May 22, 2015

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

Dear Ms. Wilson:

On April 21, 2015, the Department of Environmental Quality (Department) presented its policy recommendations on performing human health water quality criteria calculations associated with fish consumption rates. The Idaho Association of Commerce & Industry (IACI) is the leading voice for Idaho business and has been an active participant in this rulemaking process. We appreciate the Department's very comprehensive approach and extensive work to develop a fish consumption rate and associated water quality criteria calculations that utilize the best science and data applicable to Idaho residents.

In general, IACI believes that the policy recommendations put forth by the Department do utilize best data and science in calculating human health water quality criteria. IACI has put forth previously (August 22, 2014 and January 20, 2015) to the Department extensive comments on most of these policy topics. In the table below, the recommendations by the Department are shown along with IACI comments that incorporate our previous submittals.

Topic	DEQ Recommendation	Comments
1. Consumers/non-consumers	Include only consumers of fish in fish consumption distribution.	When utilizing the Idaho-specific fish consumption data, data representative of long-term consumption rates should be used. As noted by the Department, the vast majority of Idahoans are included when long-term rates are used.
2. Exposure evaluation: everyone or only high consumers.	Evaluate range of exposure/risk in both the general population and higher consuming subpopulations	Distributions of both populations need to be fully incorporated into the analysis through the use of probabilistic methodology.
3. Deterministic or probabilistic.	Use probabilistic risk assessment in addition to deterministic calculation to inform criteria selection.	A probabilistic approach is superior in that it allows a full range of values for an input parameter to be considered and to identify the level of protection afforded different segments to the population.

4. Include or exclude market fish.	Base Idaho FCR on local fish; use Relative Source Contribution to account for market fish and other sources; include rainbow trout as a local fish.	The use of local fish (excluding anadromous fish), including all rainbow trout caught or harvested from Idaho surface waters to calculate a FCR is appropriate.
5. Include or exclude anadromous fish.	Exclude anadromous fish, except that DEQ is considering how to consider steelhead.	As discussed in IACI's August 22, 2014 comments, several studies have demonstrated that anadromous fish accumulate the majority of their contaminant burden in marine waters. Anadromous fish should be excluded from determining the FCR.
6. Risk and human health protection.	Setting criteria for carcinogens to achieve a 10^{-6} incremental increase in cancer risk at the mean consumption rate for high consuming populations, while making sure that 10^{-6} risk in the overall population occurs at no less than the 95th percentile.	IACI encourages DEQ to fully consider that different levels of allowable risk are appropriate for different segments to the population. USEPA states that an allowable risk of $1x10^{-6}$ or $1x10^{-5}$ is appropriate for the general population and that the risk of highly exposed populations should not exceed $1x10^{-4}$.
7. RSC	Adjust relative source contribution based on change in FCR.	We agree with the approach of changing the RSC based on the FCR. Also, as described below in this letter and in the attachment, chemical-specific RSCs should be used regardless of FCR.
8. BAF/BCF	Move to use bioaccumulation factors (BAFs).	BAFs, based on Idaho waters and aquatic systems would be best.
9. Body weight and drinking water intake	For body weight, use a 3-step preference; for drinking water use 2.4 L/day.	IACI supports the use of the best available data to establish the most representative distribution of body weights and drinking water intake for Idahoans. The use of a probabilistic methodology allows for use of a distribution of body weights and drinking water use.
10. Protectiveness of criteria.	Criteria not be allowed to become less protective going forward.	Criteria need to be able to increase or decrease in value accounting for changes in available information and sound science, which includes changes in BAF, RSC, FCR and other relevant factors.

IACI encourages the Department to use a relative source contribution (RSC) factor greater than the U.S Environmental Protection Agency (USEPA) default of 20 percent (%) when deriving human health water quality criterion (HHWQC) for non-carcinogens. We recommend that the Department use available information to develop (or use existing) chemical-specific RSCs for all HHWQC based on protecting Idahoans from non-carcinogenic effects of compounds in Idaho surface waters. IACI also agrees with the Department's proposal to employ a RSC of greater than USEPA's default of 20% for HHWQC for bio-accumulative compounds that assume a high fish consumption rate. The attached discussion paper on RSC provides additional information on why changing the RSC factor from the default value is justified.

We appreciate the opportunity to provide comments to the Department on this rulemaking.

Sincerely,

Alex LaBeau
President

attachment
cc: Alan Prouty, Chair
IACI Environment Committee

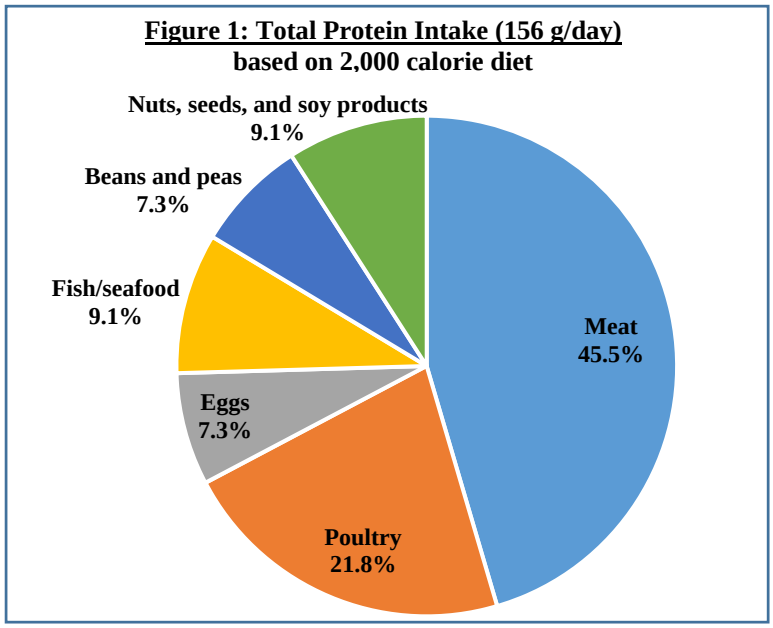
Discussion Paper: Effect of Fish Consumption Rate on the Relative Source Contribution Factor Used to Derive Human Health Water Quality Criteria

Paul D. Anderson, Ph.D., Senior Vice President/Principal Scientist, ARCADIS
Danielle Pfeiffer, Senior Scientist, ARCADIS

May 22, 2015

The first, and most recognized instance for using a RSC of greater than 20% is when data indicate that the sources of daily exposure to a compound, other than the sources regulated by a (HHWQC) (i.e., consumption of fish from a local water or consumption of fish from a local water body to which the HHWQC applies) comprise far less than 80% of the allowable daily intake[i]. When available data indicate exposures from sources other than local waters are a small fraction of the allowable daily exposure, the RSC can be set at a percentage of the allowable daily intake (e.g., reference dose (RfD)) greater than the USEPA default of 20%. For some compounds, that percentage can be substantially greater than the default of 20%, sometimes exceeding the USEPA maximum default of 80%. The Florida Department of Environmental Protection (FDEP) recently reviewed the literature and developed RSCs for 21 non-carcinogenic compounds that ranged from 0.2 to 1.0[ii]. Similarly, ARCADIS derived chemical-specific RSCs for four compounds (beryllium, chloroform, diethyl phthalate, and methyl bromide) using available literature. The four chemical-specific RSCs ranged from 44% to 87% and are substantially greater than the default RSC of 20%[iii]. Consistent with these recent developments, the California Office of Environmental Health Hazard Assessment (OEHHA) had previously concluded that the default use of an RSC of 20% is unreasonably conservative for most chemicals[iv]. In fact, for 22 of 57 chemicals, a RSC of greater than 20% was used in the calculation of California Public Health Goals for those chemicals in drinking water. As shown in the work completed by ARCADIS, use of chemical-specific RSCs can substantially affect HHWQC. It also bears pointing out that the development of chemical-specific RSCs is not necessarily time or resource intensive and the Department should undertake developing RSCs for compounds with available data. Alternatively, given the availability of recently developed chemical-specific RSCs by FDEP, the Department can also consider using those when developing HHWQC.

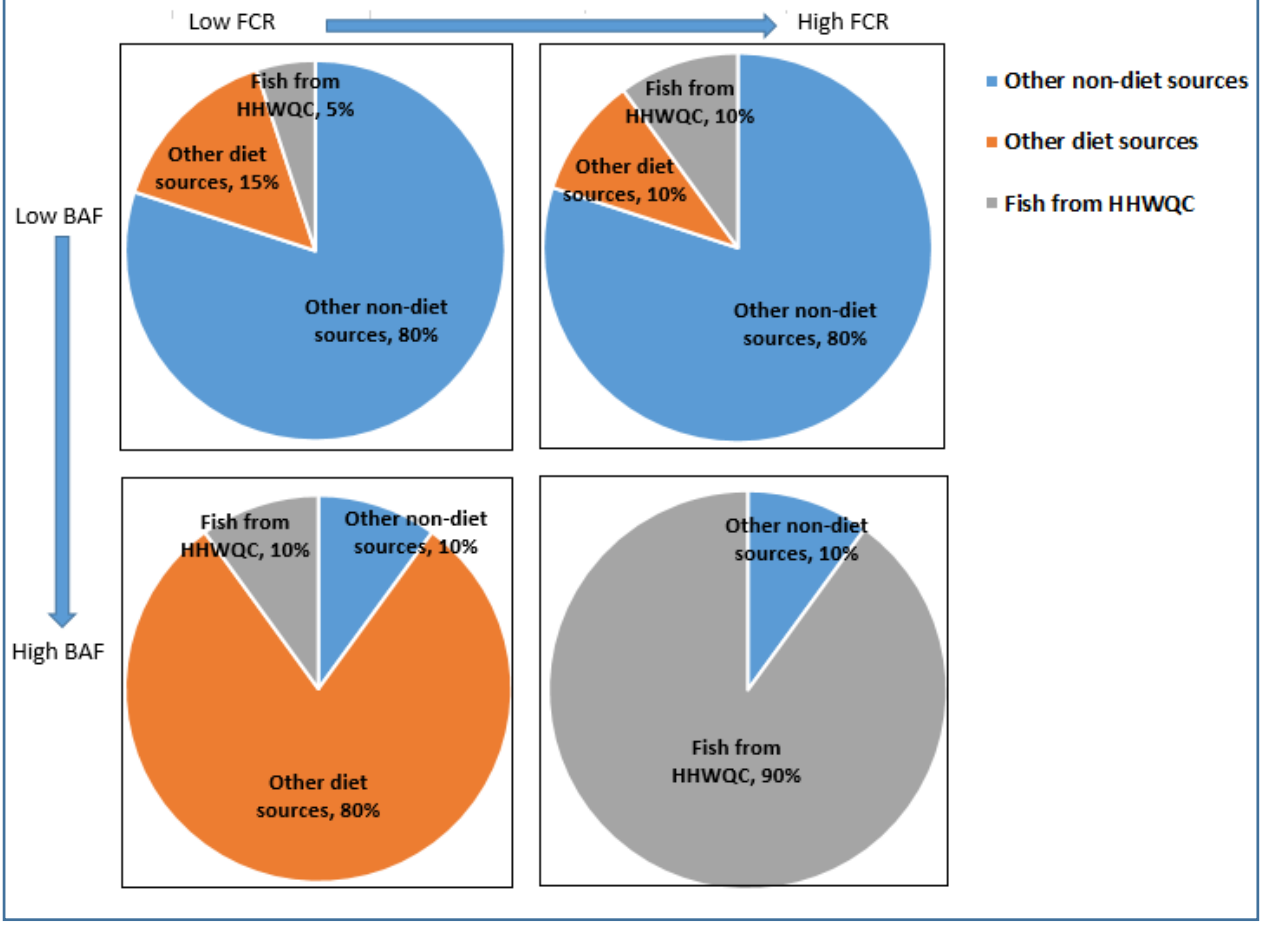
The other instance when the RSC can be substantially greater than USEPA's default of 20% was identified by the Department at the April 21, 2015 rulemaking meeting. Specifically, when the fish consumption rate assumed by a HHWQC is large and, therefore, comprises a majority of an individual's daily protein intake, use of the 20% default RSC will underestimate exposures from consumption of fish caught from waters to which the HHWQC is applied. In such instances, particularly for compounds that tend to bioaccumulate in the food chain and for which dietary exposure is assumed to be the dominant exposure pathway, an assumed high fish consumption rate can effectively mean that virtually all of an individual's daily protein intake is comprised of fish from local waters (waters regulated by the HHWQC). In such cases, other dietary sources of protein which are also the sources of a bioaccumulative compound in the human foodchain, become negligible and are replaced by locally caught fish. When that happens, the RSC can be set at value greater than the USEPA default of 20%, perhaps even close to or equal to 100%.



Based on the National Health and Nutrition Examination Survey (NHANES) 2001–2004 Survey[v], the average intake of protein in America is approximately 156 grams per day and, as shown in in the chart on the left (Figure 1), fish comprises about 9 percent of the total protein intake (14 grams per day). If a HHWQC uses a high fish consumption rate, for example 175 g/d as is used by Oregon or has been proposed in Washington, such a consumption rate accounts for essentially an individual's entire daily protein intake. For bioaccumulative compounds that tend to concentrate in animals, concentrations of the compound in other food items, including marine fish, become inconsequential contributors to dietary exposure because the high fish consumption rate used in the HHWQC effectively makes local fish consumption the sole source of dietary exposure to the compound and eliminates exposure from the other sources of protein in an average person's diet. The charts below (Figure 2) provide a hypothetical example where the RSC for a bioaccumulative compound can range from 20% for a HHWQC using an average fish consumption rate to 90% for a HHWQC using a high fish consumption rate. As discussed above, the high fish consumption rate means that the HHWQC effectively assumes all of an individual's dietary protein and exposure is from locally caught fish.

One example of such a compound is endrin (CAS# 72-20-8). Endrin bioaccumulates significantly in aquatic organisms and data suggest that the vast majority of a person's daily exposure comes from a fish diet and not other sources such as drinking water, occupational exposures, inhalation, or other foods[vi]. When an HHWQC uses a fish consumption rate that effectively represents all of an individual's daily protein intake, an RSC approaching 100% is appropriate. Oregon derived an RSC of 80% for endrin[vii], although data suggests that exposure to non-fish sources of endrin are insignificant.

Figure 2: Hypothetical Relative Source Contribution Variations



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[i] November 3, 2000. *Federal Register*, Volume: 65, Issue: 214, pages: 66472-3 (65 FR 66472-3). Available at: http://www.epa.gov/fedrgstr/EPA-WATER/2000/November/Day-03/w27924.htm.

[ii] Florida Department of Environmental Protection (FDEP). 2014. DRAFT Technical Support Document: Derivation of Human Health-Based Criteria and Risk Impact Statement. February.

[iii] ARCADIS, 2013. Use of Chemical-Specific Relative Source Contribution Factors for Calculation of Ambient Water Quality Criteria. SETAC poster. November.

[iv] Howd RA, Brown JP, FanAM. 2004. Risk assessment for chemicals in drinking water: Estimation of relative source contribution. *The Toxicologist* 78(1‑S). Lichtenberg E. 2010. Economics of health risk assessment. *Annu Rev Resour Econ* 2:53‑75.

[v] U.S. Department of Agriculture, Agricultural Research Service and U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. What We Eat In America, NHANES 2001-2004, 1 day mean intakes for adult males and females, adjusted to 2,000 calories and averaged.

[vi] U.S. Department of Health and Human Services. Toxicological Profile for Endrin. August 1996.

[vii] U.S Environmental Protection Agency (US EPA). 2011. Technical Support Document for EPA's Action on Oregon's New and Revised Human Health Water Quality Criteria for Toxics and Associated Implementation Provisions. Submitted July 12 and 21, 2011, October 17, 2011.