


Welcome to this Public Meeting



- Please note that everyone is entering the meeting with their microphones muted.
- Please **keep your microphones muted** except when you are speaking. This will help us minimize background noise and feedback.
- Please take a moment to **open the Participants list and rename yourself** to show your full name and affiliation, so we have that for our records. You should see a “Rename” option next to your name (or click on “More” to find this option).
- **This meeting is being recorded** to document any questions or comments received during our time together.
- To make a comment or ask a question, please either:
 - Indicate you would like to make a comment using the Chat feature.
 - In the “Reactions” menu, select the “raise hand” option. The host will call on you to ask your question or make your comment.



2022 Triennial Review Human Health Criteria Public Meeting

9/21/2022

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Triennial Review

- 40 CFR 131.20 requires states to review and revise water quality standards from time to time, but at least once every three years
- 40 CFR 131.20 (b) requires states to hold one or more public hearings for the purpose of reviewing and revising water quality standards
- Updates to water quality standards may be needed if there is:
 - Change in water quality conditions
 - Change in water body uses
 - New scientific information



Items Being Considered for 2022 Triennial Review

Based on EPA recommendations

- [2015 EPA Human Health Ambient Water Quality Criteria Updates](#)
- [2016 EPA Selenium Criteria](#)
- [2018 EPA Aluminum Aquatic Life Criteria](#)
- [2019 Recreational Water Quality Criteria or Swimming Advisories for Cyanotoxins](#)
- [2021 Ambient Water Quality Criteria to Address Nutrient Pollution in Lakes and Reservoirs](#)

Based on public comments

- Designated use change to recreation for nominated waterbodies

Based on internal recommendations

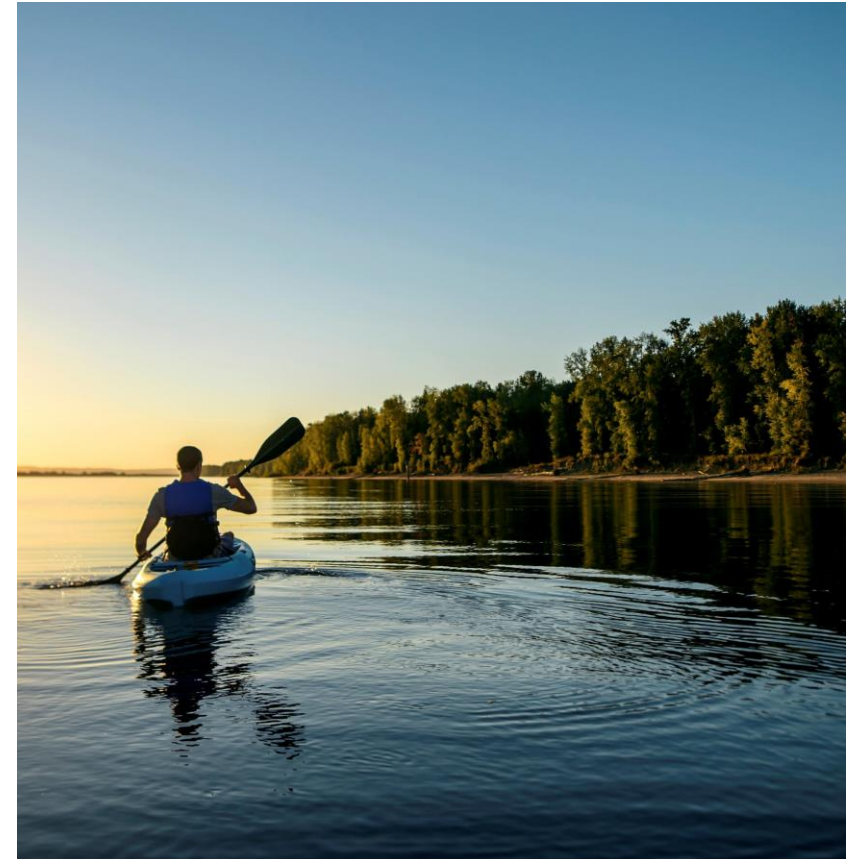
- Site specific criteria for Lakes Burton, Rabun, and Tugaloo
- City of Atlanta WER and BLM
- Updates for organization and clarification

Background

- A HHC is the highest concentration of a pollutant in water that is not expected to pose a significant risk to human health over a lifetime.
 - Humans can be exposed to these pollutants through ingestion of treated drinking water or consumption of contaminated fish and shellfish.

EPA's recommendations:

- [2000 EPA Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health](#)
- [2002 National Recommended Human Health Criteria](#)
- [2015 EPA Updated Ambient Water Quality Criteria for the Protection of Human Health](#)
- [Table comparing EPA's updated 2015 final human health criteria to previous criteria](#)



Human Health Criteria

- EPA finalized updates to the ambient water quality criteria for the protection of human health in 2015.
- Reflected the latest scientific information and implementation of existing EPA policies found in Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000).
- Revised criteria for 94 chemicals.

$$AWQC = RfD \cdot RSC \cdot \left(\frac{BW}{DI + \sum_{i=2}^4 (FI_i \cdot BAF_i)} \right)$$

Exposure

RSC = Relative Source Contribution (% to account for other sources of exposure).

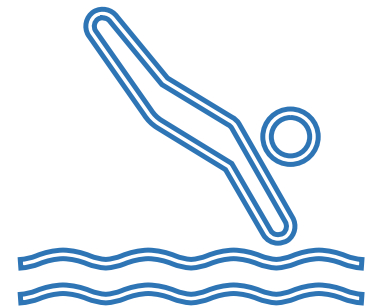
BW = Human Body Weight (70 kg for average adult).

DI = Drinking Water Intake (2 L/day for average adult).

FI = Fish Intake (kg/day).

Bioaccumulation

BAF = Bioaccumulation Factor (L/kg).



Derivation of Human Health Criteria

$$\begin{array}{c} \text{Toxicity} \\ \text{Endpoints} \end{array} \times \begin{array}{c} \text{Body} \\ \text{Weight} \end{array} \div \left(\begin{array}{c} \text{Drinking} \\ \text{Water} \\ \text{Intake} \end{array} + \left(\begin{array}{c} \text{Fish} \\ \text{Consumption} \end{array} \times \begin{array}{c} \text{Bioaccumulation} \\ \text{Factors} \end{array} \right) \right)$$

The diagram illustrates the derivation of human health criteria using a mathematical formula. The numerator consists of 'Toxicity Endpoints' multiplied by 'Body Weight', where 'Body Weight' is represented by an icon of a person on a scale. The denominator is the sum of 'Drinking Water Intake' (represented by a bottle icon) and the product of 'Fish Consumption' (represented by a fish icon) and 'Bioaccumulation Factors'. The entire equation is preceded by an equals sign.

A woman with curly hair is shown in profile, drinking water from a clear plastic bottle. She is wearing a white towel around her neck. The background is bright and out of focus, suggesting an outdoor setting. A small orange horizontal line is positioned above the title.

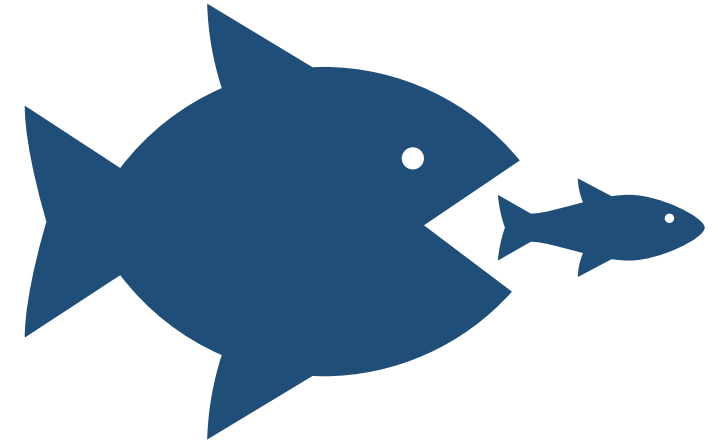
Updated Exposure Inputs

- **Body weight: 80 kg (176 lb)**
 - Previous criteria based on 70 kg
- **Drinking Water: 2.4 L/day (10 cups)**
 - Previous criteria based on 2 L/day
- **Fish Consumption: 22 g/day (0.78 oz)**
 - Previous criteria based on 17.5 g/day

Updated Exposure Inputs

- **Bioaccumulation factors**

- EPA's 2015 updates use bioaccumulation factors (BAFs) rather than bioconcentration factors (BCFs)
 - BCFs account for chemical accumulation in aquatic organisms from direct water contact
 - BAFs account for chemical accumulation from **all potential exposure routes** (water, diet, sediment, etc.)
- EPA derived national, trophic level-specific BAFs based on available datasets
 - Higher trophic levels have higher BAFs



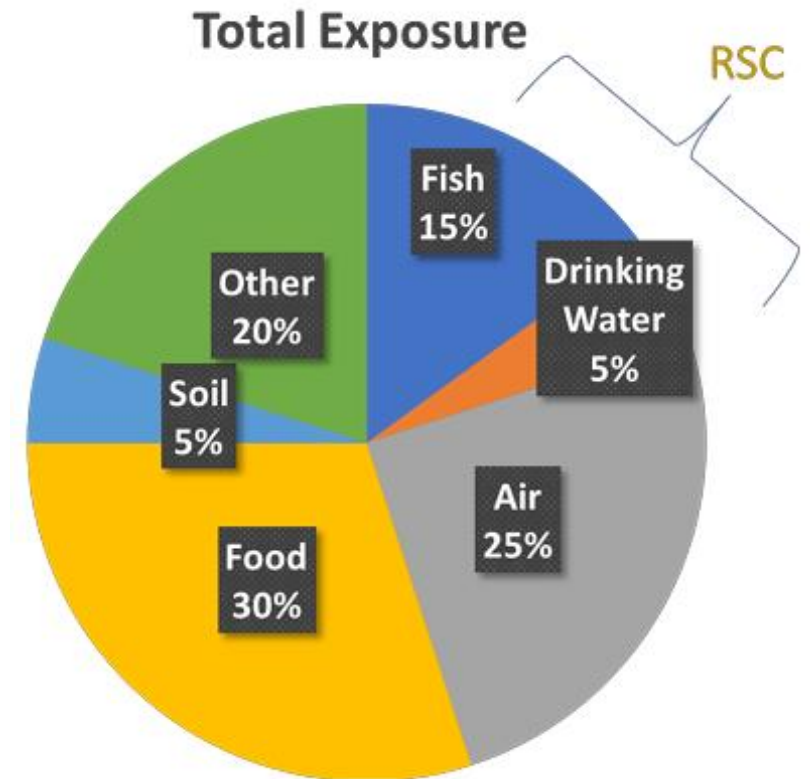
Updated Exposure Inputs

- **Updated health toxicity values**

- The minimum quantity of a pollutant that will cause adverse effects
- EPA updated these values where appropriate based on available data

- **Relative source contribution (RSC)**

- Accounts for additional routes of exposure other than water and fish consumption
- Default RSC of 20% unless available studies indicate otherwise
 - Assumes that 80% of exposure to pollutant could be from air, food, soil, etc.



Deterministic Risk Assessment

$$\begin{array}{c} \text{Toxicity} \\ \text{Endpoints} \end{array} \times \begin{array}{c} \text{80 kg} \\ \text{Icon: person with scale} \end{array} = \frac{\begin{array}{c} \text{Icon: water bottle} \\ \text{2.4 L/day} \end{array} + \left(\begin{array}{c} \text{Icon: fish} \\ \text{22 g/day} \end{array} \times \begin{array}{c} \text{Bioaccumulation} \\ \text{Factors} \end{array} \right)}{}$$

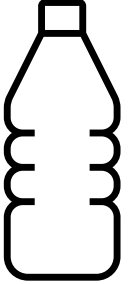


Poll

Probabilistic Risk Assessment

Toxicity
Endpoints \times  distribution

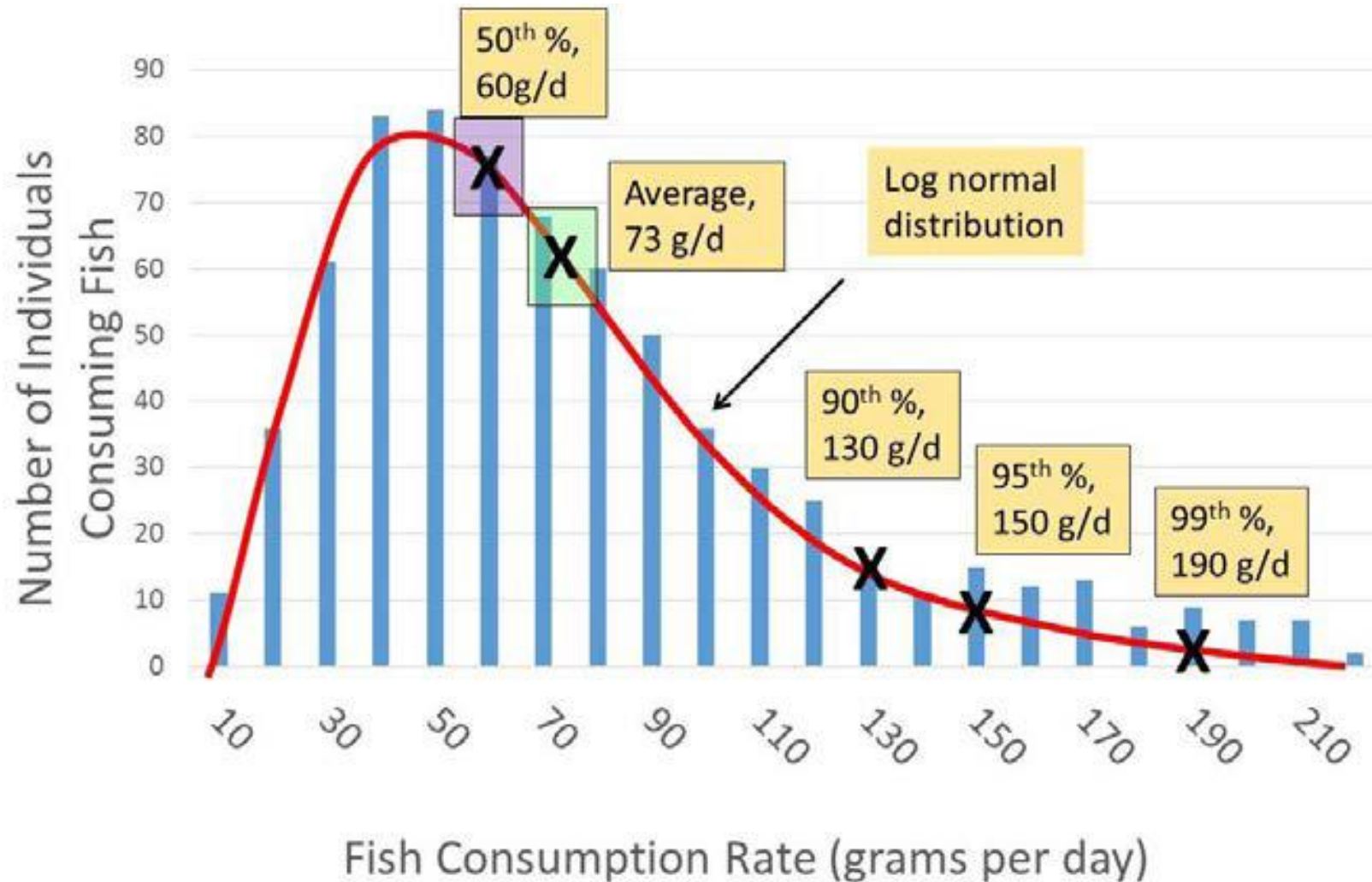
=

 distribution $+$ $\left(\begin{array}{c} \text{distribution} \\ \text{distribution} \end{array} \times \begin{array}{c} \text{Bioaccumulation} \\ \text{Factors} \end{array} \right)$

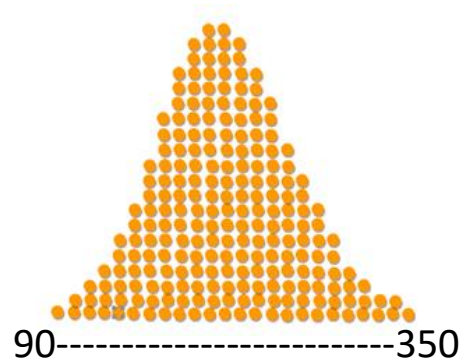
Deterministic vs. Probabilistic

- Deterministic risk assessment – single value for each parameter
 - Often results in compounded conservatism
 - Can't identify target population
- Probabilistic risk assessment – distribution for one or more parameters
 - Allows for transparent risk management decisions
 - Identifies target population and level of protection

Hypothetical Fish Consumption Distribution

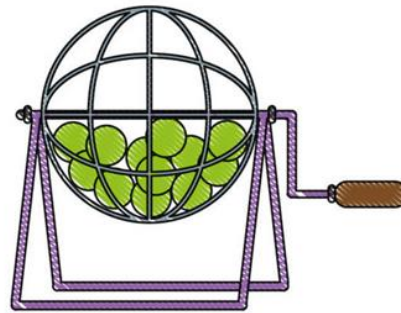
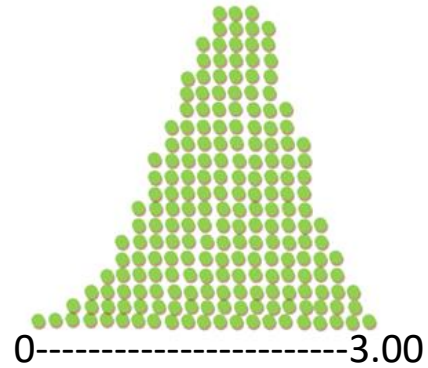


What is Monte Carlo?



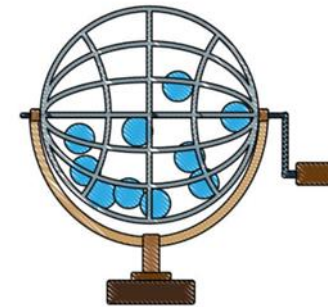
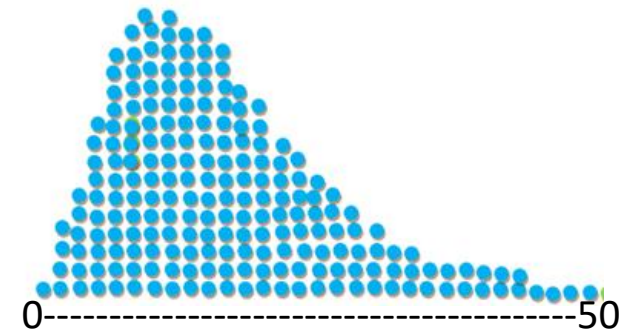
146 lb.

Body Weight



1.9 L/day

Water Intake



33 g/day

Fish Consumption



Regional Data

- EPA's updated exposure inputs are based on national datasets.
- Wherever possible, Georgia plans to use regional data distributions in our probabilistic risk assessment.
- Regional fish consumption data is available for the Southeastern United States in EPA's [2014 Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations.](#)

Summary of Human Health Criteria Updates

- Changes to Calculation Assumptions:
 - Updated toxicology - Reference doses (RfDs) and cancer potency slopes
 - Uses Bio Accumulation Factors (BAF) instead of Bio Concentration Factors (BCF)
 - Updated default values
 - Adult body weight increased from 70 kg to 80 kg
 - Adult drinking water consumption rate increased from 2.0 L/person/day to 2.4 L/person/day
 - Adult fish consumption rate increased from 17.5 g/person/day to 22 g/person/day
 - Uses Relative Source Contributions (RSC)
- EPA used a deterministic approach
- EPD will continue work to develop appropriate criteria using Georgia specific data and a probabilistic approach.

Questions?



Comments, Contacts, and WQS Webpage

- If you would like to submit official comments for any of the materials in this presentation, please send them in an email to: epd.comments@dnr.ga.gov with the subject of 2022 Triennial Review
- Questions regarding Water Quality Standards and the Triennial Review Process can be sent to Gillian Batson at: Gillian.Wason@dnr.ga.gov
- The EPD webpage dedicated to Water Quality Standards can be found at: <https://epd.georgia.gov/watershed-protection-branch/georgia-water-quality-standards>