

# Fish Consumption & Water Quality Standards

Carl Reese

Water Quality Standards

Division of Water

Alaska Department of Environmental Conservation



# Fish Consumption & Water Quality Standards

## Program

- Quick review – Alaska Water Quality Standards
- Advisory – what to worry about and what not to worry about
- Water Quality Standards (WQS), fish advisory, & mercury
- EPA
- Oregon
- Gaps?

# What are Water Quality Standards ?

## **Use + Criteria = Standard**

- Designated water use classes (7)
  - Drinking, fishing, swimming & other uses
- In Alaska, all waters protected for all uses
- Criteria are pollutant limits to protect uses
- Most stringent criteria becomes the WQS

# Fish Advisories

## Health benefits and Eating Fish

Rural Alaskans shifted from fish to a “modern” diet:

- Increased - Diabetes
- Heart disease
- Obesity



# Health Risks and Eating Fish

- Some AK fish contain contaminants, notably methyl mercury. Women who are or can become pregnant, nursing mothers, and children aged 12 years and under should limit consumption of some species of fish.



# Fish Advisory

Fish advisories are stated as meals/week

Calculated from pollutant levels in fish tissue

$$\text{Meals/week} = \frac{(\text{Hg}_{\text{allowable}})(\text{body weight})}{\text{Concentration in fish}}$$

EPA: Hg<sub>allowable</sub> = 0.1 µg/kg/day

AK: Hg<sub>allowable</sub> = 0.4 µg/kg/day)

[www.epi.alaska.gov](http://www.epi.alaska.gov)

## Fish Identified for Advisory

≤ 4 meals per week (or ≤16 meals per month);

- sablefish, roughey rockfish, medium-sized halibut (20–39.9 pounds), store-bought halibut, and medium-sized lingcod (30 to 39.9" length)

≤3 meals per week (or ≤12 meals per month);

– medium-large halibut (40 to 49.9 pounds)

≤2 meals per week (or ≤8 meals per month)

- large lingcod (>40" length), yelloweye rockfish, large halibut (>50 pounds), salmon shark, and spiny dogfish

- ([http://www.epi.hss.state.ak.us/bulletins/docs/rr2007\\_04.pdf](http://www.epi.hss.state.ak.us/bulletins/docs/rr2007_04.pdf))

## Alaska Fish Advisory Summary

- Alaskans eat more fish than national averages.
- Most Alaskan fish are below advisory levels.
- The RfD was 2.5 times greater than EPA to account for health benefits of eating fish.



# Comparison of WQS to Fish advisory

Water Quality Standard  $\neq$  Fish Advisory

Fish advisory = (meals/month)

WQS = Concentration in water



# Water Quality Criteria

- Current human health criteria for mercury in water :  $0.050 \mu\text{g} / \text{l}$
- Formula for calculating human health criteria
  - BAF = bioaccumulation factor
  - ACR = Average consumption rate for Americans (g/day)
  - BW = Body weight of an adult (assumed to be 67 kg)
  - RfD = Reference dose (max daily amount not likely to cause harm)

$$\text{WQC} = \frac{\text{BAF} \times \text{ACR} \times \text{BW}}{\text{RfD}}$$

# EPA Water Quality Criteria for Mercury

- Reference dose (RfD) of  $1 \times 10^{-5}$  mg/kg-d.
- Assumes an adult's weight is 67 kg
- Assumes average consumption of 17.5 g/d
- Water Quality Criteria
  - do not account for health benefits of eating fish.
  - used to limit discharges
  - prevent adverse effects for national fish consumption rates

Alaskans eat more fish than the rate used to calculate the water quality criteria

Alaska fish



17.5 g/d fish (EPA)



## DEC's Current Water Quality Standard

- 6.5 g/day current fish consumption rate used to calculate human health criteria
- Human health criteria is 0.050  $\mu\text{g}$  /liter based on 1999 EPA recommended criteria.
- Nationally recommended criteria do not account for higher fish consumption in Alaska.
- No fish tissue criteria adopted.

# Oregon

- 175 g/day fish consumption rate for calculating human health criteria
- Based on diet studies of tribes with similar diets to some Alaskans
- This changed criteria.

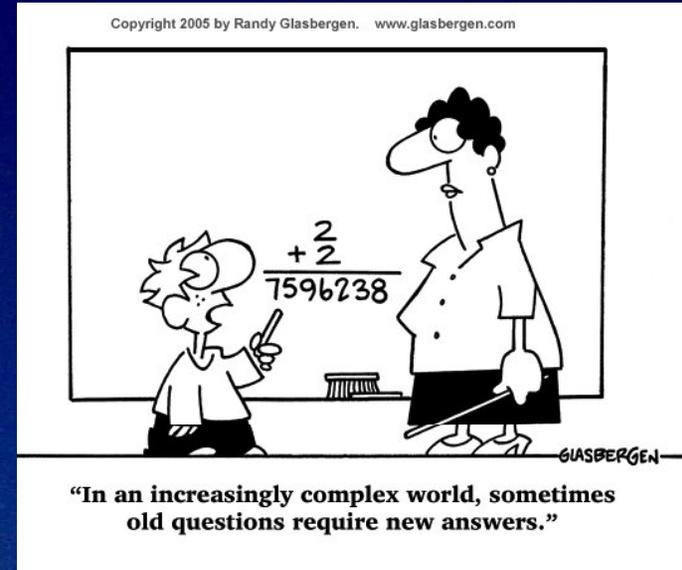


## Comparison of regulations

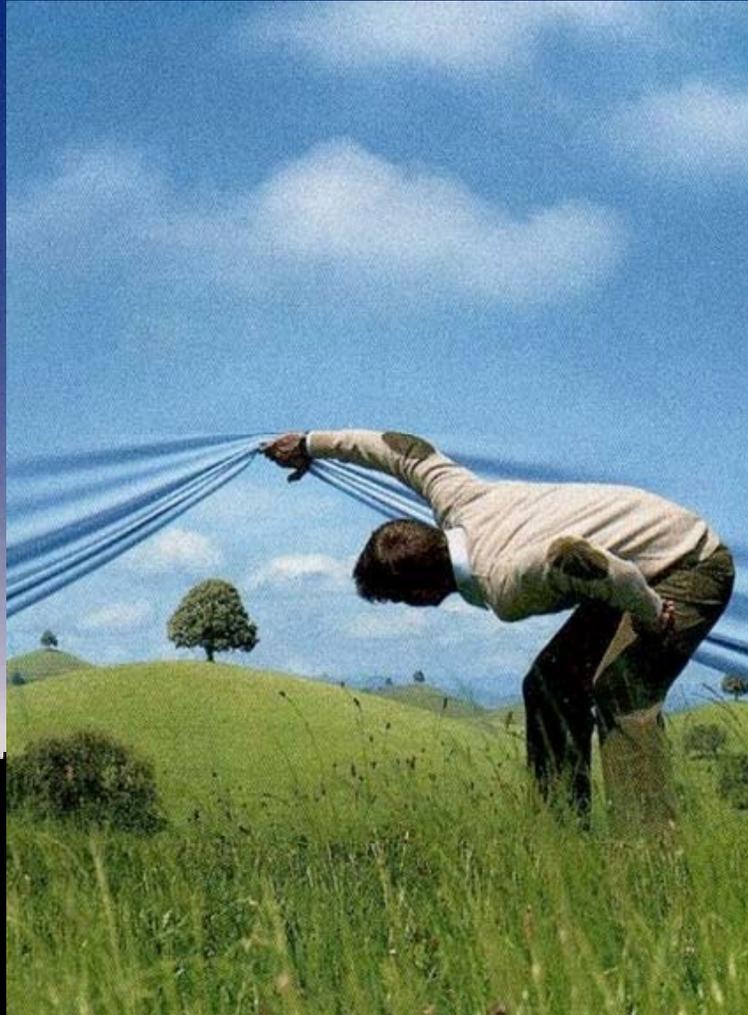
	Alaska	EPA	Oregon
Fish advisory	Yes	yes (often EPA depends on state's data)	Yes
WQ criteria for mercury	0.050 µg/liter		0.146 µg/liter
Fish tissue standard	None	0.3 mg/kg	0.3 mg/kg (not approved by EPA)
Fish consumption rate	6.5 g/day	17.5 g/day	175 g/day
Current actions	Standards are under scientific review	Recommends states use fish tissue standards	

# Gaps

- What are the sources?
  - Atmospheric deposition
  - Historic mining
- Consumption
  - Urban and Rural
- Concentrations in water and in fish tissue
  - Regional
  - Ecosystem



# What's Next?



- Fill information gaps
- Program priorities