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
Gillian Batson
Water Quality Standards Coordinator
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

\[
\text{Toxicity Endpoints} \times \text{Body Weight} = \frac{\text{Drinking Water Intake} + \left( \text{Fish Consumption} \times \text{Bioaccumulation Factors} \right)}{x}
\]
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

Toxicity Endpoints \times 80 \text{ kg}

= \begin{align*}
&\quad 2.4 \text{ L/day} \\
&+ \left( 22 \text{ g/day} \times \text{Bioaccumulation Factors} \right)
\end{align*}
Probabilistic Risk Assessment

Toxicity Endpoints \times \text{distribution}

= \text{distribution} + \left( \text{distribution} \times \text{Bioaccumulation Factors} \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

- 50th %: 60 g/d
- Average: 73 g/d
- Log normal distribution
- 90th %: 130 g/d
- 95th %: 150 g/d
- 99th %: 190 g/d

Number of Individuals Consuming Fish vs. Fish Consumption Rate (grams per day)
What is Monte Carlo?

- **Body Weight**: 146 lb.
- **Water Intake**: 1.9 L/day
- **Fish Consumption**: 33 g/day
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