

7-2013

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Jennifer Stiles

Western Washington University

Ruth M. Sofield

Western Washington University, ruth.sofield@wwu.edu

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Recommended Citation

Stiles J, Sofield RM. 2013. Fish and Shellfish Consumption: Traditions, Regulations, and a Cleaner Environment in the US Pacific Northwest. *Learned Discourse: Integrated Environmental Assessment and Management*. 9(3):539-540.

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FISH AND SHELLFISH CONSUMPTION: TRADITIONS, REGULATIONS, AND A CLEANER ENVIRONMENT IN THE US PACIFIC NORTHWEST

Jennifer Stiles and Ruth Sofield*

Western Washington University, Bellingham, Washington, USA

*ruth.sofield@wwu.edu

DOI: 10.1002/ieam.1436

THE DILEMMA OF FISH

When discussing the benefits of fish consumption, we typically focus on the health benefits such as Omega-3 fatty acids and their implications for heart health. However, nonhealth related benefits of fish consumption are important to consider. With Washington State's broad coastline, fish consumption is abundant and plays an integral role in the traditions of the Native Americans in the state. Fish and shellfish are an important part of the daily diet. There is also spiritual significance with traditions that include the "First Salmon Ceremony," where the first salmon of the year is honored to ensure that its spirit is released and to promote the return of the salmon the following year. With the increasing threat of bioaccumulative chemicals in aquatic environments, the decision that many have to make between their health and cultural traditions is becoming increasingly difficult. Contaminated site cleanup levels in Washington State can be based on the fish consumption of the general population. These levels depend on the environmental media (e.g., water or sediment). In the case of Native Americans, the suggested consumption rates are much lower than amounts they typically consume.

DECIDING HOW MUCH

The need for an appropriate fish consumption rate (FCR) should be apparent as this value is used in risk assessments for consumption of contaminated fish and shellfish. A low value may not adequately protect humans, and a high value may place an unnecessary economic hardship on industry and municipalities and may not be technologically feasible. In application, these values influence "how clean is clean?" determinations. Three regulatory rules in Washington State are relevant. The National Toxics Rule (NTR) regulates Water Quality Standards (WQS) in surface waters and relies on an FCR of 6.5 g/day. The Model Toxics Control Act (MTCA), the state's hazardous waste cleanup law, uses an FCR of 54 g/day (Ecology 2013). To put this into perspective, an 8-ounce meal of fish or shellfish could be consumed approximately every 5 weeks or every 4 days with the FCRs from NTR and MTCA, respectively. In both cases, the FCRs

are based on dated evaluations and do not consider high fish-consuming populations. The final relevant regulatory rule, the Sediment Management Standards (SMS), uses bioassay testing and standard criteria for chemical constituents to determine cleanup levels for contaminated sediment and does not rely on an FCR.

The Washington Department of Ecology (Ecology) recognizes that these values are not appropriate and are well into the process of updating the SMS and have begun to update the fish consumption values in the NTR. In July 2012, after public comments on a draft update to the SMS, Ecology decided to include a site-specific cleanup standard based on a reasonable maximum exposure (RME) instead of a default FCR in the cleanup sections (Sturdevant 2012). Final rule adoption occurred in February and becomes effective September 2013. During this process, Ecology also recognized there is no clear understanding of what actual FCRs are for Washington populations and initiated a series of evaluations that resulted in a Fish Consumption Rates Technical Support Document (Ecology 2013). This includes 3 tribe-specific surveys of finfish and shellfish consumption that Ecology found to be representative and of sound technical merit. The FCRs vary depending on the tribe, age of the survey respondent, and type and source of fish (Table 1).

WASHINGTON IS NOT ALONE

The US Environmental Protection Agency's (USEPA's) national standards for water quality have included a national recommendation for an FCR since 1980, so the process of using FCRs to derive WQS for human health is a familiar one. Twenty states have accepted and received USEPA approval for the new (2003) national default FCR of 17.5 g/day (Peeples 2011). When the USEPA considers approval of a state's default consumption rate in WQS calculations, the state needs to consider the fish consumption realities of its residents. Both Oregon and Idaho's proposals to accept 17.5 g/day as their default were rejected in 2004 and 2006, respectively, based on an apparent misrepresentation of residents' FCRs (The Columbia Basin Fish & Wildlife News Bulletin 2012). Following workshops with the Oregon Department of Environmental Quality (DEQ), Confederated Tribes of the Umatilla Indian Reservation of Oregon, the USEPA, and the general public, as well as a review of *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakima, and Warm Springs Tribes of the Columbia River Basin* (the same survey of Columbia River tribes that Washington used, Table 1), the FCR in Oregon was raised to 175 g/day (Pedersen 2011). The survey identified Native American tribes as having elevated rates of fish consumption for

Table 1. Summary of fish consumption surveys used by Ecology (2013)

Tribe (year of survey)	Geographic Region	Mean (g/day)	95th percentile for all finfish from all sources (g/day)
Umatilla, Nez Perce, Yakima, and Warm Springs (1991-1992)	Columbia River	63.2	194
Tulalip (1994)	Puget Sound	82.2	268
Squaxin Island (1994)	Puget Sound	83.7	280
Squamish (1998)	Puget Sound	214	797

primarily cultural and historical reasons. The USEPA asked Idaho to likewise consider the findings of this survey and the actual fish consumption of its residents (Peeples 2011). The process in Idaho is ongoing. In Washington State, as Ecology strives to establish a more representative FCR, frustrations have arisen. Following the recent decision to establish an RME instead of a default FCR in the SMS, some tribes stopped participating in the discussion process, exerting instead their rights as a sovereign nation and seeking to be part of an oversight group with Ecology and the USEPA (Schrader 2012). The controversy is expected to continue as the NTR updates occur.

The issues are more complex than can be fully presented here with several governments involved, scientific uncertainty of effects of consuming contaminated fish, limited data on actual consumption rates, the reality of both risks and benefits from fish consumption and individual evaluation of those, a system that regulates water and sediment with different rules, and the intrinsic complexities of working in environmental systems and with biological organisms that do not always follow the rules. The intersection of these issues as they relate to cleaning up contaminated environments and the associated regulations are certain to provide for continued debate and elevated emotions; ideally though, they will lead to improved scientific knowledge and a process that supports the goal of a

cleaner aquatic environment through appropriate cleanup regulations of water and sediments combined with source control.

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