Water Quality Standards
Human Health Criteria
Technical Workgroup
Meeting #5

Alaska Department of Environmental Conservation
Division of Water- Water Quality Standards
January 26, 2016

Webinar instructions:

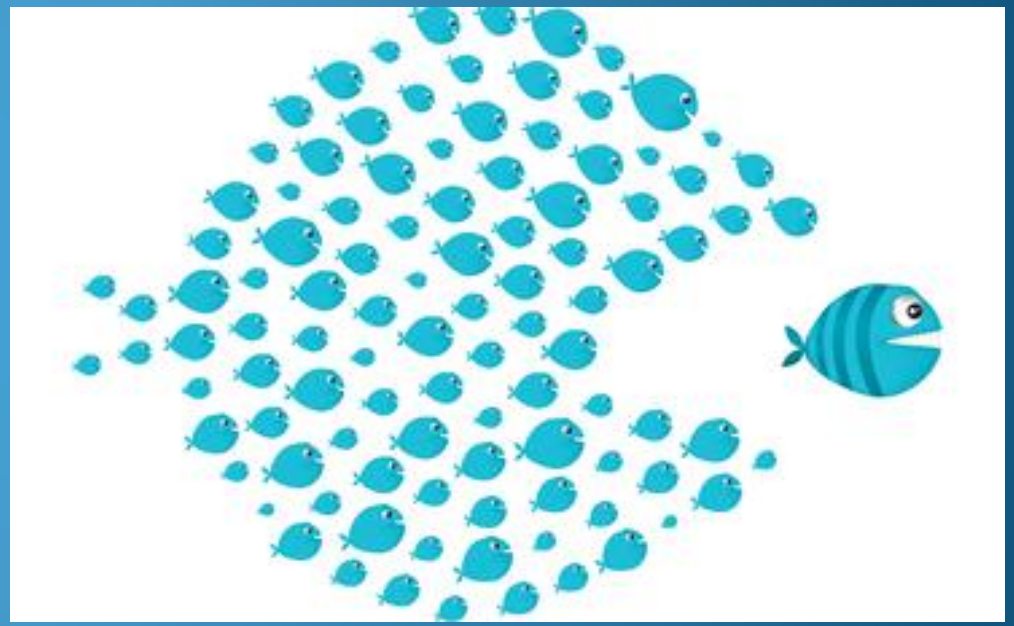
- For audio please dial: **1-800-315-6338**
- Access code: **51851**
- Note that all lines will be muted during the presentations

- Public testimony will be taken at the end of the webinar.

PLEASE BE RESPECTFUL OF ALL PARTICIPANTS

Purpose of Technical Workgroup

- Provide technical feedback on issues associated with development of human health criteria (HHC) in state water quality standards
  - **Develop a Summary Report**
- Identify key sources of information that may be applicable to the process
- Ensure a variety of stakeholder voices are heard



Questions to be considered by the Workgroup

- Issue #1: What information about fish consumption and fish consumption rates is available to inform the HHC process?

- Issue #2: What options does DEC have for developing criteria on a statewide/regional/site specific basis?
  - Issue #2a: What modeling approach(es) should DEC consider (Determinstic v. Probabilistic)?

- Issue #3: What is the appropriate level of protection for Alaska and its residents?
  - Issue #3a: How should DEC apply bioconcentration v. bioaccumulation factors?
  - Issue #3b: How should DEC address concerns about its carcinogenic risk value?

Questions to be considered by the Workgroup

- What should Alaska's FCR(s) be?
  - Issue #4a: What species should Alaska include for deriving a fish consumption rate?
    - Marine Fish (i.e., salmon?;)
    - If we include- Can we adjust FCR values based on lipid content?
    - Marine Mammals (AK would be the only state that considers this issue)
  - **Issue #4b: What is the role of Relative Source Contribution (RSC) in relation to other exposure issues and what are Alaska's options?**
- Issue #5: What are Alaska's options for implementing the proposed criteria?
  - Existing tools (compliance schedules) and new tools (variances, intake credits)

Outline of Today's Meeting

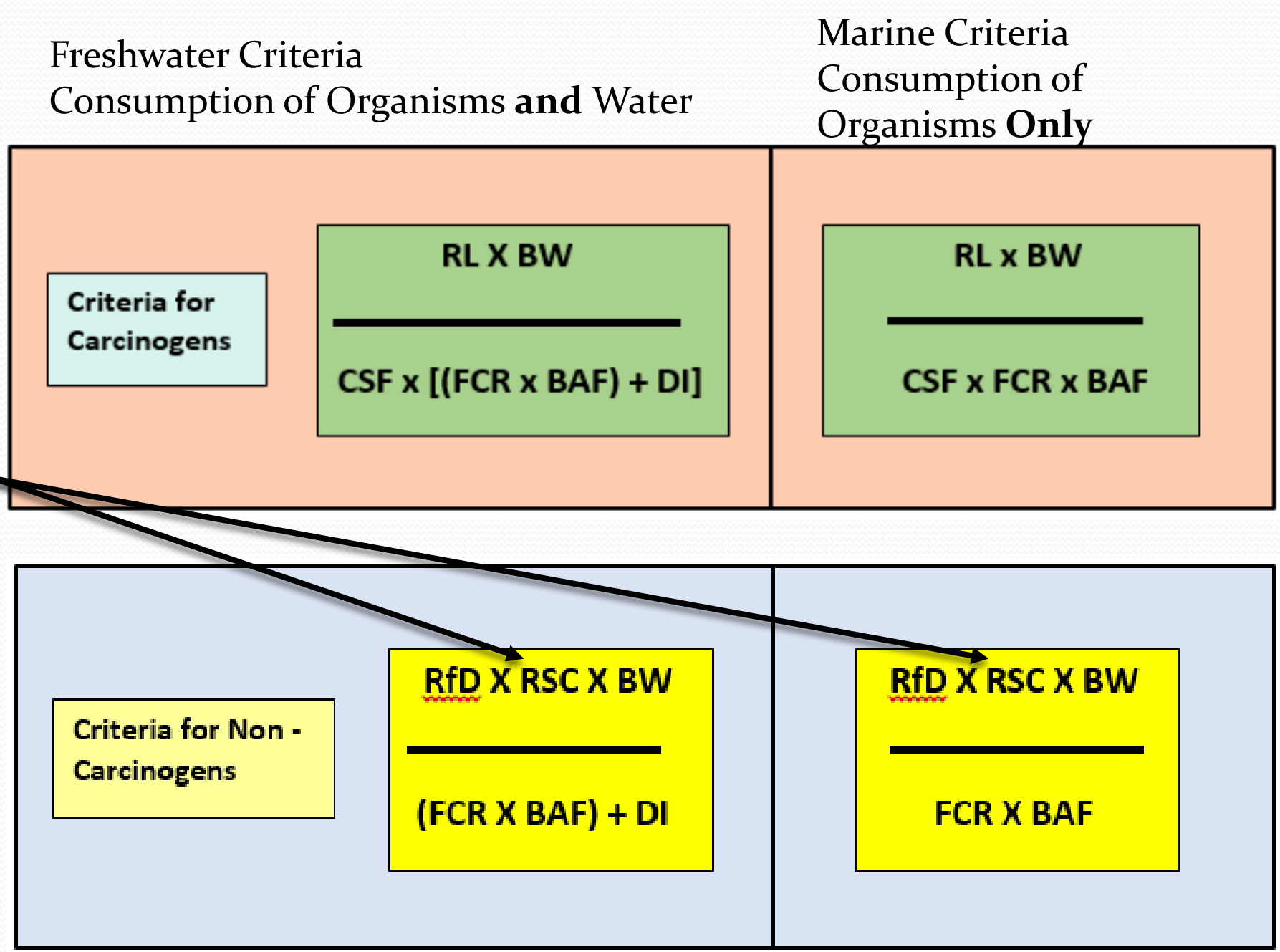
- Recap of Meeting 4
  - Workgroup Report
  - HHC Excel tool
- Goal of today's meeting:
  - Introduce Relative Source Contribution
  - Update on other state efforts (If time is available)

Meeting #4 Recap

- Workgroup Report to date
  - Questions/Comments
  - Additional thoughts on questions previously raised?
    - DEC plans to have a second draft available for discussion at the February meeting
- HHC Excel Tool
  - Did you try it?
  - Did you get the results you expected?

HHC Equation(s)

- **RL: Risk Level**
- **CSF: Cancer Slope Factor (IRIS)**
- **RfD: Reference Dose (mg/Kg-day) (IRIS)**
- **RSC: Relative Source Contribution**
- **BW: Body Weight**
- **FCR: Fish Consumption Rate**
- **BAF: Bioaccumulation**
- **DI: Drinking Water**

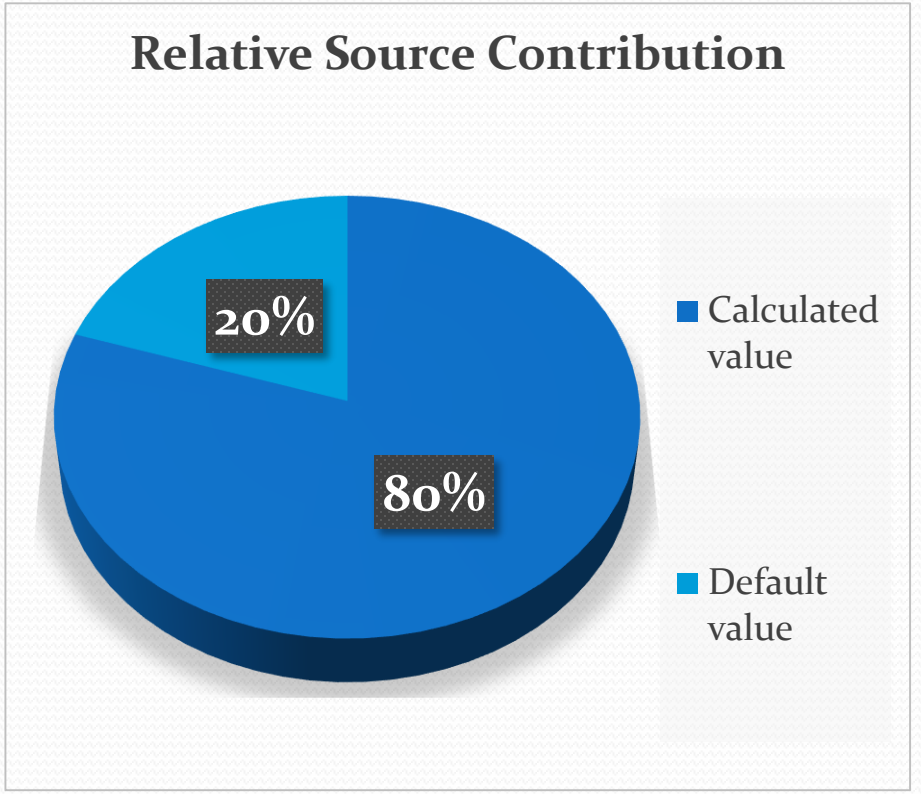


Pre-meeting Background Information

- DEC provided several background documents to you for consideration
  - EPA RSC Presentation
  - Washington Whitepaper
  - Idaho Whitepaper

Relative Source Contribution (RSC) Overview/Key Points

- An RSC is used in HHC formula for **noncarcinogens** and **carcinogens with a nonlinear response** to dose
- The RSC is the relative contribution of the contaminate as found in water intake and/or fish/shellfish from a waterbody to total daily exposure from **all** sources
- RSC is contaminate-specific



The chart represents the total allowable dosage (RfD)

Relative Source Contribution (RSC)

- The use of an RSC affects criteria calculation results as follows:
  - If the RSC is 1.0, then it does not change the resulting criteria calculation.
  - If the RSC is 0.8, then the criterion becomes more stringent by 20%.
  - If the RSC is 0.5, then the criterion becomes more stringent by 50%.
  - If the RSC is 0.2, then the criterion becomes more stringent by 80%.

- Concept is borrowed from the Safe Drinking Water Act
  - Reflects "the need to bridge the gap between the differences in the risk assessment and risk management approaches used by EPA's Office of Water"

Exposure Routes and Media

- Exposure Routes
  - Ingestion (eating fish/drinking water from treated and untreated sources
- Inhalation
  - Showering
- Dermal contact
  - Bathing
  - Recreational contact
- Drinking Water
  - Assumes an unregulated contaminate will not be removed by treatment
- Fish and shellfish from waters of concern
- All other foods
- Ambient air
- Other- personal care products/dietary supplements

Two approaches for determining RSC by pollutant

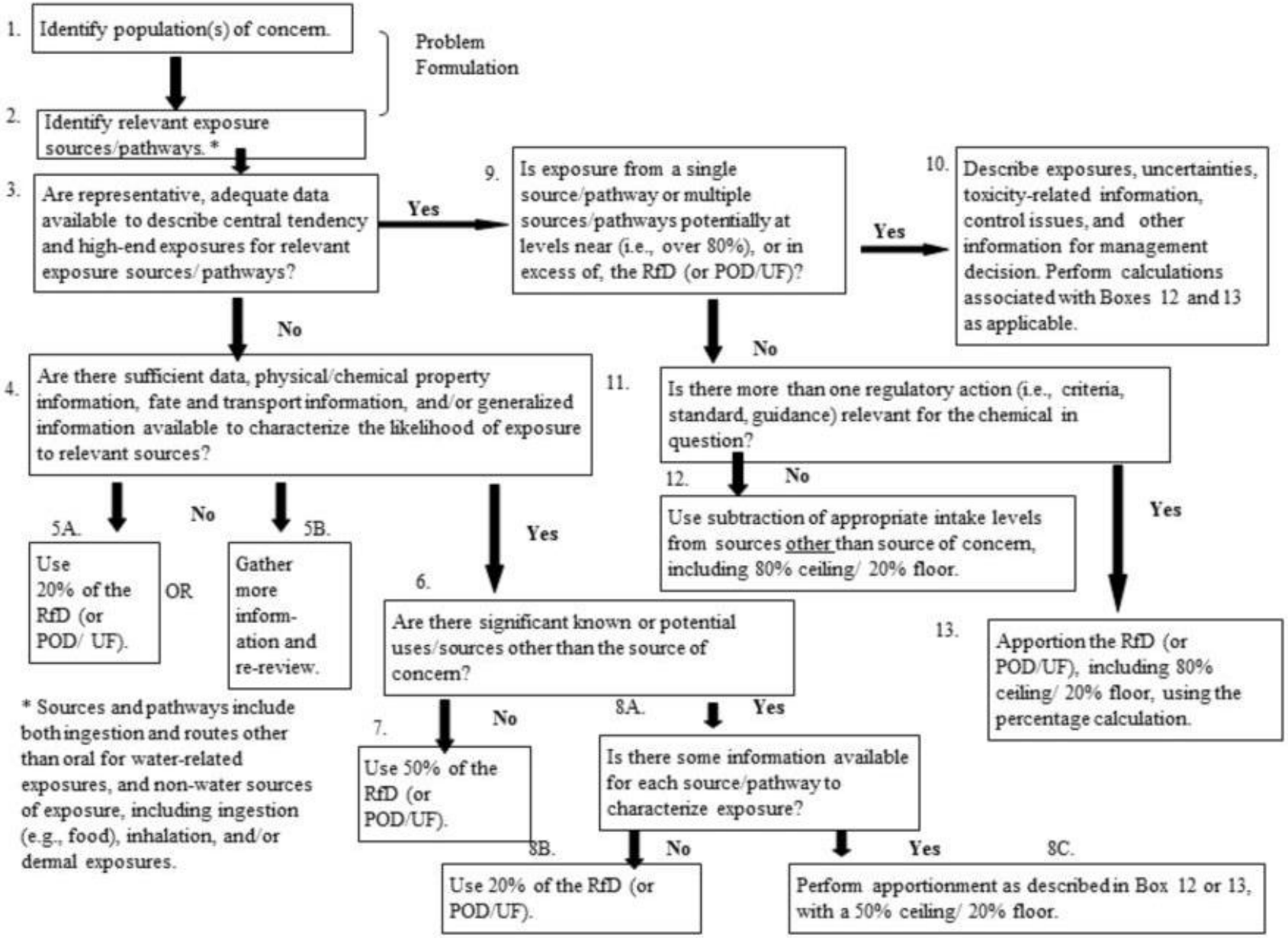
- **Percentage Approach (common)**
  - Start with RfD exposure values then add dosage from each exposure pathway
  - Data Needs
    - Population of interest
    - Determine concentrations of pollutant in DI, FCR, Other foods
    - Air, skin absorption or other sources
  - Convert to a percentage
  - Cap at 80%
  - Used for endrin
- **Subtraction Approach**
  - Start with total RfD and exposure values for each media then back-calculate
  - Subtract exposure from DW+FCR sources not in HHC (e.g. marine fish)
  - Determine percentage of RfD-exposure represented by HHC
  - Cap at 80%
  - Used for methylmercury

EPA RSC Default

- By using 0.20 as a default value EPA is assuming the following:
  - Protective of 90th percentile of general population
  - Using national dietary information for DI and FCR
  - Recognizes that there are multiple uncertainties regarding non HHC pathways – other food, air or skin contact.

- That said- there is some guidance
  - EPA Exposure Decision Tree

Figure 4-1.
Exposure Decision Tree for Defining Proposed RfD (or POD/UF) Apportionment



Issues with the use of RSC (Howd et al. 2004)

- Office of Environmental Health Hazard Assessment (OEHHA), Cal/EPA
  - Based on tradition-not data
  - Guidance for estimating RSC is vague
  - Poor quality/limited availability of exposure data
  - Default of 0.2 tends to be over-used and over-protective
  - Differing opinions as to values used for RSC calculation – avg. or target?

- Conclusion- there's room for improvement but there are few values other than defaults currently available because drinking water risk assessment is relatively new while most EPA values are 10+ years old

Other Issues- RSC-BAF-FCR relationship

- Increased fish consumption *should* lead to decreased exposure from other dietary sources, since you are making caloric choices, not consuming more food
- 50 FCR + 50 Red meat = Dietary contribution
- 75 FCR + 50 Red meat ≠ Dietary contribution since you are making choices

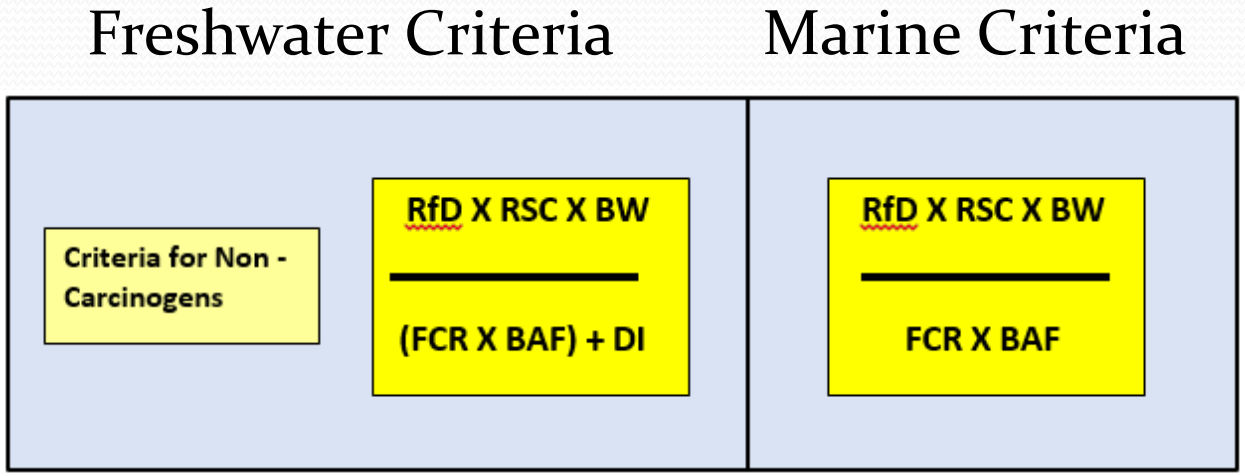
- Bioaccumulation affects RSC. BAF acts as a multiplier for the dose received by consuming fish (FCR*BAF)
  - A high BAF means more pollutant is attributed to fish while a low BAF means more may be attributed to water/other sources
  - RSC of 0.20 is applied regardless whether it is fish only or fish + water

Other Issues- RSC-BAF-FCR relationship

- EPA makes no distinction between use of RSC for **fish consumption alone** (marine) and **fish <u>and</u> water** (freshwater) consumption
  - one exposure may be substantially higher than the other
  - may need to consider using a modified BAF (ID DEQ)
- To avoid "double counting" you should either
  - include marine fish in FCR and adjust RSC accordingly (Idaho DEQ/Washington Ecology)
  - or separate the two issues per EPA methodology

Hexachloropentadiene Example

- RfD = 0.006 mg/kg-day
- High BAF = 1,300 (T4)
- RSC = 0.2
- FCR = 175 g/day
- Thoughts:
  - For high BAF chemicals: the majority of the allowable daily dose would be readily consumed as part of FCR in HHC, which suggests higher RSC value
  - What if local (fresh) fish was the only source? RSC applies in both intake scenarios
  - What if fish were the only source, shouldn't having a higher FCR eliminate the need for as low RSC for that chemical?
    - Would that depend on BAF value?



How have other states or tribes addressed RSC?

- **1992 NTR used RSC of 1.0**
- **Oregon** : Adopted RSC of 0.20 with exception of endrin
- **Washington** is proposing RSC of 1.0, because CWA should only regulate sources tied directly to waters of the state
- **Idaho** is proposing RSC of 0.20 but modifies the BAF
- **Texas** justified RSC of 1.0 (2011 EPA approval), because
  - used childhood exposure values rather than values derived for adults
  - considered use of the RSC to be an additional layer of conservativism
- **Spokane Tribe:** RSC of 1.0 based on historical consumption value

Discussion

- Ultimately the RSC question is a risk management decision but one that needs to be grounded in science
- Potential questions to consider-
  - Is Alaska in a position to consider anything but the default values?
    - maybe for site-specific criteria or contaminated sites?
  - If Alaska was to include ALL sources of fish in FCR, should it apply an RSC of 0.80 or 1 (Oregon approach)
  - Hybrid? (high BAF = higher RSC) or some other type of adjustment?

Loose ends

- Contaminate Source Tracking for persistent organic pollutants (POPs) in Alaska:
  - Various studies have taken place- mostly Cook Inlet and Prince William Sound
  - Levels appear to coincide with those in other parts of Alaska- not considered hazardous
    - Specific harbors have elevated PAH concentrations
  - Seldovia Village Tribe (with numerous partners) work is on-going.

- Asian Fish Consumption Survey in King County, Washington
  - Demographic information may be relatively close to Anchorage
  - King County Data: All Sources: 74 g/day(50^{th}) / 227 g/day (90^{th})
  - Harvest rates may be vastly different due to personal preferences and source availability-
    - Shellfish harvesting (WA) v. Kenai/Copper River dipnetting

Loose ends

- Alaska seafood imports: 1,055,115 lbs (excludes squid)
  - Interesting facts: Sardines from Morocco: 514,858 lbs
    Halibut from Canada: 320,115 lbs
- Squid (2015): **6,054,520** lbs
  - Do we really like calamari this much?
  - Bait! –Thx to MH

- Rural Sales of canned/frozen seafood (ACC Sales)
  - Aniak to Togiak (23 communities = 45K individual)
  - Sample of four communities (Barrow/Emmonak/McGrath/Craig
    - Barrow (5 g/day); Emmonak (5.1 g/day); McGrath (3.4 g/day); Craig (3.6 g/day)

Next steps:

1. Best way to proceed
    1. Circle back to first issues and keep writing based on your comments?
    2. Address all issues and then begin drafting recommendations & Workgroup Report?
2. HHC Workgroup Meeting #6
3. Introduce Issue #2: What options does DEC have for developing criteria on a statewide/regional/site specific basis?
4. DEC will distribute the draft notes to get your feedback
    - DEC needs feedback so we can add to the Workgroup Report

Alaska Forum on the Environment

1. DEC will be presenting on this issue at the Alaska Forum on the Environment on February 8th at the Human Health Criteria 201 session
   - Feel free to join us!
   - 2:15
   - HHC 101 & 201