

To: Interested Persons

From: Martha Hankins, Washington Department of Ecology, Toxics Cleanup Program

Date: January 11, 2013

RE: Comments submitted to Ecology on the Fish Consumption Rate Technical Support Document Version 2.0 (12-09-058) Public Review Draft.

Introduction

This note describes comments received on Version 2.0 of the Washington Department of Ecology's Fish Consumption Rate Technical Support Document (FCR TSD). Although Ecology is not providing a detailed response to comments, we are providing this memo so that interested readers may see how Ecology took their comments into account and made changes to the Technical Support Document as a result of public comments received between August 30, 2012, and October 26, 2012.

Ecology read and considered all comments submitted. Overall, many excellent comments were received and led to changes that improved the document. However, we also received a number of conflicting comments. Some reviewers suggested adding information that previous reviewers had asked be removed; while other reviewers suggested removing information that previous reviewers had insisted be added.

Comments generally fell into the following categories:

1. Policy vs context
 - Tension between not mentioning policy, and providing sufficient context so that the discussion and topic makes sense
2. Technical corrections
3. Areas where additional information would be helpful
 - Expand the discussion (data gaps)
 - Provide additional analysis (i.e., uncertainty in the data)
4. Clarify a section's purpose or the information presented
5. Make information available in summary tables, improve usability

How did Ecology consider and address comments received on Version 2.0?

When addressing comments, the following principles guided Ecology's choices regarding what material should be added or removed:

- Does it provide helpful information to people working to understand the issues?
- Would general readers consider the information relevant to the question(s) at hand?
- Can it be explained in sufficient detail to contribute substantively to public dialog?
- Would it be more appropriate to summarize the information and refer readers elsewhere, or would providing some detail enable a better understanding of material presented elsewhere in the document?
- Is this a question or point that multiple reviewers and interested parties ask about?
- Can discussion of the point help explain the issues?

How did Ecology address comments about the scope of the TSD?

Some commenters suggested that the discussion in the TSD be narrow. For example, it was submitted that the potential for contaminants to have adverse effects on fish and shellfish is relevant.

It is difficult to determine where precisely to draw the line regarding inclusion of information. In general, we strived to be responsive to all reviewers over the course of developing this document, especially when thoughtful reviewers bring forward related issues. Ecology may not be in a position to thoroughly explore and investigate all areas; we have produced several companion documents to provide additional detail on some topics, and noted others without pursuing them in detail.¹ We debated about whether to include related information in the body of the document, in footnotes, or in appendices. It was agreed that too many footnotes were cumbersome and awkward, that too many appendices were unwieldy, but a brief note in the text would help readers who were interested in pursuing more. This was especially true regarding discussion of bioaccumulation.

Many readers asked for an expanded discussion of bioaccumulation. At first Ecology thought to agree with the request. However, it became clear that a sufficient treatment of this topic was outside the scope of the document, and we debated whether and how to include a discussion of bioaccumulation. In the end, we decided to leave the brief narrative, with footnotes referring readers elsewhere.

Concern was expressed that the document contains statements that have bias, reach policy conclusions, or are unsubstantiated. In response and to address this concern, certain passages were modified. For example:

- One reviewer pointed to the statement: “Many Washington residents consume finfish and shellfish, **with a significant amount likely coming from local sources.** (WDFW, 2008a, 2012).” [Emphasis added.] Concern was that Ecology does not have data showing that “many” residents consume “significant” amounts of fish from local sources. The sentence was rewritten to say: “Many Washington residents harvest and presumably consume finfish and shellfish from local waters (WDFW, 2008a, 2012).”
- It was recommended that the following sentence be deleted from Chapter 6: “However, in protecting waters of Washington State, a uniform level of protection should be maintained for all fish-consuming populations in Washington State.” This sentence was deleted because it could appear to conflict with ongoing policy discussions related to human health criteria for surface water standards.

Some reviewers commented that the document lacked consistency about its purpose. In response, we carefully examined the document and added clarifying language. To answer questions of scope and context, both original and historic documents were consulted and information was added or removed where appropriate.

How did Ecology address suggestions on organization?

Submitted suggestions were considered. For example:

- A recommendation to attach the supplemental information (the set of Technical Issue Papers) as formal appendices was explored. A commenter was concerned that the information would not be readily available to future readers. We determined that attachments are permanently electronically associated with the publication through Ecology’s publication management system.
- Visual depictions of the statistical analyses, similar to those provided in Version 1.0 of the TSD, were requested. They are being prepared as part of the final statistical analysis, and will be available as an attachment.
- Rearranging information was considered.

¹ The companion documents include *Estimating Annual Fish Consumption Rates Using Data from Short-Term Surveys*; *Recreational Fish Consumption Rates*; *Health Benefits and Risks of Consuming Fish and Shellfish*; *Chemical Contaminants in Dietary Protein Sources*; and *Salmon Life History and Contaminant Body Burdens*; and *Statistical Analysis of National and Washington State Fish Consumption Data*. These documents are collected as attachments to the Fish Consumption Rate Technical Support Document, Version 2.0 Publication Number 12-09-058.

How did Ecology address comments on technical issues?

Clarifications were added in numerous places. For example:

- The types of aquatic species consumed are frequently categorized as finfish or shellfish. This is not an obvious categorization scheme, as species such as jellyfish and octopus are not readily recognized as shellfish. Generally, though, the classification distinguishes fish (those with a backbone, gills, and fins) from all other aquatic species that are consumed (including shellfish, mollusks, and crustaceans).
- The definition and use of the terms “freshwater,” “estuarine,” and “marine” may vary according to context, with different writers and sources using the terms differently. Language was added reminding readers to always verify how any terms are being defined. For example, readers may wish to confirm how jurisdictional limits are defined by different environmental laws and statutes.
- Several people commented that dates about fish harvested in Washington do not reflect current data. The data Ecology used and presented was the most currently available at the time the TSD was written. When deciding whether to update by adding newer information, we considered whether doing so would make substantive differences.
- Useful suggestions regarding survey strengths and weaknesses were considered and included where appropriate.

Answers to specific questions raised by commenters

Terminology

Question: When referring to fish consumption rate surveys consulted by Ecology, should the term “regional specific” be replaced with “tribal?”

Answer: No, although alternative wording was considered and in some places used.

Rationale: Ecology identified several studies appropriate for consideration of regulatory fish consumption rates. These were tribal (Suquamish, Tulalip, Squaxin Island, and CRITFC) and Asian and Pacific Islanders. All of these studies meet Ecology’s measures of technical defensibility. The API study, however, included people from ten ethnic groups in King County (Cambodian, Chinese, Filipino, Japanese, Korean, Laotian, Mien, Hmong, Samoan and Vietnamese). Each of these ethnic groups has distinctive dietary practices; using the results to estimate statewide fish consumption for API populations would require that statewide, ethnic groups be the same relative percentage as King County (10% Cambodian, 14 % Chinese, 2% Hmong, etc.) Ecology consulted with biostatisticians and determined it is not appropriate to assume that the relative percentages of these ten ethnic groups in King County would be applicable for the entire state. For this reason, and although the API study is an excellent study and applicable to King County, it is not considered to be in the same category as other studies. We chose not to use the term “tribal” because it is clear that other data is possible; in fact, we expect that information on other ethnic groups (Russian immigrants, API, etc.) could be collected over time. Where appropriate, we have considered changing “regional specific” to “Pacific Northwest” or “Washington.”

National Data

Question: Should national data be provided as per capita (as opposed to consumers only) fish consumption rates?

Answer: Not at this time.

Rationale: Early in this project, the decision was made to report general population data in terms of consumers only instead of per capita. This was done:

- a) In recognition that the population of concern is fish consumers (that is, those individuals exposed to contaminants in fish and shellfish; including non-consumers in estimates of fish consumption would not be health protective).
- b) To remain consistent with the Oregon Human Health Focus Group (HHFG) report and with state and federal guidance.

Statistical Evaluations

Question: Should refinements to the statistical computations (per capita rates, confidence intervals) be provided in the main body of the TSD?

Answer: No. Ecology agrees that a number of computations are important to round out the full presentation of the statistical treatment of data. The results when complete will be part of Attachment C, Statistical Analysis of National and Washington State Fish Consumption Data (Polissar et al, 2012).

Rationale: Additional computations will be completed as part of finalizing the statistical evaluations. They will be available to interested readers as part of the body of information about fish consumption rates in Washington. In particular, the final statistical report will include:

1. Graphical displays of cumulative probability distributions for each data set.
2. Confidence intervals for each data set. (Where possible, Ecology is looking into the option of working with individual level data for this computation.)
3. A calculation of the national fish consumption rates using NHANES data without subtracting out non-consumers. This acknowledges the likelihood that even self-identified non-consumers may consume small amounts of fish in certain prepared items and will provide a national per capita rate.

Public review comments, peer review, and suggestions during the technical review meetings noted that the statistical evaluation was technically sound. It was noted that certain additions would be helpful. A draft (dated September 18, 2012) of Statistical Analysis of National and Washington State Fish Consumption Data is available; the additional computations will be included in this report as soon as they are complete.

It was suggested that per capita rates be added to Table 17 (CSFII), Table 18 (NHANES), and Table 19 (NHANES/NCI). We disagree: the utility of the Continuing Survey of Food Intakes by Individuals (CSFII) information is mostly supplanted by the more recent NHANES data. Dr. Polissar's report will include per capita information. Readers who are interested in that information can reference it there. Consistent with EPA Guidance and work by Oregon's Human Health Focus Group, Ecology made the decision early in this project to consider fish consumer data. The additional information is added to the statistical evaluation report for completeness.

Discussing Policy and Context

Question: Should Chapter 6, *Using Scientific Data to Support Regulatory Decisions*, be removed?

Answer: No.

Rationale: Although some commenters prefer that *all* policy discussion be removed from the TSD, some noted that context for the presented information is necessary. Chapter 6 is designed to provide that context. It identifies a series of policy choices that are needed when using the results from scientific studies to support regulatory decisions. The chapter identifies options that have been considered by Ecology or EPA in different regulatory settings. It does not include specific recommendations applicable to decisions under the Model Toxics Control Act or the Clean Water Act. The TSD does not select specific policy options, leaving these decisions to public processes involving interested stakeholders.

Discussion of Issues raised by commenters

Risk

One commenter recommended further discussion of the National Toxics Rule (NTR), and noted that, subsequent to the 1992 adoption, EPA guidance identified a risk range as protective of fish consumers at a corresponding range of consumption rates. This is a relevant topic for important and ongoing policy discussions. However, the FCR TSD is not intended as a discussion of risk or policy. Ecology acknowledges that since the NTR's initial publication in 1992, much has been written regarding risk and risk ranges.

Population

A number of comments asked for clarification regarding what "population" is being protected, and what is meant by "population." To provide clarification the following was added to Chapter 2:

The general population is made up of people with a variety of dietary preferences. Some consume fish frequently, some infrequently, and some potentially never. (However, even people who report they don't eat fish may consume some fish in processed foods like salad dressing, Worcestershire sauce, and cheese spread.) Per capita rates that take into account the entire population will differ from rates derived from consideration of so-called "consumer only" data. For protection of people who eat fish, the population of interest is generally considered to be fish consumers. (CalEPA 2001, p 13; Oregon DEQ 2008; U.S.EPA 2002b)

Chapter 6 notes the selection and definition of the population to protect as a key policy choice. How the different populations will be considered during rule development and which populations will be protected will be part of public processes involving interested stakeholders. The TSD and supporting analyses provide technical information to help inform these policy choices.

Chapter 2 discusses the Washington general population. Because fish consumption by definition is about people who consume fish, the FCR TSD is focused on populations of Washington fish consumers. Section 2.3 roughly estimates the number fish consumers in Washington. This is an approximation to provide perspective and context. One commenter asked for further context and seemed to suggest that the TSD should mention the state population every time it mentions fish consumers. Ecology does not agree that repetition is needed: the data is provided and readers can reference it. The commenter also said that clarification on population is further needed (section 2.3.1). The commenter seemed to suggest that per capita data should also be presented throughout the document and that the distinction be discussed further. (See National Data, above). Ecology notes that in the context of this document, the population of interest is people who consume fish.

Incorporating New Survey Data

It was noted that additional information about fish consuming populations will become available.

Ecology has reviewed information available at the time of writing. New information will always be coming, and will be evaluated as appropriate. At the time of publication of Ecology's FCR TSD, two additional fish dietary and resource use surveys for Washington State tribal populations were in progress but had not been completed.

- Results from the Colville tribal resource use survey are still being evaluated and are not yet available. [Colville Tribal Resource Use Survey, in progress]
- The Lummi Indian Nation evaluated historical fish dietary practices and rates. [Lummi Indian Nation Survey, 2012]

Many science-based regulations have built-in requirements to periodically update standards. (For example, 70.105D.030(2)(e).) This is intended to require that the agency review, address and (as appropriate), incorporate

new scientific and regulatory information. This provides a mechanism for including new data as it becomes available.

Estimating Washington Fish Consumers

Chapter 2 includes an estimate of the number of fish consumers in Washington. The calculation was done as part of the initial work on the FCR TSD using the EPA 2002 national data. It is provided as a matter of context and to illustrate that the state has significant numbers of people who consume fish. Although more recent national data is available, Ecology is not updating this calculation at this time. The calculation methodology used is consistent with the Oregon HHFG report and therefore allows direct comparison with Oregon. A footnote in Chapter 2 was expanded/clarified to say: "These estimates use the EPA 2002 data and are consistent with the methodology used by the Oregon Human Health Focus Group. They do not use the National Health and Nutrition Examination Survey (NHANES) results because these estimates were developed before that work was complete."

Clarifying the CSFII Survey Methodology

It was suggested that information be added to Section 4.2.1 to clarify the CSFII survey methodology. In particular, it was suggested that the description of the survey methodology state that the survey collected data for two nonconsecutive days "...while someone who ate fish for those two days is assumed to eat fish for 365 days per year."

This survey data allowed EPA to estimate daily average per capita consumption of freshwater and estuarine finfish and shellfish using dietary information reported by respondents. (USDA 1994 – 1996 and 1998 Continuing Survey of Food Intakes by Individuals (CSFII).) It was used to estimate intra-individual variation (dietary variation between people, as opposed to dietary variation for an individual) using data from a limited number of survey days. The statistical modeling using this distribution was employed for estimates of the upper percentiles of usual intake.

The EPA 2002 report "presents point estimates of the median, 90th, 95th and 99th percentile of the average daily per capita consumption of fish. Ninety-percent interval estimates for the percentiles were generated using bootstrapping techniques described by Efron (Efron, 1982). Interval estimates for percentiles are bootstrap intervals. The reported bootstrap intervals do not result from direct estimates of the standard deviation of the point estimate. Rather, the bootstrap estimates result from the percentile method, which estimates the lower and upper bound for the interval estimate..." EPA, 2002. Estimated Per Capita Fish Consumption in the United States; page 3-23 and page B-14

"The mean, daily average per capita fish consumption for a given habitat type was estimated as the ratio of total fish for given habitat type consumed by the population or subpopulation, divided by the estimate of the total number of individuals in the population or subpopulation." [Page 3-1, EPA, 2002]

(See also The Jackknife, the Bootstrap and Other Resampling Plans. Philadelphia, Pennsylvania: Society for Industrial and Applied Mathematics (1982).)

Tribal Populations

It was recommended that Ecology add to the report census information about tribal populations surveyed. For example, include data about the number of people living on or near the reservation.

Ecology considered this recommendation and decided not to include tribal population numbers for the following reasons:

- The report provides a summary and review of the published tribal surveys. It is not a review of the tribes themselves.
- The tribal survey data is from particular years. This raises the question about whether to consider how many people were living on or near the reservation during the survey period or at present.

- Information about a tribe can be obtained only by interested people who contact the tribe directly.
- When discussing the population of Washington, the report notes the number of tribal members living in Washington, but does not break it down by tribe. This level of detail on tribal populations is outside the scope of this report.
- Presenting tribal enrollment data could be interpreted by tribes as trivializing their importance. Although tribes represent a small percent of the population they are large consumers of fish and have treaty rights related to fishing. In the context of fish consumption rates, a discussion of tribal size would probably need to be accompanied by a discussion of treaty reserved rights.

Statistical Descriptions of Populations

It was considered whether a more detailed discussion of statistics methodology should be added. One commenter recommended that the assumed shape of the distributions (lognormal) be identified and discussed. They noted that the data are clearly skewed and that Ecology should state the distribution and summary metrics, such as the geometric standard deviation. They asked if the distributions were truncated and if so, how.

In response, some additional general information was added to the TSD. Other requested information goes beyond the scope of Ecology's analysis. Details of the statistical evaluations, however, are in Attachment C, Statistical Analysis of National and Washington State Fish Consumption Data (Polissar et al, 2012).

Uncertainty and Variability

It was pointed out that the report does not quantify uncertainty or variability.

The various factors affecting uncertainty and variability are discussed in Chapter 5. Although this report does not quantify the uncertainties associated with fish consumption rate data, confidence intervals are being computed. (Polissar, 2012 and work in progress.)

Section 5.4 provides additional focus on Pacific Northwest populations. Considerable information exists about fish consumption among Pacific Northwest populations; there is, however, variability due to differences in dietary habits between different population and among individuals within the population. Uncertainty, on the other hand, exists as a result of potential inaccuracies in how well a survey correctly captures information about the populations of interests. Information was added to the report to clarify this difference.

Salmon

Ecology acknowledges the complexities, passion, and conundra around addressing salmon. The TSD cannot and is not intended to provide a completely exhaustive review of the data or issues. The information that is provided is intended to help set the stage for further discussions and to help interested readers understand the basic regulatory dilemma. Reviewers provided many suggestions regarding technical literature; we have accommodated this where possible by adding citations to Appendix C. It should be clear that on the topic of salmon, someone will always have more to say.

Environmental Justice

Ecology removed a sentence saying that a uniform level of protection should be maintained for all fish consuming populations in Washington. This change was made in response to a comment that this sentence is a policy conclusion and should not be included in the TSD.

However, Ecology also received several comments from people who recommended that Ecology include more information on current disparities in exposure and risk and the environmental justice issues associated with those disparities. These comments highlight the importance of this issue for ongoing and future regulatory discussions. This topic has also been addressed by the National Environmental Justice Advisory Council. The Council is a federal

advisory committee that provides independent advice, consultation and recommendations to EPA on environmental justice related matters. The Council provided the following advice to EPA on Pacific Northwest fish consuming populations:

"[E]PA until quite recently employed a fish consumption rate of 6.5 grams/day for all populations. EPA now employs a fish consumption rate of 17.5 grams/day for the general populations and recreational fishers, and 142.4 grams/day for subsistence fishers. These are 90th and 99th percentile values, respectively, from a study of the general populations (fish consumers and non-consumers alike). That is to say, EPA targets protection at the 90th percentile of the general population (a point discussed further below). Compare these values with the 90th percentile of Asian and Pacific Islanders in King County, at 242 g/day or the 90th percentile of the Suquamish Indian tribe, at 489 g/day, or the 90th percentile of fishers in the Los Angeles Harbor, at 225 g/day. Consider, too, that whereas those Asian and Pacific Islanders in King County consuming at the average (mean) rate may be adequately protected were the relevant environmental standards to reflect EPA's default for subsistence fishers (142.4 g/day), those consuming at the maximum rate – 733.46 g/day would be grossly underprotected. They would fare even worse were the relevant environmental standards to reflect EPA's default for the general population (17.5 g/day). Those consuming at the maximum rate for the Suquamish Tribe (1453.6 g/day), the Laotian communities in West Contra Costa County (182.3 g/day), the Squaxin Island and Tulalip tribes (391.4 g/day), and the four Columbia river tribes (972 g/day) would be similarly underprotected – and, as discussed below, consumption at these rates may reflect the very practices that these affected groups would want to see perpetuated and protected for cultural, traditional, religious, economic, and other reasons." [NEJAC at page 28]

Data Gaps

Data gaps exist where missing information impairs the ability to make decisions. Some people commented that data gaps exist regarding the amount of fish consumption by the general Washington population and sources of fish consumed by the general population. To fill this data gap a survey of fish and shellfish consumption among the general population of Washington was recommended.

Some suggested considering information about the amount of fish sold in Washington. Ecology notes that only limited information is available by considering the seafood supply and availability.

"Approaches to collecting data on fish consumption include both indirect and direct measures. Indirect measures primarily rely on data pertaining to food availability or food disappearance into marketing channels or households, and are best regarded as a measure of food availability into commercial markets and only a rough indicator of consumption. Data from studies on food availability generally have been collected for purposes other than to estimate consumption rates, and data gaps are most serious at the level of the individual consumer; therefore, these types of data are inappropriate for estimating consumption rates for consumers (Anderson, 1986; U.S. EPA, 1992). Additionally, food availability data do not account for waste or spoilage, and interpretation of the results is highly specialized; however, the results from these types of surveys can be useful to assess trends over time (Anderson, 1986)." [Cal-EPA, 2001 on page 15]

Ecology is not aware of information about the commercial distribution routes of locally harvested fish and shellfish supplied to local grocery stores, food markets, restaurants, and other food outlets in Washington State. That is, a data gaps exist regarding the amount of locally harvested fish and shellfish purchased and consumed by the general population.

Another data gap pertains to the distribution of the various Asian and Pacific Islander ethnic groups across the state. A robust and technically defensible fish dietary survey for Asian-Pacific Islanders exists for King County, Washington (Sechena et al, 2003). Results from this fish dietary survey indicate that Asian-Pacific Islanders consume fish and shellfish. A statewide fish and shellfish dietary survey for Asian-Pacific Islanders has not been conducted. Additional information on Washington State Asian-Pacific Islanders would augment the available fish dietary information for Washington State fish consuming populations, and would better define the fish/shellfish dietary habits for these populations.

Some commenters suggested that more information is needed and that the TSD document not be finalized until data gaps are filled. In particular, it has been suggested that a survey of the Washington general population is needed. The TSD is intended to support public dialog. Ecology has decided that currently-existing data provides sufficiently useful information that can and should be a part of ongoing and future discussions. When additional information becomes available, it too can join the ever-growing wealth of data that impacts decisions about environmental protections for the people of Washington.

Conclusion

Science is both a systematic body of information and a methodology for understanding the world; like all human knowledge it is shaped by the values and perspectives of the participants. Science offers, however, a relatively objective method for approaching policy questions. It is not free of values, but provides a way of approaching objectivity. As the comments coming from all the various interests have shown, no single vantage point exists. Ecology acknowledges and respectfully thanks all persons and organizations who have provided input on this and related environmental issues.