## Rights-Based / Heritage Fish Consumption Rates in the Columbia Basin and Water Quality Standards

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October 9, 2013

## There is no single "tribal fish consumption rate"

You can't simply ask, "How much do tribes eat?"

## Different Questions - Different Methods

## Heritage or rights-based rate



## Misconception

This is NOT a Pre-Dam vs. Post-Dam distinction. It is true that dams have had a devastating impact.

But it is incorrect to assume that Heritage or Rightsbased rates are pre-dam and contemporary rates are post-dam. Heritage rates are not just a historical curiosity, nostalgia, or "too bad things have changed."

It is correct that fewer people are able to eat a heritage-rate amount of fish. But the right for everyone to eat that amount of fish exists regardless of the presence of a dam or degraded habitat.

## Which rate do you need to know?

> Heritage or rights-based rate

Understand baseline exposures and risks; and baseline resource use rates

How much fish would people eat if they were clean and abundant?

Set habitat restoration goals for NRDA or watershed application.

Set cleanup goals (Superfund)

Set prospective or aspirational standards to make the heritage rates safe.

## Contemporary rate

Understand current risks based on current fish consumption rates; how much fish do people eat NOW?

Design immediate intervention or fish advisories based on current FCR and current contaminant loads.

Research: Develop or validate foodchain models; compare model to biotic and human exposure data (e.g., Hg model / fish tissue / human hair data).

## Comparison of Methods

## Heritage

## Contemporary

## Multiple Lines of Evidence:

- Ethnography
- Ethnohistory
- Archaeology
- Isotopes
- Fish buying records
- Ecological history
- Oral history
- Nutrition, paleomedicine


## Surveys

- Cross-sectional surveys of today's diets
- Computer-based statistical tools
- Contemporary ethnography with traditional fishers (subset, not a cross-section average).

Both can be "scientific" - systematic, repeatable, verifiable. Both can be "accurate." Statistical precision is not the same as being accurate or even "scientific."


Accurate but not precise (average is correct but with a large spread)


Precise but not accurate
(small spread but with an incorrect average)


Precise and accurate (correct average, small spread)

## Can you derive a heritage rate from a contemporary survey?

## NO

- You can ask what people remember eating as a child - if a full subsistence diet was possible and treaty rights were honored in that time frame.
- Exception: Alaska, where subsistence is the norm
- You will find high consumers with a survey, but you don't know if this is a full heritage rate.

Units:
Pounds per capita per year
Grams per day (gpd)
454 grams/pound
16 ounces/pound
1 ounce $=28.35$ grams
8 ounce meal = $1 / 2$ pound $=227 \mathrm{~g}$
4 ounces $=113 \mathrm{~g}$ = deck of cards

Contemporary computer-based surveys


## Columbia Basin numbers

1 pound/day $365 \mathrm{lbs} / \mathrm{yr}$ or 454 gpd Walker 1985 -
unadjusted average for
the Columbia Basin Walker 1985 -
unadjusted average for
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the Columbia Basin

## Walker 1985

$$
583 \text { Ibs/year - Columbia }
$$

Basin median heritage
rate (pre-dam)

$$
\text { Range }=365-800 \mathrm{lbs} / \mathrm{yr}
$$



Contemporary ethnography


## Heritage FCR - Initial Estimates

Griswold (1953): $4000 \mathrm{lbs} /$ family for consumption at 4-5 people per family; plus more for trade at The Dalles; citing Swindell (1942) and early observers and ethnographers, settlers, naturalists, artists, Lewis \& Clark, explorers, trappers, traders, missionaries.

Hewes $(1947,1973)$ used ethnographic data and direct observation from central California to Alaska and the Yukon and estimated a total yearly salmon catch of 127,775,800 pounds for the entire area, based on a human requirement for 2000 kcal/day and 900 kcal/lb of salmon.

| Tribe | Lbs per capita per year |
| :--- | :---: |
| Klickitat, Yakama, Wanapum, <br> Wishram, Palouse | 400 |
| Tenino Umatilla Walla Walla | 500 |
| Wenatchi, Sinkiuse, Methow, <br> Nespelem, Sanpoil, Colville, Spokane | 500 |
| Kalispel, Coeur d'Alene, | 100 |
| Okanagon, Lakes | 500 |
| Kutenai, Nez Perce | 300 |

## Heritage FCR - Initial Estimates

Other western salmon rivers (Hewes 1973). Unadjusted for migration caloric loss. Based on river/stream characteristics, estimated population size, and nutrition. Supporting information includes archaeology, ecological history, etc. Some native groups have much lower rates, depending on proximity to rivers and spawning areas, and abundance of other resources.

| Tribe | Lbs per capita per year |
| :--- | :---: |
| Alaska - Kuskokwagmiut | 1000 |
| Alaska - Tanaina | 500 |
| Tlingit | 500 |
| Makah, Quinault | 365 |
| Fraser River delta | 1000 |
| Lummi | 600 |
| Skagit area | 350 |
| Karuk | 450 |
| California - Wintun | 365 |
| California - Maidu groups | 200,300 |

## Heritage FCR - Revised Estimates

Schalk (1986), Scholz (1985), Walker (1967, 1985), Hunn (1981, 1989), adjusted Hewes' rates to account for declining nutritional quality of salmon over the course of the migration.

| Tribe | Lbs per <br> capita/yr <br> (Hewes) | Adjusted <br> (Schalk) <br> Lbs/yr | Adjusted (Walker, 1985) <br> Lbs/yr |
| :--- | :---: | :---: | :--- |
| Klickitat, Yakama, Wanapum, <br> Wishram, Palouse | 400 | 863 | 1200 of which 900 are anadromous <br> salmonid |
| Tenino Umatilla Walla Walla | 500 | 744 | 1000 of which 750 are anadromous <br> salmonid |
| Wenatchi, Sinkiuse, Methow, <br> Nespelem, Sanpoil, Colville, <br> Spokane | 500 | 976 | 1200 of which 1080 are anadromous <br> salmonid |
| Kalispel, Coeur d'Alene, | 100 | 219 | Scholz $1985=658 ;$ Walker 1967 = 584; <br> Walker $1985=750$ (1000 total fish of <br> which 750 are anadromous salmonid) |
| Okanagon, Lakes | 500 | 1250 | 1000 total fish of which 750 are <br> anadromous salmonids |
| Kutenai, Nez Perce | 300 | $481 ; 646$ | 1000 of which 900 are salmonid, and <br> the rest resident fish |

## Implications for Water Quality Standards

## Anadromous fish - In or Out? <br> Answer: it depends on the details

$\square$ If the anadromous FCR is simply subtracted from the total, the remaining FCR would be low and pollution limits would be high. Example: "1000 gpd of which 750 are anadromous salmonid."

If the anadromous portion is handled as a Relative Source Contribution, using actual contamination data, then a portion of the pollution 'quota' is used up by anadromous fish.

If the total FCR comes from the regulated water body (i.e. all fish are resident), then it doesn't matter what proportion of the FCR is resident or anadromous.

## Implications for Water Quality Standards

## What population group to protect?

## Answer: this is a policy call

$\square$ Because human sensitivity varies, it is always true that protecting children 'over-protects' healthy adults, or protecting healthy adults 'under-protects' children, at the same target risk level.
$\square$ Federal laws vary in their intent. The lead rule seeks to protect 95\% of children with no margin of safety. Air laws tend to protect the average person (with provisions for children and asthmatics). Some rules use a 10X safety factor for children; others use $3 X$. Superfund cleanups (CERCLA) seek to protect a $90^{\text {th }}$ percentile reasonable maximum exposure scenario, but with lots of wiggle room. Some proposals set a lower protection level for higher exposure groups (e.g., subsistence consumers). High-end tail of all people or average of a vulnerable or high-exposure subgroup.

## Ranges of Exposure (or FCR) Among different populations

Ranges in Exposures based on Activities and/or Lifestyles


## Traditional

lifestyles are not just the extreme tail of a general population exposure range, but discrete LIFESTYLES with legal protection.

Ranges in Sensitivity due to other factors - diabetes, poverty, etc.

## Treaty Rights

The right to fish in common is not in dispute.
The requirement for access of the fish to habitat is not in dispute (culverts), although requirements for water flow are still being argued. Progress is being made; dams are coming down or being regulated to protect juveniles.

The requirement that the fish be clean is the current question.

## Columbia Basin <br> Fish \&Wildife News Bulletin

"High Toxicity Levels In Resident Fish From Bonneville To McNary Prompts Fish
Consumption Warnings" Posted on Friday, September 27, 2013
-- Bonneville Dam - OHA and WA Health recommend no consumption of any resident fish species taken from Bonneville Dam to Oregon's Ruckel Creek, one mile upstream from Bonneville Dam. Bradford Island landfill is the likely primary source.
-- Middle Columbia River - OHA and WA Health recommend eating no more than one meal per week - four meals per month - of any resident fish species taken from the river between Ruckel Creek and McNary Dam. ( 1 meal $=8 \mathrm{oz} ; 2 \mathrm{lbs} /$ month $=24 \mathrm{lbs} / \mathrm{yr}=30 \mathrm{gpd}$ )

Can we agree on what we care about?


Define a narrative goal with adequate specificity, such as making fish clean enough for everyone, including tribal children, to eat at unrestricted (baseline) amounts.

