that influence their potential for exposure to contaminants in water, sediment, and food resources. To relate this array of information to FCR policy, two critical questions surface:

- What salmon species are consumed by people and at what percentages?
- What percentage of the body burden of the salmon species that are consumed might be attributable to exposure at a specific site (for SMS) or within Puget Sound (for WQS)?

We appreciate the information provided in the TSD (2012b) and TIP (Ecology 2012c) that helps to inform these questions. The following key facts summarized from the TSD and TIP are particularly germane.

1. Although Puget Sound salmon may accumulate contaminants from freshwater, estuarine, or marine habitats during their life cycle, several studies cited in the TIP indicate that salmon accumulate most of their adult body burden of persistent bioaccumulative toxins (PBTs) in the marine waters of Puget Sound and the Pacific Ocean.
    - Kelly et al. (2007) reported that sockeye salmon spawning 10 to 1,200 km upstream in the Fraser River accumulated the majority of their polychlorinated biphenyls (PCBs) and polychlorinated dibenzo-*p*-dioxin (PCDD)/polychlorinated dibenzofuran (PCDF) body burdens from marine food sources and pathways.
    - O'Neill et al. (1998) reported that Chinook and coho salmon accumulate > 98% of their PCB body burden in the marine waters of Puget Sound and the Pacific Ocean.
    - O'Neill and West (2009) indicated that, even in the PCB-contaminated Lower Duwamish Waterway, the vast majority (> 96%) of PCB accumulation in Chinook salmon occurred in the marine environment, with little freshwater or estuarine contribution.
    - Cullon et al. (2009) reported that 97 to 99% of PCB, PCDD/PCDF, dichlorodiphenyltrichloroethane (DDT) and hexachlorocyclohexane (HCH) concentrations in returning adult Puget Sound Chinook were acquired during their time at sea, not in fresh water or estuaries.
    - The accumulation of relatively high contaminant body burdens in marine environments is consistent with the high metabolic rates, heavy feeding, and fast growth during marine residence (Quinn 2005; cited in Ecology 2012b).
2. Chinook salmon resident to Puget Sound have higher body burdens of PBTs than do other salmon, particularly PCBs. For resident Chinook salmon, the great

majority of their growth and contaminant uptake (> 96%) occurs in Puget Sound. Therefore, body burden accumulation for resident Chinook salmon may be an indicator of environmental conditions within Puget Sound. The TIP (Ecology 2012c) provides the following support:

- O'Neill et al. (1998) demonstrated that adult Chinook from Puget Sound and coastal populations had higher concentrations of PCBs than did coho from the same locations (53.9 and 28.9 µg/kg, respectively).
- O'Neill et al. (2006) reported that concentrations of PCBs, DDTs, and PBDEs were higher in coho and Chinook populations that have more coastal distributions than those measured in chum, pink, sockeye salmon, which have more oceanic distributions.
- O'Neill et al. (2006) also reported that resident Chinook, had 2 to 6 times the amount of PCBs than did non-residents, and 5 to 17 times the polybrominated diphenyl ether (PBDE) body burden.

3. Body burdens in resident Chinook are highly variable but generally correspond with the basins where they are captured. The TIP (Ecology 2012c) provides the following support:
   - O'Neill and West (2009) demonstrated that Chinook from central and southern Puget Sound tend to have higher contaminant body burdens than those from northern Puget Sound. PCB concentrations in returning adults from central and southern Puget Sound averaged 80 and 60 ng/g, respectively; whereas, PCB concentrations in Chinook from rivers in the northern portion of Puget Sound were significantly lower (40 ng/g).
   - O'Neill and West (2009) attributed the higher PBC concentrations in South Puget Sound stocks to more significant feeding and residency time in the more highly contaminated South Puget Sound habitats and attributed the high variability within stocks to poorly understood differences in diet, overwintering, and movement among individual fish.
4. Geographic differences in Chinook contaminant body burdens generally correspond with those of Pacific herring, which are a key prey item.
   - The TIP (Ecology 2012c) described the results of West et al. (2008), which reported that Pacific herring from central Puget Sound are 3 to 9 times more contaminated with PCBs and 1.5 to 2.5 times more contaminated with DDTs than those from northern Puget Sound and the southern Strait of Georgia.
5. Hope (2012) modeled the potential for changes in WQS to affect PCB concentrations in fall Chinook salmon under a variety of scenarios. A scenario for resident fall Chinook in a confined marine water body such as Puget Sound was specifically included. The results indicated that for resident Puget Sound

> Chinook, changes in WQS are predicted to affect contaminant body burdens by ≤ 2 times because non-point sources constitute the major source of legacy contaminants such as PCBs. For other salmon, with open ocean adult residency, WQS were not expected to affect body burdens.

The above information, as summarized from the TSD (Ecology 2012b) and TIP (Ecology 2012c), indicates that resident Chinook salmon contaminant uptake may be attributable to exposure within Puget Sound as a whole and to a lesser degree to regions within Puget Sound but not to specific locations or sites. Some fraction of coho and pink salmon contaminant uptake may also be attributable to exposure within Puget Sound, but the fraction of residents in the population is small relative to ocean migrants.

Given these findings, WQS are unlikely to have a significant effect on contaminant uptake by salmon, with the possible exception of resident species (primarily resident Chinook). The TSD and TIP should be revised to clearly state this information.

As an aside, much of the other information presented in the TIP (Ecology 2012c) (i.e., salmon abundance trends; life history information for egg, fry, and adult life stages; potential impacts on juvenile and adult salmon) does not address key questions relevant to the FCR. Although the impacts of contamination on salmon is of concern for both Puget Sound ecology and harvest, the inclusion of information on contaminant effects on salmon themselves is not germane to the determination of whether salmon should be included in FCR calculations. Thus, the TIP (REF) should be re-focused to evaluate the potential effects of life history information on exposure to people through the consumption of salmon, and this extraneous information should be deleted.

TECHNICAL ANALYSIS REGARDING EXPOSURE TO PEOPLE CONSUMING SALMON

We appreciate the information provided in the TSD (Ecology 2012b) that describes the relative abundance of the different salmon species and harvest by human consumers. This information is helpful in determining the relative importance of the different species and runs to consumers, which is critical to providing the link to FCR policy. Based on the information summarized above, it is clear that Puget Sound exposure is likely to significantly affect only one salmon species (i.e., resident Chinook). To understand the ramifications on WQS, it is necessary to understand what percentage of consumed salmon is resident Chinook salmon.

Table C-4 of the TSD (Ecology 2012b) reports the population status of 208 individual runs among six salmon species, Chinook, chum, coho, pink, sockeye, and steelhead, as determined by the Washington State Department of Fish and Wildlife (WDFW) salmon and steelhead stock inventory assessment (SASI) (WDFW 2002). Although these data provide some indication of the variety of salmon populations present, because run sizes vary from dozens to thousands of fish, they do not clearly describe the relative numbers of the various species. Run size estimates for each stock are provided in SASI (WDFW 2002) and should be summarized in the TSD (Ecology 2012b).

Of greater importance to understanding the role of salmon consumption in FCRs is the contribution of each species and stock to harvest. Limited harvest data are provided in TSD Tables C-8 through C-10 (Ecology 2012b), which report sport catch of salmon for a subset of Puget Sound river systems (i.e., Dungeness River, Elwha River, Morse Creek, and Strait of Juan de Fuca [Port Angeles area]) for the years 2001 through 2003 (summarized in Table 1). This limited dataset indicates that coho and pink salmon constitute more than 90% of the recreational fish harvest. To facilitate an understanding of the relative importance of resident Chinook salmon, recreational harvest data that is summarized over a longer time period and includes all Puget Sound fisheries should be provided.

Table 1. Summary of 2001 to 2003 sport salmon catch for Strait of Juan de Fuca (Port Angeles area), Dungeness River, Elwha River, and Morse Creek

Species	Average Sport Salmon Catch (No. of Fish)	Percentage of Total Average Catch
Coho	14,584	70
Steelhead	647	4
Chinook	1,074	6
Pink	7,575	19
Sockeye	2	0.01
Chum	22	0.18

Note: Summarized from TSD, Appendix C, Tables C-8 through C-10 (Ecology 2012b).

Commercial and tribal fishery data should also be summarized to provide a complete picture of Puget Sound salmon harvest. Table 2 summarizes Puget Sound-wide commercial and tribal fisheries data for the years 2000 to 2011 (PFMC 2012). Combined, pink and sockeye salmon constitute 85% of the catch. The relatively high catches of sockeye and pink salmon have been attributed to a heavy reliance on returns to the Frazier River (NRC 1996). The contribution of different runs to the total harvest is not summarized in the TSD (Ecology 2012b). Puget Sound is divided into nine marine fishing areas (Marine Areas 5 through 13), and WDFW collects data on commercial, tribal, and sport catches in each area. A summary of harvest data over several years for each area would provide insight into the contribution of more- and less-contaminated salmon stocks to harvest. In particular, such data could provide insight into the contribution of resident central and southern Puget Sound Chinook to the fishery.

Table 2. Year 2000 to 2011 average annual commercial net and troll salmon catches in the Strait of Juan de Fuca and Puget Sound

Species	Annual Average Catch (No. of Fish)	Percentage of Total Average Catch
Chinook	110,451	3
Coho	301,490	9
Pink	1,108,114	34
Sockeye	1,330,546	41
Chum	407,649	13

Source: PFMC (2012)

The data presented in Tables 1 and 2 provide a gross indication of the relative importance of the different salmon species to human consumers, and clearly indicate that Chinook salmon are a minority contributor to sport and commercial catch.

For specific consumer groups, such as tribes, salmon species-specific estimates for various consumer groups are not provided in the TSD. The fish consumption survey of the Suquamish Tribe (2000) provides some insight (Table 3). Based on this study, Chinook salmon constitute approximately 17% of catch by this tribe.

Table 3. Relative percentage of different salmon species consumed by adult members of the Suquamish Tribe

Salmon Consumed	Percentage of Diet
King (Chinook)	17.06
Sockeye	14.42
Coho	16.30
Chum	20.65
Pink	2.99
Other salmon/unspecified	13.57
Steelhead	8.70
Salmon at gatherings	6.31

Source: Suquamish Tribe (2000)

TSD Table 24 (Ecology 2012b) indicates that Puget Sound salmon constitute 72% of fish consumption for Squaxin tribal members. Assuming that Squaxin tribal consumers eat Chinook salmon in the same proportion as do Suquamish tribal members (i.e., 17% of salmon consumed), the inclusion of Chinook in the FCR would account for 12% of their overall exposure; whereas, 60% of their overall exposure from fish (i.e., the percentage contributed by other salmon) would be attributable to salmon from oceanic sources. Given that WQS may reduce resident Chinook body burdens by only two-fold (Hope

2012), WQS are unlikely to result in a significant decrease in potential exposure to hydrophobic compounds, such as PCBs, from the consumption of salmon.

CONCLUSION

The technical analysis presented above shows that WQS would have little effect on the concentrations of hydrophobic compounds, such as PCBs, in most returning adult salmon consumed by people and thus salmon consumption should not be included in the FCR for WQS. The one notable exception is resident Puget Sound Chinook salmon, which have a higher exposure within Washington waters because they grow to adult size in Puget Sound rather than in the Pacific Ocean. Hope (2012) estimates that WQS could reduce the concentrations in these resident species by less than approximately 2 times. Given these findings, the following is recommended:

- Consumption of salmon should not be included in site-specific consumption rates for sediment cleanup sites. Salmon are highly mobile species that accumulate contaminants primarily throughout their migration in marine waters. The attribution of contaminant uptake from specific locations cannot reliably be determined because of the large home ranges of these fish and the high variability in contaminant uptake patterns within stocks stemming from differences in diet, overwintering, and movement among individual fish.
- Consumption of salmon should not be included in FCR used in the derivation of WQS. Only one type of salmon, resident Chinook salmon, appears to accumulate a significant portion of its body burden from exposure to Washington waters. And although data regarding the type of salmon consumed by people in Washington State are limited, the consumption of Chinook salmon (including resident Chinook) ranges from 3 to 17% of total salmon consumption (Tables 1 through 3).

REFERENCES

Cullon DL, Yunker MB, Alleyne C, Dangerfield NJ, O'Neill S, Whiticar MJ, Ross PS. 2009. Persistent organic pollutamts in chinook salmon (*Oncorhynchus tshawytscha*): implications for resident killer whales of British Columbia and adjacent waters. Environ Toxicol Chem 28(1):148-161.

Ecology. 2012a. Draft sediment management standards (SMS) rule proposed amendments. Chapter 173-204 WAC. Review version, August 15, 2012. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, WA.

Ecology. 2012b. Supplemental information to support the fish consumption rates: technical support document. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, WA.

Ecology. 2012c. Technical issue paper: Salmon life history and contaminant body burdens. In: Supplemental information to support the fish consumption rates technical support document. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, WA.

EPA. 2007. Framework for selecting and using tribal fish and shellfish consumption rates for risk-based decision making at CERCLA and RCRA cleanup sites in Puget Sound and the Strait of Georgia. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

Hope BK. 2012. Acquisition of polychlorinated biphenyls (PCBs) by Pacific Chinook salmon: an exploration of various exposure scenarios. Integr Environ Assess Manag 8(3):553-562.

Kelly BC, Gray SL, Ikonomou MG. 2007. Lipid reserve dynamics and magnification of persistent organic pollutants in spawning sockeye salmon (*Oncorhynchus nerka*) from the Fraser River, British Columbia. Environ Sci Tech 41(9):3083-3089.

Kissinger L. 2005. Application of data from an Asian and Pacific Islander (API) seafood consumption study to derive fish and shellfish consumption rates for risk assessment. Office of Environmental Assessment, US Environmental Protection Agency Region 10, Seattle, WA.

NRC. 1996. Upstream: salmon and society in the Pacific Northwest. Committe on Protection and Management of Pacific Northwest Anadromous Salmonids, National Research Council. Published by National Acadamies Press, Washington, DC.

O'Neill SM, Ylitalo GM, West JE, Bolton J, Sloan CA, Krahn MM. 2006. Regional patterns of persistent organic pollutants in five Pacific salmon species (*Oncorhynchus spp*) and their contributions to contamination levels in northern and southern resident killer whales (*Orcinus orca*). Extended abstract. 2006 Southern Resident Killer Whale Symposium, April 3-5. 2006, Seattle, WA. National Oceanic and Atmospheric Administration; Fisheries and Oceans Canada.

O'Neill SM, West JE. 2009. Marine distribution, life history traits, and the accumulation of polychlorinated biphenyls in Chinook salmon from Puget Sound, Washington. Trans Am Fish Soc 138:616-632.

O'Neill SM, West JE, Hoeman JC. 1998. Spatial trends in the concentration of polychlorinated biphenyls (PCBs) in chinook (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*) in Puget Sound and factors affecting PCB accumulation: Results from the Puget Sound Ambient Monitoring Program. Puget Sound Research '98:312-328.

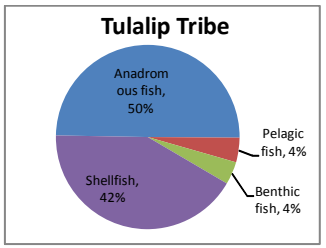
PFMC. 2012. Review of 2011 ocean salmon fisheries: Stock assessment and fishery evaluation document for the Pacific Coast Salmon Fishery Management Plan. Pacific Fishery Management Council, Portland, OR.

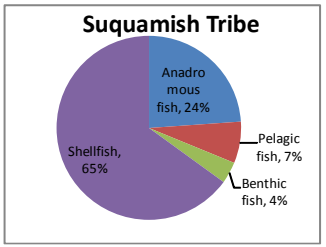
Quinn TP. 2005. The behavior and ecology of Pacific salmon and trout. American Fisheries Society in association with University of Washington Press, Seattle, WA.

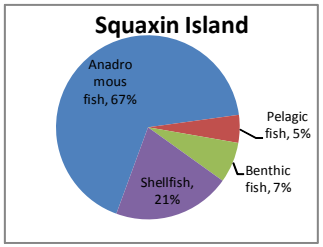
Suquamish Tribe. 2000. Fish consumption survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation, Puget Sound region. The Suquamish Tribe, Suquamish, WA.

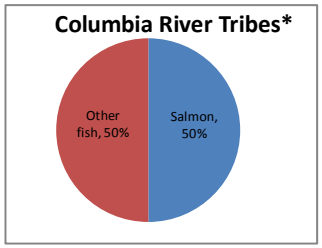
WDFW. 2002. Salmonid stock inventory (SaSI) 2002 [online]. Washington Department of Fish and Wildlife, Olympia, WA. [Cited May 2010.] Available from: http://wdfw.wa.gov/fish/sasi/.

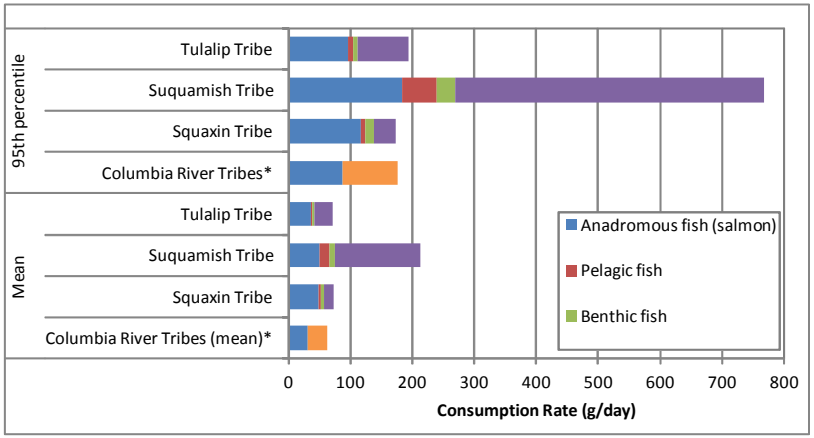
West JE, O'Neill SM, Ylitalo GM. 2008. Spatial extent, magnitude, and patterns of persistent organochlorine pollutants in Pacific herring (*Clupea pallasi*) populations in the Puget Sound (USA) and Straight of Georgia (Canada). Sci Tot Environ 394:369-378.











Wind Ward environmental LLC

N

Attachment 2: Tribal Consumption Rates Map

Prepared by craigh, 10/24/2012, W:\Projects\Boeing FCR Support\Data\GIS\5324 Tribal fish consumption.mxd

* For the Columbia River Tribes survey, respondents were not asked about shellfish consumption

ATTACHMENT 3

State Fish Consumption Rate Table

State	Default Fish Consumption Rate	Risk Level
Alabama	30 g/day	10^{-6}
Colorado	17.5 g/day	10^{-6}
Louisiana	6.5 g/day	10^{-6}
Maine	32.4 g/day	10^{-6}
Minnesota	30 g/day	10^{-5}
Montana	17.5 g/day	10^{-5}
North Carolina	17.5 g/day	10^{-6}
Oregon	175 g/day	10^{-6}
Vermont	6.5 g/day	10^{-6}

TransAlta Centralia Generation LLC
913 Big Hanaford Road
Centralia, Washington
USA 98531

(360) 736-9901
www.transalta.com

October 26, 2012

Mr. Ted Sturdevant, Director
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Fish Consumption Rates Technical Support Document, Version 2.0

Dear Mr. Sturdevant:

Thank you for the opportunity to comment on the Second Draft of the Department's Fish Consumption Rates Technical Support Document. These comments are being submitted on behalf of TransAlta Centralia Generation LLC and TransAlta Centralia Mining LLC. The comments presented here are general although some specific comments are referenced by chapter or section number in the draft document.

Chapter 1, Table 2
The table shows the relationship of specific "grams per day" consumption rates to other ways of expressing the rate. In the 17.5 grams per day column the "frequency of 8-ounce meals" actually equates to over 18 ounces of fish per month or approximately two meals, not "one 8-ounce meal" as shown on Table 2.

Chapter 2, Section 2.3.2 and 2.3.3
Section 2.3 estimates the number of "high fish consuming" individuals using only the 90th percentile information for Washington State or national values. In this section it does not clearly identify that the Department intended to convey the 90th percentile as an example of one of the many choices for defining high fish consumers. The choice of the 90th percentile is clearly a policy choice which is not identified as such in this document. This section should be modified to show ranges and/or other options for the policy choice of defining what constitutes high consumers. The section should include all information for ranges like the 75th, 90th, and 95th percentiles, similar to information presented elsewhere in the document, and not focus a single value thereby leading the reader to believe that the 90th percentile is the only choice. The choice of what level defines a high fish consumer is a policy decision that must be made outside of this technical support document and the TSD should supply all the information necessary to support that policy decision.

Washington State General Fish Consumption Rate Survey

As is noted in Chapters 3 and 4, there is no specific survey data that identifies the fish consumption rates that would generally apply within Washington State. The Department has made the effort to re-asses the national survey and assumed it applies appropriately to Washington residents, but it is not clear that a survey performed in Washington would give similar results. TransAlta suggests that Washington should perform a survey to determine the appropriate rates and the source of the fish consumed (local native fish, local farmed fish, or fish from waters not under Washington State control) for the general population of the State.

Chapter 6, Statewide Default Fish Consumption Rate

Discussion in Chapter 6 still implies that a statewide default fish consumption rate is the goal of the Department of Ecology (see section 6.4), although the section is discussing policy implications, the options listed lead the reader to believe that "default" rates and "statewide" rates are the only choices available for policy decisions. As noted in our comments on Version 1.0, there is no justification for setting a statewide default rate for fish consumption given in this document particularly with respect to sediment management. Therefore, references to "default" and "statewide" rates should be eliminated from this portion of the document.

Ecology must not set a default statewide fish consumption rate to be used by multiple programs or a default rate to use statewide. Each program (MTCA, sediments, water quality, etc.) should set rates appropriate for the intended location or intended needs of the program. Additionally, there are clearly multiple regions and watersheds in Washington with different fish, different needs, and different populations of fish consumers. At a minimum the Puget Sound, coastal rivers and their tributaries, and the Columbia River and its tributaries should be considered as separate and distinct ecosystem types with different needs, uses, and different fish consumption rates should be evaluated for each of these regions. Any discussion of a statewide default rate should be eliminated from this document by the Department of Ecology and left to consideration by the water quality policy group.

Chapter 6 and Appendix C, Accounting for Exposure and Fish Diet Fraction in Salmon Consumption

Section 6.4 and Appendix C of the document identify salmon consumption, fish diet fraction, and the fact that salmon and other anadromous fish may obtain a large or small fraction of their body burden of contaminants from Washington waters as issues. However, Appendix C of the document proceeds to state that the Department will include salmon in the fish consumption estimates for cleanup decisions. TransAlta assumes this means the proposal to modify the Sediment Management standards (SMS) that is currently proceeding through the public comment process. The Department may need to modify this section of the document based upon comments received on the SMS rulemaking.

Additionally, Appendix C does not offer enough information to make informed policy decisions on including salmon or some fish diet fraction of salmon consumption in the decision making process. It is a general review of salmon life cycles and contaminant body burdens, without clear indications of where the salmon obtained those pollutant burdens. If that information is included in other documents, like the July Technical Issue Paper referenced in Section 6.4, those documents or the necessary parts should have been included in Appendix to this document and included in this public review process.

Additionally, any discussion of fish consumption rates (including salmon consumption) needs to include where the fish are obtained as Appendix C discusses farmed salmon consumption. This data must be included in the document as the general population of Washington State is unlikely to obtain the majority of the fish that it consumes directly from Washington waters. The fish consumption rates must remove any consumption of fish where the contaminants in those fish are not directly attributable to Washington waters. To include consumption of fish that was harvested or raised in Washington water in the rates used for regulation of Washington waters would increase stringency of Washington water quality standards while providing no reduction in health risk for Washington residents.

Chapter 6, Sources of Fish

The first paragraph of section 6.5 states "a uniform level of protection should be maintained for all fish-consuming populations in Washington State". However, the EPA's 2000 Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health states in section 1.6 "With AWQC derived for carcinogens based on a linear low-dose extrapolation, the Agency will publish recommended criteria values at a 10^{-6} risk level. States and authorized Tribes can always choose a more stringent risk level, such as 10^{-7}. EPA also believes that criteria based on a 10^{-5} risk level are acceptable for the general population as long as States and authorized Tribes ensure that the risk to more highly exposed subgroups (sportfishers or subsistence fishers) does not exceed the 10^{-4} level." The Department of Ecology seems to have ignored this guidance in the document. This is clearly a much higher level of protection than is required by "federal law and policy" and is also clearly a "policy" decision not a "technical" issue to be addressed in this document. If the Department is planning to set fish consumption rates at a level to protect all fish consumers at "a uniform level", then that is a policy decision to be made later and it should not be expressed in this document as if that decision has already been made. Any discussion of a "uniform protection" must be removed from the document and left to consideration by the water quality policy group.

Chapter 6, Acceptable Risk Levels

Section 6.8 discusses risk levels and references only Oregon State's policy discussions. As noted in the above paragraph, the EPA has risk policy and guidance that is directly applicable to Washington's efforts to address this issue. The Department should rely on the EPA guidance and not guidance from the State of Oregon that has made policy decisions to create a standard that exceeds the requirements of the EPA rules and guidance. Oregon has chosen a much higher level of protection than is required by federal law and policy and should not be referenced as the sole guidance to follow. This discussion is clearly a policy decision to be addressed with policy group and the EPA. As such, EPA guidance should be referenced in this section not Oregon guidance.

Please feel free to contact me at (360) 807-8031 or at brian_brazil@TransAlta.com if you have any questions related to these comments.

Sincerely,

Brian Brazil
Environmental Manager
TransAlta Centralia Generation

October 26, 2012

Washington Department of Ecology
Toxics Cleanup Group
fishconsumption@ecy.wa.gov

Submitted Via Email

RE: Public Comments on Ecology's Draft Fish Consumption Rates Technical Support Document Version 2.0

Dear Department of Ecology:

Columbia Riverkeeper, Spokane Riverkeeper, the Puget Soundkeeper Alliance, and North Sound Baykeeper (collectively "Washington Waterkeepers") submit the following comments on the Washington Department of Ecology's (Ecology) draft *Fish Consumption Rates Technical Support Document: A Review of Data and Information About Fish Consumption in Washington Version 2.0* (Second Draft Report). Waterkeepers Washington is a coalition of Waterkeeper Alliance members in Washington State and represents thousands of individuals who regularly eat fish caught in Puget Sound and Washington rivers and streams.

The cultural, health, and economic benefits of the state's aquatic resources cannot be overstated. Puget Sound, the Columbia River, the Spokane River, and countless other waterbodies across the state provide healthy sources of food for individuals and families from all walks of life. Yet Washington State has dozens of fish advisories and many individuals are eating less locally caught fish and shellfish because of fear of toxic exposure. Despite these facts, Washington has relied on one of the nation's lowest fish consumption rates—6.5 grams per day—for nearly two decades. By using a low fish consumption rate, Washington's regulations which are intended to protect public health and aquatic resources fail to achieve these objectives.

Despite the critical importance of protecting people from toxic pollution, Ecology's Second Draft Report is a significantly watered down version of the draft *Fish Consumption Rates Technical Support Document: A Review of Data and Information About Fish Consumption in Washington Version 1.0* (First Draft Report). Specifically, the Second Draft Report omits important recommendations on a state default fish consumption rate and how the rate should account for consumption of salmonids. As we explained in a letter sent to Ecology and the U.S. Environmental Protection Agency (EPA) earlier this month, we are joining the Northwest Indian Fisheries Commission (NWIFC) and many Washington State Tribes in calling on EPA to take over the state's broken process and establish new human health criteria water quality standards. Ecology's decision to make significant changes to the Second Draft Report is one of several reasons for this decision. The department, however, still has the opportunity to restore important recommendations contained in the First Draft Report. We urge Ecology to issue a final Technical Rate Report that includes recommendations on a default fish consumption rate for use in the state's forthcoming human health criteria revisions and sediment management standards.

I. Specific Comments on the Second Draft Report.

A. Ecology Should Restore Recommendations on a Default Rate.

The First Draft Report recommends a default fish consumption rate that would protect all people in Washington who eat fish, including those individuals that eat a lot of fish, such as Native Americans, Asian and Pacific Islanders, and some recreational fishers. *See* First Draft Report at 92. Aside from pressure from industry, it is entirely unclear what changed between the development of the First Draft Report and the Second Draft Report to prompt Ecology to remove critical recommendations and analysis from the technical report. Moreover, Ecology routinely published technical reports that contain policy recommendations based on reviewing scientific literature or Ecology-commissioned studies. What is different about the fish consumption rate analysis?

Ecology now states that the report should not include any policy recommendations. Yet, as the Second Draft Report acknowledges, the line between "science" and "policy" is not always clear. Furthermore, the underlying purpose of the Report is to provide the Department with expert input on an accurate rate. In reality, the Second Draft Report—despite being scrubbed of a fish consumption rate recommendation—still contains a number of policy recommendations.

The Final Technical Rate will advance Ecology's work to adopt new standards if it contains a science-based recommendation on an accurate, protective fish consumption rate. Unfortunately, Ecology's abrupt decision to remove major recommendations and discussion from the Second Draft Report casts doubt on the entire process.
//
//

B. Ecology should Account for "Suppression" Impacts in the Fish Consumption Rate.

The Second Draft Report acknowledges the impact of "suppression effects" when calculating the fish consumption rate. *See* Report at Section 5.3.3. "Suppression effects" refer to suppressed fish consumption rates due to a variety of reasons including habitat degradation, fish and shellfish contamination, lower fish and shellfish abundance, and fewer numbers of Native Americans practicing subsistent or traditional lifestyles. For example, the Second Draft Report states:

> Studies indicate that tribal fish consumption rates are suppressed compared with historical rates and presumable rates that would exist given historical fishing stocks. The recommendations in this report, however, were developed using existing data from published studies.

In short, the Report acknowledges that suppression effects exists, but fails to provide any recommendations on how the department should account for suppression effects in adopting a default fish consumption rate or site specific fish consumption rates. This misses an important component of identifying an accurate fish consumption rate. Waterkeepers Washington recommend that Ecology revise the Report to include specific recommendations on how site specific and default fish consumption rates can account for suppression effects.

C. The Report Acknowledges, but Fails to Account for Increased Fish Consumption by Children Living in Coastal States.

Ecology estimates fish consumption rates from children based on a national average. This is a flawed estimate because, as the department acknowledges, people in coastal states consume more fish. Specifically, Ecology assumes that approximately 290,000 Washington children eat some amount of fish on regular basis. The Second Draft Report states that its estimate for fish consumption by children "is based on current population estimates and national survey results that indicate that 16 to 19 percent of children reported eating some amount of finfish or shellfish." Second Draft Report at 17. The Second Draft Report also acknowledges that "[s]tudies have shown that people living in coastal states tend to consume finfish and shellfish at a higher frequency and higher rates than inland states." *Id.* at 19.

Despite acknowledging increased fish consumption in coastal states, Ecology fails to incorporate this fact into the fish consumption rate estimates for children. Instead, the department defaults to the national average. Waterkeepers Washington recommends that Ecology revise Second Draft Report to account for increased fish consumption in coastal states by children.

D. Ecology Should Account for Salmon and Steelhead Consumption When Calculating the Default Fish Consumption Rate.

Waterkeepers Washington urges Ecology to retain the First Draft Report's recommendation: salmon consumption should be included in calculating the state fish consumption rate. Ecology discusses this issue at length and requests input from stakeholders on this decision. As we explained in our January 18, 2012 comment to Ecology (First Comment

Letter), studies demonstrate that salmon are exposed to and impacted by bioaccumulative toxins during life stages spent in state-regulated waters. Ecology should restore recommendations contained in the First Draft Report that support including salmon in calculating a default fish consumption rate.

The Second Draft Report also states that "[m]ost states have adopted human health-based water quality criteria that do not include anadromous salmon." Ecology provides no authority for this blanket assertion, let alone an explanation for why this is "good policy" or "sound science." We recommend that Ecology omit this statement from the final report or provide authority and explanation for its value in developing a fish consumption rate.

Like the First Draft Report, the Second Draft Report fails to address the impacts of toxic pollution on Columbia River salmon and steelhead stocks. Instead, without explanation, the Report focuses exclusively on Puget Sound. Our First Comment Letter, along with other comments submitted to Ecology, provided extensive information on the impact of toxic pollution on salmon and steelhead during life stages spent in the Columbia River. For example, the Columbia River Intertribal Fish Commission's comment letter on the First Draft Report states:

> Recent studies demonstrate that salmon receive a significant percentage of their body contaminant burden from the freshwater portion of their life cycle through contact with contaminated sediments and ingestion of contaminated food sources. (NOAA, 2009, Data Report for Lower Columbia Juvenile Salmon Persistent Organic Pollutant Exposure Assessment, prepared by the Environmental Conservation Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, for the NOAA Damage Assessment Center and Portland Harbor Natural Resource Trustees; and Sloan, C.A., et. al, 2010, Polybrominated Diphenyl Ethers in Outmigrant Juvenile Chinook Salmon from the Lower Columbia River and Estuary and Puget Sound, Washington, Arch. Contam. Toxicol, (2010), 58:403-414.) Ecology should consider these findings when reviewing the discussion contained in Appendix E – *The Question of Salmon*.

Letter from CRITFC to Ecology (Dec. 20, 2011).

Other studies on toxics in salmon conducted in the lower Columbia River demonstrate that PCBs and DDTs are accumulating in the bodies of outmigrating juvenile salmon. For example, a study published in 2007 showed that almost one-third of juvenile salmon had PCB concentrations that exceeded threshold levels for adverse health effects such as metabolic alterations, reduced growth immune dysfunction, and reduced long-term survival. Johnson, L.L. *et al.* 2007a. Persistent Organic Pollutants in Outmigrant Juvenile Chinook Salmon from the Lower Columbia Estuary, USA. Science of the Total Environment, 374: 342-366; *see also* Meador et al. 2002. Use of Tissue and Sediment-Based Threshold Concentrations of Polychlorinated Biphenls (PCBs) to Protect Juvenile Salmonids Listed Under the U.S. Endangered Species Act. Aquatic Conservation: Marine and Freshwater Ecology, 12: 493-516. Other studies found amounts of DDT in some juvenile salmonid bodies at levels that could contribute to disruption of the endocrine and immune systems. Beckvar *et al.* 2005. Approaches

for linking Whole-Body Fish Residues of Mercury or DDT to Biological Effects Thresholds. Environmental Toxicology and Chemistry, 24: 2094-2105.

The findings of the *Lower Columbia River and Estuary Monitoring: Water Quality and Salmon Sampling Report* ("LCREP study") also support including salmon when calculating the fish consumption rate. The LCREP study explains:

> A salmon fry hatches with toxic contamination in its body from the fats and proteins it inherits from its mother, who deposits toxics during egg production. As the young salmon maneuvers and fees, it takes in additional toxics in several ways: from the water that passes over its skin and through its gills, from bed sediment it ingests as it pursues bottom-dwelling prey, and from suspended sediment it swallows during feeding. The aquatic and terrestrial insects it eats also contain toxics, which then are absorbed in the fish's body.

Lower Columbia River Estuary Partnership. 2007. *Lower Columbia River and Estuary Ecosystem Monitoring: Water Quality and Salmon Sampling Report* at 18. The LCREP study also discusses exposure profiles of salmon populations, stating:

> Because toxic contaminants are unevenly distributed and different salmon populations use different habitats, the types and levels of toxics that juvenile salmon are exposed to in the lower Columbia River and estuary vary from one population to the next. Ocean-type juveniles rear in the lower river for weeks or months during the first year of life. They take refuge and forage in side channels, shallow marshes, and swamps—**the very areas where bioaccumlative toxics can build up if contaminant sources are present**.

Id. at 19 (emphasis added). The LCREP study further explains:

> Given the habitat use and relatively long estuarine residence time of ocean-type juveniles, their contaminant exposure profiles tend to reflect toxics present in the habitat and prey species of the lower river. These toxics include both water-soluble toxics, such as pesticides currently being used, and bioaccumulative toxics, such as PCBs and DDT. Thus ocean-type juveniles experience both short-term and bioaccumulative toxicity.

Id. In short, toxics present in the lower Columbia River account for toxics found in salmon during later life stages.

The impacts of toxins in the Columbia River are not limited to ocean-type juvenile salmonids. The LCREP study explains that stream-type juveniles, which spend most of their first year in freshwater tributaries, are also impacted by toxic pollution in the estuary and freshwater environment. The study states:

> When they [*i.e.*, the stream-type juveniles] do migrate downstream, they move through the estuary more quickly than ocean-types do, using deeper water habitats and spending more time in the plume waters. Consequently, the exposure profile of stream types is

more likely to reflect toxics in upstream tributaries and the water-soluble toxics in the river's deeper channels.

Id. at 19. After conducting monthly juvenile salmon sampling at multiple points along the lower Columbia River, the LCREP study found the following toxic pollutants in juvenile salmon: PCBs, PAHs, Organochlorine, pesticides, PBDEs, and vitellogenin. In particular, the LCREP study detected PCBs, PAHs, DDTs and PBDEs in both the bodies and stomach contents of juvenile salmon, including that prey are a source of exposure to these bioaccumlative toxics. *Id.* at 43. Notably, the LCREP study found that "[t]he highest concentrations of PCBs, PAHs, and PBDEs were observed in salmon from sites near the more industrialized areas of the Columbia River: lower Willamette River, confluence of the Columbia and Willamette rivers, Columbia City, and Beaver Army Terminal. *Id.* In short, the findings of the LCREP study support Ecology's decision to include salmon when calculating the fish consumption rate.

We again urge Ecology to revise the Second Draft Report to incorporate information and recommendations based on the impact of state-regulated waters on Columbia River salmon and steelhead stocks.

II. Conclusion.

Ecology's recent decisions related to the sediment management standards and human health criteria water quality standards cast doubt on the department's commitment to protect public health in Washington State in the near future. We urge Ecology to reconsider its decision to remove important recommendations from the Second Draft Report and move swiftly to finalize the report so that it can advance important work on adopting accurate standards. Thank you in advance for considering these comments.

Sincerely,

Brett VandenHeuvel
Executive Director
Columbia Riverkeeper

Bart Mihailovich
Spokane Riverkeeper

Chris Wilke
Puget Soundkeeper and Executive Director
Puget Soundkeeper Alliance

Matt Krogh
North Sound Baykeeper

Weyerhaeuser

CH 1J32
PO Box 9777
Federal Way, WA 98477-9777
Telephone: (253) 924-3426
Fax: (253) 924-2013
E-Mail: ken.johnson@weyerhaeuser.com

October 26, 2012

Sent by Electronic Mail to: fishconsumption@ecy.wa.gov

Adrienne Dorrah
Water Quality Program
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Dorrah:

Weyerhaeuser Company offers the following observations relating to the "*Fish Consumption Rates Technical Support Document: A Review of Data and Information about Fish Consumption in Washington - Version 2.0*" (hereafter "the TSD").

1. We appreciate the Department of Ecology's response to the many comments received on version 1.0. The Response to Comments (September 2012) was informative and the Technical Issue Papers issued concurrently with the TSD (which responded to the more significant comment topics from version 1.0) were revealing. Together, the agency's willingness to engage in this iterative process has lead to a more refined, relevant, and targeted TSD. It has certainly provided a good knowledge resource for stakeholders interested in water quality and sediment management regulatory processes.

2. This said, Weyerhaeuser has reviewed comments on the TSD submitted by the National Council for Air and Stream Improvement and is aware that The Boeing Company will be submitting comments. We endorse these comment sets. These comment packages have been developed by very knowledgeable scientists and regulatory experts.

3. While Ecology has indicated written responses will not be provided to TSD version 2.0 comments, they certainly cannot be overlooked in subsequent regulation development activities. Revisions to WAC 173-201A human health-based water quality criteria have enormous implications for all NPDES permittees (public and private) and, without overstating the matter, to the future economic development and health of Washington state. Ecology needs to have a clear commitment to incorporate the best current and credible science in regulatory development activities which rely on Fish Consumption Rate information.

Weyerhaeuser looks forward to continuing opportunities to be a constructive participant in this current set of regulation development activities. We will advocate for reliance on best scientific

information, that any outcome will achieve confident and durable compliance with Clean Water Act provisions, and will accomplish meaningful environmental and human health improvements based on application of AKART technologies.

Sincerely,

Ken Johnson

Comments received from:

Citizens

through October 26, 2012,

regarding

Washington State Department of Ecology's

Draft Fish Consumption

Technical Support Document (Version 2.0)

From:	cygnus42@aol.com
To:	ECY RE Fish Consumption
Subject:	What about the other fish-consumers in the ecosystem?
Date:	Friday, August 31, 2012 3:17:38 AM

Hellooo! People are not the only consumers of fish in the waters!

The notion that water standards depend, or are based on, human consumption metrics, makes no sense to me. That describes an anthropocentric view of the world. What if we shifted that perspective to a habitat-centric perspective? Humans are just one user of the waters, not the only one. The other, non-human fish consumers, who have no voice in human behavior regarding their habitat, must be heard, and their needs factored into the metrics.

Mark Gray
PO Box 5812
Lacey, WA 98509-5812