

Fish Consumption Rates for High Exposure Population Groups

Issue

What rule revisions are needed to incorporate new scientific information and federal guidance on the health risks for people consuming large amounts of fish and shellfish?

Problem Statement

The Model Toxics Control Act (MTCA) cleanup regulation includes methods for establishing surface water cleanup levels that are based on preventing health risks associated with the consumption of contaminated fish and shellfish.¹ The reasonable maximum exposure (RME) for MTCA surface water cleanup standards is based on a recreational angler exposure scenario.

Many sites being addressed under MTCA are located in the Usual and Accustomed (U&A) fishing areas for one or more tribes. Studies have shown that tribal members often consume much higher amounts of fish and shellfish than recreational anglers. Studies have also shown that other population groups (e.g., Asian-Pacific Islanders) residing near MTCA sites often consume fish and shellfish at much higher rates than recreational anglers. Consequently, exposure estimates based on a recreational angler scenario will generally underestimate fish and shellfish exposure for these population groups.

Ecology currently considers fish consumption rates for tribal populations and other high exposure groups when developing site-specific cleanup levels under the MTCA and the Sediment Management Standards (SMS) rules. This case-by-case approach can be resource intensive, can produce decisions that result in different levels of protection at different sites and often contributes to delays in cleanup decisions and actions.

Background

Under the Model Toxics Control Act (MTCA) Cleanup Regulation, cleanup levels are based on estimates of the “reasonable maximum exposure” (RME).²

- The RME represents a high end (but not worst case) estimate of individual exposures. It provides a conservative estimate that falls within a *realistic* range of exposures.
- The RME takes into account both current and reasonably foreseeable future conditions.

¹ The terms MTCA cleanup regulation and MTCA rule are used interchangeably and refer to Chapter 173-340 WAC.

² MTCA defines the RME as the “...the highest exposure that can be reasonably expected to occur for a human or other living organisms at a site under current and potential future site use.” CERCLA provides a similar definition “...the highest exposure that is reasonably expected to occur at a Superfund site...”

- The RME is defined as reasonable because it is a product of several factors that are an appropriate mix of average and upper-bound estimates. RME estimates typically fall between the 90th and 99.9 percentile of the exposure distribution.³

The MTCA rule includes methods for establishing surface water cleanup levels that are based on preventing health risks associated with the consumption of contaminated fish and shellfish. As noted above, the RME for MTCA surface water cleanup standards is based on a recreational angler exposure scenario. The rule also provides the flexibility to establish more stringent surface water cleanup levels when Ecology determines that such levels are “...necessary to protect other beneficial uses or otherwise protect human health and the environment...” (WAC 173-340-730(1)(e)). Ecology uses a similar case-by-case approach when establishing sediment cleanup standards under MTCA and the Sediment Management Standards.

There are several sites where Ecology has concluded that a recreational angler exposure scenario is not appropriate for situations involving population groups who consume much larger amounts of fish and shellfish. These groups include Native Americans, Asian Pacific Islander populations, and subsistence fishers. Ecology has discussed this issue with the MTCA Science Advisory Board and the Board has agreed with Ecology’s overall conclusions. Ecology’s conclusion is based on the following factors:

- The MTCA default exposure parameters are based on an exposure scenario (recreational fisher) that is significantly different than the exposure scenario for most tribal populations, Asian Pacific Islanders, and subsistence fishers.
- EPA-Region 10 has published a Decision-Making Framework for selecting and using tribal consumption data to establish cleanup requirements at federal Superfund sites.⁴ The framework identifies a four-tiered hierarchy of preferred data sources. Under the EPA Framework, exposure estimates for particular tribes can be based on fish consumption surveys from other tribes (Suquamish or Tulalip Tribes) with similar dietary habits. The exposure parameters specified in the EPA Region 10 Decision-Making Framework are significantly different than the MTCA default exposure parameters.
- EPA exposure guidance materials include exposure parameters based on tribal exposure scenarios. The EPA *Exposure Factor Handbook* recommends, for tribal exposure scenarios, an average ingestion rate of 70 g/day and a 95th percentile ingestion rate of 170 g/day.⁵ For children, the EPA *Child-Specific Exposure Factors Handbook* identifies weighted average (21 g/day), 90th percentile (60 g/day) and 95th percentile (78 g/day) values, respectively, for the tribal exposure scenario.⁶ These child-specific rates for

³ U.S. Environmental Protection Agency. 2004. An Examination of EPA Risk Assessment Principles and Practices. EPA/100/B-04/0001.

⁴ EPA Region 10 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, August 2007. Page 6.

⁵ U.S. Environmental Protection Agency. 1997. Exposure Factors Handbook. National Center for Environmental Assessment. Office of Research and Development. August 1997. Available at: <http://www.epa.gov/ncea/efh/>.

⁶ U.S. Environmental Protection Agency. 2006. Child-Specific Exposure Factors Handbook (External Review Draft). National Center for Environmental Assessment. Office of Research and Development. EPA/600/R/06/096A.

Native American children are significantly higher than estimates for recreational fish intake. The exposure parameters specified in these EPA guidance materials are significantly different than the MTCA default exposure parameters.

- Several Northwest tribes have developed surface water quality standards that are based on human health protection. The fish consumption rates used to develop those standards range from 6.5 to 170 g/day. More recent standards have generally used consumption rates much higher than the MTCA rule default fish consumption rate of 54 g/day.

New Scientific and Regulatory Information Since 2001 Rule Revisions

Since the 2001 rule revisions, there have been several important scientific and regulatory developments relevant to the current rulemaking process.

- Ecology has established cleanup standards at several sites that are based on tribal fish consumption scenarios. These represent site-specific interpretations of the narrative standards in the MTCA and SMS rules. In general, fish consumption rates used at these sites range from 50 to 300 g/day.
- EPA-Region 10 has published a Decision-Making Framework for selecting and using tribal consumption data to establish cleanup requirements at federal Superfund sites.⁷ The framework identifies a four-tiered hierarchy of preferred data sources. Under the EPA Framework, exposure estimates for particular tribes can be based on fish consumption surveys from other tribes (Suquamish or Tulalip Tribes) with similar dietary habits.
- Ecology asked the MTCA Science Advisory Board to review a site-specific consumption rate prepared by the Lower Elwha Klallam Tribe (LEKT). The LEKT recommended that Ecology establish cleanup requirements for the former Rayonier mill site in Port Angeles developed using the EPA Decision-Making Framework. The Board agreed with Ecology's conclusion that it was inappropriate to establish cleanup levels using a recreational exposure scenario.
- The Oregon Environmental Quality Commission approved the Oregon Department of Environmental Quality (ODEQ) plan to update Oregon's water quality standards for toxic pollutants using a new fish consumption rate of 175 g/day. This culminated a multi-year effort where ODEQ worked with EPA and the Confederated Tribes of the Umatilla Indian Reservation to conduct a series of public workshops exploring options. In reaching a decision on an updated value, the Oregon Environmental Quality Commission considered the results of an evaluation of available studies prepared by an expert advisory committee, the Human Health Focus Group.⁸ The Focus Group identified six studies that

⁷ EPA Region 10 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, August 2007. Page 6.

⁸ Oregon Department of Environmental Quality. 2008. Human Health Focus Group Report: Oregon Fish and Shellfish Consumption Rate Report. Water Quality Division-Standards and Assessment. June 2008.

they believe provide a scientific basis for establishing health protective requirements. The Focus Group summarized their conclusions in a table which is included at the end of this issue summary.

Rulemaking Options Being Considered

Ecology is considering several options for addressing this issue during the current rulemaking process. These include:

Narrative Standard: Under this option, Ecology would modify the MTCA rule to establish a clear narrative standard that includes an exposure scenario for tribal and other high exposure population groups. Cleanup levels would continue to be based on site-specific determinations.

Develop Guidance Materials: Under this option, Ecology would prepare guidance materials for implementing the current rule provisions. Guidance could be issued without regulatory changes or in tandem with regulatory changes. Guidance would be updated if needed after rule revisions are complete.

Criteria for Site-Specific Determinations: Under this option, Ecology would amend the MTCA rule to explicitly require site-specific determinations based on the narrative standards in the MTCA and SMS rules. The rule revisions would also include criteria and factors that would need to be considered when implementing the narrative standards.

Default Fish Consumption Rates: Under this option, Ecology would amend the MTCA rule to establish default fish consumption rates for sites located within Usual and Accustomed (U&A) areas or areas regularly used by other groups consuming large amounts of fish/shellfish. This option would also define factors that could be considered when modifying the default value for individual groups and sites.

Factors to Consider When Selecting Options

Developing amendments to the MTCA cleanup regulation will require consideration of a number of issues and interests. Ecology believes that the following factors need to be considered when evaluating this issue:

- Scientific information on tribal fish and shellfish harvesting and consumption habits and patterns, including study designs, results, and factors relevant to interpreting the study results (for example, evidence of suppressed consumption rates or resource switching).
- Scientific information on fish and shellfish harvesting and consumption habits and patterns for other high exposure population groups (for example, Asian Pacific Islanders).
- Federal and tribal regulatory requirements and guidance applicable to this issue (for example, consumption rates underlying federal and tribal water quality standards).
- Requirements in other state and federal laws and regulations. This includes methods and policies used to characterize fish consumption rates and the use of that information in regulatory decision-making.

- Whether other exposure parameters (for example, body weight, exposure duration, and fish diet fraction) should be adjusted when calculating cleanup levels.
- Whether particular options comply with key requirements of the Administrative Procedures Act.

The following table is from the Human Health Focus Group Report: Oregon Fish and Shellfish Consumption Rate Report. Water Quality Division-Standards and Assessment. June 2008.

Table 3. Adult Fish Consumption Rates (gram per day) Recommended by the Human Health Focus Group for Oregon Human Health-Based Water Quality Criteria. (As printed in Oregon DEQ 2008)

Group	Species included in consumption rate evaluation	N	Statistic					
			Mean	Median	Percentile			
					75th	90th	95th	99th
Tulalip Tribe	Anadromous and estuarine finfish and shellfish	73	72	45	85	186	244	312
Suquamish Tribe	Anadromous and estuarine finfish and shellfish	284	214	132	NA	489	NA	NA
Squaxin Island Tribe	Anadromous and estuarine finfish and shellfish	117	73	43	NA	193	247	NA
Columbia River Tribe	Freshwater and anadromous finfish	512	63	40	60	113	176	389
Asians & Pacific Islanders	Anadromous and estuarine finfish and shellfish	202	117	78	139	236	306	NA
U.S. General Population	Freshwater, anadromous, estuarine and marine finfish and shellfish	2585	127	99	NA	248	334	519

N = Number of Adults
 NA = Statistical value not available
 Adults are 18 years or older for all surveys except Suquamish; Suquamish adults were 16 years or older.
 All values reported in this table are described in Table 1 (located at the end of this document)
 Tulalip Tribes and Squaxin Island Tribe from Toy et al. 1996.
 Suquamish Tribe from Suquamish. 2000.
 Columbia River Treaty Tribes from CRITFC. 1994.
 The Columbia River Tribes did not report marine fish consumption;
 The 75, 90, 95, and 99th percentiles are interpolated from percentiles reported in CRITFC. 1994.
 Asian Pacific Islanders from Sechena et al. 1999.
 US General Population from US EPA. 2002b.