Idaho Association of Commerce & Industry
The Voice of Business in Idaho®

August 22, 2014

Ms. Paula Wilson
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

Dear Ms. Wilson:

As a part of the development of the Idaho Fish Consumption Rate and Human Health Water Quality Criteria, DEQ has released for public comment Discussion Paper #5 – Anadromous Fish. The Idaho Association of Commerce & Industry (IACI), has been an active participant in this rulemaking and has the following comments on Discussion Paper #5.

Source of Contaminants

The ultimate result of the fish consumption rate rulemaking is the refinement of Idaho's human health water quality criteria (HHWQC) to ensure such criteria are protective of public health. Thus, understanding the potential exposure of the public to contaminants from eating fish from Idaho's waters and drinking Idaho water is key to setting water quality criteria and subsequent discharge levels for the regulated community. Underpinning this regulatory framework is the *assumption* that regulation of dischargers in Idaho directly affects the contaminants in Idaho fish and water being consumed. Thus, for anadromous fish, the substantive question related to fish consumption by Idaho residents is, where do anadromous fish acquire the majority of their contaminants of concern?

Unlike true freshwater species, anadromous fish spend a substantial portion of their life in marine or estuarian environments that are outside the jurisdiction of Idaho. If a substantial fraction of the chemical-specific body burden (mass per fish) found in returning adult salmon is acquired during time spent in the ocean, there is effectively nothing Idaho water quality criteria can do to reduce risks to humans resulting from exposure to chemicals in the salmon they eat. Thus, the ultimate question is, what fraction of the final chemical burden in Idaho's returning adult salmon is acquired in Idaho vs. in the ocean?

A review of the scientific literature shows several studies providing results relevant to this question. It is to be expected that if salmon spend time in both freshwater and saltwater habitats, they will accumulate contaminants in both types of habitats. The scientific literature (e.g., Johnson et al. 2007a,b)[1,2] shows that juvenile salmon caught in freshwater contain some mass of persistent bioaccumulative toxins [PBT; i.e., chemicals such as polychlorinated biphenyls (PCBs)] prior to outmigration to the ocean. O'Neill and West (2009)[3] found that PCB levels in adult Chinook salmon (fillets) collected from a wide range of geographic locations are relatively uniform except for fish taken from Puget Sound, which show three to five times higher levels of PCBs than fish taken from

[1] Johnson, L.L., Ylitalo, G.M., Arkoosh, M.R., Kagley, A.N., Stafford, C., Bolton, J.L., Buzitis, J., Anulacion, B.F., and Collier, T.K. 2007a. Contaminant exposure in outmigrant juvenile salmon from Pacific Northwest estuaries of the United States. Environmental Monitoring and Assessment 124:167-194.
[2] Johnson, L.L., Ylitalo, G.M., Sloan, C.A., Anulacion, B.F., Kagley, A.N., Arkoosh, M.R., Lundrigan, T.A., Larson, K, Siipola, M., and Collier, T.K. 2007b. Persistent organic pollutants in outmigrant juvenile Chinook salmon from the Lower Columbia estuary, USA. Science of the Total Environment 374:342-366.
[3] O'Neill, S.M., and West, J.E. 2009. Marine distribution, life history traits, and the accumulation of polychlorinated biphenyls in Chinook salmon from Puget Sound, Washington. Transactions of the American Fisheries Society 138:616-632.

other locations. As discussed by the authors, these data can be interpreted as indicating accumulation of PCBs in Puget Sound and/or along the migratory routes of these fish, which, depending on the specific runs, can pass through some highly contaminated Superfund sites (e.g., Duwamish Waterway). Ultimately, however, O'Neill and West (2009) concluded that, on average, greater than 96% of the total body burden (mass) of PCBs in these Puget Sound Chinook was accumulated in the Sound and not in natal river(s) based on a comparison of PCB concentrations and body burdens in out migrating Chinook smolts collected from the Duwamish River and adults returning to the Duwamish.

Even the most contaminated out migrating smolts contained no more than 4% of the body burden (mass) of PCBs found in returning adults. Thus, greater than 96% of the PCB mass (burden) found in the returning adults was accumulated in marine or ocean waters (including Puget Sound). Even allowing for an order of magnitude underestimate in the body burden of out migrating smolts, O'Neill and West (2009) concluded that accumulation in freshwater would account for less than10% of the average PCB burden ultimately found in adults returning to the Duwamish River. By extension, this analysis supports the conclusion that Chinook salmon passing through uncontaminated estuaries during out migration accumulate a dominant fraction of their ultimate PCB body burdens in the open ocean. Cullen et al. (2009)[4] concluded that 97% to 99% of the body burdens of various PBT chemicals were acquired during the time at sea (based on measurements in out-migrant juvenile and returning adult Chinook from multiple natal rivers).

EPA Guidance

This research showing anadromous fish acquire the majority of the contaminant burden in marine waters has been reflected in United States Environmental Protection Agency (USEPA) guidance. EPA has recently made proposals implicitly acknowledging that the body burden of PBTs in harvested (non-farmed) adult salmon is acquired predominantly in the ocean or marine phase of their life history.

First, as part of a recent proposal to increase the national default fish consumption rate (FCR) from 17.5 g/d to 22 g/d, USEPA (USEPA 2014a)[5] affirmed that it considers salmon to be marine fish. Although USEPA also decided to include salmon in the updated FCR at a discounted rate, this was a policy decision unrelated to the issue of where salmon accumulate PBTs. Thus, USEPA decided to include 4% of salmon consumption in the recommended FCR based on National Oceanic and Atmospheric Administration (NOAA) data showing that 4% of salmon consumed in the US was caught in fresh and estuarine waters.[6]

[4] Cullon, D.L., Yunker, M.B., Alleyne, C., Dangerfield, N.J., O'Neill, S., Whiticar, M.J., and Ross, P.S. 2009. Persistent organic pollutants in Chinook salmon (Oncorhynchus tshawytscha): Implications for resident killer whales of British Columbia and adjacent waters. Environmental Toxicology and Chemistry 28(1):148-161.

[5] United States Environmental Protection Agency (USEPA). 2014a. Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010). EPA 820-R-14-002. April 2014. Washington DC: United States Environmental Protection Agency.

[6] As reported by EPA, NOAA's landing data indicate that 96%, 3.5%, and 0.5% of salmon are caught in marine, estuarine, and freshwaters, respectively, and EPA ultimately included salmon in the recommended FCR at a discounted rate (4% of total consumption) reflecting catch in estuarine and fresh waters. If Idaho chooses to follow EPA's lead on this, including 0.5% of total salmon consumption (reflecting catch in freshwater only) in an FCR would be more appropriate considering that Idaho has no estuarine waters. In any case, to be clear: apportionment based on catch location does not accurately account for where salmon accumulate chemicals, so this decision on EPA's part was truly a matter of policy, not science.

Second, as part of guidance on implementing the proposed aquatic life tissue residue criterion for selenium (USEPA 2014b)[7], USEPA specifically states that anadromous fish should not be used to assess compliance (see Section 1.2.1. in Appendix I of the draft criteria document):

> "States and tribes should target nonanadromous species (species that do not migrate from salt water to spawn in fresh water), because selenium exposure and subsequent bioaccumulation occurs over a relatively long period of time through consumption of locally contaminated aquatic organisms."

Consistency with Northwest States

DEQ poses the question in Discussion Paper #5 whether Idaho needs to be consistent with other Northwest states in how anadromous fish are treated in determining FCR. For example, Oregon includes salmon in the FCR determination. There are several key facts that differentiate Idaho from other Northwest states.

First, Idaho water quality rules can't regulate estuarine and marine waters and, thus, cannot influence concentrations of chemicals present in such waters or the accumulation of chemicals by fish from such waters. There are significant different geographic settings between Idaho and other Northwest states (Oregon, Washington and Alaska); the other states being coastal states and Idaho an inland state. Excluding anadromous fish from the Idaho FCR computation would differ from Oregon but such exclusion recognizes and accounts for clear geographic differences between the two states. In this instance, consistency with Oregon or any other coastal state is an inappropriate and scientifically unsupportable reason for including anadromous fish in the FCR used to derive the Idaho HHWQC.

Also, unlike Oregon, Washington or Alaska, Idaho is conducting a state-wide fish consumption survey. Oregon established a state-wide FCR based on a subpopulation study of four Native American tribes published by the Columbia River Inter-Tribal Fish Commission (CRITFC).[8] This study has a number of uncertainties which include the origin and species of consumed fish (locally harvested or commercial) and the type of local harvested (anadromous, non-anadromous) fish. Furthermore, the raw data from the study have never been available for public review.

Though EPA has implied that studies such as CRITFIC (1994) provide information that can be used to establish a FCR for the State of Idaho, such a study does not represent the Idaho population, geography, and fish availability. The survey being conducted by the State of Idaho will provide a scientifically sound basis for FCR for Idaho residents.

Bioaccumulative Contaminants, Anadromous Fish and Human Health

Discussion Paper #5 and the slides presented by IDEQ at the July 23, 2014 negotiated rulemaking meeting indicate that including anadromous fish, either at a full or discounted rate, leads to greater protection of public health. This is not correct, at least as it applies to anadromous fish. For the reasons described above, namely that essentially all of the concentrations of chemicals in anadromous fish are accumulated outside of waters of Idaho, lowering Idaho HHWQC (i.e., making them more stringent) will not change the concentration of chemicals in anadromous fish caught in Idaho. Therefore, it will not improve public health by decreasing risks associated with chemicals in anadromous fish.

[7] United States Environmental Protection Agency (USEPA). 2014b. External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2014. EPA 822-P-14-001. May 2014. Washington DC: United States Environmental Protection Agency.

[8] 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.

It is true that including anadromous fish in the FCR used to derive HHWQC will lower the HHWQC (i.e., make them more stringent) and that may, in turn, be potentially more protective of public health by reducing exposures from sources other than consumption of anadromous fish (i.e., consumption of native fish, ingestion of drinking water). However, more stringent HHWQC do not necessarily translate directly to greater protection of public health for several reasons.

First, HHWQC for some chemicals may be so low as to be below common analytical detection limits regardless whether anadromous fish are included or not. For such chemicals, inclusion of anadromous fish does not increase public health protection because the lower HHWQC cannot be measured. Moreover, many PBTs are legacy pollutants and lowering their HHWQC will not result in greater protection to public health because the new criteria will not be attainable.[9]

Second, lower HHWQC may lead to the implementation of fish consumption advisories on some Idaho waters that would not have been posted otherwise and Idahoans catching and eating fish from such waters will be deprived of the opportunity to enjoy fish from local waters. More importantly, if they were to consume a source of protein other than fish (e.g., beef or chicken), they would be deprived of the demonstrated benefits of consuming fish (Comments on Toxicology 2002,[10] Kris-Etherton et al. 2003,[11] Sidhu 2003[12]). Ironically, if they were to go to the market and buy wild caught anadromous salmon, they might be exposed to higher levels of chemicals than if they caught and ate local fish, but they are prevented from eating such local fish by the inclusion in HHWQC of the very fish they are buying at the market.

Third, if implementation of more stringent HHWQC increases water treatment costs for local utilities, those utilities are likely to pass such costs onto Idahoans. That will increase the cost of living for those residents (and as noted above, with little or no measurable benefit) (HDR 2013)[13]. Increases in cost of living can lead to decreased socioeconomic status unless a concomitant increase in income occurs. Little reason exists to think that changes in HHWQC will lead to increases in income. In fact, the opposite may happen. If compliance costs rise substantially, the companies with facilities in Idaho that provide jobs to Idahoans may choose to relocate, further lowering the socioeconomic status of some Idahoans. Thus, the costs of more stringent HHWQC seem unwarranted in the absence of clear public health benefits that outweigh the potential costs.

A subtle, but perhaps even more significant ramification should be considered as well. By including anadromous fish in the FCR, the State creates the impression that it can protect Idahoans from exposure to chemicals in anadromous fish using HHWQC. That is a false impression. Idaho HHWQC has essentially no effect on concentrations of chemicals in anadromous fish. If the State were to determine the concentrations of chemicals in anadromous fish were posing a risk to Idahoans, reducing those risks would need to occur through a program other than Idaho HHWQC because HHWQC have no effect on anadromous fish concentrations. An example of such a program might be the implementation of a fish consumption advisory recommending or directing Idahoans not to eat anadromous fish caught in Idaho waters because of chemicals accumulated by the fish prior to entering Idaho waters.

[9] Two common PBTs are PCBs and mercury. Discharges of PCBs have not been allowed for a number of years. Mercury is present naturally in Idaho and the other major source is air deposition from global combustion of fossil fuels. Such PBTs have become ubiquitous in the environment.
[10] Comments on Toxicology. 2002. Comments on Toxicology, Special Issue Comparative Dietary Risk: Balance the Risks and Benefits of Fish Consumption. Comments on Toxicology, 8:431-502.
[11] Kris-Etherton, P.M., W.S. Harris, and L.J. Appel. 2003. Omega-3 fatty acids and cardiovascular disease new recommendations from the American Heart Association. Arteriosclerosis, Thrombosis, and Vascular Biology, 23(2), 151-152.
[12] Sidhu, K.S. 2003. Health benefits and potential risks related to consumption of fish or fish oil. Regulatory Toxicology and Pharmacology, 38(3), 336-344.
[13] HDR Engineering, Inc (HDR). 2013. *Treatment Technology Review and Assessment*. December 4.

Anadromous fish have great cultural importance in the Northwest and represent an important source of protein for many people. If chemicals in anadromous fish truly pose a public health risk, regulations should be adopted that will actually mitigate that risk and improve public health, not create false hope and misappropriate scarce public resources. We urge IDEQ not to mislead the public into thinking that HHWQC can affect the concentration of chemicals in anadromous fish.[14]

Summary

In conclusion, we recommend that IDEQ select Option (3) from the policy choices presented in Discussion Paper #5 and exclude anadromous fish from the fish consumption rate when developing HHWQC for Idaho. The predominant fraction of the ultimate PBT burden found in harvested adult salmon, even salmon passing through highly contaminated fresh and estuarine waters during out migration, is accumulated while in the ocean phase of their life cycle (e.g., Cullon et al. 2009; O'Neill and West 2009). This conclusion is supported by modeling as well (Hope 2012)[15]. Including anadromous fish, even on a discounted basis, has greater potential to harm rather than improve the health of Idahoans for the reasons described above. Indeed, HHWQC could be set to zero and human health risks associated with consumption of anadromous fish, assuming such risks are present, would remain unchanged. In short, Idahoans could be faced with substantially increased compliance costs and garner no benefit from such increased costs.

We appreciate the opportunity to provide comments on this important issue.

Sincerely,

Alex LaBeau
President

cc: Alan Prouty, Chair
IACI Environment Committee

[14] Note that this observation applies to market fish (the subject of Discussion Paper #4) as well. Because most market fish are not from Idaho, if the State were to determine that concentrations of chemicals in market fish posed a risk, to reduce those levels, regulations separate from HHWQC would need to be put in place to monitor and reduce those concentrations. HHWQC have no effect on concentrations of chemicals in market fish raised or caught outside of Idaho.
[15] Hope, B.K. 2012. Acquisition of polychlorinated biphenyls (PCBs) by Pacific Chinook salmon: An exploration of various exposure scenarios. Integrated Environmental Assessment and Management 8(3):553-562.