2022 Triennial Review GIEC Meeting

Gillian Batson

Water Quality Standards Coordinator

December 10th 2024

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Clean Water Act

- "Federal Water Pollution Control Act" also known as Clean Water Act or CWA.
- Objective
  - Restore and maintain the chemical, physical, and biological integrity of the waters of the United States
  - Achieved through water quality standards that define the use of the waterbody and the criteria necessary to protect the use
- Goal: fishable/swimmable

Water Quality Standards

- Established to
  - Protect public health and welfare
  - Enhance the quality of the water
  - Provide water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water
- Need to be
  - Scientifically defensible
  - Protective of existing aquatic life and designated use
  - Compatible with existing guidance
- Consist of
  - Designated Uses
  - Water Quality Criteria to protect those uses
  - Antidegradation Policy

Designated Uses

- GA R&R Rule 391-3-6-.03 (4) types of designated uses:
  - Drinking Water Supplies
  - Recreation
  - Fishing, Propagation of Fish, Shellfish, Game and Other Aquatic Life (“Fishing”)
  - Wild River
  - Scenic River
  - Coastal Fishing
- All of Georgia’s designated uses meet the CWA fishable/swimmable goal

Water Quality Criteria

- Georgia's water quality criteria are listed in:
  - 391-3-6-.03(5) – General criteria for all waters
    - Narrative: free from visible sewage/debris, scum, objectionable color/odor, turbidity due to human causes, toxic substances in toxic amounts
    - Numeric: magnitude, duration and frequency limits for priority pollutants
  - 391-3-6-.03(6) – Specific Use criteria for
    - Dissolved oxygen
    - pH
    - Temperature
    - Bacteria

Antidegradation policy

- Protection of existing uses 40 CFR 131.12(a)(1)
- 3 tiers of water quality 391-3-6-.03(2)(b) and 40 CFR 131.12
  - Tier 1: Protection of existing designated uses (applies to all waters)
  - Tier 2: Protection of waters of a higher quality than their designated use (All waters of GA are Tier 2 or higher)
    - Antidegradation analysis required
  - Tier 3: Protection of Outstanding Natural Resource Waters (ONRW)
    - Except for temporary changes, water quality cannot be lowered in these waters

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

Current status of Water Quality Standards

- Latest EPA approved version
  - 2019 Triennial Review (2019 – 2021)
  - Adopted by DNR Board on January 28, 2022
  - Approved by EPA on August 31, 2022
- 2022 Triennial Review
  - Kickoff Hearing held March 22, 2022
  - Several public and stakeholder meetings on specific topics held 2022-2024
  - Final public meeting
  - DNR Board briefing, public notice, 45-day comment period, public hearing, DNR Board adoption, SOS and AG certification, submit to EPA for approval.

2022 Triennial Review Rule changes

- Adoption of EPA's recommended aquatic life criteria for:
  - Diazinon
  - Nonylphenol
  - Selenium
- Updated human health criteria for 82 pollutants and new human health criteria for 6 pollutants based on updated information in EPA's 2015 Human Health Criteria Updates
- Adoption of site-specific criteria for Lakes Rabun, Burton, and Tugalo
- Revision of designated uses to reflect current use
  - 11 waterbody segments being updated to include Recreation designated use
  - 7 waterbody segments being updated to include Drinking Water designated use
- Formatting updates including adding borders to tables

Diazinon and Nonylphenol

- Diazinon: organophosphate pesticide banned for residential uses in 2004, still approved for agricultural uses
- Nonylphenol: organic compound widely used in household products; endocrine disruptor

Pollutant	CAS Number	Freshwater (acute) (µg/L)	Freshwater (chronic) (µg/L)	Saltwater (acute) (µg/L)	Saltwater (chronic) (µg/L)	Publication Year
Diazinon	333415	0.17ug/L	0.17ug/L	0.82ug/L	0.82ug/L	2005
Nonylphenol	84852153	28 ug/L	6.6 ug/L	7 ug/L	1.7 ug/L	2005

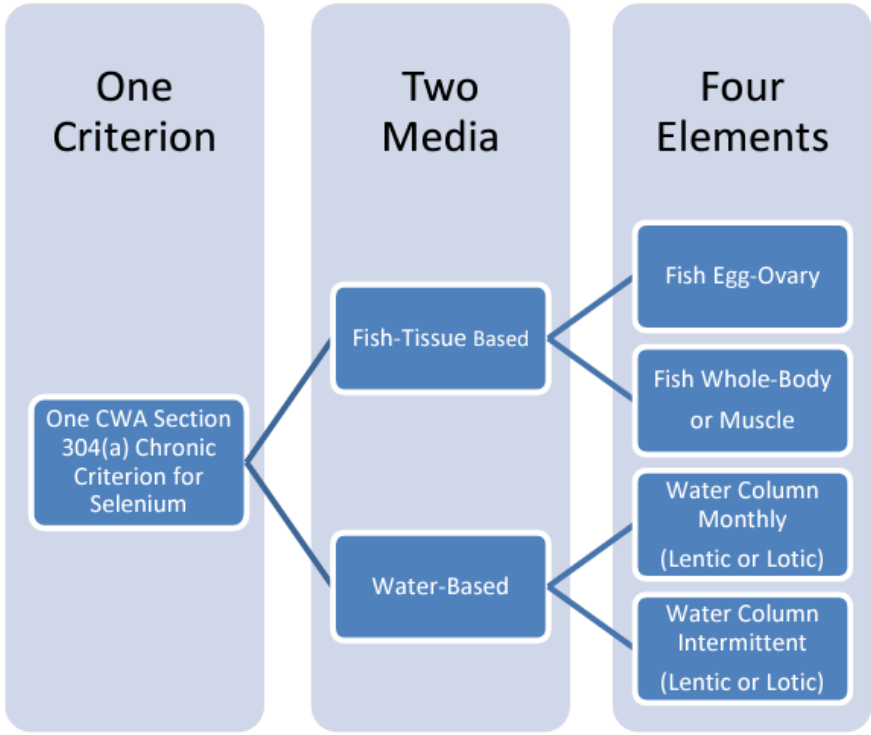
- These aquatic life criteria are being adopted in 391-3-6-.03(5)(e)(iii)

Table 1. Summary of the Recommended Freshwater Selenium Ambient Chronic Water Quality Criterion for Protection of Aquatic Life.

Media Type	Fish Tissue[1]		Water Column[4]	
Criterion Element	**Egg/Ovary [2]**	**Fish Whole Body or Muscle [3]**	**Monthly Average Exposure**	**Intermittent Exposure[5]**
Magnitude	15.1 mg/kg dw	8.5 mg/kg dw whole body or 11.3 mg/kg dw muscle (skinless, boneless filet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement[6]	Instantaneous measurement[6]	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average

1. Fish tissue elements are expressed as steady-state.
2. Egg/Ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured, except as noted in footnote 4 below.
3. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured, except as noted in footnote 4 below.
4. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. When selenium inputs are increasing, water column values are the applicable criterion element in the absence of steady-state condition fish tissue data.
5. Where WQC30-day is the water column monthly element, for either a lentic or lotic waters; C_{bkgrnd} is the average background selenium concentration, and fint is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).
6. Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.

Selenium



This table will replace Georgia's current chronic freshwater aquatic life criteria for selenium in 391-3-6-.03(5)(e)(ii), which is 5 µg/L not to be exceeded more than once in three years.

[6] Freshwater Selenium Chronic Water Quality Criterion Table

Media Type	Criterion Element	Magnitude	Duration	Frequency
Fish Tissue[A]	**Egg/Ovary[B]**	15.1 mg/kg dw	Instantaneous measurement[F]	Not to be exceeded
	Fish Whole Body or Muscle [C]	8.5 mg/kg dw whole body or 11.3 mg/kg dw muscle (skinless, boneless filet)	Instantaneous measurement[F]	Not to be exceeded
Water Column[D,G]	**Monthly Average Exposure**	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	30 days	Not more than once in three years on average
	Intermittent Exposure[E]	$$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$$	Number of days/month with an elevated concentration	Not more than once in three years on average

Footnotes for selenium criterion

A Fish tissue elements are expressed as steady-state.

B Egg/Ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured, except as noted in footnote D below.

C Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured, except as noted in footnote 4 below.

D Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. When selenium inputs are increasing, water column values are the applicable criterion element in the absence of steady-state condition fish tissue data. **Water column values shall not exceed the chronic criteria indicated above under 30-day, 10-year minimum flow (30Q10) or higher stream flow conditions.**

E Where $WQC_{30-\text{day}}$ is the water column monthly element, for either a lentic or lotic waters; C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).

F Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.

G The water column criterion element may be modified on a site-specific basis as follows:

Site-specific criteria for non-sturgeon waters

G The water column criterion element may be modified on a site-specific basis as follows:

i. Stakeholders interested in nominating a waterbody for sturgeon-absent site-specific selenium criteria must notify EPD of their interest and consult with EPD regarding methods for determining absence of sturgeon. Following notification and consultation the interested stakeholder must submit current documentation of absence of fishes in the Order Acipenseriformes (Order includes sturgeon and paddlefish).

ii. Upon review and approval by EPD, in consultation with the Georgia Wildlife Resource Division (WRD), the Environmental Protection Agency (EPA), and U.S. Fish and Wildlife, the stakeholder will be notified to proceed to additional data collection and analysis steps required to develop site-specific selenium criteria.

iii. Appendix K of the EPA's 2016 recommend selenium criteria document (EPA 822-R-16-006) and the 2013 EPA Revised Deletion Process for the Site-Specific Recalculation Procedure for Aquatic Life Criteria (EPA-823-R-13-001) shall be used by the stakeholder to conduct their own site-specific recalculation procedure, including establishing appropriate fish species to be included, conducting the necessary field data collection and analysis, and determining appropriate four-element Se criteria. This information will be used as supporting documentation for the recalculation of the site-specific criteria. EPD will need to approve the study plan, supporting documentation, and final criteria.

iv. Once the recalculated criteria and supporting documentation have been submitted and approved, EPD can then propose adoption of the recalculated criteria table as sub-paragraph c under paragraph 18 of this Rule, which lists site-specific criteria and allows for the adoption of waterbodies for which those criteria apply. The adoption of site-specific selenium criteria is subject to the Rule revision process. The implementation of the site-specific selenium criteria is subject to EPA's approval of the revised Rules.

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

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

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 (BAFs)
  - Accounts for chemical accumulation in fish from all exposure routes (water, diet, sediment, etc.)
- Updated health toxicity values
- Relative source contributions (RSCs)
  - Accounts for additional routes of exposure other than water and fish consumption

Deterministic Risk Assessment

$$= \frac{\text{Toxicity Endpoints} \times \text{80 kg}}{\text{2.4 L/day} + \left(\text{22 g/day} \times \text{Bioaccumulation Factors}\right)}$$

Georgia's concerns with the deterministic method

Compounded conservatism

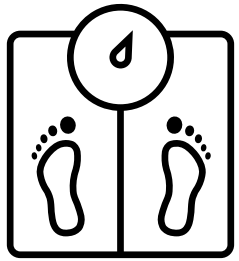
Does not account for variability among the population

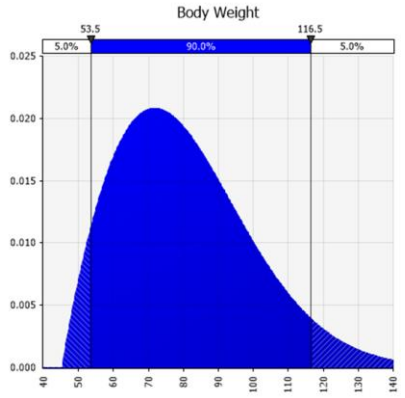
Impossible to determine the percentage of the population being protected

National rather than regional fish consumption rates

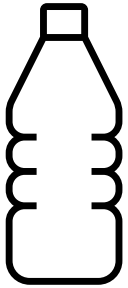
Probabilistic Risk Assessment

Toxicity Endpoints x

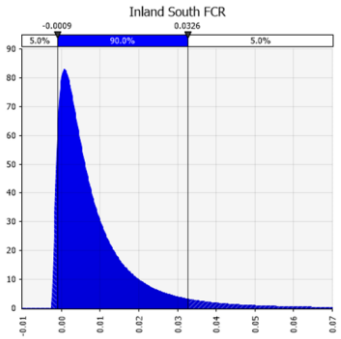




=

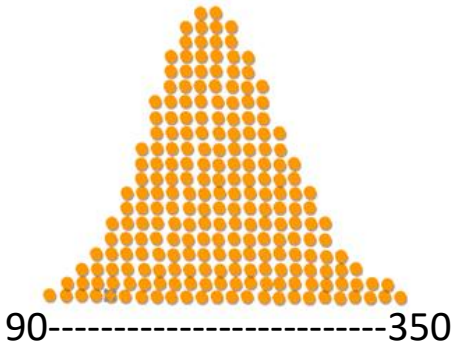


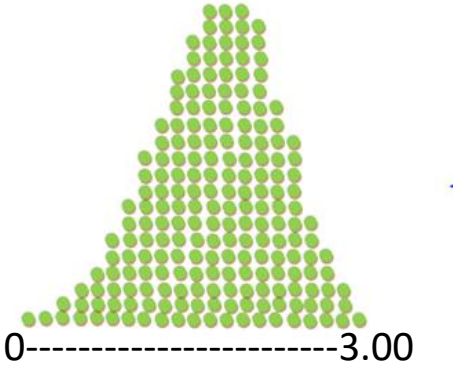
+ (

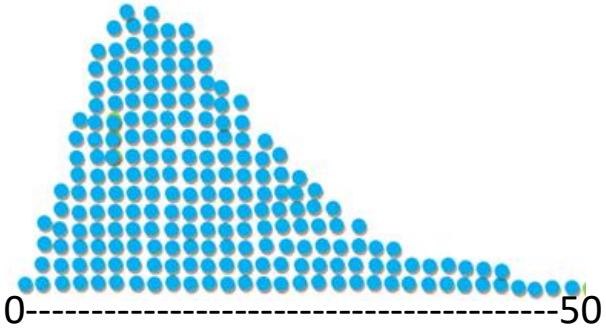


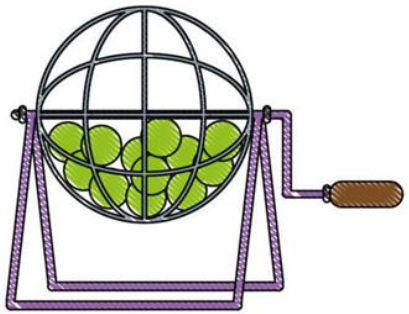
x Bioaccumulation Factors)

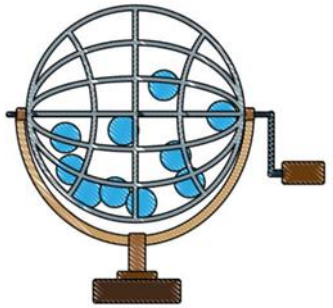
What is Monte Carlo?

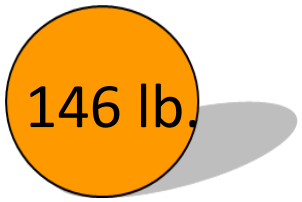




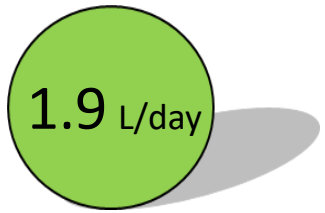








Body Weight



Water Intake

Fish Consumption

Criteria adoption

- 391-3-6-.06(5)(e)(iv) of Georgia's current WQS have human health criteria for 82 of the pollutants in EPA's 2015 update
- These 82 pollutants each have a single criterion value based on the "organism only" criteria from EPA's 2002 recommendation
- There are 12 pollutants in EPA's 2015 update for which Georgia has no current human health criteria. We are adopting criteria for 6 of these pollutants based on our PRA results
- Our PRA analysis resulted in 2 criteria values for each pollutant; one to protect human health from exposure through fish consumption ("organism only") and one to protect human health from exposure through fish consumption and water ingestion ("water + organism").
- EPD is planning to adopt the "organism only" criteria values for all waterbodies except those designated as a Drinking Water source, which will get the "water + organism" criteria values.

Criteria updates for 391-3-6-.03(5)(e)(iv)

(iv) Instream concentrations of the following chemical constituents listed by the U. S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under annual average or higher stream flow conditions:

	Pollutant and CAS Number	Water Plus Organism (Drinking Water) (µg/L)	Organism only (all other designated uses) (µg/L)
1.	Acenaphthene (CAS RN[1] 83329)	69	~~990 µg/L~~76
2.	Acenaphthylene (CAS RN[1] 208968)		**
3.	Acrolein (CAS RN[1] 107028)	3.1	~~9.3 µg/L~~320
4.	Acrylonitrile (CAS RN[1] 107131)	0.18	~~0.25 µg/L~~27
5.	Aldrin (CAS RN[1] 309002)	0.0000027	~~0.000050 µg/L~~0.0000027
6.	Anthracene (CAS RN[1] 120127)	290	~~40000 µg/L~~320
7.	Antimony (CAS RN[1] 7440360)		640 ~~µg/L~~
8.	Arsenic (Total) (CAS RN[1] 7440382)	10	50
	~~(a) Drinking Water Supplies~~		~~10 µg/L~~
	~~(b) All Other Designated Uses~~		~~50 µg/L~~

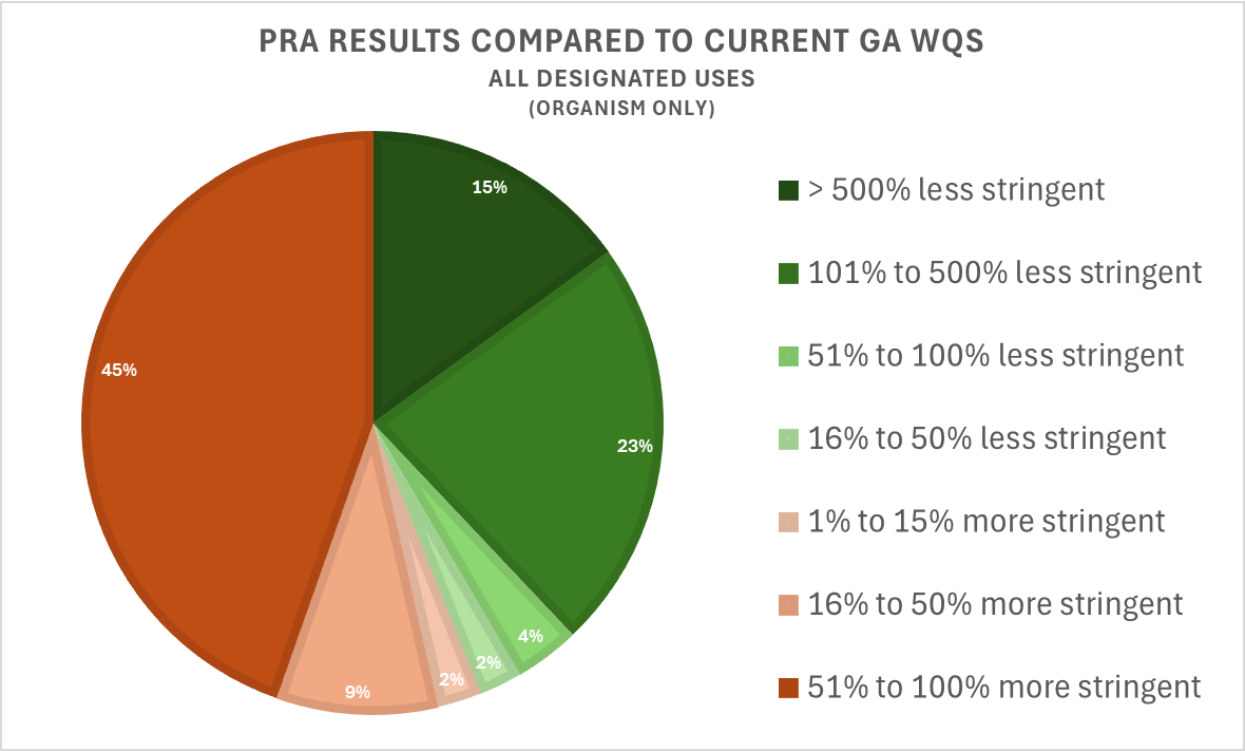
The full table of human health criteria updates can be found starting on page 13 of the Proposed Rule Draft

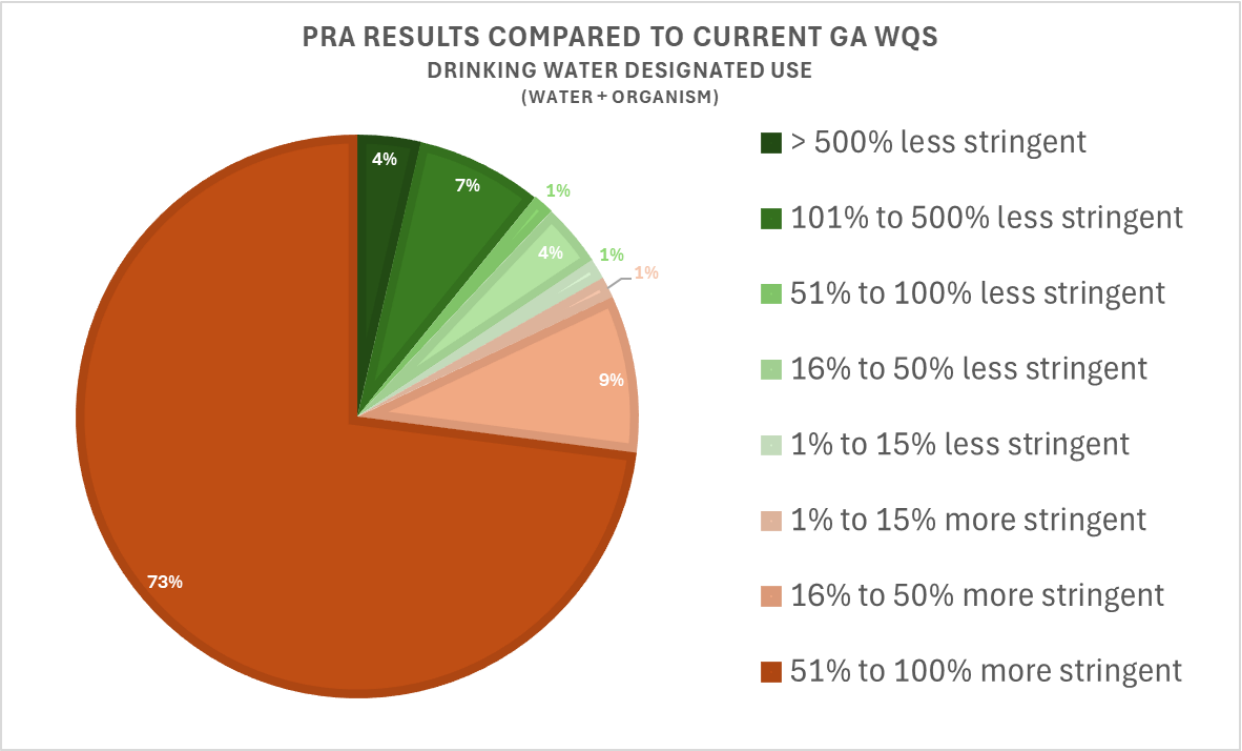
Not adopting criteria for:

- 1,2,4,5-Tetrachlorobenzene (CAS RN1 95-94-3)
- 2,4,5-Trichlorophenol (CAS RN1 95-95-4)
- Bis(Chloromethyl) Ether (CAS RN1 542-88-1)
- Dinitrophenols (CAS RN1 25550-58-7)
- Hexachlorocyclohexane (HCH)-Technical (CAS RN1 608-73-1)
- Pentachlorobenzene (CAS RN1 608-93-5)

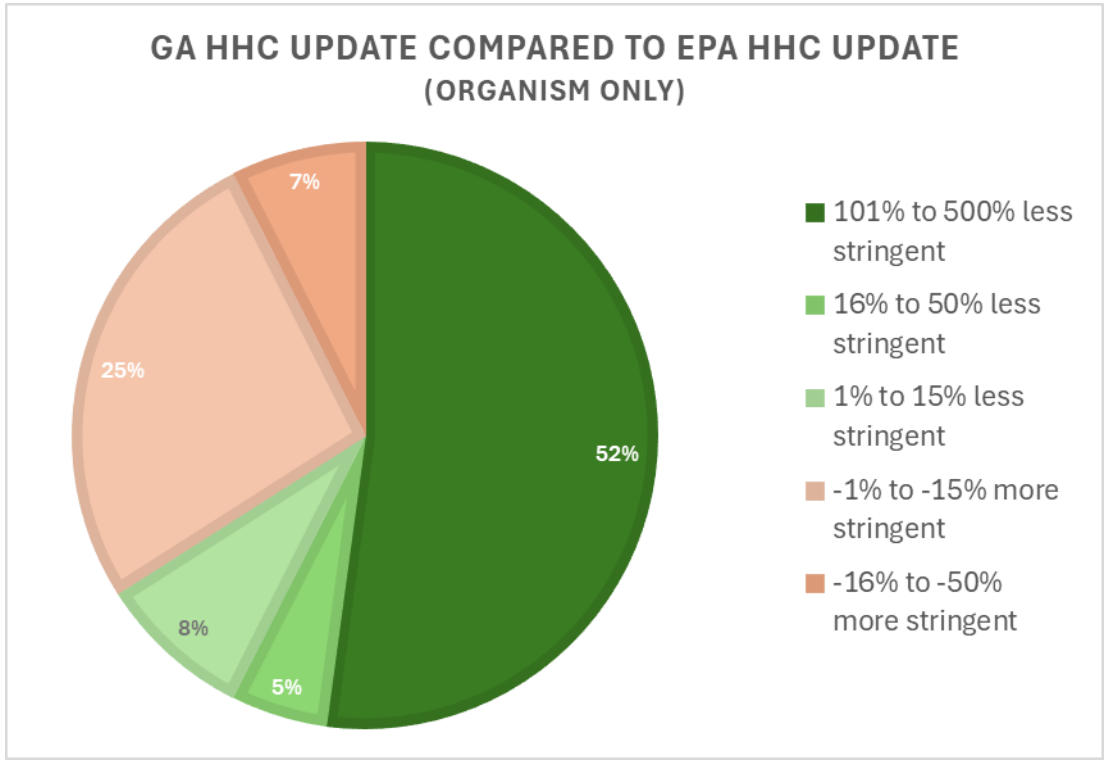
These pollutants were included in EPA's criteria recommendations and in our initial PRA analysis, but EPD is not adopting criteria for them because there are no approved test methods for these chemicals listed in 40 CFR 136

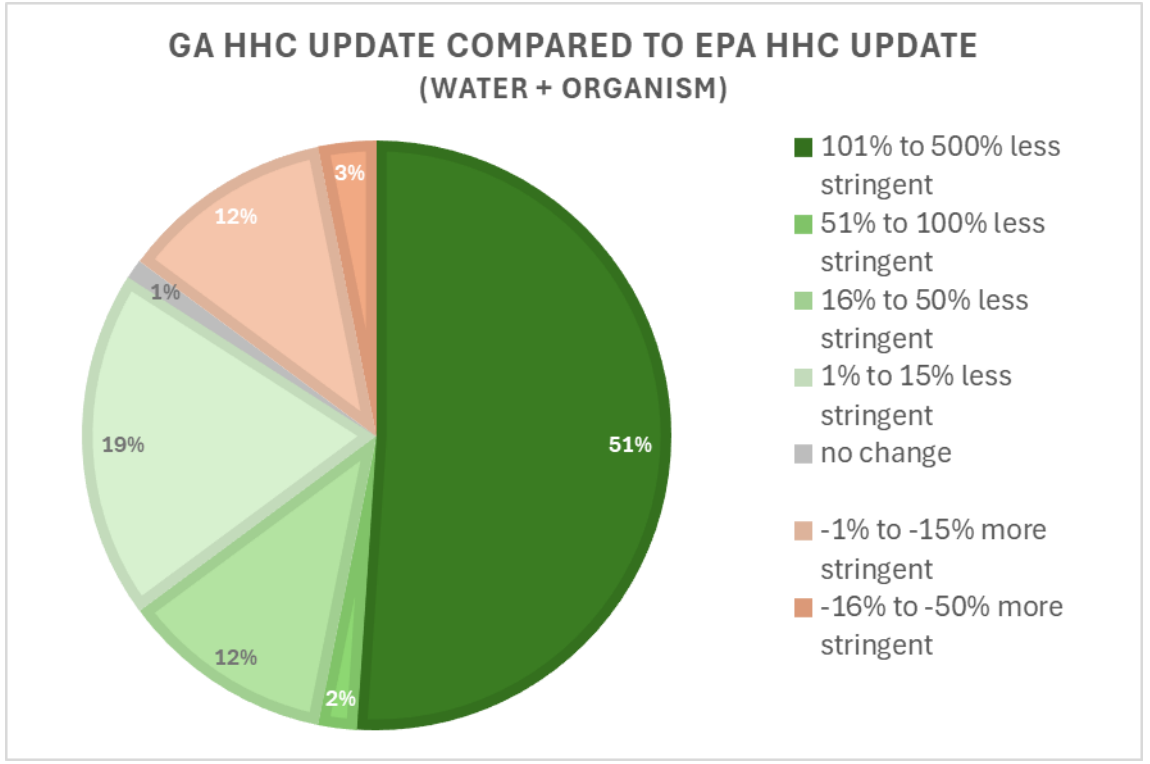
How do the updated criteria values compare to our current criteria?





How do our PRA results compare to EPA's 2015 HHC recommendations?





Designated Use update to recreation

Altamaha River (Altamaha River Basin) - **Jaycee Landing to Doctors Creek**

Chattahoochee River (Chattahoochee River Basin)- **Sweetwater Creek to Snake Creek**

South River (Ocmulgee River Basin) - **Panola Shoals to Honey Creek (Henry County)**

Satilla River (Satilla River Basin)- **Jamestown Road to Alabaha River**

Broad River (Savannah River Basin)

- **Scull Shoals Creek to Briars Landing at Hwy 72**
- **Hwy 17 to Clarks Hill Lake**

South Fork Broad River (Savannah River Basin)– **Watson Mill Bridge State Park to Lexington-Carlton Bridge Rd**

North Prong St. Marys River (St. Marys River Basin) – **Headwaters to St. Marys River**

St. Marys River (St. Marys River Basin)

- **North/Middle Prong to Deep Creek**
- **Boone Creek to Prospect Landing Rd**

Withlacoochee River (Suwannee River Basin)– **Georgia Hwy. 37 to Tiger Creek**

Designated Use update to drinking water

Chattahoochee River Basin

- Cedar Creek – Hood Branch to Panther Creek
- Ward Creek – Headwaters to Yahoola Creek

Coosa River Basin

- Etowah River – Ward Creek to Pettit Creek
- Richland Creek – Headwaters to Richland Creek Reservoir dam

Flint River Basin

- Antioch Creek – Headwaters to Horton Creek
- Horton Creek – Confluence of Antioch Creek and Woolsey Creek to Flint River
- Woolsey Creek – Headwaters to Horton Creek

Site-Specific Lake Criteria

- Watershed and lake models were used to develop site specific criteria for:
  - Lake Burton
  - Lake Rabun
  - Lake Tugalo

Lake Burton

(i) Chlorophyll *a*: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. 1/4 mile South of Burton Island (aka Tallulah River: 6 μg/L
2. Dampool (aka Tallulah River u/s Lake Burton Dam): 6 μg/L

(ii) Total Nitrogen: Not to exceed 0.5 mg/L as nitrogen in the photic zone more than once in a growing season

(iii) Total Phosphorus: Not to exceed 0.04 mg/L in the photic zone more than once in a growing season

(iv) pH: within the range of 6.0 – 9.0 standard units.

(v) Bacteria: E. coli shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at the depth specified in 391-3-6-.03(5)(g).

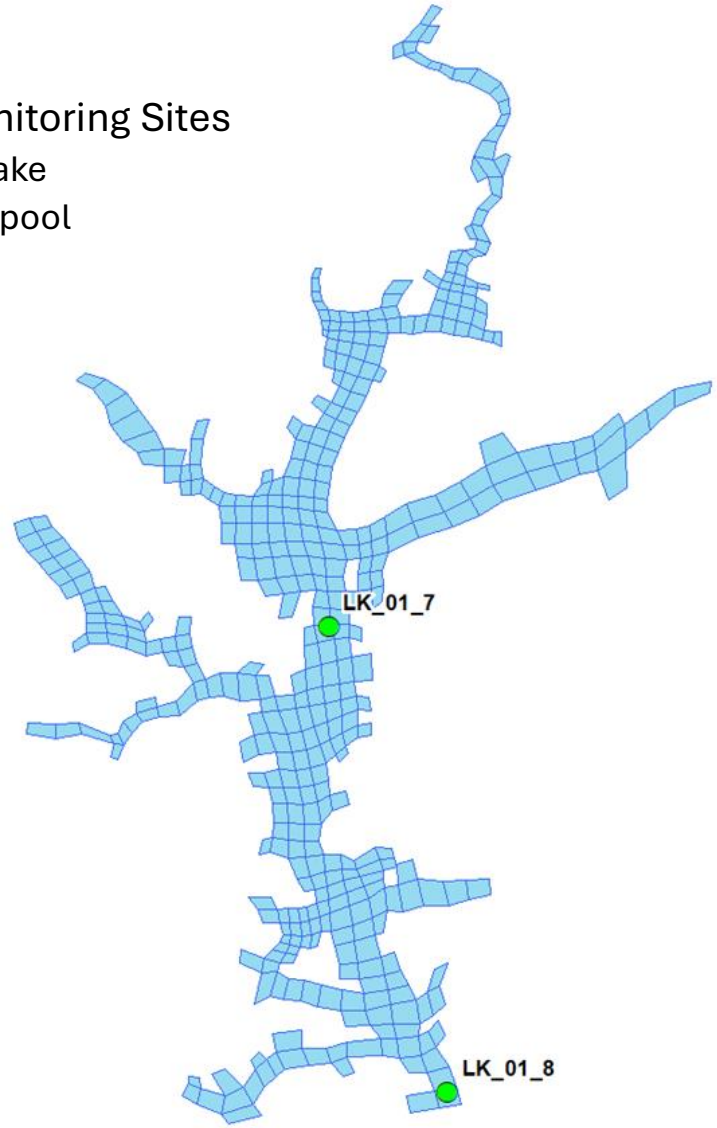
(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

Lake Burton Monitoring

EPD has been monitoring Lake Burton monthly during the growing season (April-October) since 2013.

Lake Burton Monitoring Sites

- LK_01_07 = Midlake
- LK_01_08 = Dampool



Lake Rabun

(i) Chlorophyll *a*: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Approx. 4.5 mi u/s Dam (Mid Lake): 6 μg/L
2. Dampool (aka Tallulah River - Upstream From Mathis Dam): 6 μg/L

(ii) Total Nitrogen: Not to exceed 0.5 mg/L as nitrogen in the photic zone more than once in a growing season

(iii) Total Phosphorus: Not to exceed 0.04 mg/L in the photic zone more than once in a growing season

(iv) pH: within the range of 6.0 – 9.0 standard units.

(v) Bacteria: E. coli shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at the depth specified in 391-3-6-.03(5)(g).

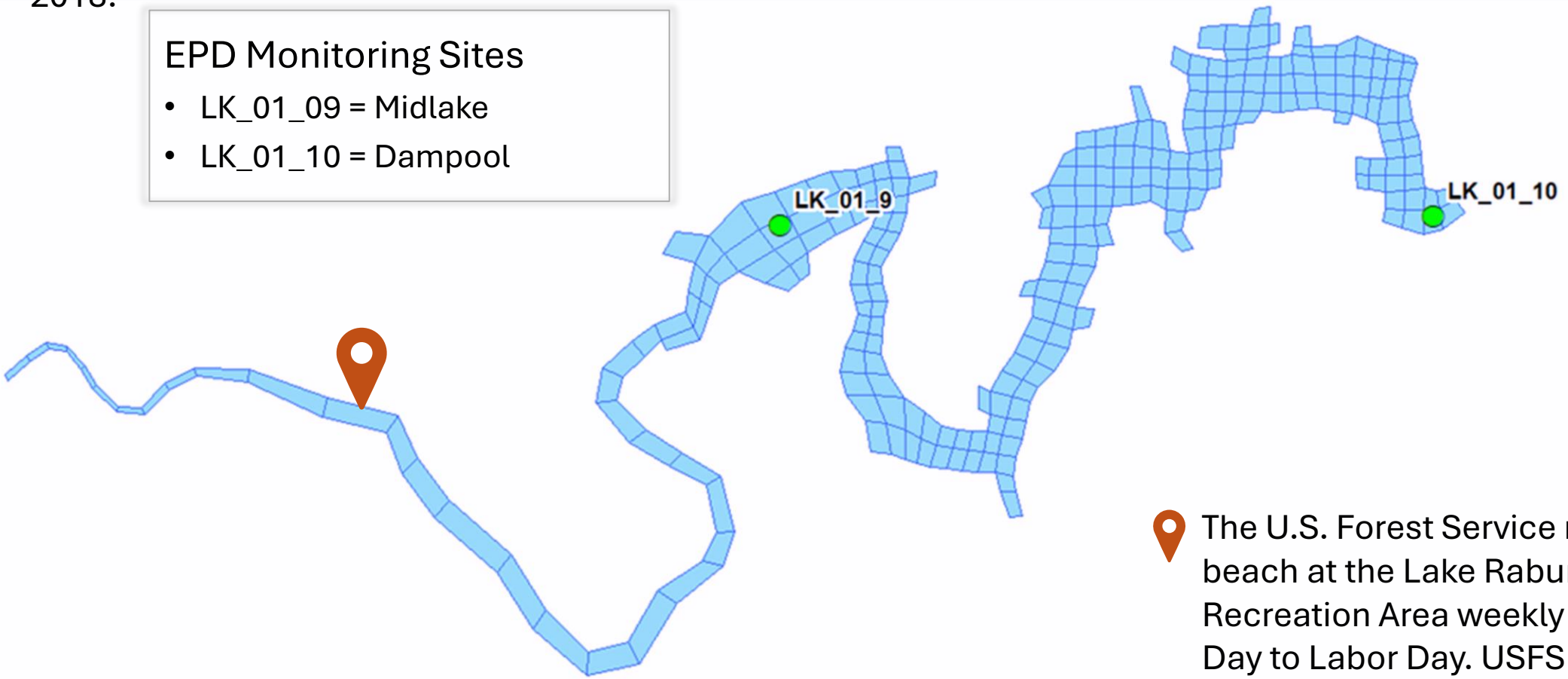
(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

Lake Rabun Monitoring

EPD has been monitoring Lake Rabun monthly during the growing season (April-October) since 2013.

EPD Monitoring Sites

- LK_01_09 = Midlake
- LK_01_10 = Dampool



The U.S. Forest Service monitors the beach at the Lake Rabun Beach Recreation Area weekly from Memorial Day to Labor Day. USFS will post any beach closings on the Lake Rabun Beach Recreation Area website.

Lake Tugalo

(i) Chlorophyll *a*: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. u/s Tugalo Lake Rd (aka Bull Sluice Rd.): 7 µg/L
2. Upstream From Tugalo Dam: 7 µg/L

(ii) pH: within the range of 6.0 – 9.0 standard units.

(iii) Bacteria: E. coli shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).

(iv) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at the depth specified in 391-3-6-.03(5)(g).

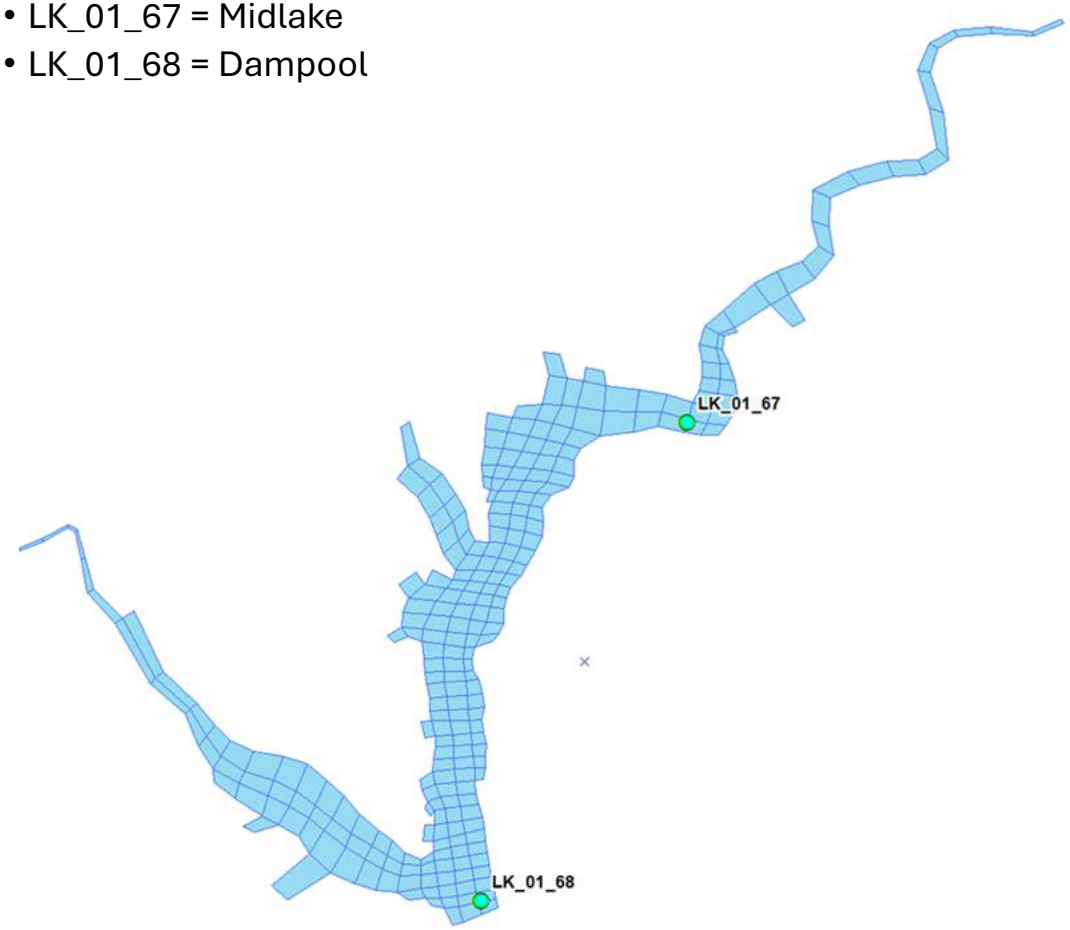
(v) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

Lake Tugalo Monitoring

EPD has been monitoring Lake Tugalo monthly during the growing season (April-October) since 2013.

EPD Monitoring Sites

- LK_01_67 = Midlake
- LK_01_68 = Dampool

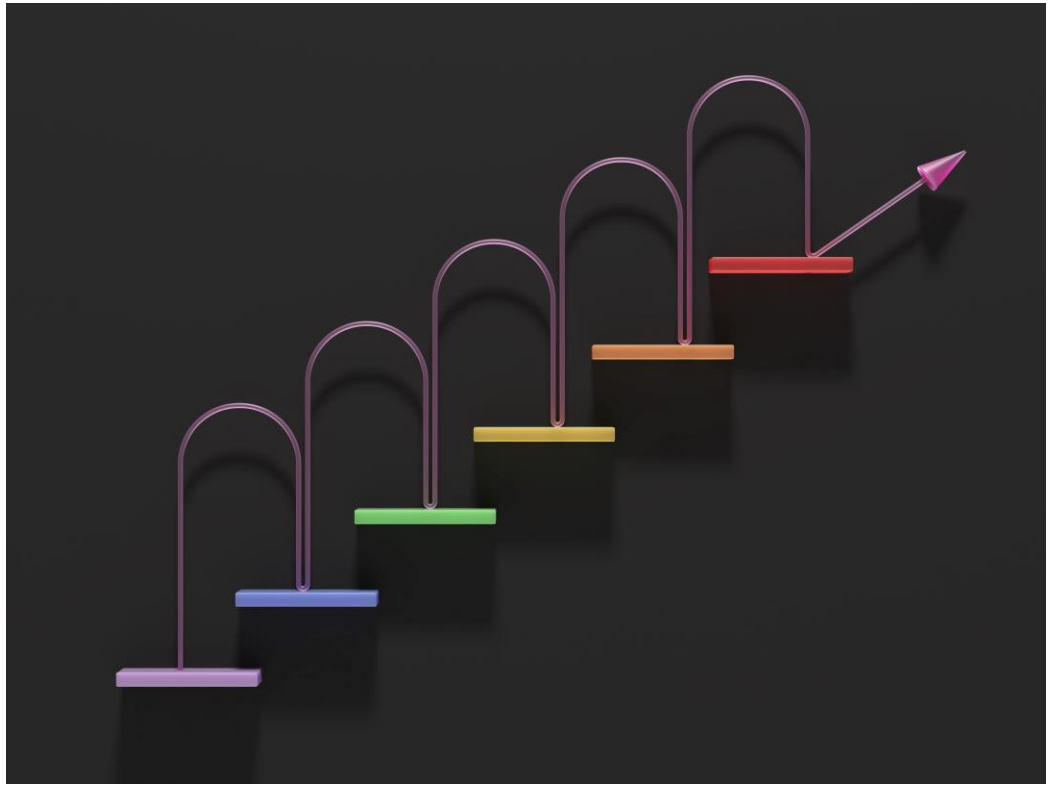


Impacts to homeowners

- To meet and maintain current and future water quality standards for Lake Rabun, homeowners are encouraged to:
  - Properly maintain septic systems
  - Ensure compliance with manufacturer's instructions when fertilizing lawns
  - Avoid blowing of yard debris into the lake

Next Steps

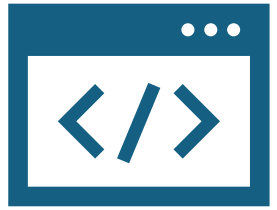
- DNR Board Briefing – December 3, 2024
- Public Hearing – January 28, 2025
- Deadline for written comments – January 31, 2025
- DNR Board adoption of rule change – March 25, 2025
- Internal certification process (approx. 60 days)
- Submit to EPA for approval (approx. June 1)
- EPA response (approve within 60 days or disapprove within 90 days)
- Rule is not enforceable until approved by EPA



Questions/Comments

Comments, Contacts, and WQS Webpage

The deadline for comments regarding the proposed rule change is January 31, 2025. Comments can be emailed to EPD.Comments@dnr.ga.gov or sent to Gillian Batson at: Gillian.Batson@dnr.ga.gov. Please include “Triennial Review Comments” in the subject line.



The EPD webpage dedicated to Water Quality Standards can be found at: https://epd.georgia.gov/watershed-protection-branch/georgia-water-quality-standards