



PUBLIC WORKS

January 24, 2012

Subject: Comments on Ecology's Fish Consumption Rates Technical Support Document

Thank you for the opportunity to review and comment on the Fish Consumption Rates Technical Support Document (TSD). The City is concerned that Ecology is moving towards a very significant change in the way human health based surface water quality criteria are established. Specifically, Ecology is keeping the risk range constant at one in a million, but changing from applying it to average consumers to applying it to high end consumers in high consuming groups.

The fish consumption data presented provides a basis to compare our existing criteria with EPA's Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). EPA's methodology says that average consumers should be protected at the 10^{-6} or 10^{-5} level and high end consumers should be protected at least to the 10^{-4} level. Our existing human health based water quality criteria meet the intent of EPA's methodology. Because people have a range of fish consumption rates, it is not possible or practical to establish one risk level applicable to all consumption rates. Consequently, regardless of the fish consumption rate basis for a criteria, those who consume less will be protected at a higher rate and those who consume more will be protected at a lesser rate. EPA recognizes this and sets certain boundaries where criteria are protective and where criteria may need to be tightened. Our current criteria appear to be protective and to not require tightening.

We recognize that Ecology could still go ahead and tighten the criteria in the interest of protecting human health, but we are concerned that the action, by focusing on fish and shellfish consumption, lacks context and balance in consideration of the various health risks associated with other sources of protein and food and also disregards the health benefits associated with fish consumption. Consequently, there is potential to do harm, by raising concerns about fish consumption and diverting people to other, potentially more harmful food. Consumers lack comparable information on quantifying risks from different types of food including red meat, poultry, dairy, processed foods, smoked foods, cereals, sweets, peanut butter, etc. Those risks may include cancer, as well as non-cancer risks, such as cardiovascular disease, diabetes, and others.

Another concern is that Ecology could set standards so low that our fish and shellfish industry would be impacted because we could end up listing all our waters as impaired for human health criteria. For example, Ecology is already listing many of NOAA's mussel watch sites in the state as impaired due primarily to PAH levels in mussels with the thresholds of concern being derived from the human health surface water quality criteria. If criteria become more stringent, then probably all mussel watch sites will need to be listed.

The following comments first address the issue of whether the fish consumption information necessitates any changes to the human health water quality criteria. Then the comments address some individual issues.

Sincerely yours,

A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke extending to the right.

John McClellan
Operations Superintendent

The current human health criteria, based on 6.5 grams/day fish consumption rate, are protective of average consumers, median consumers of high consumer groups, and high end consumers of high consumer groups.

Our current human health surface water quality criteria were adopted for our state by EPA in 1992 in the National Toxics Rule (NTR) at 40 CFR 131.36. The criteria are based on an average general fish consumption rate of 6.5 grams a day of freshwater and estuarine (not marine) fish (salmon are counted as marine fish). At the time of the NTR, EPA gave states the option of choosing a one in a million risk level or a one in one hundred thousand risk level. Washington selected one in a million. (For comparison, Alaska selected one in one hundred thousand as the risk level, resulting in less stringent human health criteria than in Washington, by a factor of 10.) Note that these risk levels assume a 70 year lifetime of exposure.

Washington's state water quality standards do not provide specific human health criteria, but instead reference to the one in a million risk level decision made by the state back in 1992, and identifies the NTR as the place where our human health criteria are. (See WAC 173-201A-240(5) and (6)) There has been no rule-making in Washington that defined fish consumption rates for water quality criteria or adopted specific human health water quality criteria.

In the preamble to the NTR, EPA describes how the criteria are based on the 6.5 grams/day average per capita US general consumption rate specific to freshwater and estuarine fish, and also describes how if the criteria were protective at the one in a million risk level, then it would also be protective of those consuming 10 times more (65 grams/day) at the one in one hundred thousand risk level which EPA considers to be adequately protective. (57 FR 60863, December 22, 1992)

EPA's *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000) discusses cancer risk range. Note that in the following quoted section, 10^{-6} means a one in one million life time risk level, 10^{-5} means a one in a hundred thousand life time risk level, and 10^{-4} means a one in ten thousand life time risk level.

- “EPA believes that both 10^{-6} and 10^{-5} may be acceptable for the general population and that highly exposed populations should not exceed a 10^{-4} risk level. States or Tribes that have adopted standards based on criteria at the 10^{-5} risk level can continue to do so, if the highly exposed groups would at least be protected at the 10^{-4} risk level. However, EPA is not automatically assuming that 10^{-5} will protect “the highest consumers” at the 10^{-4} risk level. Nor is EPA advocating that States and Tribes automatically set criteria based on assumptions for highly exposed population groups at the 10^{-4} risk level. The Agency is simply endeavoring to add that a specific determination should be made to ensure that highly exposed groups do not exceed a 10^{-4} risk level. EPA understands that fish consumption rates vary considerably, especially among subsistence populations, and it is such great variation among these population groups that may make either 10^{-6} or 10^{-5} protective of those groups at a 10^{-4} risk level. Therefore, depending on the consumption patterns in a given State or Tribal jurisdiction, a 10^{-6} or 10^{-5} risk level could be appropriate. In cases where fish consumption among highly exposed population groups

is of a magnitude that a 10^{-4} risk level would be exceeded, a more protective risk level should be chosen.” (emphasis added)

Ecology has compiled information on Fish Consumption Rates in Washington, including studies of three Puget Sound Tribes, four Columbia River Tribes, and Asian & Pacific Islanders. The data include marine species as well as freshwater and estuarine species. The weighted median consumption rate of these groups is 69 grams/day.¹ The studies also calculated high end consumer rates and Table 1 in the executive summary identified these as:

312 grams/day – 99th percentile for Tulalip Tribe,
489 grams/day – 90th percentile for Suquamish Tribe,
247 grams/day – 95th percentile for Squaxin Island Tribe,
389 grams/day – 99th percentile for Columbia River Tribes, and
306 grams/day – 95th percentile for Asian & Pacific Islanders.

Recognize that these consumption rates include anadromous fish. Anadromous fish spend much of their life in the Pacific and maybe should not be included, or if included should be discounted some percentage proportional to the part of their lives spent outside of state waters. Consequently, the mean, median, and other percentile calculations for fish consumption rates should be lowered to account for salmon spending part of their life in the Pacific.

The question can be answered now as to whether the currently applicable human health criteria from the NTR are protective according to EPA’s methodology.

6.5 grams/day is protected at the one in a million life time risk level.

65 grams/day is protected at the one in a hundred thousand life time risk level. This is comparable to the 69 grams/day weighted median consumption, but less than the 110 grams/day weighted average consumption of the above groups. If salmon consumption is discounted by a reasonable percentage, then 65 grams/day may be comparable to the average consumption as well.

650 grams/day is protected at the one in ten thousand life time risk level. It appears that the high end consumers identified in the above groups eat less than this amount.

Clearly the median consumer from these high consumer groups is still protected at the one in a hundred thousand risk range for the consumption of freshwater and estuarine fish, and if anadromous fish consumption is reasonably discounted, the average consumer from these high consumer groups will probably also be protected in this risk range. The high end consumers

¹ Calculated from number of adults surveyed in each group and the median of each group, from Table 1 in Ecology’s Technical Support Document as follows:

$$[(73*45)+(284*132)+(117*43)+512*40)+(202*78)] \div (73+284+117+512+202) = 69$$

from Table 1 are protected at better than the one in ten thousand risk range which meets EPA's methodology.

While the above groups will consume fish and shellfish mostly from state waters, and anadromous fish that spend part of their life in state waters, much of the rest of the general population will be consuming store bought fish, mostly not from state waters. Approximately 84 percent of the seafood consumed in the United States is imported, about half of that is sourced from aquaculture and domestic aquaculture provides only about 5 percent of seafood consumed in the United States.² The general population's fish consumption rate needs to be discounted to reflect fish not from state waters.

When making some adjustment to the fish consumption rate for anadromous fish consumption by the surveyed populations and for fish not from state waters for the rest of the general population, it appears that there is no need to revise the human health water quality criteria in Washington State. We also note that the current human health criteria are adopted by EPA for the state, and EPA is neither requiring the state to adopt new criteria, nor are they proposing rulemaking to change the currently applicable criteria. The human health criteria are protective within EPA's guidelines.

The City of Everett is concerned that in spite of a lack of regulatory need to change the human health criteria, Ecology is proposing to establish a default fish consumption rate in the range of 157 to 267 grams/day (based on upper 80th and 95th percentile consumption rates for high consumer groups), while applying the 10^{-6} risk level to these rates. This is a very substantial shift from setting 10^{-6} criteria to protect the average consumer which is the basis for our current human health criteria. It will be setting 10^{-6} criteria to protect the upper 80th to 95th percentile consumers of high consuming groups and counting salmon consumption fully. It will result in more stringent criteria (lower by factors of 24 to 41). It will result in having to list more waters in our state as impaired for failing to meet criteria. Such listings could impact the marketability of Washington fish and shellfish products and undermine recent efforts announced by the state and by NOAA to increase the amount of shellfish aquaculture.³ It may also scare people away from consuming fish and towards consuming other food which may be more risky, but for which Ecology provides no useful comparisons with which to make informed choices.

Significantly, some of the parameters that will be most problematic are actually legacy contaminants, no longer in production, that reside in and cycle through the biota. These include PCBs, DDTs and dioxins and furans. There are limits as to just what can be done to bring the tissue levels of these contaminants down and tissue levels do not really represent exceedences of water quality criteria. Tissue levels for some contaminants such as PCBs in salmon already

² NOAA. June 2011. National Oceanic and Atmospheric Administration Marine Aquaculture Policy. http://aquaculture.noaa.gov/pdf/noaa_aquaculture_policy_2011.pdf

³ See press release from the Office of the Governor, December 9, 2011 at http://www.ecy.wa.gov/news/2011/gov_20111209.html

exceed a 10^{-6} risk level based on 6.5 grams/day consumption⁴. Yet monitoring of surface and deep water from multiple stations in Puget Sound consistently show total PCBs at levels well below the human health based water quality criteria.⁵ Increasing the fish consumption rate, thereby making the criteria more stringent isn't going to speed the recovery or improve human health. But it will result in existing tissue concentrations being seen as exceeding human health criteria by much greater margins,⁶ and it might cause people to steer away from fish consumption towards something less healthy.

The City suggests that if any change to the fish consumption rate is considered, it should be just to match the basis for EPA's national recommended water quality criteria⁷, which are based on 17.5 grams/day for protection at the 10^{-6} risk level, and which provides 10^{-5} risk level protection for 175 grams/day, and 10^{-4} risk level protection for 1,750 grams/day. This clearly provides better than 10^{-5} risk level protection for both the weighted median and the weighted average consumers from the studied groups and provides better than 10^{-4} risk level protection for the high end consumers. Even Ecology's calculated 157 grams/day for the 80th percentile value of the studied groups is protected at better than 10^{-5} .

⁴ For example, 5.3 ppb wet weight total PCBs in fish tissue is considered to be the 10^{-6} threshold that our current human health criteria are based on. (From spreadsheet provided to Lincoln Loehr by Brandee Era-Miller on June 22, 2011.) Chinook salmon everywhere exceed this (see figure on page E-11 in the TSD).

⁵ See Table E-20 in Ecology 2011. *Control of Toxic Chemicals in Puget Sound Characterization of Toxic Chemicals in Puget Sound and Major Tributaries, 2009-2010*. Publication No. 11-03-008.

⁶ The PCB threshold will drop from 5.3 ppb wet weight to as low as 0.13 ppb wet weight, meaning that all Chinook salmon will exceed the criteria by a factor of 100 or more.

⁷ EPA 2002. *National Recommended Water Quality Criteria: 2002*. EPA-822-R-02-047.

Specific comments.

Concerns with the Suquamish fish consumption data.

Tables 1 and A-1 and C-1 identify 284 adults surveyed for the Suquamish Tribe. The text on pages 55 and 56 indicates that there were only 92 respondents out of a total of 142 potentially eligible tribal adults in the Suquamish study. It is not at all clear how 92 respondents equals 284 adults surveyed.

The Suquamish data also indicate some very high consumption rates compared to other Tribes. Have the data been made available for review? We understand that the data are not available to others who have requested, and that raises concerns about putting too much weight on the study.

Reanalysis by EPA Region 10 of Asian Pacific Islander consumption rates.

Table 1 shows a median fish consumption rate of 78 g/day and a 95th percentile of 306 g/day for Asian & Pacific Islanders, and this is used by Ecology without adjustment in developing recommended fish consumption rates.

Pages 60-62 show that EPA Region 10 reanalyzed the API data to correct for cooking weight loss, regional harvest and API population demographics and determined median fish, shellfish and crab consumption to be 5.9 g/day, and the 95th percentile to be 57 g/day (and these included salmon consumption). When salmon consumption was excluded the values dropped to 5.3 g/day and 51.1 g/day.

The reanalysis was done to develop API fish consumption rates to establish cleanup levels in the Lower Duwamish Waterway. The reanalysis provides some important insights. The significant difference from the overall API study illustrates why Ecology should not adopt a default fish consumption rate for use across the sediment, water quality and MTCA programs.

Regulatory decisions. Should they ultimately lead toward eliminating – or minimizing – risk to human health?

Ecology asserts at the bottom of page 102 that regulatory decisions should ultimately lead toward eliminating – or minimizing – risk to human health. This sounds initially like a reasonable goal, but when selectively administered in the confines of health risks from eating fish and shellfish, while ignoring other very substantial dietary risks, could have the opposite effect. An understanding of comparative risks would be good.

Human health criteria based on 10^{-6} risk applied to high end consumers could result in conclusions by Ecology in the 303(d) listing of impaired waters program, and other programs as well, that criteria are exceeded. Publicity could divert people away from consuming fish or shellfish. They would consume something else for which we have no

similar evaluations of risk level, and for which the risks (including cardiovascular) could be much greater. As such, it could result in increasing risk to human health. Regulatory decisions such as are considered here should be made and put in context of relevant relative risks.