



Water Quality Standards Human Health Criteria Public Workshop

Alaska Department of Environmental
Conservation
Division of Water- Water Quality Standards
Brock Tabor
October 29-30, 2015



Division of Water

Mission Statement: **Improve and Protect Alaska's Water Quality**

How?

- **Establishes standards for water cleanliness**
- Regulates discharges to waters and wetlands
- Provides financial assistance for water and wastewater facility construction and waterbody assessment and remediation
- Trains, certifies, and assists water and wastewater facility system operators
- Monitors and reports on water quality



Human Health Criteria

- Human Health Criteria “101”
- History of Regulation(s) and Purpose of Updates
- What DEC is hoping to achieve with this Workshop



Outline of this Workshop: Day 1

- Ground Rules and Expectations
- Introduction to human health criteria (HHC) issue (DEC)
- Current issues from a National Perspective (EPA)
- Relationship to Fish Consumption Advisories (DHSS)
 - Lunch
- Introduction to HHC formula (DEC)
- Introduction to Dietary Surveys (EPA)
- State experiences: Idaho and Washington
 - Panel Discussion



Outline for this Workshop: Day 2

- DEC Efforts to date (DEC)
 - Fish Consumption Research Literature Review
- Tribal Efforts to Quantify Fish Consumption: Seldovia Village Tribe
- ADF&G Efforts to collect fish harvest data and relevance to FCR (ADF&G)
 - Break
- Implementation of new HHC: Existing and Potential options (DEC)
- Panel discussion (Industry/Municipal/DEC)
- Break-out Groups- feedback on specific issues of concern



Ground Rules for the Public Workshop

- We understand that many different interests will be represented, and that it might not be possible for all parties to agree with one another.
- Regardless of the degree of agreement attained, all opinions and recommendations will be of value to DEC and other participants in the process.
- We will be respectful of all participants at all times- this is an issue of importance to all of us for different reasons.
- No one is required to speak but everyone has a right to contribute to the conversation.

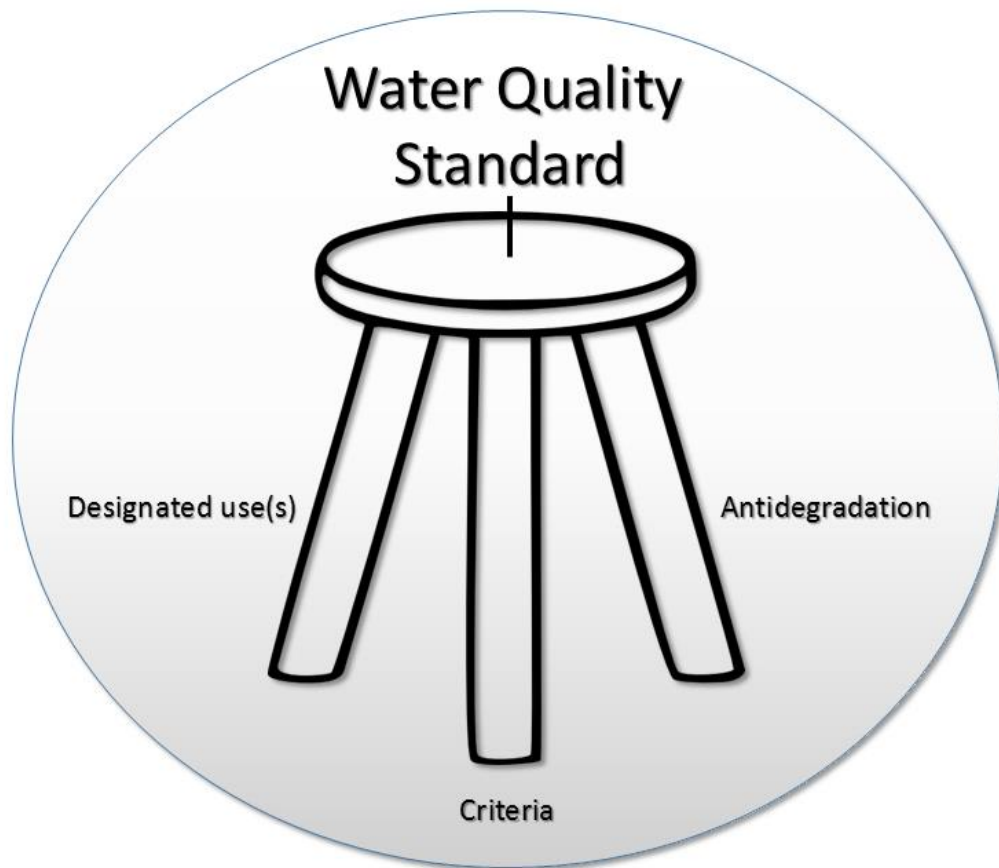


What are Water Quality Standards (WQS)

- The foundation of state/tribal water quality-based pollution control programs under the Clean Water Act (CWA)
- Are designed to protect public health or welfare (*designated use*)
- Provide acceptable maximum concentration (generally) of a particular pollutant in the water (*criteria*)
- Help prevent polluted water; identify polluted waters; and clean-up polluted water
- Identified at 18 AAC 70

Foundation of a Water Quality Standard

-Defined-



1. **Designated Uses** – how water is used (e.g. recreational, industrial, aquatic life)
2. **Criteria** - are numeric or narrative values. Consider how much and how long you may be exposed to a substance or condition
3. **Antidegradation** –process for protecting high quality waters

Where do Water Quality Standards (and discharge limits) apply?

(AS 46.03.900) "Waters" include lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, straits, passages, canals, the Pacific Ocean, Gulf of Alaska, Bering Sea, and Arctic Ocean, in the territorial limits of the state, and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially in or bordering the state or under the jurisdiction of the state.

(18 AAC 70.020(b)): [t]he water quality standards regulate human activities that result in alterations to **waters** within the state's jurisdiction.

Human Health Criteria Workshop

Presentation #1: An Introduction to Human Health Criteria

Human Health Criteria (HHC)



- A human health criterion is the highest concentration of a pollutant in surface water that is not expected to pose a significant risk to human health
 - designed to **minimize the risk** of adverse effects from exposure to different contaminants
 - 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.



Alaska Water Quality Criteria Manual for Toxic and other Deleterious Organic and Inorganic Substances (2008)

Department of Environmental Conservation
Alaska Water Quality Criteria Manual for Toxic And Other Deleterious Organic and Inorganic Substances

WATER QUALITY CRITERIA FOR TOXICS AND OTHER DELETERIOUS SUBSTANCES (µg/l unless shown otherwise)

Pollutant CAS Number	Type of Pollutant	Drinking Water ¹	Stock- water ²	Irrigation Water ³	Aquatic Life for Fresh Water		Aquatic Life for Marine Water		Human Health for Consumption of:		References ⁴
					Acute (CMC)	Chronic (CCC)	Acute (CMC)	Chronic (CCC)	Water + Aquatic Organisms	Aquatic Organisms Only	
Endrin 72208	PEST SVOC	2	—	—	0.086 (1-hr avg) ^{11, 20}	0.036 (4-day avg) ^{12, 20, 44}	0.037 (24-hr max) ⁷	0.0023 (24-hr avg) ^{7, 10, 29}	0.76	0.81 ^{5, 32}	Drinking Water: 18 AAC 80.300(b) Aquatic Life: 57 FR 60848 65 FR 31682 67 FR 79091 EPA 440-5-80-047 EPA 820-B-96-001 EPA 822-Z-99-001 EPA NRWQC 2006 Human Health: 65 FR 31682 67 FR 79091 EPA 440-5-80-047 EPA 822-Z-99-001
Endrin Aldehyde 7421934	PEST SVOC	—	—	—	—	—	—	—	0.76	0.81 ^{5, 32}	Human Health: 57 FR 60848 65 FR 31682 EPA 822-Z-99-001
Ethylbenzene 100414	VOC	700	—	—	—	—	—	—	3,100	29,000	Drinking Water: 18 AAC 80.300(b) Human Health: 57 FR 60848 65 FR 31682 67 FR 79091 EPA 440-5-80-048 EPA 822-Z-99-001
Ethylene Dibromide 106934	PEST	0.05	—	—	—	—	—	—	—	—	Drinking Water: 18 AAC 80.300(b)
Fluoranthene 206440	SVOC	—	—	—	—	—	—	—	300	370	Human Health: 57 FR 60848 65 FR 31682 EPA 440-5-80-049 EPA 822-Z-99-001

When does HHC apply- Designated Use?



- HHC are tied to the designated uses
- ***Drinking water***
 - ***Growth and propagation of fish, shellfish, other aquatic life and wildlife***
 - ***Harvesting for consumption of raw mollusks or other raw aquatic life***

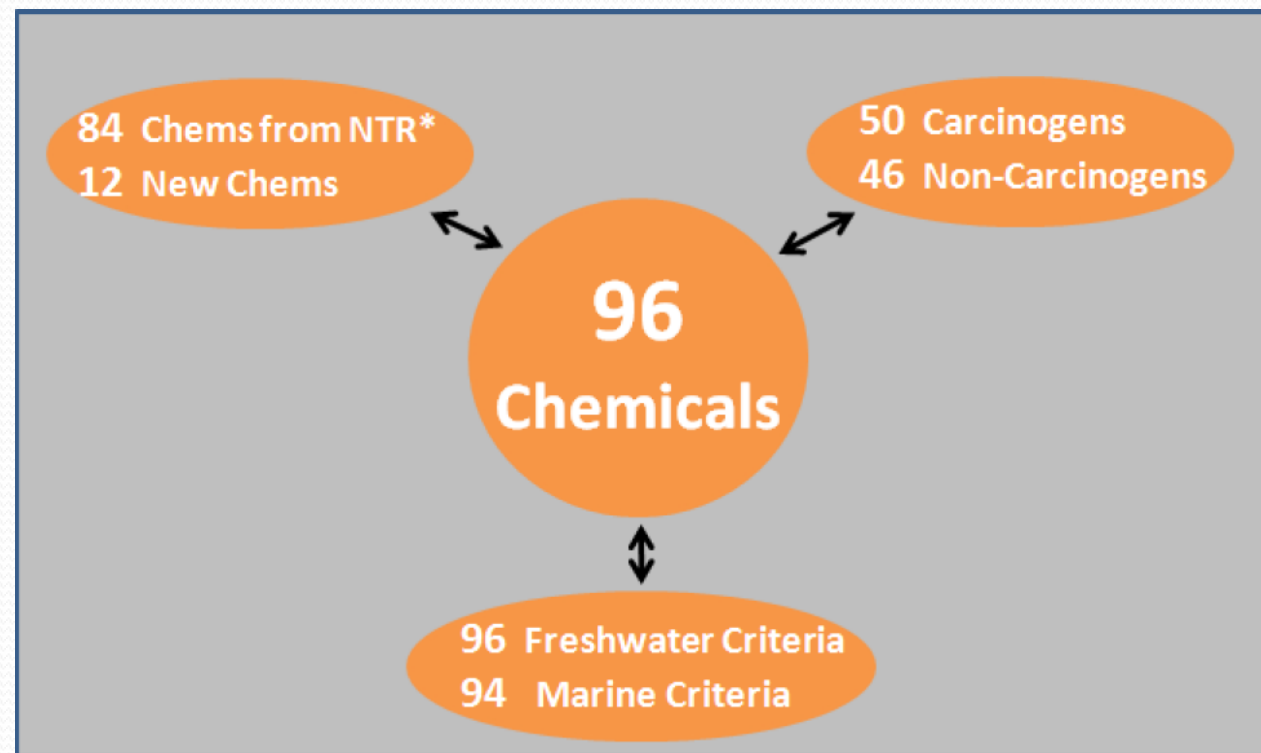


Historical Context: National

- 1980 - EPA derived 64 recommended HHC. Criteria were based on national dietary information (where original FCR values were derived)
- 1992 - National Toxics Rule promulgated carcinogens for Alaska
- 2000 - New HHC methodology was published.
 - Updated FCR to 17.5 g/d
 - Subsistence user value of 142.4 g/d
- 2002 to 2015 - EPA updates various HHC and introduces new pollutants to the list.
 - The most recent revisions included new exposure values

How do the 2015-recommended HHC compare with existing HHC?

- There are revised criteria for 96 chemical pollutants
 - 70% of the 2015 HHC are lower concentrations than 1980 criteria
 - 30% of the 2015 HHC are equal in concentration to 1980 criteria
 - Numerous pollutants were not updated at this time (e.g., PCBs, metals)



NTR* – National Toxics Rule (1992)

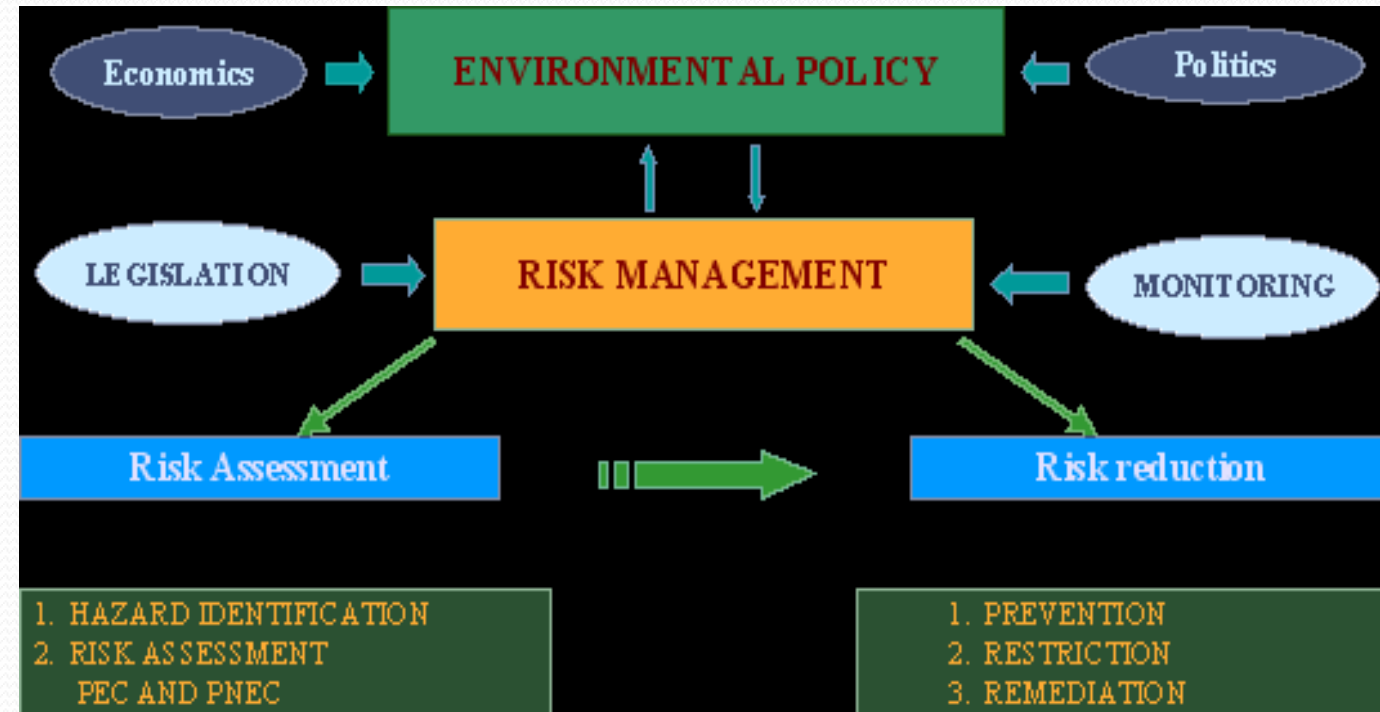
Why is Alaska interested in the HHC issue?

- Clean Water Act requires states to adopt updated criteria when new information is available
- Alaska is subject to the promulgated National Toxics Rule
 - Not based on Alaska-specific or even Northwest data
 - Alaska knows that an FCR of 6.5 g/day is not representative of fish consumed in AK
- Criteria must be scientifically defensible



What has DEC heard or learned to date?

- Comments submitted in Triennial Review process
 - Existing values are outdated
 - Desire for the state to adopt *Alaska-specific* values
- Lots of interest and activity in other Region 10 states
- Lots of interest from tribes and others that may rely on fish for subsistence



What has DEC heard or learned to date?

- Concerns from the regulated community
 - May be very difficult to meet updated criteria in the short term
 - May not be the right mechanism for reducing toxics in the environment
 - Over protectiveness may divert resources from other environmental improvements.



Goals of this rule-making?

- **Ensure water quality standards are protective of human health** so our fish, shellfish, and drinking waters (surface) remain clean and healthy to consume;
- **Apply a regulatory process based on realistic timeframes** to allow dischargers to reduce pollutants and still be in compliance while they are doing their work; and
- **Acknowledge that there are technology limitations** and recognize that non-permitted sources may be a significant part of the problem with being able to meet the criteria.

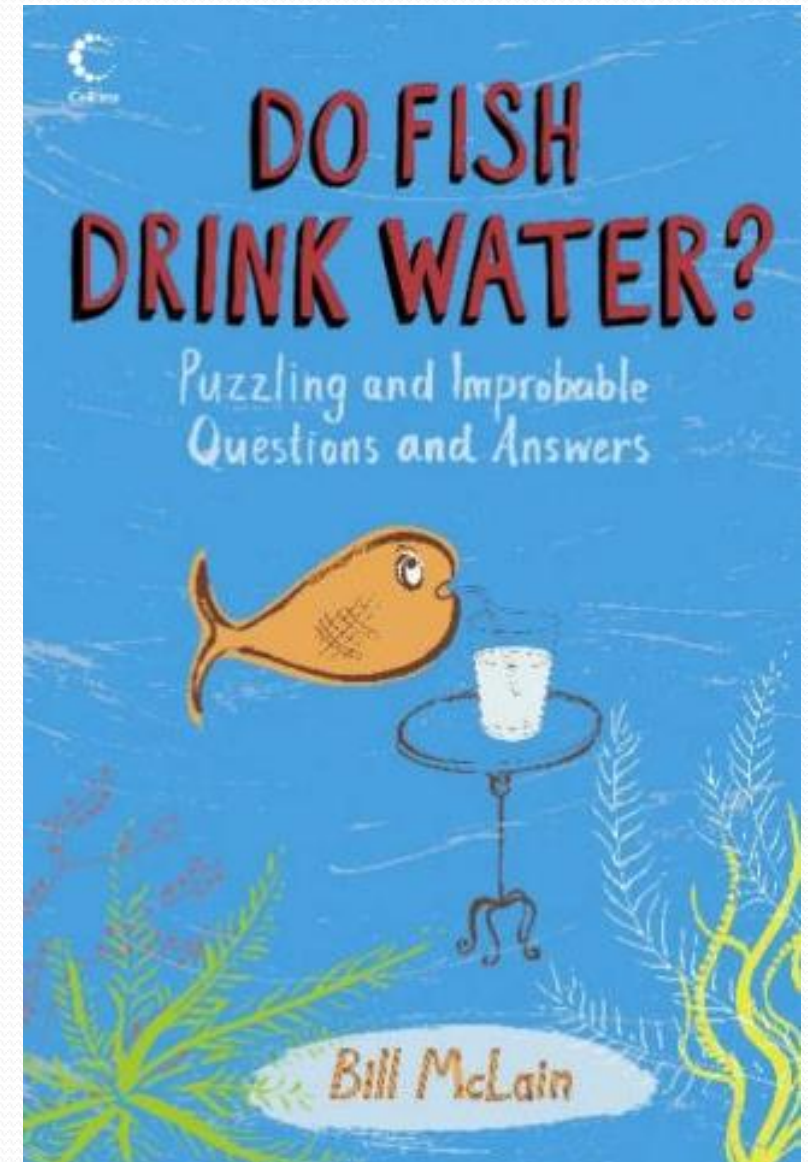


Who else is working on this issue?

- **Florida:** Started this process in 2003. Awaiting EPA response on 2015 package...
- **Washington:** Began work in 2011. Working on a revised draft rulemaking package...
- **Idaho:** Began work in 2011. Working on a draft rulemaking package...
- **Oregon:** Adopted criteria (2011). Working on implementing in permits using new/existing tools.
- **Maine:** HHC were disapproved of in 2015 for not being protective of tribal populations Currently being litigated (Maine v. EPA)
- **EPA-Region 10:** Has proposed criteria for Washington if the draft rulemaking package isn't acceptable
- **Numerous tribes...**both in Alaska and Northwest

Questions?
Thank you for your time!

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4 Equations to Calculate Human Health Criteria

Input Variables (2015 recommended)

BW = Human Body Weight (adult = 80 kg = 176 lbs)

DI = Drinking Water Rate (2.4 liters/day)

CSF = Cancer Slope Factor (mg/Kg-day) AKA (RSD)

FCR = Fish Intake Rate (? grams/day)

BCF/BAF = Bioconcentration v. bioaccumulation factor (L/Kg, chemical specific)

RfD = Reference Dose, Non-Carcinogens (mg/Kg-day)

RL = Risk Level (10^{-5}) in Alaska (EPA uses 10^{-6})

RSC = Relative Source Contribution

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

Slide Images and Inspiration courtesy of
Washington Ecology