



August 18, 2021

Delivered via Electronic Mail

Environmental Management Commission
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ADEM Hearing Officer
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Re: 2021 Alabama Triennial Review of Water Quality Standards

Dear Commissioners and Hearing Officer:

The Environmental Defense Alliance is pleased to submit the following comments on water quality standards for Alabama waters in response to the July 2, 2021 Notice of Public Hearing – Triennial Review of Alabama’s Water Quality Standards. The Alliance is a non-profit, membership organization dedicated to the strategic use of law and policy to protect human health and the environment. Members of the Alliance consume water and fish from waters located in Alabama. To the extent that water quality criteria for toxic pollutants adopted by the Environmental Management Commission of the Alabama Department of Environmental Management are inadequate to protect human health, Alliance members are threatened with harm.

The triennial review of Alabama’s water quality standards is a requirement of the Clean Water Act § 303(c)(1), 33 U.S.C. § 1313(c)(1), and 40 C.F.R. § 131.20. Clean Water Act § 303(c)(2)(B), 33 U.S.C. § 1313(c)(2)(B), requires:

Whenever a State reviews water quality standards pursuant to paragraph (1) of this subsection, or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria for all toxic pollutants listed pursuant to section 1317(a)(1) of this title for which criteria have been published under section 1314(a) of this title, the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses. Such criteria shall be specific numerical criteria for such toxic pollutants.

40 C.F.R. § 131.11(a)(2) requires:

Toxic pollutants. States must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use. * * *

On July 16, 2015, the Environmental Defense Alliance and others submitted comments to the Department concerning the 2015 Triennial Review of Water Quality Standards. Therein, the commenters requested that the Department adopt new and revised water quality criteria for toxic pollutants necessary to protect human health. In its May 3, 2016 response to comments, the Department said, “EPA finalized the updated national human health criteria in June 2015. The Department will review EPA’s Final Updated Ambient Water Quality Criteria for the Protection of Human Health and propose changes as appropriate.” Subsequently, the Department did not propose any new or revised water quality criteria for toxic pollutants necessary to protect human health.

On July 23, 2018, the Environmental Defense Alliance and others submitted comments to the Department concerning the 2018 Triennial Review of Water Quality Standards. Therein, the commenters requested that the Department adopt new and revised water quality criteria for toxic pollutants necessary to protect human health. In its September 9, 2019 response to comments, the Department said, “The Department will continue to review and evaluate all data and information and collaborate with EPA and other stakeholders pertaining to the development of national recommended human health and aquatic life criteria during its 2018-2020 triennial review period.” Subsequently, the Department did not propose any new or revised water quality criteria for toxic pollutants necessary to protect human health.

The time is past for the Department to complete its review of water quality criteria for toxic pollutants necessary to protect human health and for the Commission to adopt new and revised criteria for toxic pollutants. Further delay jeopardizes the health of Alabamians and Alliance members who consume water and/or fish from Alabama’s waters.

EPA and the Department use a similar approach to derive most water quality criteria for toxic pollutants necessary to protect human health. Most toxic pollutant criteria are derived using the following factors and equations:

Non-carcinogenic Toxic Pollutants

Consumption of water and fish:

$$\text{Criterion conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / [(\text{FCR} \times \text{BCF}^*) + \text{WCR}]$$

Consumption of fish only:

$$\text{Criterion conc. (mg/l)} = (\text{HBW} \times \text{RfD} \times \text{RSC}) / (\text{FCR} \times \text{BCF}^*)$$

Carcinogenic Toxic Pollutants

Consumption of water and fish:

$$\text{Criterion conc. (mg/l)} = (\text{HBW} \times \text{RL}) / (\text{CPF} \times [(\text{FCR} \times \text{BCF}^*) + \text{WCR}])$$

Consumption of fish only:

$$\text{Criterion conc. (mg/l)} = (\text{HBW} \times \text{RL}) / (\text{CPF} \times \text{FCR} \times \text{BCF}^*)$$

where:

BAF = bioaccumulation factor, in l/kg tissue

BCF = bioconcentration factor, in l/kg tissue (*EPA generally uses BAF values rather than BCF values)

CPF = cancer potency factor, in (kg-day)/mg

FCR = fish consumption rate, in kg/day

HBW = human body weight, in kg

RfD = reference dose, in mg/(kg-day)

RL = cancer risk level

RSC = relative source contribution

WCR = water consumption rate, in l/day

With the exception of BAF values, the Commission has adopted values for each of the above-identified factors by rule. Ala. Admin. Code r. 335-6-10-.07. The Commission has not adopted new or revised values for these factors since 2008. Subsequent to 2008, EPA revised many values for the above-identified factors based on new or improved science.

The Environmental Defense Alliance has compared the derivation of water quality criteria for toxic pollutants necessary to protect human health in Ala. Admin. Code r. 335-6-10-.07 with EPA's derivation of recommended national water quality criteria for toxic pollutants necessary to protect human health. This comparison, reflected in the enclosed *Comparison of EPA and Alabama Human Health Ambient Water Quality Criteria and Derivation Inputs* (EDA, Aug. 2021), yields the following conclusions.

1. Toxic Pollutants Not Regulated

The EPA has recommended water quality criteria necessary to protect human health for 117 toxic pollutants. *National Recommended Water Quality Criteria - Human Health Criteria Table*, <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table> (updated May 19,

2021). In Ala. Admin. Code r. 335-6-10-.07, Table 1, the Commission has adopted water quality criteria for the protection of human health for 96 toxic pollutants. The Alliance finds that water quality criteria for the protection of human health have not been adopted by the Commission at Ala. Admin. Code r. 335-6-10-.07 for the following 21 toxic pollutants:

1,2,4-Tetrachlorobenzene
2,4,5-Trichlorophenol
2-Methyl-4,6-Dinitrophenol
3-Methyl-4-Chlorophenol
Barium
Bis(Chloromethyl) Ether
Chlorophenoxy Herbicide (2,4-D)
Chlorophenoxy Herbicide (2,4,5-TP) [Silvex]
Dinitrophenols
Hexachlorocyclohexane (HCH) - Technical
Manganese
Methylmercury
Methoxychlor
Nitrates
Nitrosamines
Nitrosodibutylamine
Nitrosodiethylamine
Nitrosopyrrolidine
Pentachlorobenzene
pH
Solids Dissolved and Salinity

Accordingly, the Alliance requests that Commission initiate rulemaking to amend Ala. Admin. Code r. 335-6-10-.07, Table 1, to include these toxic pollutants without further delay to ensure that human health is adequately protected from exposures to these toxic pollutants.

2. Cancer Potency Factors (CPFs)

For toxicological effects from exposure to carcinogenic toxic pollutants, EPA and Alabama use oral CPFs (also known as Cancer Slope Factors) to derive

water quality criteria for the protection of human health. The oral CPF is an upper bound limit (approximating 95 percent confidence) on the increased cancer risk from a lifetime of oral exposure to a pollutant. EPA's Integrated Risk Information System (IRIS) is the primary data source for CPFs. The Environmental Defense Alliance compared the CPFs determined by EPA to be appropriate for individual carcinogenic toxic pollutants with the CPFs for individual carcinogenic toxic pollutants adopted by the Commission at Ala. Admin. Code chap. 335-6-10, Appendix A. *See Comparison of EPA and Alabama Human Health Ambient Water Quality Criteria and Derivation Inputs* (EDA, Aug. 2021). The Alliance finds that the CPFs (or absence of CPFs) adopted by the Commission at chap. 335-6-10, Appendix A for the following 13 carcinogenic toxic pollutants are not scientifically defensible and are not adequately protective of human health:

1,2,4-Trichlorobenzene
2,3,7,8-TCDD (Dioxin)
2,4-Dinitrotoluene
Bis(Chloromethyl) Ether
Butylbenzyl Phthalate
Hexachlorocyclohexane (HCH) - Technical
Hexachloroethane
Nitrosamines
Nitrosodibutylamine
Nitrosodiethylamine
Nitrosopyrrolidine
Trichloroethylene (TCE)
Vinyl Chloride

Accordingly, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code chap. 335-6-10, Appendix A to adopt new or revised CPFs for these toxic pollutants without further delay to ensure that human health is adequately protected from exposures to these toxic pollutants.

3. Risk Levels (RLs)

A Risk Level is assigned to each carcinogen for which water quality criteria are derived. The RL dictates the number of excess cancers that will result from a lifetime of exposure to a carcinogenic toxic pollutant at the level of a specified

criterion. Generally, EPA publishes national recommended water quality criteria for carcinogenic toxic pollutants at a 1×10^{-6} risk level (1 in 1,000,000 excess cancers), which EPA considers to be appropriate for the general population. Generally, the Commission has adopted a 1×10^{-6} risk level for carcinogenic toxic pollutants. Ala. Admin. Code r. 335-6-10-.07(1)(d)2. The Alliance finds that the Commission has not adopted a cancer Risk Level for the following 8 carcinogenic toxic pollutants:

1,1,1-Trichloroethane
Bis(Chloromethyl) Ether
Butylbenzyl Phthalate
Hexachlorocyclohexane (HCH) - Technical
Nitrosamines
Nitrosodibutylamine
Nitrosodiethylamine
Nitrosopyrrolidine

Accordingly, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code r. 335-6-10-.07, Table 1 and chap. 335-6-10, Appendix A without further delay to include these carcinogens so as to ensure that human health is adequately protected from exposures to these toxic pollutants at the RL of 1×10^{-6} provided in Ala. Admin. Code r. 335-6-10-.07(1)(d)2.

4. Reference Doses (RfDs)

For toxicological effects from exposure to non-carcinogenic toxic pollutants, a Reference Dose (RfD) is used to derive water quality criteria for the protection of human health. An RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure of the human population to a pollutant that is likely to be without an appreciable risk of deleterious effects during a lifetime. RfDs are typically derived from a laboratory animal dosing study in which a no-observed-adverse-effect level (NOAEL), lowest-observed-adverse-effect level (LOAEL), or benchmark dose can be obtained. Uncertainty factors are applied to reflect the limitations of the data. The Environmental Defense Alliance compared the RfDs determined by EPA to be appropriate for individual toxic pollutants with the RfDs adopted by the Commission at Ala. Admin. Code chap. 335-6-6-.10, Appendix A. *See Comparison of EPA and*

Alabama Human Health Ambient Water Quality Criteria and Derivation Inputs (EDA, Aug. 2021). The Alliance finds that the RfDs (or absence of RfDs) adopted by the Commission at chap. 335-6-10, Appendix A for the following 12 toxic pollutants are not scientifically defensible and are not adequately protective of human health:

1,1,1-Trichloroethane
1,2,4-Tetrachlorobenzene
2,4,5-Trichlorophenol
2-Methyl-4,6-Dinitrophenol
3-Methyl-4-Chlorophenol
Chloroform
Chlorophenoxy Herbicide (2,4-D)
Chlorophenoxy Herbicide (2,4,5-TP) [Silvex]
Dinitrophenols
Methylmercury
Methoxychlor
Pentachlorobenzene

Accordingly, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code chap. 335-6-10, Appendix A to adopt new or revised RfDs for these toxic pollutants without further delay to ensure that human health is adequately protected from exposures to these toxic pollutants.

5. Relative Source Contributions (RSCs)

The RSC factor recognizes that human exposures to non-carcinogenic toxic pollutants may be from sources in addition to consumption of water and fish. If there are other sources of exposure, it is possible that the aggregate exposure to toxic pollutants from all sources may exceed the RfD for a particular toxic pollutant. In that case, it is appropriate to reduce the exposure to toxic pollutants from consumption of water and fish to ensure that aggregate exposures do not exceed the RfD. This is accomplished by multiplying the RfD by a percentage which represents that fraction of the total exposure which should be allocated to water and fish consumption. The Environmental Defense Alliance compared the RSCs determined by EPA to be appropriate for non-carcinogenic toxic pollutants with the RSCs adopted by the Commission at Ala. Admin. Code r. 335-6-6-.10,

Appendix A. *See Comparison of EPA and Alabama Human Health Ambient Water Quality Criteria and Derivation Inputs* (EDA, Aug. 2021). The Alliance finds that the RSCs (or absence of RSCs) adopted by the Commission at Ala. Admin. Code chap. 335-6-10, Appendix A for the following 35 non-carcinogenic toxic pollutants are not scientifically defensible and are not adequately protective of human health:

1,1,1-Trichloroethane
1,2,4-Tetrachlorobenzene
1,3-Dichlorobenzene
2,4,5-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2-Chloronaphthalene
2-Chlorophenol
2-Methyl-4,6-Dinitrophenol
3-Methyl-4-Chlorophenol
Acenaphthene
Acrolein
alpha-Endosulfan
Anthracene
Bis(2-Chloro-1-Methylethyl) Ether
Chloroform
Chlorophenoxy Herbicide (2,4-D)
Chlorophenoxy Herbicide (2,4,5-TP) [Silvex]
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butyl Phthalate
Dinitrophenols
Endosulfan Sulfate
Endrin Aldehyde
Fluoranthene
Fluorene
Methylmercury
Methoxychlor
Methyl Bromide

Nitrobenzene
Nitrobenzene
Pentachlorobenzene
Phenol
Pyrene

Accordingly, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code chap. 335-6-10, Appendix A to adopt new or revised RSCs without further delay to ensure that human health is adequately protected from exposures to these toxic pollutants.

6. Bioconcentration Factors (BCFs) and Bioaccumulation Factors (BAFs)

“Bioaccumulation” refers to the uptake and retention of a chemical by an aquatic organism from all surrounding media (e.g., water, food, sediment). The term “bioconcentration” refers to the uptake and retention of a chemical by an aquatic organism from water only. For some chemicals (particularly those that are highly persistent and hydrophobic), the magnitude of bioaccumulation by aquatic organisms can be substantially greater than the magnitude of bioconcentration. Thus, an assessment of bioconcentration alone would underestimate the extent of accumulation in aquatic biota for these chemicals. In order to prevent harmful exposures to waterborne chemicals through the consumption of contaminated fish and shellfish, EPA recommends that water quality criteria for the protection of human health address the process of chemical bioaccumulation in aquatic organisms. EPA’s methodology for deriving national bioaccumulation factors for setting recommended national water quality criteria to protect human health is presented in *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000), EPA-822-B-00-004 (Oct. 2000) at Chap. 5. A detailed scientific basis of the recommended national BAF methodology is provided in *Technical Support Document Volume 2: Development of National Bioaccumulation Factors*, EPA-822-R-03-030 (Dec. 2003). The goal of EPA’s national BAFs is to represent the long-term, average bioaccumulation potential of a chemical in edible tissues of aquatic organisms that are commonly consumed by humans throughout the United States. The numerous scientific advances that have occurred in the area of bioaccumulation since 1980 have significantly increased the ability to assess and predict the bioaccumulation of chemicals in aquatic biota.

As a result, EPA has revised its methodology for developing recommended water quality criteria to reflect the current state of the science. In lieu of using bioconcentration factors or locally derived bioaccumulation factors, the EPA-derived National bioaccumulation factors for individual toxic pollutants should be used in criteria development. National BAFs for 95 toxic pollutants are identified in *Chemical-specific Inputs for EPA's 2015 Final Updated Human Health Ambient Water Quality Criteria*, https://www.epa.gov/sites/default/files/2016-03/documents/summary_of_inputs_final_revised_3.24.16.pdf. Accordingly, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code r. 335-6-10-.07(1)(d)1. and -.07(1)(d)2. to reflect BAFs rather than BCFs for individual toxic pollutants and to amend Ala. Admin. Code chap. 335-6-10, Appendix A to adopt new BAFs for individual toxic pollutants without further delay to ensure that human health is adequately protected from exposures to these toxic pollutants.

7. Fish Consumption Rate

The consumption of fish is a pathway for human exposure to toxic pollutants. Generally, EPA has developed national recommended water quality criteria for toxic pollutants using a national default fish consumption rate of 22 grams/day (0.022 kg/day). However, EPA also states that where local fish consumption rates are higher, those higher rates should be used in the development of water quality criteria for toxic pollutants to protect human health. On July 20, 1994, the Commission adopted a fish consumption rate of 30 grams/day (0.030 kg/day) in Ala. Admin. Code r. 335-6-10-.07(1)(d)1. & -.07(1)(d)2. based on a study of fish consumption among Alabama anglers. *Estimation of Daily Per Capita Freshwater Fish Consumption of Alabama Anglers* (FIMS & FAA, 1994). The study actually supports a fish consumption rate for Alabama anglers of 45 grams/day (0.045 kg/day). Accordingly, the Alliance requests that the Commission revisit the 1994 fish consumption study and initiate rulemaking to revise the fish consumption rate in Ala. Admin. Code r. 335-6-10-.07(1)(d)1. & -.07(1)(d)2. to accurately reflect the 45 grams/day (0.045 kg/day) fish consumption rate demonstrated by the study and to ensure adequate protection of human health.

8. Water Consumption Rate (WCR)

The consumption of water is a pathway for human exposure to toxic pollutants. EPA previously recommended a national default drinking water consumption rate of 2.0 liters per day, which represented the per capita community water ingestion rate at the 86th percentile for adults surveyed in the U.S. Department of Agriculture's 1994-1996 Continuing Survey of Food Intake by Individuals (CSFII) analysis and the 88th percentile of adults in the National Cancer Institute study of the 1977-1978 Nationwide Food Consumption Survey. In June of 2015, EPA increased its national default drinking water consumption rate to 2.4 liters per day based on National Health and Nutrition Examination Survey (NHANES) data collected by the National Center for Health Statistics from 2003 to 2006. *Human Health Ambient Water Quality Criteria: 2015 Update*, EPA 820-F-15-001 (June 2015). See *Exposure Factors Handbook: 2011 Edition* - Chap. 3, EPA-600-R-09-052F (Sep. 2011). This value represented the per capita estimate of community water consumption at the 90th percentile for adults ages 21 and older. The National Research Council estimated that "[d]aily consumption of water is a function of temperature, humidity, physical activity, and other factors that vary widely. * * * [C]onsideration should be given to establishing some standards on a regional or occupational basis, to take extremes of water consumption into account. *Drinking Water and Health*, Vol. 1, National Research Council, National Academies Press (1977) at 12. Ala. Admin. Code r. 335-6-10-.07(1)(d)1. and -.07(1)(d)2. continue to prescribe a water consumption rate of 2.0 liters per day. This consumption rate is no longer scientifically defensible. Absent local or regional data indicating a higher water consumption rate, the Alliance requests that the Commission initiate rulemaking to amend Ala. Admin. Code r. 335-6-10-.07(1)(d)1. and -.07(1)(d)2. to adopt a revised water consumption rate of 2.4 liters per day to ensure adequate protection of human health.

Conclusion

The water quality criteria for toxic pollutants adopted by the Commission in Ala. Admin. Code chap. 335-6-10 are not adequate to protect human health and designate water uses. Accordingly, for the third time in six years, the Environmental Defense Alliance requests that Ala. Admin. Code chap. 335-6-10

be revised to ensure adequate protection of human health and designated water uses in Alabama.

Sincerely,



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Enc. – *Comparison of EPA and Alabama Human Health Ambient Water Quality Criteria and Derivation Inputs* (EDA, Aug. 2021)

cc:

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