# Water Quality Standards
# Human Health Criteria
## Technical Workgroup
## Meeting #6

Alaska Department of Environmental Conservation
Division of Water- Water Quality Standards
February 24, 2016

# Webinar instructions:

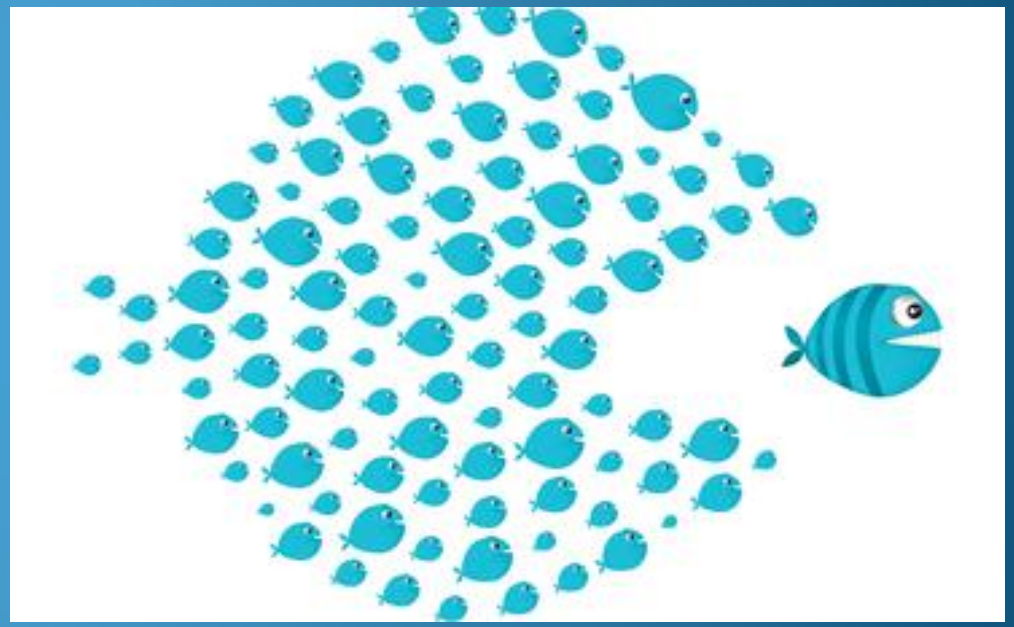
- For audio please dial: **1-800-315-6338**
- Access code: **51851**
- Note that all lines will be muted during the presentations

- 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

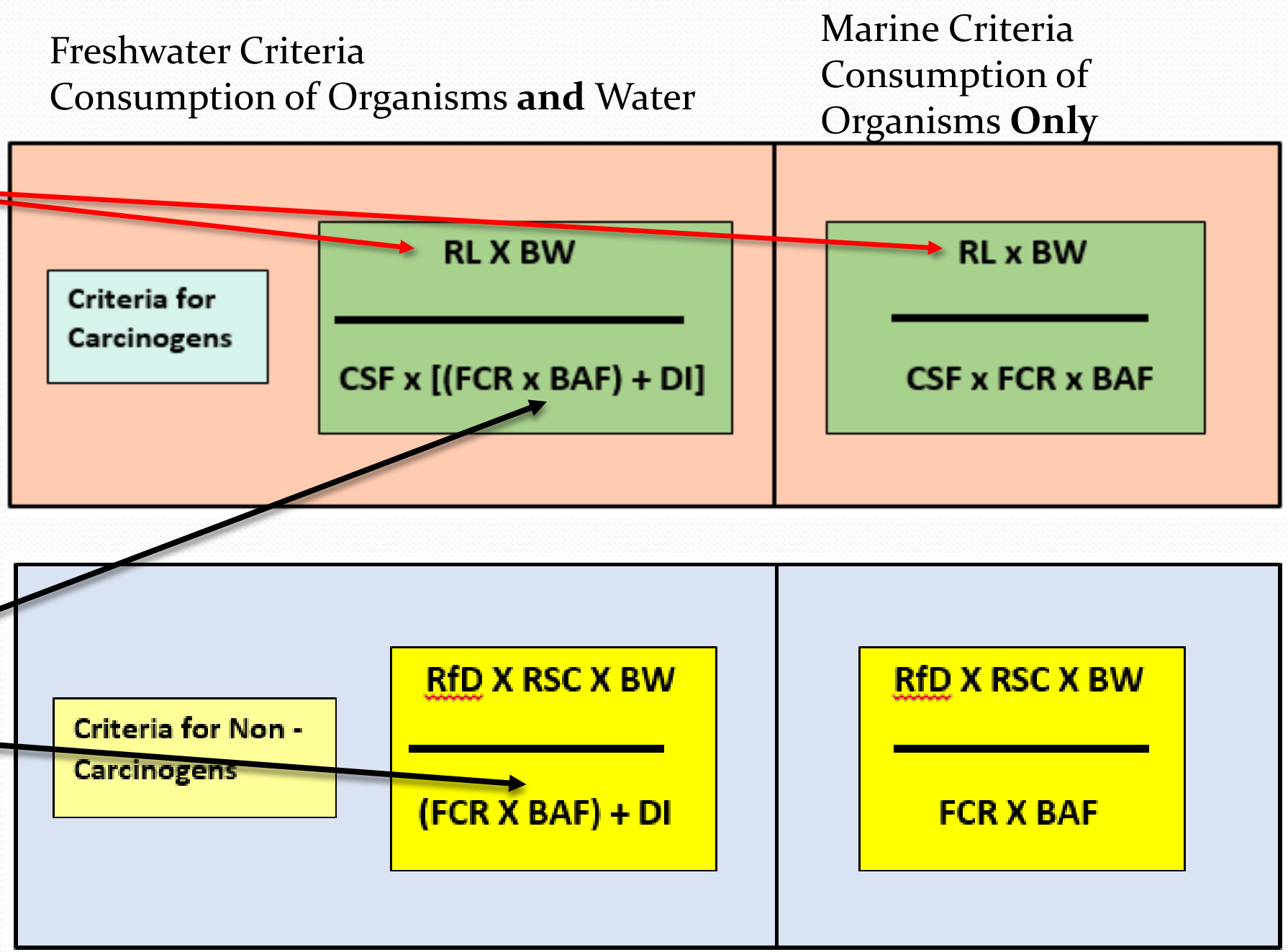
- Recap of Meeting 5
  - RSC concerns
- Goal of today's meeting:
  - Introduce Bioaccumulation/Bioconcentration
  - Introduce Cancer Risk Level issue
- Status of Regional Sub-group

# Meeting #5 Recap

- Workgroup Report to date
  - Questions/Comments
  - Additional thoughts on questions previously raised?
    - DEC plans to have a second draft available for discussion this spring
- Thoughts on RSC?

# 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

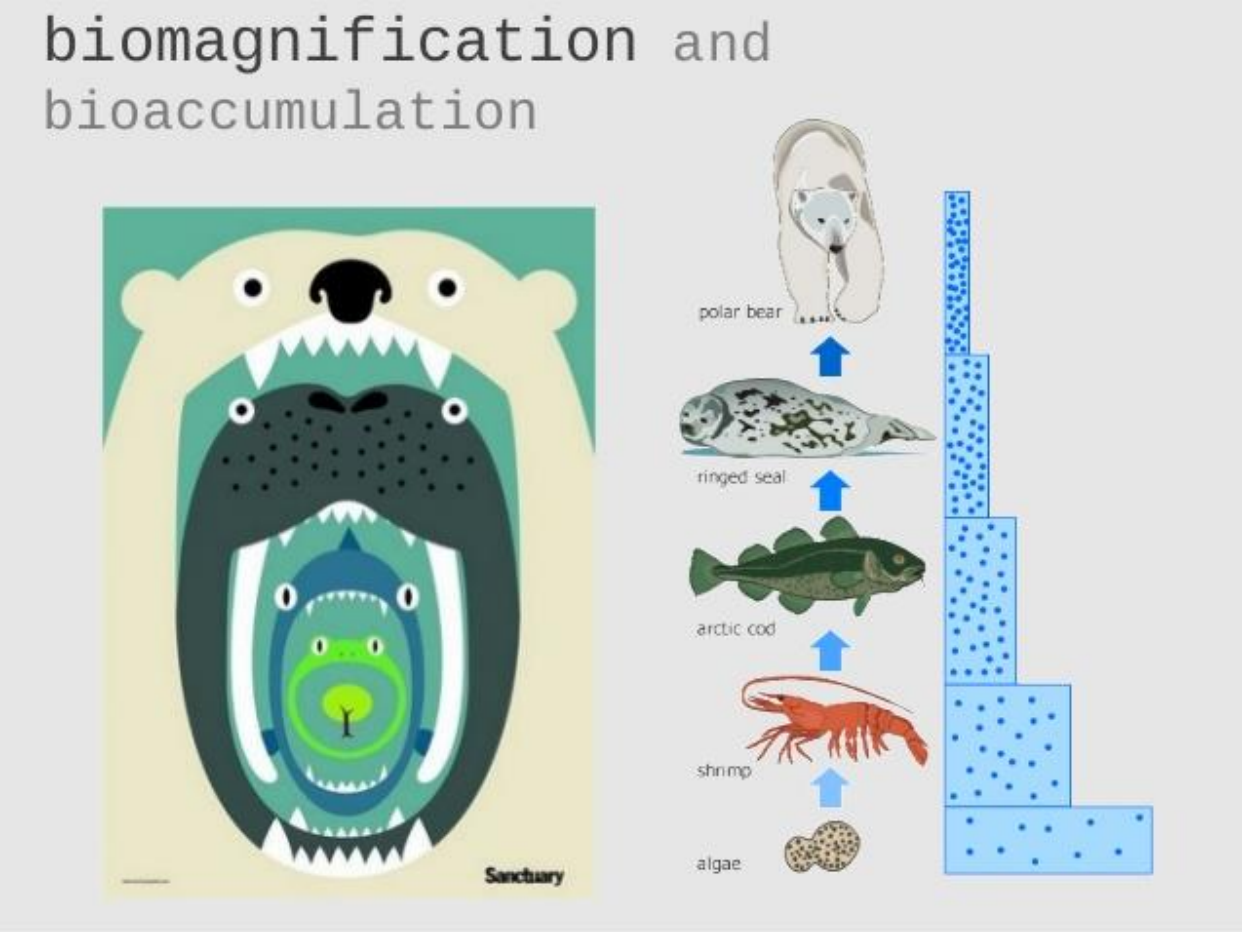
- DEC provided EPA 2015 *Development of National Bioaccumulation Factors: Supplemental Information for EPA's 2015 Human Health Criteria Update*

# Bioaccumulation (BAF) v. Bioconcentration (BCF)

- BAF reflects uptake from **all** sources and pathways
  - Water, food, and sediment
  - The ratio of the chemical concentration in the organism (CB) and the water (CW), including the uptake in the diet.
  - BAF is reported as liters per kilogram of lipid in both organism and water (BAF=t/w)

- BCF reflects absorption of chemicals through respiratory and dermal surfaces
  - Subset of bioaccumulation
  - For fish and shellfish this is uptake though exposure to water (e.g. gills)
  - The concentration of test substance in/on the fish or specified tissues thereof divided by the concentration of the chemical in the surrounding medium at steady state.
  - Generally lab-derived or modeled values

# BAF considerations




- BAF = exposure to a pollutant through diet, water contact, and trophic position (where in the food chain)
- BAF can range from 1- 1000's for highly bioaccumulative compounds (e.g., PCBs)
- 
  - Low bioaccumulation = exposure from drinking water
  - High bioaccumulation = ↑ exposure from eating fish
- For persistent or hydrophobic chemicals, the BAF can be significantly higher than BCF

EPA currently recommends adoption of a BAF based on trophic level (2-4)

# HHC History

- EPA and states have previously used BCF values for HHC
  - Many of these were developed some time ago
  - BAF for a chemical may be higher or lower than national values

- 2000 Methodology recommends BAF based on locally appropriate info
  - 2009- TSD for Site-Specific Bioaccumulation Factors issued
  - $$$ to develop/technically challenging

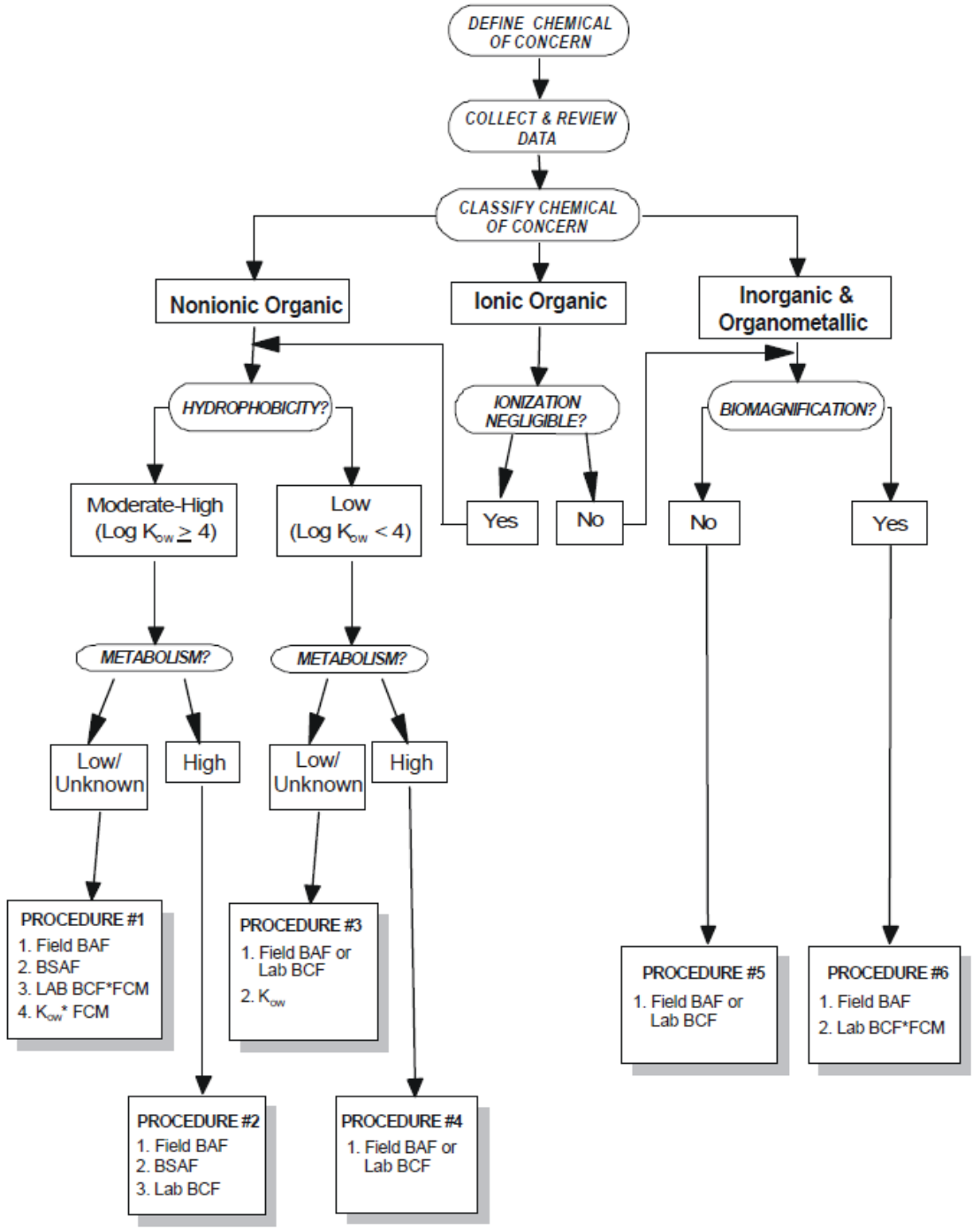
- WA Ecology notes that the WQS Handbook (2012) may inc. language that suggest only BCF should be used due to direct relationship with CWA
  - *For section 304(a) criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of water and contaminated fish and shellfish.*
  - Sounds a bit like the RSC argument?

# EPA 2015 Recommended HHC

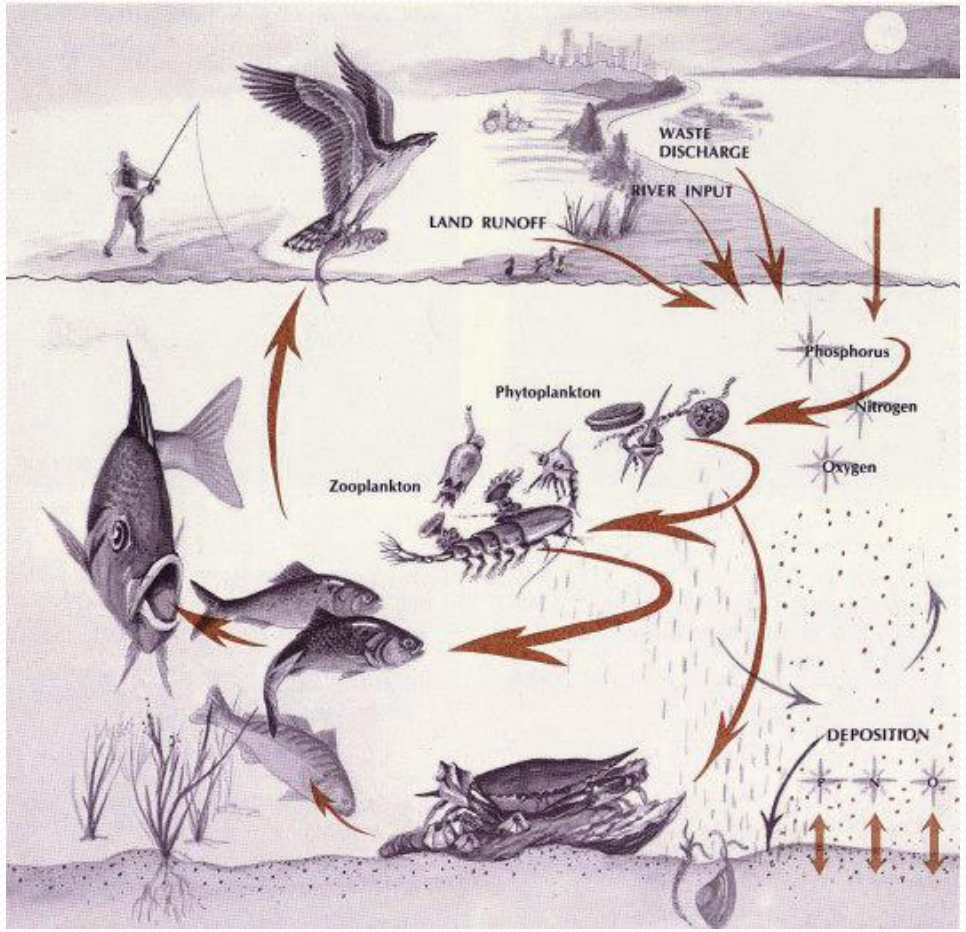
- Provided to you in advance of today's mtg
- Describe how *national* BAF values were developed for 94 updated chemicals
- Used 2000 and 2003 methodology/TSD
- Calculates Trophic Levels I-IV
  - If BAF method did not produce reliable values, BCF is reported
- May be possible to derive a TL V using the EPA 2003 TSD
  - Likely to be complicated as some marine mammals may be considered TL IV

# BAF v. BCF-what should I use?

- There are various ways to calculate a BAF (Field v. lab)
- For a given chemical, there may be a better method



# Once you pick a model, you need to consider Food Chain Multipliers




- Need to choose one of many food chain modeling tools
- Models have different accuracy/sensitivity/ uncertainty levels

# Alaska…

- National dataset may not have accounted for AK
- BAF considers **both** tissue of consumed organisms and the water column.
  - Alaska has very little water column data for HHC-regulated chemicals
- Food web modeling did not account for marine mammal consumption
- While research has made recommendations on allowable g/day for some chemicals, this is not the case for all 94
- Marine mammals are not all alike- some TL4 and some potentially higher
  - That kind of dietary information may/may not be available

# How have other states or tribes addressed BCF/BAF?

- **1992 NTR:** used BCF
- **Oregon**: Used BCF since Oregon-specific BAF values were not available
- **Washington:** proposed BCF in the 2016 rulemaking
- **Idaho:** Proposed EPA-2015 BAF/BCF where BAF wasn't available. Created a weighted factor based on trophic level proportions in local fish (NOTE)
- **Florida:** Used BCF in 2014 TSD but is now reviewing 2015 BAF values for application. Modified on lipid content specific to Fl. (shrimp)

# Previous EPA response to Ecology on 2014 draft criteria

- *BAFs account for biomagnification in the food chain, which is an essential pathway that Ecology is missing by using BCFs.*

- *If Ecology chooses not to use the latest scientific information on bioaccumulation, the EPA strongly recommends that Ecology provide a rationale for choosing not to integrate the latest science regarding bioaccumulation into its human health criteria.*

# Discussion

Sample questions:

- Are there specific concerns you have with using the EPA-2015 BAF recommendations?
- Should national BAF values be acceptable to Alaska if Alaska species or conditions are not considered?
- Since there is a degree of uncertainty in using derived BAFs, would BCFs be more scientifically acceptable?

# Cancer Risk Level

- Nancy Presentation

# Loose ends

- Regional Working Group
  - Consists of Marylynne, Lori, Ali, Bob, Nancy
  - Met on 2/17
  - Jim has a paper coming out in March in *Arctic* that will be helpful in our discussion

# Next steps:

1. DEC needs to spend time making sure the questions are framed appropriately for the workgroup to begin drafting recommendations:
    1. Circle back to previous issues/discussions and keep writing based on your comments?
    2. Address all issues and then begin drafting recommendations & Workgroup Report?
2. HHC Workgroup Meeting #7
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

# Thank you!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