Alaska's Efforts to Amend and Adopt Human Health Criteria

Alaska Department of Environmental Conservation
ACWA Conference 2024

How much fish do you eat?

Portion Sizes

Photo 1: Very Small

~28 grams or 1 oz

Photo 2: Small

~85 grams or 3 oz

Photo 3: Medium

~170 grams or 6 oz

Photo 4: Large

~255 grams or 9 oz

NOTE: The portion weight should be based on an uncooked amount

Human Health Criteria (HHC)

https://glacierbayalaska.com/alaska-fishing/fish-species-guide/

- HHC Represent the highest allowable concentration of a pollutant in surface water considered protective of human health
  - designed to **minimize the risk** of adverse effects from exposure to different contaminates
  - Based on a **chronic (lifetime) exposure** to contaminants
  - Includes **the ingestion of drinking water** from surface water sources and/or
  - The **consumption of aquatic life** obtained from surface waters.

EPA recommended formulas for Human Health Criteria

BAF: Bioaccumulation

BW: Body Weight

CRL: Cancer Risk Level

CSF: Cancer Slope Factor

DI: Drinking Water Intake

FCR: Fish Consumption Rate

RfD: Reference Dose

RSC: Relative Source Contribution

	Consumption of Organisms and Water	Consumption of Organisms Only
Criteria for Carcinogens	$\frac{CRL \times BW}{CSF \times [(FCR \times BAF) + DI]}$	$\frac{CRL \times BW}{CSF \times FCR \times BAF}$
Criteria for Non-Carcinogens	$\frac{RfD \times RSC \times BW}{(FCR \times BAF) + DI}$	$\frac{RfD \times RSC \times BW}{FCR \times BAF}$

Historical Context (1) of HHC

- **1992** - National Toxics Rule promulgated HHC for Alaska

- **2000 – Today** – National-Regional HHC Work
  - EPA Issues HHC methodology update (2000)
  - EPA issue HHC pollutant criteria updates (2015)
  - Maine engages in discussions with EPA about "heritage rates" (2013-2016)
  - Northwest states engage in rulemaking (and litigation)
    - Oregon sets FCR of 175 g/d based on "negotiated" rate
    - **Idaho** engages with EPA on multiple issues including use of "probabilistic" methodology
    - **Washington** – EPA rulemaking/promulgation/litigation…
  - Florida? EPA rulemaking/promulgation/litigation…

Historical Context (2) - HHC in Alaska

- Meanwhile…

- **1997** – Alaska adopts CRL of 10(-5) and is removed from NTR-HHC for arsenic
  - 1992-2022 DEC adopts HHC for several non-carcinogenic pollutants

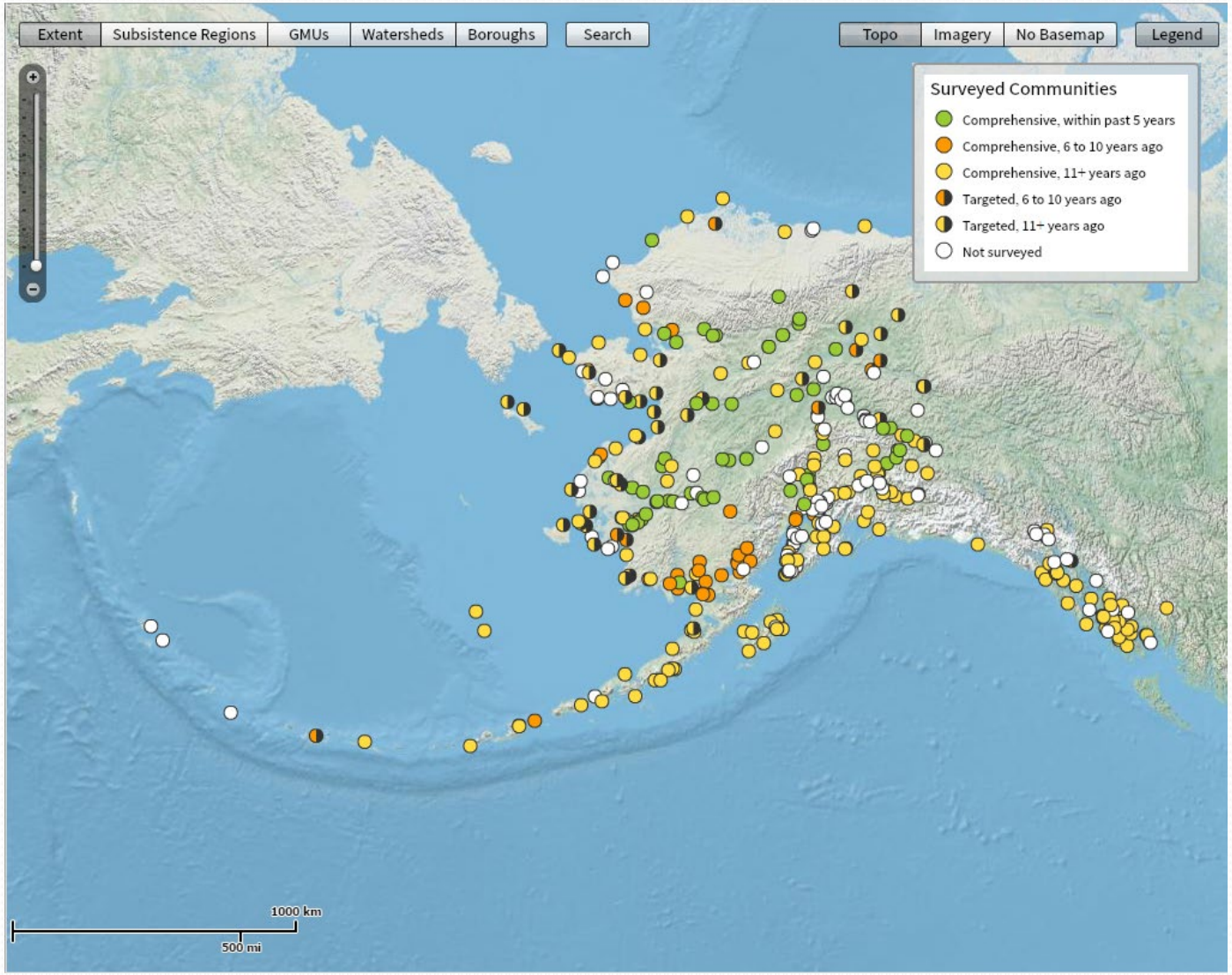
- **2000s**– DEC Work
  - DEC participates in an interagency Fish Consumption Advisory Workgroup
  - DEC receives comments on need to update HHC via triennial review process (2000 - onward)
  - 2011-2012 – Brock hired as WQS Coordinator and told to "work on this"
  - DEC commissioners FCR lit review (2013)
  - DEC convenes **HHC Technical Workgroup** (2015-2018)

Questions either poised or developed by the TWG

- What Alaska-specific FCR information is readily available?
- Which species should be included in FCR?
- Population of interest?
- Appropriate CRL? AK adopted 10 (-5)
- Role of Relative Source Contribution?
- Application of EPA 2015 bioaccumulation values?
- Options for establishing HHC on a statewide v. regional basis?
- Implementation issues?

ADF&G FCR Data

- TWG Recommended that the ADF&G Division of Subsistence was the best source of relevant information
  - ADF&G used data from 110 Communities
  - Collected between 2008 and 2015
  - Considered a range of aquatic species from both fresh and marine waters



ADF&G Methods: Mean Per Capita Use

$$\frac{Community's\ Mean\ Per\ Capita\ Harvest}{Percentage\ of\ Community's\ Households\ Using\ the\ Resource} =$$

Mean Per Capita Use

- More precise measure of mean consumption rates, constructed from both harvest and use information
- Mean per capita use (who consumes) > Mean per capita harvest (who does the work)
- Captures differences among household consumption rates related to cultural food patterns

ADF&G Methods: Cont.

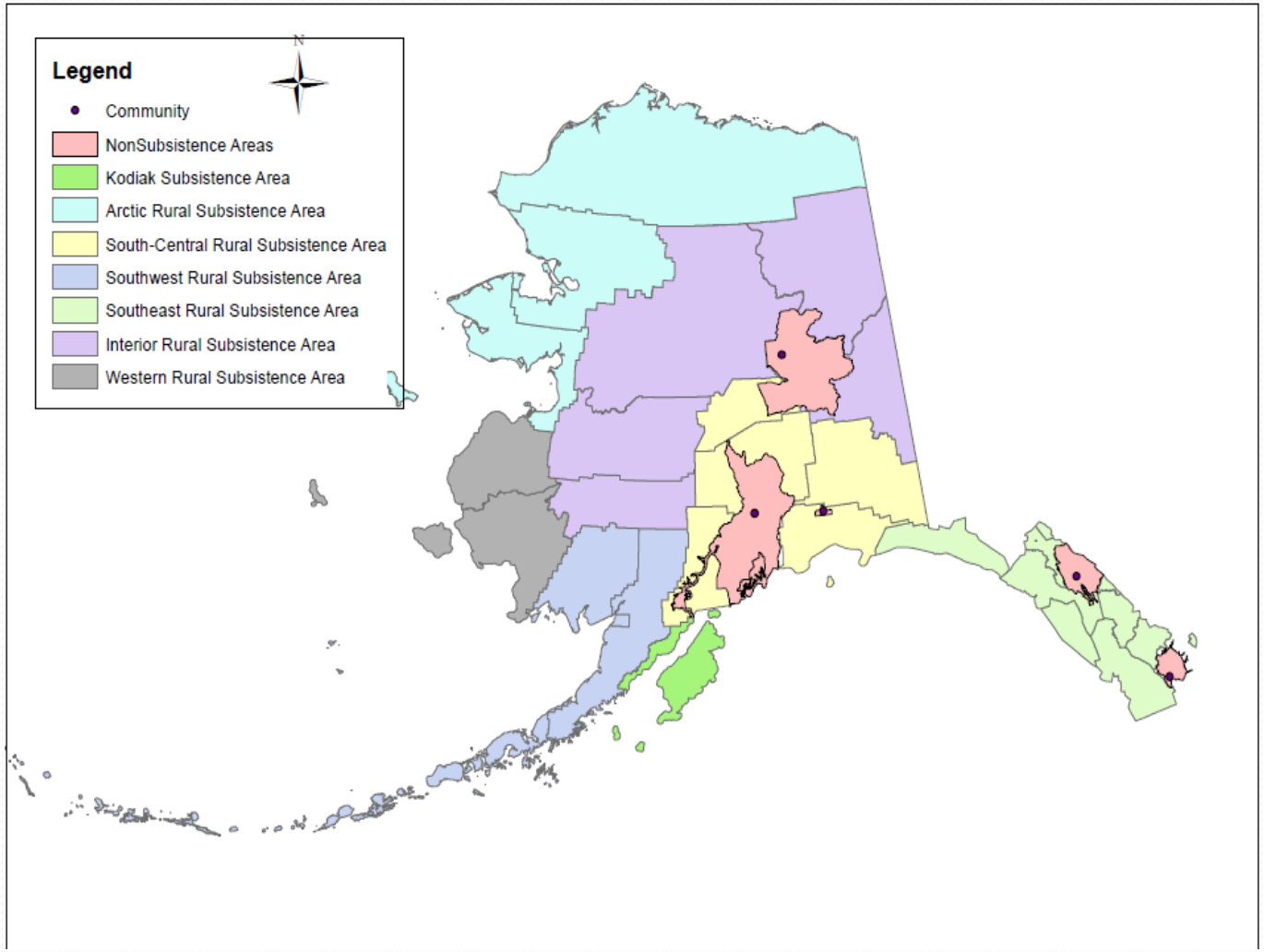
Assumes that wild foods are …

- Equally distributed among and consumed by all residents of households *that report sharing and using the wild food category*
- Not exported from or imported into a community
- Consumed equally across each day of the year, when expressed as grams per day

Limitations …

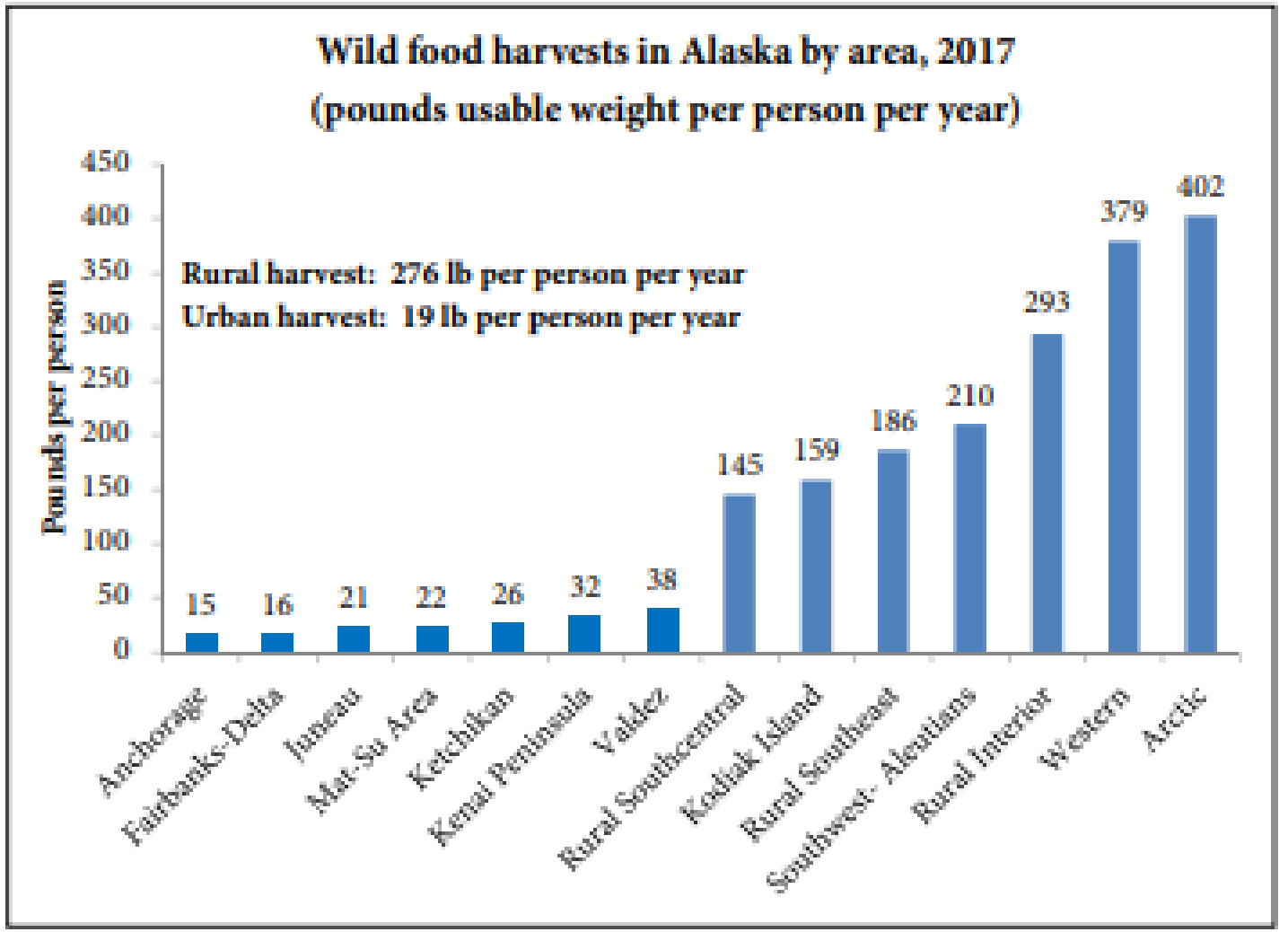
- The results may be lower/higher than actual consumption by individuals
- Data is not age-specific
- "High-end" consumers underestimated, "low-end" consumers overestimated

Things to consider when calculating an FCR: Regional Differences



Alaska Total Population	~730,000 (2020)	% of Alaska's Total Population
Alaska Urban Population	~610,000	83%
Alaska Rural Population	~125,000	17%
Total Population of Communities selected for CSIS	~50,000	6%
ADF&G Sampled Population used to compile ADF&G FCRs	~22,000 (45% of total communities in sample / ~17% of total rural population)	3%

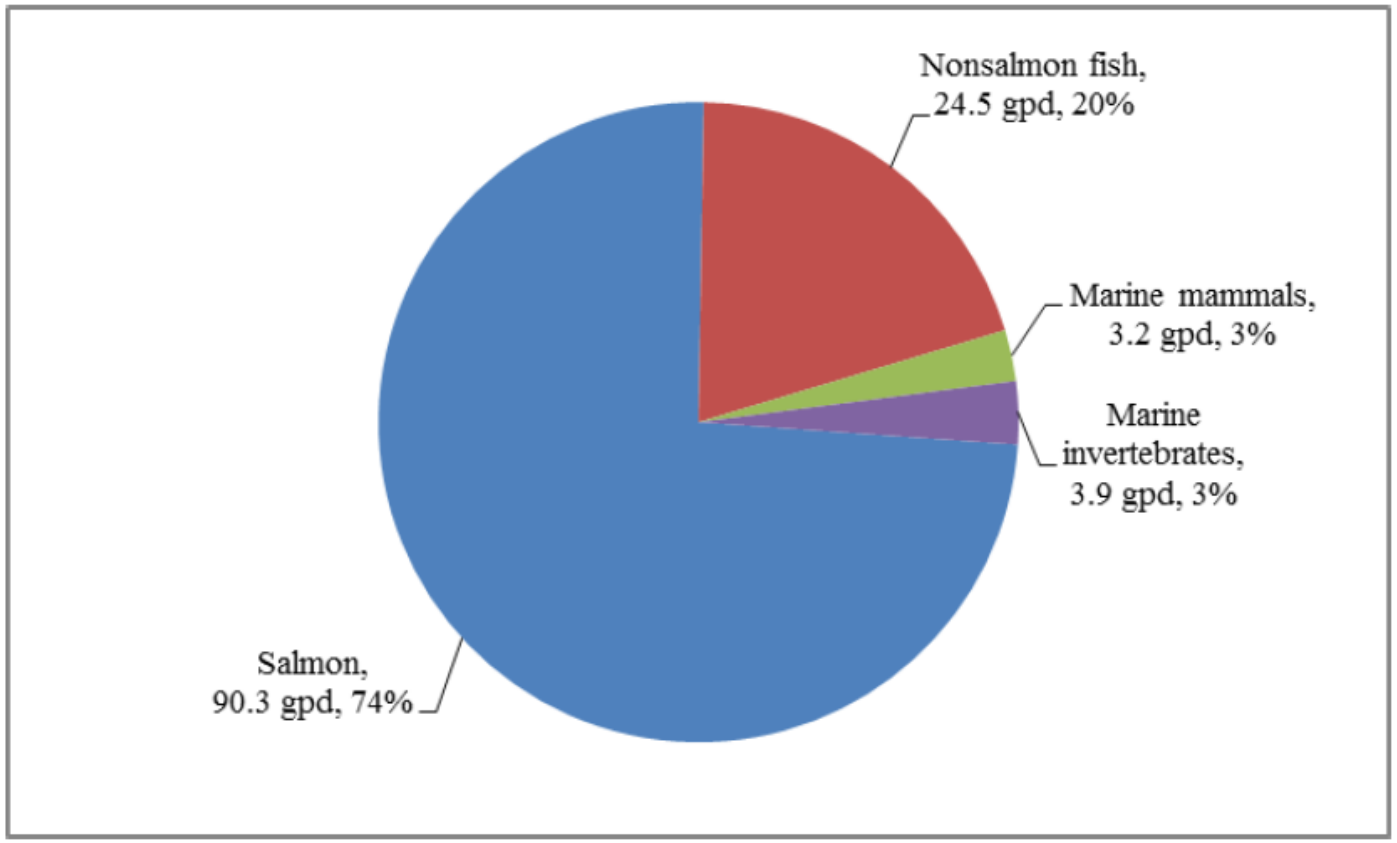
Things to consider: Regional Differences



ADF&G *Subsistence in Alaska: A Year 2017 Update*

Things to consider when calculating an FCR: Which Fish?

Southcentral AK - % of FCR by Family



Nutrition Facts

Steller sea lion meat, raw

Serving Size: 3oz (85g)

Amount per Serving: 1

Calories 102	Calories from Fat 14
	% Daily Value*
Total Fat 1.6g	**2%**
Saturated Fat nv	**nv**
Cholesterol 54mg	**18%**
Sodium 53mg	**2%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Sugars 0g	
Protein 22g	**44%**
Vitamin A 0% •	Vitamin C 0%
Calcium 0% •	Iron 54%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Source: U.S. Department of Agriculture, Agricultural Research Service, 2012

ADF&G *Subsistence in Alaska: A Year 2017 Update*

Results: ADF&G FCR Estimates

- Dataset
  - FCR percentiles vary by region
  - Some regions included more communities than others
  - Ethnic composition of participants: 35.3% (SC) to 90.2% (W) AK Native

- Results were then evaluated and recalculated to incorporate statistical weighting
  - Determined ADF&G methodology to be technically defensible
  - Used statistical weighting to adjust the non-random sample dataIn

Consumer only FCRs (Mountain Whisper Light (2019))

	ADFG	MWL		
Region	Freshwater & Marine Invertebrates (g/day)	Fresh/Marine Invert/Salmon/Halibut/Herring (g/day)		Diff in 90th percentiles
	90th	**Mean**	**90th**	
Rural (N=6,632)	161	149	308	91%
SE	94	152	320	240%
SC	70	113	217	210%
SW	118	145	287	143%
W	171	190	379	121%
A	261	125	291	11%
Int	127	127	246	94%

Interesting points about the results

Mean and 90th percentiles vary widely across rural AK

Consumption of fresh/marine/salmon, halibut, herring has significant implications on the FCR

- Percent Increase of 11% (Arctic) to 240% (Southeast)
- Example of regional species availability and dietary preference

68% difference between the lowest and regional means (113 v 190 g/day)

AK Rural mean of **149 g/d** is very similar to EPA nationally-recommended 90th percentile Subsistence value of **~143 g/d**

Other HHC Inputs and TWG Recommendations

	Current Inputs	TWG Recommendations
BAF	BCF-values applied (1992)	Apply EPA BAF Trophic Level 4
BW	70 kg (~154 lb.)	Change to 80 kg (~176 lb.)
CRL	1 in 100,000 (1997)	Majority recommended to retain 1 in 100,000
CSF	Pollutant specific	Apply EPA recommended values
DI	2.0 liters/day	Change to 2.5 liters/day
FCR	6.5 g/day. Does not include anadromous fish and other marine species	Majority recommended: Anadromous and non-anadromous local fish, and use rural consumers as target population
RfD	Pollutant specific	Apply EPA recommended values
RSC	N/A	Apply EPA values (did not deliberate on the adjustment of RSCs to account for inclusion of marine species)

What pre-rulemaking actions have occurred?

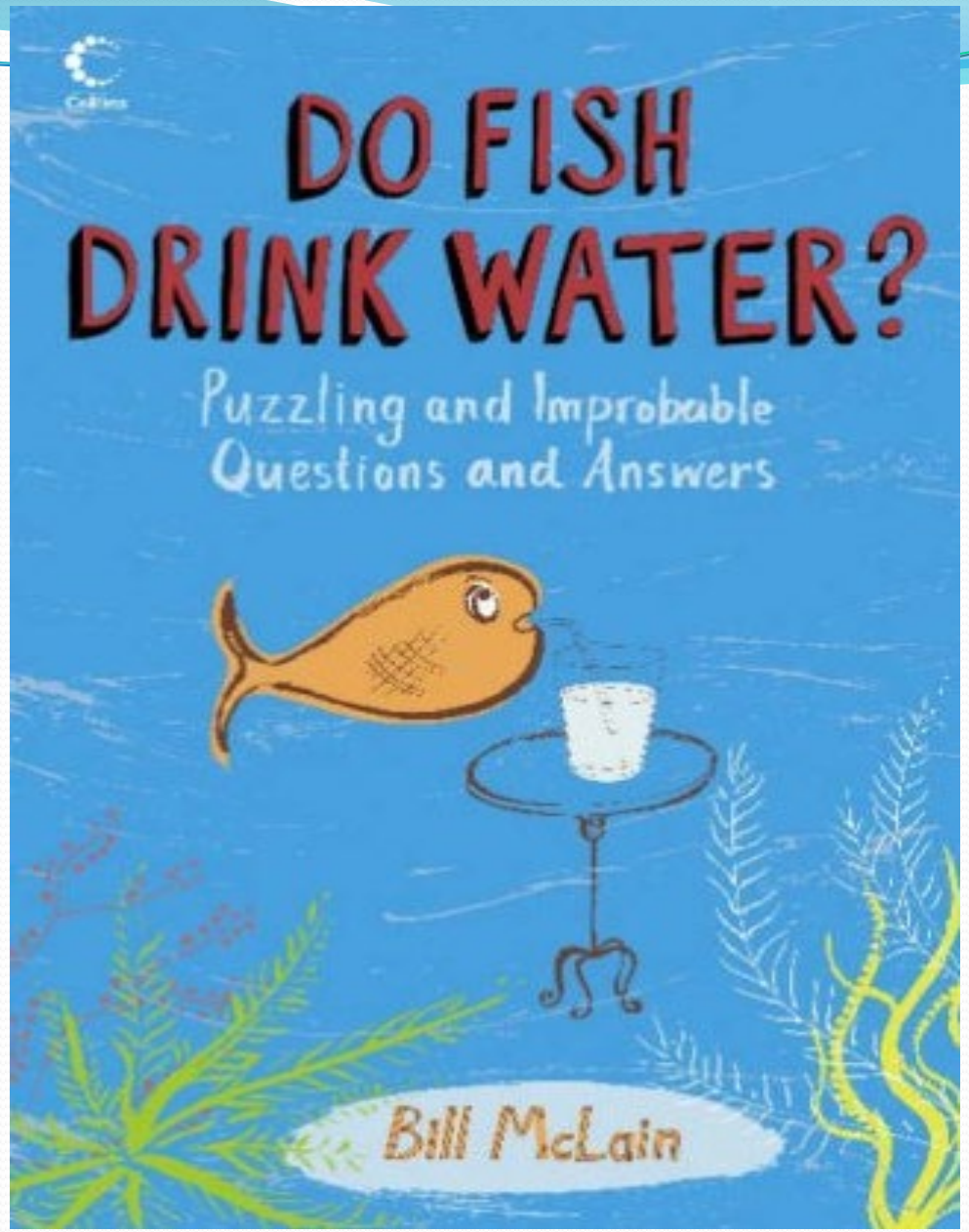
- DEC created multiple HHC scenarios and presented them to different permittee stakeholders (POTWs, Mining, Oil and Gas)
  - Many HHC were calculated to be below existing WQ criteria
  - Tried to develop "draft" permits but that was too challenging without necessary effluent and receiving water data
- Provided a public "scoping" opportunity in February 2023
- Multiple interactions with EPA regarding points of concern, sources of information, and potential challenges (all correspondence posted on DEC website)

Now what cont.

- DEC is considering **potential courses of action** related to the development of HHC.
  - EPA has two petitions they have to respond to…
- Monitoring EPA national policies related to tribes
- Working on rulemaking for adopting authority to issue intake credits for WQBELs – similar actions were taken by other NW states during their HHC rulemaking efforts

Questions?

Thank you!



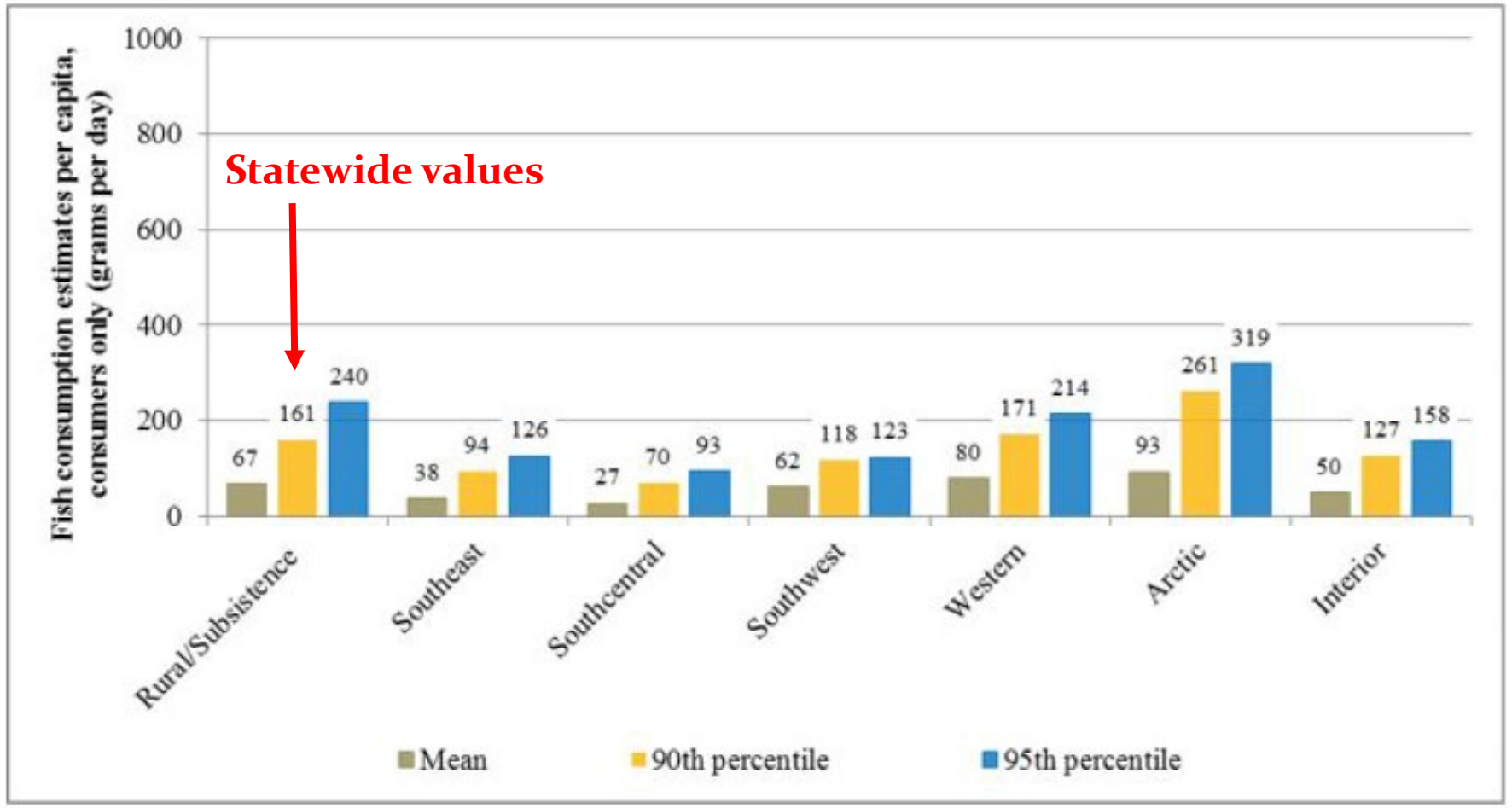
A few lead in questions:

- Why not just let EPA promulgate for AK?
  - DEC conducted rulemaking in 1997 to have Alaska removed from the NTR for arsenic (As) HHC. If EPA promulgates over AK we anticipate EPA will establish new HHC for As
  - EPA has expressed reservations about a CRL of 1:100,000.
  - EPA is much more likely to choose a 90th or 95th percentile of the ADF&G dataset
- Any thoughts about HHC lower the existing analytical detection limits?
  - Yes, proposing to add language to WQS that explicitly states DEC will use MDLs for assessment purposes

ADF&G FCRs for Freshwater and Nearshore species

Includes:

- Statewide and Regional Rural/Subsistence Values
- Mean and High Consumer Values
- Species
  - **Freshwater fish**
  - **Marine Invertebrates (e.g., shrimp, mussel, geoducks, etc)**



ADF&G FCRs: Freshwater, Nearshore, Select Marine Species

Includes:

- Statewide and Regional Rural/Subsistence Values
- Mean and High Consumer Values
- Species
  - **Salmon**
  - **Freshwater fish**
  - **Halibut & Herring**
  - **Marine Invertebrates (e.g., shrimp, mussel, geoducks, etc)**