REGION 6
DALLAS, TX 75270

October 3, 2025

TRANSMITTED VIA EMAIL

Stacie Wassell
Deputy Director, Office of Water Quality
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118
stacie.wassell@arkansas.gov

Re: Arkansas's 2023 Triennial Revisions to 8 CAR § 21 (Rule 2), as amended, Rule Establishing Water Quality Standards for Surface Waters of the State of Arkansas

Dear Ms. Wassell:

I am writing in response to your letter requesting review and approval of revisions to Part 21 of Title 8 of the Code of Arkansas Rules (CAR), *Rule Establishing Water Quality Standards for Surface Waters of the State of Arkansas*. The revised water quality standards in 8 CAR § 21 were adopted by the Arkansas Pollution Control and Ecology Commission (Commission) via Minute Order No. 25-060 on April 25, 2025. These revisions were certified as adopted pursuant to state law by Kesia Morrison, Chief Legal Counsel for the Arkansas Department Energy and Environment, Office of Chief Counsel, via letter dated July 16, 2025. These revisions were submitted by the Arkansas Division of Environmental Quality (DEQ) to the U.S. Environmental Protection Agency (EPA) via the GoAnywhere Web Client on July 14, 2025, as required under federal regulations at 40 CFR § 131.5.

The EPA is approving the majority of the new and/or revised provisions within its discretionary authority pursuant to Clean Water Act (CWA) § 303(c) and its implementing regulations at 40 CFR § 131. The EPA is not disapproving any new or revised provisions. The approval of the new or revised provisions and appendices, in part or in their entirety, is described in Section II of the enclosed Technical Support Document (TSD). These provisions are effective for CWA purposes as of today's action. Section III details new as well as previously adopted provisions where the EPA does not have enough information to take an action or additional discussion with the DEQ is needed. State-adopted water quality standards are not effective for CWA purposes unless and until approved by the EPA as specified at 40 CFR §131.21(c). Other provisions described in Section III that do not require EPA action are effective as State law. Section IV details that portion of 8 CAR § 21-511 (Mineral Quality) that was previously disapproved by the EPA. Those provisions the EPA disapproved are not effective for CWA purposes.

In addition to the EPA's approval of new and revised WQS pursuant to CWA § 303(c), the Endangered Species Act (ESA) requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of designated critical habitat of such species. The EPA initiated informal ESA consultation regarding the EPA's approval of revisions to 8 CAR § 21 with the USFWS through discussions with the Arkansas Ecological Services Field Office (ESFO). During this process, the Arkansas ESFO concurred with the EPA's determination that revisions to freshwater aquatic life criteria for ammonia and cadmium under 8 CAR § 21 are not likely to adversely affect any listed species or proposed listed species, nor adversely modify designated critical habitat, in Arkansas. The EPA likewise determined that all other revisions to aquatic life uses or criteria in this triennial revision will have no effect on listed species or critical habitat in the state. These "no effect" determinations are documented in memos to the file located in the administrative record of the EPA's action on this triennial revision.

The EPA appreciates the state of Arkansas's efforts in reviewing and revising its water quality standards and for answering EPA staff questions during its review of the state's submission. We look forward to working with you to resolve the outstanding issues related to this triennial review during the next triennial water quality standards review. If you have any questions or concerns, please contact me at (214) 665-6647, or have your staff contact Mike Schaub at (214) 665-7314.

Sincerely,

Acting for Troy C. Hill, P.E.
Director
Region 6 Water Division

Enclosure

cc: via email
Joe Martin, Associate Director, Office of Water Quality, DEQ
Brie Lusk, Branch Manager, Water Quality Planning, Office of Water Quality, DEQ
Mary Barnett, Ecologist Supervisor, Water Quality Planning, Office of Water Quality, DEQ

TECHNICAL SUPPORT DOCUMENT FOR EPA REGION 6 REVIEW OF:

PART 21: *RULE ESTABLISHING WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF ARKANSAS*

Revisions Adopted by the Arkansas Pollution Control and Ecology Commission via Minute Order No. 25-06, Docket No. 24-005-R

U.S. EPA REGION 6
WATER DIVISION
October 3, 2025

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I. Introduction

Regulatory Requirements and Purpose

As described in § 303(c) of the Clean Water Act[1] (CWA) and in the standards regulation within the Code of Federal Regulations (CFR) at 40 CFR § 131[2], specifically § 131.20, states and authorized Tribes have primary responsibility for developing and adopting water quality standards to protect their waters. In addition, CWA § 303(c)(1) and 40 CFR § 131.20 require states to hold public hearings at least once every three years to review and, as appropriate, modify and adopt standards. As required by 40 CFR § 131.21, the Environmental Protection Agency (EPA) is obligated to review new and revised surface water quality standards that have been adopted by states and authorized Tribes. Authority to approve or disapprove new and/or revised standards submitted to the EPA for review has been delegated to the Water Division Director at EPA Region 6. Tribal or state water quality standards are not effective under the CWA until approved by the EPA.

The purpose of this Technical Support Document (TSD) is to provide the basis for the EPA's action on the Arkansas Pollution Control and Ecology Commission's (Commission) revisions to Part 21, *Water Quality Standards for Surface Waters of the State of Arkansas*.

Summary of Revisions to 8 Code of Arkansas Rules (CAR) Part 21

Revisions to Rule 2, now Part 21 *Water Quality Standards for Surface Waters of the State of Arkansas*[3]*,* were adopted by the Arkansas Pollution Control and Ecology Commission (Commission) via Minute Order No. 25-060, Docket No. 24-005-R on April 25, 2025. These revisions were certified as adopted pursuant to state law by Kesia Morrison, Chief Legal Counsel for the Arkansas Department of Energy and Environment via letter dated July 16, 2025. The Arkansas DEQ submitted these revisions by letter dated July 1, 2025, to the EPA for review and action. The EPA received the revisions via the GoAnywhere web client on July 14, 2025. The purpose of this Technical Support Document (TSD) is to describe the EPA's analysis and action on the revisions to Part 21.

The Commission's 2023 triennial revisions resulted in several changes to Part 21, reflecting statewide statutory requirements and several substantive and non-substantive revisions. Although not a complete list, significant revisions include:

[1] Clean Water Act. 33 USC §§ 1251-1387.

[2] Water Quality Standards Regulation, 33 U.S.C. 1251et seq.

[3] Arkansas Pollution Control and Ecology Commission. 2025. *Part 21: Rule establishing water quality standards for surface waters of the State of Arkansas.* April 25, 2025.

- Removal of fecal coliform indicator for all recreational use waters.
- Revised primary contact season from May 1st – September 30th to April 1st – October 31st.
- Revised the assessment period for the *E. coli* geometric mean criterion from 30 days to across the entire primary contact recreation season.
- Adoption of acute and chronic aquatic life criteria for cadmium and ammonia.
- Adoption of human health criteria for benzene, ethylbenzene, phenol, toluene, and xylene.
- Removal of the Trout Waters – Aquatic Life Use designation for three reservoirs.
- Adoption of site-specific aquatic life criteria for pH for Barren Creek, Irons Fork Creek, Short Creek, Caney Creek and Dry Fork Creek.
- Adoption of site-specific critical season dissolved oxygen (DO) aquatic life criteria for Saline River, South Fork Ouachita River and the Alum Fork Saline River.
- Removal of the exemption from fishable/swimmable and domestic water supply uses for two portions of Coffee Creek and two other unnamed tributaries.

EPA Action on New and Revised Provisions

The EPA has the CWA § 303(c)(3) authority to review and approve or disapprove new and/or revised water quality standards (WQS) submitted by a state or authorized Tribe. The EPA has determined that the following revisions to Part 21 constitute new or revised water quality standards, the majority of which are approved consistent with CWA § 303(c) and its implementing regulations at 40 CFR § 131.5 and 40 CFR § 131.6 and are in effect for CWA purposes. For those provisions that the EPA has not approved in today's action nor in prior actions, the previously approved provision remains in effect for CWA purposes.

There are a significant number of non-substantive revisions throughout Part 21 based on statewide statutory requirements and other reasons that are intended to provide clarity, correct minor errors, and provide consistency within the document that may be noted but may not be addressed in detail unless pertinent to the EPA's review consistent with CWA and federal regulatory requirements. The EPA considers non-substantive edits to existing WQS to constitute new or revised WQS that the Agency has the authority and duty to approve or disapprove under CWA § 303(c)(3). While such revisions typically do not substantively change the meaning or intent of the existing WQS, the EPA believes that it is reasonable to treat such non-substantive changes in this manner to ensure public transparency as to which provisions are effective for purposes of the CWA. The EPA notes that the scope of its action in reviewing and acting on such non-substantive changes extends only as far as the actual non-substantive changes themselves. In other words, the EPA's action on non-substantive revisions to previously approved WQS would not constitute an action on the underlying previously approved WQS under § 303(c) of the CWA and its implementing regulations at 40 CFR § 131.

II. New or Revised Water Quality Standards the EPA is Approving

General

- All six chapter headings have been changed from "CHAPTER" to "SUBPART". Within each subpart, section titles now reflect the change from "Rule" to 8 CAR § 21. For instance, "Rule 2.101" is now "8 CAR § 21-101".

  All such changes to title headings, and references thereto, are non-substantive and are approved pursuant to CWA § 303(c). All updated references to 8 CAR § 21 will be used throughout the remainder of this technical support document.

Subpart 1. Authority, general principles, and coverage

- ***8 CAR § 21-101, 102, 103, 104, and 105***
  The text in these sections has been variably updated to include changes in capitalization, remove two parenthetical references, hyphenate two terms, and to spell out the state name "Arkansas" in references to the Arkansas Code.

  These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-106 Definitions***
  Definitions are generally considered to be WQS given that they can affect the meaning and interpretation of a WQS provision. The exception to this convention is when the use of a definition is limited to those provisions that are not WQS, e.g., implementation language. The EPA's decision on revisions to definitions depends on the effect the definitions have on the viability of other WQS provisions in 8 CAR § 21.

  - The terms defined throughout this subsection are now included in quotes and are followed by the phrase "means the" or "refers to". For instance: "~~Abatement:~~ "Abatement" means the ~~The~~ reduction in degree or intensity of pollution."

    All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

  - Many definitions contain references to numbers and the units assigned to those numbers, all of which are now fully spelled out. For instance, "1 cubic foot per second" now reads "one cubic foot per second (1 ft3/sec)". Terms within some definitions are now in lower case or hyphenated, spaces have been removed, or minor verbiage has been added to definitions for improved readability (inclusion of the term "headwater" in the definition of "headwater").

All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- The definition of critical season now includes the temperature in both Celsius (>22°C) and Fahrenheit (71.6°F).

  The addition of 71.6°F to this definition is approved pursuant to CWA § 303(c).

- The definition of *Escherichia coli* no longer includes the parenthetical reference to its size in microns (0.5 – 3.5 microns).

  The removal of this parenthetical is approved pursuant to CWA § 303(c).

- The term "Fecal coliform bacteria" and its definition have been struck.

  The EPA no longer recommends the use of fecal coliform criteria in the assessment of recreational uses and permitting. The DEQ will no longer implement fecal coliform bacteria criteria in its water quality management programs. The removal of this definition is approved pursuant to CWA § 303(c).

- A definition of the term "Most probable number (MPN)" has been added to this section.

  This new definition is approved pursuant to CWA § 303(c).

- A definition of the term "Non-critical season" has been added to this section.

  This new term has the same definition as the now-removed term "Primary season". The renaming of "Primary season" as "Non-critical season" is approved pursuant to CWA § 303(c).

- The exponent for one trillionth was corrected to read 10^{-12} in the definition of "Picocurie".

  This correction is approved pursuant to CWA § 303(c).

Subpart 2. Antidegradation policy

- The text in the four sections under this subpart has been variably updated to include changes in capitalization.

These revisions are non-substantive and are approved pursuant to CWA § 303(c).

Subpart 3. Waterbody uses

- The text in all sections under this subpart has been variably updated to include changes in capitalization, to add or subtract hyphens and spaces, or the revision of singular words to their plural form. Some references to the "Division" or "Commission" have been expanded to include the full names of each, including the "Division of Environmental Quality" and the "Arkansas Pollution Control and Ecology Commission", respectively. References to numbers and the units assigned to those numbers are now fully spelled out. For instance, "All streams with watersheds less than ten square miles (≤10 mi^2)…" Parenthesized alphabetical and numeric subsection references within each section (and new references thereto) have also been revised or added.

  All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-302. Designated uses***

  - Subsection 302(4) includes a definition for Primary Contact Recreation which includes a new reference to an amended length of time in which the primary contact recreation use will apply in Arkansas: April 1 – October 31.

    This extension of the primary contact recreation season provides two additional months of added protection to potential swimmers and is in line with (or in a few cases much longer than) Arkansas's border states. Arkansas's recent determination to extend protections into April and October is based in part on five and ten-year average water and air temperatures measured at multiple locations around the state which indicated temperatures within suitable ranges for primary contact.[4] Surveys of multiple parks and recreation areas with swim beaches likewise confirmed low to moderate levels of usage at beaches in April and October.[5] This new reference to the primary contact recreation use season is approved pursuant to CWA § 303(c).

  - Subsection 302(5) includes a definition for Secondary Contact Recreation which includes a new reference to the length of time in which this use will apply in Arkansas: year-round.

[4] Arkansas Division of Environmental Quality. 2025. Investigation of Extension of Primary Contact Season Designated Use. Attachment A to DEQ's 2025 triennial revisions submission to EPA.
[5] Ibid.

The secondary contact recreation use has long applied to all state waters on a year-round basis so the addition of this reference only further codifies an existing practice in the WQS. This seasonal reference is approved pursuant to CWA § 303(c).

- Subsection 302(6)(iii) includes the following updates to the names of ecoregions in Arkansas (deleted terms are lined out, added terms are underlined):
  - Arkansas ~~River~~ Valley Ecoregion
  - Typical ~~Gulf Coastal~~ South Central Plains Ecoregion
  - Springwater-influenced ~~Gulf Coastal~~ South Central Plains Ecoregion
  - Least-altered ~~Delta~~ Mississippi Alluvial Plain Ecoregion
  - Channel-altered ~~Delta~~ Mississippi Alluvial Plain Ecoregion

  These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- The spotted sunfish was replaced with "Redspotted Sunfish" as a common fish species in the Typical South Central Plains Ecoregion. Given the consistency of this change with redspotted sunfish ranges found in the 2nd edition of *Fishes of Arkansas* by Henry W. Robison and Thomas M. Buchanan, this change is approved pursuant to CWA § 303(c).

Subpart 4. General standards

- The text in all sections under this subpart has been variably updated to include changes in capitalization. Some references to the "Division" have been expanded to include the full name of "Division of Environmental Quality". References to numbers and the units assigned to those numbers are now fully spelled out. For instance, "For aquatic life toxic substances in larger streams (those with Q7-10 flows equal to or greater than one hundred cubic feet per second (≥100 cfs))…" One revision of the word "fishery' to "aquatic life use" was also provided in subsection 8 CAR § 21-405(a).

  All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

Subpart 5. Specific standards

- The text in all sections under this subpart has been variably updated to include changes in capitalization. Some references to the "Division" have been expanded to include the full name of "Division of Environmental Quality". References to numbers and the units assigned to those numbers are now fully spelled out. For instance, "The non-critical season dissolved oxygen standard is to be met at a water temperature of twenty-two degrees Celsius (22°C (seventy-one and six-tenths

degrees Fahrenheit (71.6°F))…" The use of asterisks in several tables have been replaced by numeric footnotes.

All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-502. Temperature***

    - The table found in subsection 502(b) reflects the state's updated ecoregion names as listed in 8 CAR § 21-302(6)(iii). Temperature criteria were struck for "Springwater-influenced Gulf Coastal" ecoregion streams as they are the same as those already listed for "Typical Gulf Coastal" ecoregion streams. The names of both ecoregion stream types have been struck from the table and are now included in the "South Central Plains" ecoregion that encompasses both. The temperature criteria for both stream types therefore remain the same. A new "note" referencing the location of site-specific criteria for temperature (Appendix A) has been added to this section as well.

      All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-503. Turbidity***

    The opening sentence of this provision is now found in 8 CAR § 21-503(a) and has been slightly truncated as reflected in strikeout below:

    "(a) There shall be no distinctly visible increase in turbidity of receiving waters attributable to ~~municipal, industrial, agricultural, other waste~~ discharges or instream activities."

    The revised phrase is clear that any "discharges or instream activities" should not cause any visible increase in turbidity regardless of anthropogenic cause or source. This revised sentence in 8 CAR § 21-503(a) is approved pursuant to CWA § 303(c). Please see Section III below for a discussion of EPA's determination on the remaining portion of the opening narrative provision in 8 CAR § 21-503(b).

    - The table below subsection 503(b) reflects the state's updated ecoregion names as listed in 8 CAR § 21-302(6)(iii). Turbidity criteria were struck for "Springwater-influenced Gulf Coastal" ecoregion streams as they are the same as those already listed for "Typical Gulf Coastal" ecoregion streams. The names of both of these ecoregion stream types have been struck from the table and are now included in the "South Central Plains" ecoregion that encompasses both. The turbidity criteria for both stream types therefore remain the same.

      All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-504. pH***

    - A new "note" referencing the location of site-specific criteria for pH (Appendix A) has been added to the end of this section.

      This revision is non-substantive and is approved pursuant to CWA § 303(c).

- ***8 CAR § 21-505. Dissolved oxygen***

    - In the table found in 8 CAR § 21-505(a)(1), the criteria heading titled "Primary" has been revised to read "Non-critical". This table also reflects the state's newly updated ecoregion names for Arkansas Valley, Typical South Central Plains, Springwater-influenced South Central Plains, and Mississippi Alluvial Plain (least altered and channel altered) ecoregions as found in 8 CAR § 21-302(6)(iii). Several references to "primary" season have also been updated to read "non-critical" season throughout subsection 505(a). A reference to "Rule 6" in Subsection 505(b)(2) has been changed to read "8 CAR pt. 25." A new "note" referencing the location of site-specific criteria for dissolved oxygen (Appendix A) has been added to the end of this section.

      All such revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-506. Radioactivity***

    - References to "20 CAR pt. 3" of the Department of Health, and to "8 CAR 21" were added to this section.

      This revision is non-substantive and is approved pursuant to CWA § 303(c).

- ***8 CAR § 21-507. Bacteria***

    - The subheading "Fecal Coliform" and all associated numeric fecal coliform criteria have been struck from this provision.

      The EPA no longer recommends the use of fecal coliform criteria in the assessment of recreational uses and permitting. The DEQ will no longer implement fecal coliform bacteria criteria in its water quality management programs. The removal of this indicator and all associated criteria is approved pursuant to CWA § 303(c).

    - In 8 CAR § 21-507(c), a geometric mean criterion of 126 col/100ml has been added under the heading "GM" for "All other waters" for protection of primary contact recreation. A geometric mean criterion of 630 col/100ml has

likewise been added under the heading "GM" for "All other waters" for protection of secondary contact recreation. These values are the same level of protection afforded to the ERW, ESW, NSW, Reservoirs, and Lakes classes.

Adding these geometric mean criteria provides additional protection to "All other waters". The addition of these criteria to subsection 507(c) is approved pursuant to CWA § 303(c).

- Footnote 1 in 8 CAR § 21-507(c) includes a new reference to an amended length of time in which the primary contact recreation use will apply in Arkansas: April 1 – October 31.

  This extension of the primary contact recreation season provides two additional months of added protection to potential swimmers and is in line with (or in a few cases much longer than) Arkansas's border states. Arkansas's recent determination to extend protections into April and October is based in part on five and ten-year average water and air temperatures measured at multiple locations around the state which indicated temperatures within suitable ranges for primary contact.[6] Surveys of multiple parks and recreation areas with swim beaches likewise confirmed low to moderate levels of usage at beaches in April and October.[7] This new reference to the primary contact recreation use season is approved pursuant to CWA § 303(c).

  All other citations in this table have been updated to correctly correspond with the four footnotes at the end of the table. These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-508. Toxic substances***

  - The word "indigenous" has been struck from subsection 508(a) in reference to protection of aquatic biota from toxicants.

    The removal of "indigenous" is appropriate in this case as the protection of all aquatic biota, not just indigenous biota, from toxicity is required. This revision is approved pursuant to CWA § 303(c).

  - DEQ based its revised cadmium criteria in the "Dissolved Metals" table of subsection 508(d) on the EPA's 2016 § 304(a) recommended acute and

[6] Arkansas Division of Environmental Quality. 2025. Investigation of Extension of Primary Contact Season Designated Use. Attachment A to DEQ's 2025 triennial revisions submission to EPA.
[7] Ibid.

chronic aquatic life criteria for cadmium, in accordance with 40 CFR 131.11(b)(1)(i).

During Arkansas's process of revising these WQS, the U.S. District Court for the District of Arizona vacated the EPA's 2016 national recommended §304(a) chronic freshwater aquatic life criterion for cadmium based on a challenge brought by the Center for Biological Diversity. The Department of Justice has appealed the decision and filed the EPA's brief with the U.S. Court of Appeals for the Ninth Circuit. As a result of the vacatur order, the current national recommended chronic freshwater cadmium aquatic life criterion can be found in the EPA's 2001 Update of Ambient Water Quality Criteria for Cadmium.

In light of the vacatur, DEQ re-evaluated the scientific basis for its revised freshwater chronic cadmium criterion. DEQ evaluated other scientifically defensible methods, in accordance with 40 CFR 131.11(b)(1)(iii) and scientific studies conducted after the 2016 CWA section 304(a) recommended cadmium criteria were published. As noted in an email from DEQ to EPA Region 6: "In the view of DEQ, the scientific studies captured in Appendix C of the EPA's 2016 § 304(a) [cadmium] aquatic life criteria document are of sufficient quality to derive aquatic life criteria. Based on those studies and following the EPA's 1985 Guidelines, the freshwater chronic [cadmium] criterion adopted by the Commission is protective of 95% of genera at very low effect levels. DEQ's review of twelve (12) individual chronic freshwater [cadmium] toxicity tests from twelve (12) separate publications published after 2016 confirm the protectiveness of the adopted criteria."[8] Therefore, while the EPA's 2016 chronic freshwater aquatic life criterion for cadmium is no longer the EPA's current § 304(a) recommendation, the DEQ concluded that its revised freshwater chronic cadmium criterion is based on a sound scientific rationale and protective of applicable designated uses in Arkansas. The EPA agrees.

By virtue of the completion of this review by the DEQ, the adoption of both the acute and chronic aquatic life criteria for cadmium is approved pursuant to CWA § 303(c).

- Acute and chronic aquatic life criteria for cyanide, mercury and selenium have been moved from the table entitled "Dissolved Metals" to a separate table entitled "Total Metals". All criteria and footnote notations remain unchanged.

[8] Email from Mary Barnett, Ecologist Supervisor, Arkansas Department of Energy & Environment, Division of Environmental Quality, to Mike Schaub, Physical Scientist, EPA Region 6 on September 4, 2025.

These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- Human health criteria for five toxic pollutants (benzene, ethylbenzene, phenol, toluene, xylene) have been added to the table entitled "All Waterbodies – Human Health Criteria". Footnote 11 has been added to reflect the lifetime risk factor (10^{-6}) and cancer slope factor (0.015) for benzene. Footnote 12 has been revised to remove reference to the change in units for beryllium. New footnotes (13 and 14) have been added to indicate that the xylene criterion reflects total isomers and to clarify the units for xylene. All criteria in this table are also now listed in µg/L.

  The criteria adopted for four of the five toxic pollutants above are consistent with the EPA's 2015 § 304(a) human health criteria recommendations (benzene, ethylbenzene, phenol, and toluene).

  The EPA does not have § 304(a) human health criteria recommendations for xylene. The EPA compiled and published available information on the toxicology of xylenes in 2003, including a Reference Dose (RfD) for oral exposure of 2 x 10^{-1} mg/kg-day, but has not recently evaluated this information, nor any new information, on the bioconcentration or bioaccumulation of xylene, in the context of deriving ambient water quality criteria for human health.[9] The criterion that DEQ adopted for xylene is 10,000 µg/L, which is the maximum contaminant level goal (MCLG) as found in the National Primary Drinking Water Regulations under the Safe Drinking Water Act (SDWA), 42 U.S.C. 300f et seq. The MCLG is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, allowing an adequate margin of safety. Therefore, there is a sound scientific rationale to conclude that this criterion is protective of Arkansas's domestic water supply use. Because the xylene criterion that DEQ adopted also applies to protect humans from exposure to xylene when consuming aquatic organisms, the EPA evaluated whether the MCLG would protect that use. The EPA found that bioconcentration factors for xylenes in the literature range from 6 to over 250, while the relative source contribution could reasonably range from 0.2 to 0.5, given likely exposure to xylene through indoor and outdoor air, as well as contaminated groundwaters and soils.[10] Considering these ranges of inputs, along with the 2003 RfD and the other inputs that DEQ used to derive human health criteria in this action, the EPA used its 2000

[9] USEPA. 2003. Toxicological Review of Xylenes.
[10] Nunes P, Benville PJ. 1979. Uptake and depuration of petroleum hydrocarbons in the manila clam, tapes semidecussata reeve. Bull Environ Contam Toxicol 21:719-726; Herman DC, Mayfield CI, Inniss WE. 1991. The relationship between toxicity and bioconcentration of volatile aromatic-hydrocarbons by the alga Selenastrum-cupricornutwn. Chemosphere 22:665-676; California Environmental Protection Agency. 1997. Public Health Goal for XYLENE in Drinking Water.

Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health[11] to derive an organism-only criterion value ranging from 600-60,000 µg/L. Therefore, there is a sound scientific rationale to conclude that the DEQ's 10,000 µg/L xylene criterion is protective of humans that consume aquatic organisms from surface waters in Arkansas where this criterion applies.

The adoption of these criteria, the revision of footnote 12, the newly added footnotes 13 and 14, and the revision of all criteria units in this table to µg/L are approved pursuant to CWA § 303(c). Please see Section III with respect to the EPA's determination on footnote 11 in this table.

- A new "note" referencing the location of site-specific toxics criteria (Appendix A) has been added to the end of this section.

  This revision is non-substantive and is approved pursuant to CWA § 303(c).

- In subsection 508(e), a reference to the EPA document "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" has been removed and a reference to the EPA document number for the Water Quality Standards Handbook (EPA-823-B-94-005, August 1994) has been added. Likewise, a reference to the EPA document number (EPA-821-R-02-012) for the document "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms" has been revised.

  These revisions are non-substantive and are approved pursuant to CWA § 303(c). Please note that the publication date for the EPA document "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms", 5th Edition, is October 2002 and not December 2002. We recommend that DEQ correct this reference in a future rulemaking.

- ***8 CAR § 21-509. Nutrients***

  - Only minor non-substantive edits were made to subsection 509(a) in this revision, it now reads:

    "However, when excess nutrients result in an impairment, based upon division assessment methodology or by any Arkansas established numeric water quality criteria, the waterbody will be determined to be impaired by nutrients."

[11] USEPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health.

The DEQ updated its assessment methodology to determine nutrient impairments in 2025[12]. EPA Region 6 communicated its acceptance of the DEQ's nutrient assessment methodology on March 27, 2025.[13] The DEQ has made use of it in several Section 303(d) list decisions as outlined in the EPA's record of decision supporting its 2022 303(d) list action, which included the EPA's approval of the state's listing decisions for several waters in the state previously determined to be impaired by nutrients. Since the "division assessment methodology" referenced in subsection 509(a) is now complete, accepted by the EPA, and in use by the state, the above sentence is approved pursuant to CWA § 303(c). The entirety of subsection 509(a) is now effective for CWA purposes.

- ***8 CAR § 21-511. Mineral quality***

    - Subsection 511(a)(2) was added to read:

      "Site specific mineral quality criteria are found by ecoregion in Appendix A."

      The subsequent table of numeric minerals criteria were moved to site-specific criteria tables by ecoregion in Appendix A. This change in the location of these criteria in the WQS is non-substantive and is approved pursuant to CWA § 303(c).

      The EPA acknowledges that previous references in this subsection to the acronym "ER", meaning "ecoregion value", that were listed for chlorides, sulfates, and/or TDS, were not likewise transferred to the site-specific criteria variations tables in Appendix A. These "ecoregion values" are in reference to ecoregion reference stream values listed in 8 CAR § 21-511(b). This revision is acceptable in that it may not necessarily be appropriate to list these values in Appendix A where only site-specific criteria are identified. It also does not preclude the continued applicability of ecoregion values for specific minerals in those waters with other site-specific minerals criteria. It is the EPA's interpretation that these ecoregion values apply by default to all streams unless otherwise replaced by site specific criteria.

    - Subsection 511(b) text has been modified to include minor wording changes as well as changes in regulatory citations from Rules 2.306 and 2.308 to 8 CAR §§ 21-306 and 21-308.

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[12] Arkansas Division of Environmental Quality. 2022. 2022 Assessment Methodology for the Preparation of: The 2022 Integrated Water Quality Monitoring and Assessment Report Pursuant to Clean Water Act Sections 303(d) and 305(b). 70pp.

[13] USEPA. 2025. Review of Arkansas's 2022 Section 303(d) Waterbody List. Submitted as enclosure to letter from Troy Hill, Director, Water Division, US EPA Region 6 to Stacie Wassell, Office of Water Quality, Division of Environmental Quality. March 27, 2025.

These changes are non-substantive and are approved pursuant to CWA § 303(c).

- The table entitled "Ecoregion Reference Stream Values (mg/L)" in subsection 511(b) was amended to change the names of ecoregions to be consistent with those listed in 8 CAR § 21-302(6)(iii).

  These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- Subsection 511(c) was revised to spell out the numeric criteria for chlorides, sulfates and total dissolved solids, as well as to update regulatory citations from Rules 2.306 and 2.308 to 8 CAR §§ 21-306 and 21-308.

  These revisions are non-substantive and are approved pursuant to CWA § 303(c).

- ***8 CAR § 21-512. Ammonia***

  - Subsection 512(a)(1) includes updated temperature and pH dependent ammonia values of the CMC (acute criterion magnitude) for both *Oncorhynchus* Species Present and Absent. These two tables replace the previous pH-dependent ammonia criteria table.

    These new criteria are consistent with the EPA's 2013 Section 304(a) freshwater ammonia aquatic life criteria recommendations and are approved pursuant to CWA § 303(c).

  - Subsection 512(a)(2) includes updated temperature and pH dependent ammonia values of the CCC (chronic criterion magnitude). This table replaces the previous temperature and pH-dependent ammonia values of the CCC for fish early life stages present and absent.

    These new criteria are consistent with the EPA's 2013 Section 304(a) freshwater ammonia aquatic life criteria recommendations and are approved pursuant to CWA § 303(c). Please note the EPA's recommendation that these chronic criteria be based on a thirty-day *rolling average* concentration not to be exceeded more than once every three years on the average.

Appendix A: Designated Uses, Specific Standards, and Maps of Waters of the State by Ecoregions

A number of non-substantive revisions have been generally incorporated into Appendix A, including:

- Page numbering;
- Footnote citations (numbers instead of asterisks);
- Minor grammatical/wording/writing mechanics changes;
- New references to 8 CAR § 21 instead of Rule 2;
- Revisions to ecoregion names, maps, and "plates", as well as associated revised waterbody plate references and map inset numbers for waters listed in the site-specific designated use and criteria variations tables;
- Addition of two new columns to the site-specific designated use and criteria variation tables to indicate the source of the approved variation and year of approval;
- Removal of the phrase "Use Attainability Analysis" and replacement with the phrase "Chemical and Biological Data" in all site-specific criteria variation tables;
- Removal of references to Rule 2.511 for minerals criteria;
- Revision of dissolved oxygen "Primary" season to read "Non-Critical" season;
- Removal of reference to Rule 2.505 for lake dissolved oxygen criteria and replacement with a criterion value of "5", reflecting the lake dissolved oxygen criterion listed in Rule 2.505, now 8 CAR § 21-505;
- Transfer of all site-specific minerals criteria from 8 CAR § 21-505 to site-specific criteria variations tables by ecoregion.

These revisions do not affect the meaning of the provisions in Appendix A and will not be addressed further in this document. All such revisions are approved.

Additional species names were added to the list of aquatic species occurring in specifically identified Ecologically Sensitive Waterbodies (ESWs) in five of the six ecoregions in the state (excluding the Arkansas Valley, which does not have any waters with this designated use). Some of these added species are endangered, threatened, or are not otherwise listed under the Endangered Species Act. However, they provide additional support to the unique ecological diversity and value of these waters and their continued designation as ESWs. The addition of these species names does not alter the protectiveness of the ESW use in these waters and is therefore non-substantive and approved.

Substantive revisions are identified and addressed below regarding their importance to the meaning of a provision or one of the EPA's prior or current determinations.

- ***Ozark Highlands Ecoregion***

    - The DEQ is proposing to remove the Trout Waters – Aquatic Life Use designation for Bull Shoals Reservoir (lower portion).

      As documented by the Arkansas Division of Environmental Quality[14], Bull Shoals Reservoir, Greers Ferry Reservoir and Lake Ouachita were stocked for a limited time with both lake and rainbow trout in the 1980s. Neither species is native to Arkansas. Rainbow trout were stocked seasonally in these three lakes in the winter as part of the Arkansas Game and Fish Commission's (AGFC) community fishing program. Both rainbow trout and lake trout are dependent on artificially cooler water temperatures created by a manmade dam. AGFC no longer stocks lake or rainbow trout in these lakes. AGFC's most recent creel surveys on these lakes (2019-2020) did not reveal any lake or rainbow trout.

      The critical season five and ten-year average water temperatures measured just above the dams in Bull Shoals Reservoir, Greers Ferry Reservoir, and Lake Ouachita (and in almost all measurements) exceeded the current 20°C temperature criterion specific to trout waters (Table 1 & Table 2). The normal critical season temperature ranges in these lakes exceeded the upper thermal tolerance values (maximum weekly average temperature (MWAT) and daily maximum temperature (DM)) for rainbow trout of 19°C and 24°C, respectively (Table 1 & Table 2).

Table 1. Critical Season Temperature Data (2011-2019) Summary

Lake Name	Sampling Station	5 year Average Temp °C	10 year Average Temp °C	Maximum Weekly Average Temperature	Daily Maximum Temperature	Number of Samples	# Samples over 19°C	# Samples over 20°C	# Samples over 24°C
Bull Shoals	LWHI012A	26.81	26.25	30.8	30.8	19	19	19	16
Greers Ferry	LWHI010A	29.39	28.63	32.6	32.6	12	12	12	11
Lake Ouachita	LOUA020A	30.14	27.94	32.7	32.7	12	12	12	9

Table 2. Long Term Critical Season Temperature Data Summary For All Historic Data.

Lake	Date Range	Average Temp °C	Maximum Temperature	Number of Samples	# Samples over 19°C	# Samples over 20°C	# Samples over 24°C
Bull Shoals	1974-2016	26.73	32.8	298	286	281	238
Greers Ferry	1974-2022	27.00	32.6	397	383	372	311
Lake Ouachita	1969-2017	22.46	32.7	70	52	45	31

The EPA's regulations at 40 CFR 131.10(h)(1) prohibit the removal of existing uses, defined at 40 CFR 131.3 as "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included

[14] Arkansas Division of Environmental Quality. 2025. Removal of Trout Use from Three Lakes. Attachment C to DEQ's 2025 triennial revisions submission to EPA.

in the water quality standards." However, the EPA has explained that the intent of these regulations is to further the objective of the CWA to restore and maintain the integrity of the Nation's waters, not to prevent actions that make the waterbody more like its minimally impacted condition.[15] In this case, removing the Trout Water use will more accurately reflect the minimally impacted conditions of these waters. Additionally, the lack of observed trout individuals or populations and the above temperature observations support the removal of the Trout Water Use from Bull Shoals Reservoir, Greers Ferry Reservoir, and Lake Ouachita. Lake specific temperature (32°C), dissolved oxygen (5mg/L), turbidity (25/45NTU) and trout-absent acute ammonia criteria will now apply to these waters. These revisions are approved pursuant to CWA § 303(c).

- ***Boston Mountains Ecoregion***

    - The DEQ is proposing to remove the Trout Waters – Aquatic Life Use designation for Greers Ferry Reservoir below Narrows. See the discussion above regarding the removal of the Trout Waters use for Bull Shoals Reservoir, Greers Ferry Reservoir and Lake Ouachita. These revisions are approved pursuant to CWA § 303(c).

- ***Ouachita Mountain Ecoregion***

    - The DEQ has proposed to remove the Trout Waters – Aquatic Life Use designation for Lake Ouachita (lower portion). See the discussion above regarding removal of the Trout Waters use for Bull Shoals Reservoir, Greers Ferry Reservoir and Lake Ouachita. These revisions are approved pursuant to CWA § 303(c).

    - The DEQ has renamed "Ouachita River" as "Upper Lake Hamilton" for that stretch of water that supports trout from Blakely Mt. Dam to the Hwy. 270 bridge.

      This stretch of water below the Blakely Mountain Dam to the Hwy. 270 bridge appears to have lake-like characteristics in the upper reach of Lake Hamilton. This revision is approved pursuant to CWA § 303(c).

    - The DEQ has proposed site-specific criteria variations for pH ranging from 5.5-8.5 for five waters in this ecoregion: Barren Creek (AR_11140108_907), Irons Fork Creek (AR_08040101_838), Short Creek (AR_11140109_719), Caney Creek (AR_11140109_921) and Dry Fork Creek

[15] USEPA. 2015. Chapter 3 Issue Category: Designated Uses. Response to Public Comments Water Quality Standards Regulatory Rulemaking.

(AR_11110206_914). These criteria revise the formerly applicable criteria of 6.0 – 9.0.

The EPA reviewed the document *Justifications for Proposed Site Specific pH Criteria* as submitted by DEQ in Attachment D of its *Justifications of Proposed Revisions - 8 CAR § 21 (Rule 2).* Based on data provided by the DEQ, pH in these waters is consistently moderately acidic, with no pH data occurring near the upper limit of 8.5. The DEQ's reasoning for establishment of the 5.5 lower pH limit is based on existing water quality data over time, land use/cover predictive of minimal anthropogenic impacts, the underlying geology, the lack of National Pollution Discharge Elimination System (NPDES) permitted point sources, and biological data demonstrating support of the aquatic life use.

DEQ grab sample data show there are excursions below the proposed lower limit pH criterion of 5.5 in 4 of the 5 streams, with some approaching or below a pH of 5.0. None of the Diel data for any streams showed excursions below the proposed lower limit pH of 5.5.

The EPA provides information about aquatic pH and the effects of low and high pH on aquatic systems in online documentation of its Causal Analysis/Diagnosis Decision Information System (CADDIS).[16] Low pH has both lethal and sublethal effects on organisms. For many stream species, prolonged periods of pH <5 are likely to be lethal, resulting in significant changes in species composition and diversity. At pHs between about 5 and 6.5, sublethal effects on many stream species can result in reduced fecundity, growth and population size. The presence of stream species that are either especially sensitive to or especially tolerant of low pH may suggest whether to consider pH to be a stressor. Macroinvertebrate diversity, particularly for the commonly monitored EPT (Ephemeroptera, Plecoptera and Trichoptera) taxa, generally declines with declining pH. Of the EPT taxa, Ephemeroptera (mayflies) are generally most sensitive and Plecoptera (stoneflies) are generally most tolerant. Invertebrates that require calcium carbonate for shell or cuticle development (e.g., clams, mussels, snails and amphipods) also are intolerant of low pH (<5) because acidic water dissolves calcium carbonate. In general, minnows (small members of the family *Cyprinidae*) are the first to disappear from acidifying streams. Eggs of several fish species (e.g., striped bass, lake trout, fathead minnow) will not develop

[16] EPA (2025) Causal Analysis/Diagnosis Decision Information System (CADDIS), Sources, Stressors and Responses: pH. United State Environmental Protection Agency (U.S.EPA). Office of Research and Development (ORD), Center for Public Health and Environmental Assessment (CPHEA), Washington, DC. Accessed at https://www.epa.gov/caddis/ph.

properly at pH less than approximately 5.5.[17,18] For most North American species, juvenile and adult fish are generally more tolerant of moderately low pH (5-6.5).[19]

The DEQ provided macroinvertebrate (MI) data for each of the target streams and for many other similar streams in the same watersheds, with a specific focus on the percentage of sensitive MI orders Ephemeroptera, Plecoptera, and Trichoptera present, as compared to total taxa (% EPT). These data indicate that there may be some level of effect of low pH on sensitive ephemeropterans in Dry Fork Creek, but much less so in the other target streams where ephemeropterans significantly outnumbered low pH-tolerant plecopterans. % EPT ranged from 36% to 72 % across the five target streams, with an average %EPT of 50%. This suggests that less tolerant MI remain a significant proportion of overall stream MI species occurrence despite pH<6.

The DEQ provided fish metric data for four of the five target streams. Fish biocriteria assessments in four sites indicated fish communities that are generally to mostly similar to typical fish communities naturally observed and expected in the Ouachita Mountains ecoregion, which indicates good water quality. Specifically, a high proportion of % native cyprinids (69.72 %) in Irons Fork Creek, (40.63 %) in Barren Creek, (70.79 %) in Short Creek, and (40.95 %) in Caney Creek compared to other fish demonstrates the good quality of the water and signals the capacity of these streams to support aquatic life. As noted above, cyprinid species are the first to disappear from acidifying streams, so the high proportion of cyprinids in these moderately acidic streams indicates that the existing water quality is protective of the aquatic life use.

Given the lack of trend in pH over time, coupled with no NPDES discharges, limited urbanization (~1-6 %) within the watersheds with no significant changes from 2001-2019, land use which is mainly forested (>60 % for all AUs), the presence of pyritic soils in the ecoregion resulting in the natural acidification of fresh waters[20], and the presence of robust aquatic communities, it can be assumed the observed pH range over time represents current and historical values and can be ascribed to natural sources. Therefore, these site-specific pH criteria are approved pursuant to CWA § 303(c).

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[17] Howells GG, Brown DJA, Sadler K (1983) Effects of acidity, calcium and aluminum on fish survival and productivity: a review. Journal of the Science of Food and Agriculture 34(6):559-570.
[18] Baker JP, Bernard DP, Christensen SW, Sale MJ (1990) Biological effects of changes in surface water acid-base chemistry. National Acid Precipitation Assessment Program, Washington DC. NAPAP Report 13.
[19] Ibid.
[20] Rimstidt, D.D., and D.J. Vaughan. 2003. Pyrite oxidation: A state-of-the-art assessment of the reaction mechanism. Geochim. Cosmochim. Acta 67(5): 873–880.

- The DEQ has proposed a site-specific critical season criterion for dissolved oxygen (DO) of 5 mg/L for three waters in this ecoregion: Saline River (Red River Basin) (AR_11140109_014), Alum Fork Saline River (AR_08040203_014), and South Fork Ouachita River (AR_08040101_043). This new DO criterion amends the previous critical season criterion of 6 mg/L in these waters.

  The EPA reviewed the document *Justifications for Proposed Site Specific Dissolved Oxygen Criteria* as submitted by DEQ in Attachment E of its *Justifications of Proposed Revisions - 8 CAR § 21 (Rule 2)*. The DEQ's reasoning for establishment of a lower critical season DO criterion is based on existing water quality data over time, land use/cover predictive of minimal anthropogenic impacts, the lack of NPDES permitted point sources, and biological data demonstrating support of the aquatic life use.

  As described in the above document, only data for the critical seasons (when water temperature is greater than 22 degrees Celsius) within the different monitoring periods were utilized. Critical season data were utilized in order to better assess the potential for trends in DO and also capture how often DO in these assessment units exceed these proposed seasonal criteria. The DEQ grab sample data show there are excursions below the proposed DO criterion in 2 of the 3 streams but these excursions are much more limited as when compared to 6mg/L. Most of these excursions were highly periodic, and only marginally below 5mg/L, with the exception of two DO values in the Saline River of ~4mg/L. No significant trends were noted in the data, although the data were quite limited for two of the water bodies.

  The DEQ considered land use data specific to Saline River, Alum Fork Saline River, and South Fork Ouachita River at the 8-digit Hydrologic Unit Code level (HUC8). The HUC8 assessments indicate that all of these waters have a relatively low percentage of urban landscapes, with the highest in Saline River, remaining below 6%, with forest and grass/shrubs comprising the bulk of the land use (>80%) within the respective HUCs. There have been no significant changes in land use coverages since 2001. The low urbanization levels in these HUCs and high levels of forestation limit the potential habitat loss and support overall biodiversity.

  The DEQ provided MI data for each of the target streams and for many other similar streams in the same watersheds, with a specific focus on % EPT and Hilsenhoff Biotic Index (HBI). Benthic macroinvertebrate sampling and habitat assessments for the non-Extraordinary Resource Water (ERW) sites indicated sensitive orders Ephemeroptera, Plecoptera, and Trichoptera were the most common orders found with overall total percent 58.6 % ±4% (Table 3). Specifically, a high proportion of EPT in South Fork Ouachita River

(77.50 %) and in Saline River (89.6 %) compared to other organisms in the streams demonstrates the high quality of the water and signals the capacity of these streams to support aquatic life. Likewise, HBI values in South Fork Ouachita River (4.71) and Saline River (3.4) are also indicative of good to excellent water quality. Similarly, benthic macroinvertebrate sampling and habitat assessments for the ERW sites indicated sensitive orders Ephemeroptera, Plecoptera, and Trichoptera were the most common orders found with overall total percent 64.8 ±5.1 % and 50.4 ±3.8 % in 2016 and 2017, respectively (Tables 4 and 5). A high proportion of EPT 39.9 % and 36. 3% was noted in 2016 and 2017, respectively in Alum Fork Saline River (OUA0216) compared to other organisms in the streams. This also signals the capacity of this stream to support aquatic life. The HBI for Alum Fork Saline River in both years, 3.97 and 3.29, respectively, are also indicative of very good to excellent water quality.

The DEQ provided fish metric data for the three target rivers. Fish biocriteria assessments in the three sites indicated fish communities that are generally similar to typical fish communities naturally observed and expected in the Ouachita Mountains ecoregion. Specifically, a high proportion of % native cyprinids and percids in Alum Fork Saline River (61%), Saline River (82%), and South Fork Ouachita River (77%) compared to other organisms in the streams demonstrates the good quality of the water and signals the capacity of these streams to support aquatic life.

Research has demonstrated that freshwater mussels in aquatic habitats where DO typically declines in summer from alga blooms or organic decomposition generally maintain their oxygen consumption (i.e. act as regulator) even under declining DO levels during such periods.[21,22,23] As such, Chen et al. (2001) demonstrated in their study that DO concentrations greater than or equal to 4.0 mg/L (≥4.0 mg/L) will be adequate for mussels species in moderately flowing waters that are subject to DO decline in the growing season; below this value the animals will not be able to maintain normal oxygen consumption and may undergo irrecoverable degree of stress should the condition persist for days.[24]

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[21] McMahon, R. H. 1991. Mollusca: Bivalvia. In Thorp, J. H. & A. P. Corvich (eds), Ecology and Classification of North American Freshwater Invertebrates. Academic Press, New York, 315–399.
[22] Bayne, B. L. 1971. Oxygen consumption by three species of lamellibranch mollusc in declining ambient oxygen tension. Comp. Biochem. Physiol. 40A: 955–970.
[23] Chen L, A.G Heath, and R.J Neves. 2001. Comparison of oxygen consumption in freshwater mussel (Unionidae) from different habitats during declining dissolved oxygen concentration. Hydrobiologia 450: 209-214.

[24] Chen L, A.G Heath, and R.J Neves. 2001. Comparison of oxygen consumption in freshwater mussel (Unionidae) from different habitats during declining dissolved oxygen concentration. Hydrobiologia 450: 209-214.

Generally, since fish tend to be more sensitive to low DO than many aquatic invertebrates[25,26],targeting DO that will be optimum for fish growth and propagation is reasonable for ecosystem health. Likewise, given that hypoxia tolerance seldom varies across fish taxa[27], a recent study has demonstrated a sub-lethal hypoxia DO threshold concentration of 4.5 mg/L for fish propagation; below this value, negative effects on fish growth and consumption is eminent.[28] Therefore, the fish biocriteria assessment data from DEQ indicate that the existing water quality supports the aquatic life use in these three streams.

Given the lack of observed trend in DO conditions over time, coupled with no NPDES discharges, limited urbanization (~4-6 %) within the watersheds with no significant changes over the years, land use which is mainly forested or shrub/grass (>80 % for all AUs), and the presence of robust aquatic communities, it can be assumed the observed DO range over time represents current and historical values and can be ascribed to natural sources. Therefore, this revised site-specific DO criterion (5 mg/L) is approved pursuant to CWA § 303(c).

- ***South Central Plains Ecoregion***

  - The DEQ has removed the exemption from fishable/swimmable and domestic water supply uses in the site-specific designated use variations table for two portions of Coffee Creek: (1) from the headwater section below the Georgia-Pacific Crossett Settling Basin, where the creek was separated from the waste treatment system in 1981, to the point where the effluent channel below Mill Pond enters Coffee Creek upstream of Mossy Lake; and (2) the lower segment of Coffee Creek below Mossy Lake to its confluence with the Ouachita River.

    Given the watershed size for both portions of Coffee Creek are >10mi^2, perennial South Central Plains aquatic life and primary contact uses apply. Therefore, the full suite of uses and criteria applied to other perennial streams in the South Central Plains ecoregion will be applied to the above-identified portions of Coffee Creek. The removal of Coffee Creek from the

[25] Vaquer-Sunyer, R. and C. M. Duarte. 2008. Thresholds of hypoxia for marine biodiversity. - Proc. Natl. Acad. Sci. U. S. A. 105: 15452–15457.
[26] Ekau, W., H. Auel, H.O. Portner, and D. Gilbert. 2010. Impacts of hypoxia on the structure and processes in pelagic communities (zooplankton, macro-invertebrates and fish). Biogeosciences 7: 1669–1699.
[27] Smale and Rabeni. 1995. Hypoxia and hyperthermia tolerances of headwater stream fishes. Transactions of the American Fisheries Society 124:698-710.
[28] Hrycik, A. R., L..Z., Almeida, and T. O. Höök, 2016. Sub-lethal effects on fish provide insight into a biologically-relevant threshold of hypoxia. Oikos 126: 307–317, 2017 doi: 10.1111/oik.03678.

site-specific designated use variations table is approved pursuant to CWA § 303(c).

- The DEQ removed the site-specific designated use variations for Unnamed Tributary to Smackover Creek and Unnamed Tributary to Flat Creek that previously excluded application of CWA § 101(a)(2) ("fishable/swimmable") uses in these waters.

  Given the watershed size for each of these tributaries is $<10 mi^2$, seasonal South Central Plains Ecoregion aquatic life and secondary contact uses apply.

  The removal of these tributaries from the site-specific designated use variations table is approved pursuant to CWA § 303(c).

- The DEQ removed the "Spring Water Streams" column of specific criteria for temperature and turbidity. These criteria match the criteria listed for "Typical Streams" and were combined in previous provisions for temperature and turbidity.

  This revision is approved pursuant to CWA § 303(c).

- The following revisions to water body names were made in the site-specific criteria variations table (new portions are underlined, deleted portions are struck):

  - Saline River (Red River Basin)
  - ~~Poston~~ Posten Bayou
  - ~~Big Cornie Creek~~ Cornie Bayou
  - Little ~~Cornie Creek~~ Corney Bayou
  - Bayou de Loutre from ~~Chemtura~~ AR0001171 outfall 001 to Loutre Creek
  - Saline River (Ouachita River Basin)

  These revisions provide additional information on waterbody locations, facility name, or correct waterbody names. These revisions are approved pursuant to CWA § 303(c).

- The DEQ has removed exemptions from 8 CAR § 21-406 and Subpart 5 in the site-specific criteria variations table for two portions of Coffee Creek: (1) from the headwater section below the Georgia-Pacific Crossett Settling Basin, where the creek was separated from the waste treatment system in 1981, to the point where the effluent channel below Mill Pond enters Coffee

Creek upstream of Mossy Lake; and (2) the lower segment of Coffee Creek below Mossy Lake to its confluence with the Ouachita River.

Given the watershed size for both portions of Coffee Creek are >10mi^2, perennial South Central Plains aquatic life and primary contact uses apply. Therefore, the full suite of uses and criteria (including those in 8 CAR § 21-406 and Subpart 5) applied to other perennial streams in the South Central Plains ecoregion will be applied to the above-identified portions of Coffee Creek. The removal of Coffee Creek from the site-specific criteria variations table is approved pursuant to CWA § 303(c).

- The DEQ has removed the waterbody "Unnamed tributary of Lake June below Entergy Couch Plant to confluence with Lake June" and the associated temperature criterion (95°F) from the site-specific criteria variations table. The Entergy Couch Plant was closed in 2017 so there is no longer a high temperature water discharge to this tributary. The applicable temperature criterion to this tributary is now 30°C (86°F).

  This revision is approved pursuant to CWA § 303(c).

- The DEQ removed the site-specific criteria variations for Unnamed Tributary to Smackover Creek and Unnamed Tributary to Flat Creek that included a year-round DO criterion of 2mg/L.

  Given the watershed size for each of these tributaries is <10mi^2, a seasonal South Central Plains Ecoregion aquatic life use applies. A DO criterion of 5mg/L will be automatically applied in the non-critical season and a 2mg/L DO criterion will be applicable only during the critical season.

  The removal of these tributaries from the site-specific criteria variations table is approved pursuant to CWA § 303(c).

Appendix C: Scientific Names of Aquatic Biota

- All added or revised common names, species, and family names are approved pursuant to CWA § 303(c).

Appendix D: List Of Current Extraordinary Resource Waters, Ecologically Sensitive Waterbodies, And Natural And Scenic Waterways

- All revised stream and ecoregion names, and plate identifiers are non-substantive and approved pursuant to CWA § 303(c).

III. Provisions the EPA is Neither Approving or Disapproving ("No Action")

Subpart 1: Authority, general principles, and coverage

- ***8 CAR § 21-106 Definitions***

    - "Effluent":

      The EPA continues to have concerns with DEQ's revised definition of effluent from the state's 2020 triennial revisions and previously took no action on this definition under CWA § 303(c), meaning that it is not effective for CWA purposes. The EPA encourages DEQ to explain the intent of this definition in a future WQS rulemaking.

    - "Storm flows":

      The EPA continues to have concerns with DEQ's revised definition of "storm flows" from the state's 2007 "Phase II" triennial review and previously took no action on this definition under CWA § 303(c), meaning that it is not effective for CWA purposes. It is the EPA's understanding that the DEQ will consider alternatives to this term as part of the agency's next triennial review, based on recent discussions between EPA and DEQ staff and management on the use of the terms "base flows" and "storm flows" in the application of turbidity criteria.

Subpart 3. Waterbody uses

- ***8 CAR § 21-306. Procedures for removal of any designated use except fishable/swimmable, Extraordinary Resource Water, Ecologically Sensitive Waterbody, or Natural and Scenic Waterway, and modification of water quality criteria not related to these uses***

    - Revisions to this provision only included changes in capitalization for various terms. As noted in previous WQS actions, this provision, and revisions thereto, establish State procedures and decisional criteria that do not constitute new or revised WQS and are thus not subject to EPA review under the CWA.

- ***8 CAR § 21-310 and 311.***

    - Both of these provisions were revised to reflect the following (added text is underlined): "Any other submittals required by Administrative Procedures, 8 CAR pt. 11 (previously, Rule 8) for a petition to initiate rulemaking."

In its January 24, 2008, triennial action[29], the EPA explained that Regulations, now 8 CAR § 21-310 and 311, are state procedures and decisional criteria for adding and removing the specific designated uses and are not themselves WQS, therefore, there is no action required under CWA § 303(c) on these revisions.

Subpart 5. Specific standards

- ***8 CAR § 21-503. Turbidity***

    - Based on previous EPA actions on the opening narrative of this section, the two sentences below, as previously found in this provision, remain in effect for CWA purposes:

      "Specifically, in no case shall any such waste discharge or instream activity cause turbidity values to exceed the base flow values listed below. Additionally, the non-point source runoff shall not result in the exceedance of the in-stream storm flow values in more than 20% of the ADEQ ambient monitoring network samples taken in not less than 24 monthly samples."

      The EPA and DEQ have recently initiated discussions regarding the use of the terms "base flow" and "storm flow" in turbidity assessments and how the original turbidity criteria were derived from baseline ecoregion turbidity data. It is the EPA's understanding that the DEQ is reevaluating the use of these terms and original criteria derivation approaches to better support revisions to the base flow and storm flow exceedance frequencies, or to propose alternate assessment approaches in a future rulemaking. Until that re-evaluation, the previously approved provisions remain in effect for CWA purposes, as noted above.

- ***8 CAR § 21-507. Bacteria***

    - Footnote 4 of the table in 8 CAR § 21-507(c) was revised as follows (removed language is struck, added language is underlined):

      "For calculation ~~and assessment~~ of Geometric Mean – ~~calculated on a minimum of five (5) samples spaced evenly and within a thirty (30) day period~~ <u>all samples taken within a primary contact recreation season.</u>"

[29] USEPA Region 6. (2008). *Record of Decision. Regulation 2: Regulation Establishing Water Quality Standards for the State of Arkansas, Revisions Adopted by the Arkansas Pollution Control and Ecology Commission via Minute Order No. 07-36.*

In 2012, the EPA published its updated recreational water quality criteria (RWQC) recommendations.[30] This document included recommended magnitude, frequency and duration components of the water quality criterion for the bacteria indicators *E. coli* and enterococcus. The magnitude of the *E. coli* and enterococcus indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10% of the samples taken. The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval (which may be extended to up to a 90-day interval). There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day (or 90-day) interval.

This provision of the state's WQS has long included numeric criteria for *E. coli* at magnitudes consistent with, and in some cases more stringent than, the magnitude recommendations found in EPA's RWQC for the protection of the primary contact recreation use. However, the DEQ now proposes to modify this provision to include the primary contact recreation season as the averaging period when assessing the GM criterion, as opposed to a 30-day (or up to 90-day) duration.

The DEQ has indicated that the current 30-day duration language "significantly limits DEQ's ability to assess geometric mean bacteria data" and "will allow for the assessment of geometric mean bacteria data on a broader scale across the state." However, EPA considers a duration of up to 90 days to represent an acceptable critical exposure period to protect recreational uses for the following reasons. The epidemiological studies used to develop the 2012 criteria recommendations were conducted over exposure periods of up to 90 days, thus making durations up to 90 days scientifically defensible. In addition, analysis of data from waters that experience short-term variability, or "transient fluctuations", from periodic high concentration releases exhibit very similar criteria attainment assessment outcomes using a 30-day or 90-day assessment period, when both the GM and STV criteria components are evaluated. The STV criterion component appears to be a significant factor in preventing significant levels of fecal indicator bacteria to be "averaged out" over a 90-day assessment period. It is this combination of field study duration and subsequent data analysis that makes up to 90 days an acceptable duration period.

The EPA continues to recommend that the DEQ consider the use of short-term (30-90 day) durations in high use waters of the state where more regular monitoring (≥5 samples per month) may occur. Because the

[30] USEPA. 2012. Recreational Water Quality Criteria. Office of Water. 820-F-12-058. 69pp.

designated use protected by this criterion is primary contact recreation, the EPA believes that a shorter duration (i.e., 30 days, or up to 90 days), used in a static or rolling manner, coupled with more limited excursions above the STV, would allow for the detection of transient fluctuations in water quality in a timelier manner.

Since the EPA has no scientific basis to support the adoption of a criterion duration that exceeds 90 days, it is taking no action on footnote 4 of the table in 8 CAR § 21-507(c). The language previously found in footnote 4, as identified below, remains effective for CWA purposes:

"For calculation and assessment of Geometric Mean – calculated on a minimum of five (5) samples spaced evenly and within a thirty (30)-day period."

The EPA would welcome the opportunity to discuss with the DEQ the option to extend the above 30-day averaging period to 90 days, as well as alternative ways of assessing the currently CWA-effective geometric mean criterion and associated STV across the primary contact use season when sample sizes and frequencies are limited.

- ***8 CAR § 21-508. Toxic substances***

    - Footnote 11 in the table entitled "ALL WATERBODIES - HUMAN HEALTH CRITERIA" indicates that the listed criterion for benzene (0.58µg/L) is based on a cancer slope factor (CSF) of 0.015.

      The correct CSF used to calculate this criterion is 0.055. This was likely an oversight by DEQ when adding this criterion to the above table. The EPA is taking no action on this CSF and requests that it be corrected in a future rulemaking.

- ***8 CAR § 21-509. Nutrients***

    - Various non-substantive edits were made to the text of subsection 509(c). Although the legislative provisions in 509(c) are important in state management of phosphorous pollution, the entirety of 509(c) is implementation language and not a WQS, which does not require EPA action under CWA § 303(c).

- ***8 CAR § 21-511. Mineral quality***

    - The EPA continues to be concerned that the last sentence in 8 CAR § 21-511(b) is not protective of waters with naturally low mineral levels. The EPA

has not approved the following sentence under CWA section 303(c), and therefore, it is not applicable for CWA purposes.

"The values listed in the table below are not intended to be used by the Division of Environmental Quality to evaluate attainment of water quality standards for assessment purposes."

The EPA would welcome a discussion with DEQ regarding the intended use of ecoregion reference stream values for minerals in Arkansas' waters.

- ***8 CAR § 21-512. Ammonia***

    - In the table "Temperature and pH-Dependent Values of the CMC (Acute Criterion Magnitude) – *Oncorhynchus Species* Absent", the ammonia criterion provided at pH = 6.8 and temperature = 0-10 is mistakenly listed as 440 instead of 44.

      The EPA is taking no action on this misprint and requests that it be corrected in a future rulemaking.

Appendix A: Designated Uses, Specific Standards, and Maps of Waters of the State by Ecoregions

- ***Ozark Highlands Ecoregion***

    - The minerals criteria for Strawberry River, Spring River, Eleven Point River, South Fork Spring River, and Myatt River struck from 8 CAR § 21-511 included a criterion for sulfate of 30mg/L. However, in the site-specific criteria variations tables in Appendix A, the sulfate criterion for each of these waters is listed as 20mg/L. No documentation to explain this change has been provided.

      Until such documentation can be provided, or these criteria can be corrected in Appendix A, EPA is taking no action on these revisions to sulfates criteria for the above waters. The previously listed criterion of 30mg/L will remain the CWA-effective sulfate criterion.

- ***Boston Mountains Ecoregion***

    - The minerals criteria for West Fork White River struck from 8 CAR § 21-511 included a criterion for TDS of 150mg/L. However, in the site-specific criteria variations tables in Appendix A, the TDS criterion for this water is listed as 180mg/L. No documentation to explain this change has been provided.

Until such documentation can be provided, or this criterion can be corrected in Appendix A, EPA is taking no action on this revision to the TDS criterion for the above water. The previously listed criterion of 150mg/L will remain the CWA-effective TDS criterion.

- ***Ouachita Mountain Ecoregion***

    - Footnote 36 provided for Secondary Contact Recreation, Domestic, Industrial and Agricultural Water Supply, and Aquatic Life is incorrect and should reference footnote 35. EPA is taking no action on this footnote for these designated uses and recommends that the DEQ correct these in the next WQS revision.

    - In the table Temporary Variations Supported by Environmental Improvement Project, the footnote citation for Cove Creek, Lucinda Creek and Rusher Creek (41) appear to be typos and should be corrected to reflect footnote 40. EPA is taking no action on footnote 41 for these waters and recommends that the DEQ correct these citations in the next WQS revision.

    - The minerals criteria for Mountain Fork struck from 8 CAR § 21-511 included a criterion for TDS of 110mg/L. However, in the site-specific criteria variations tables in Appendix A, the TDS criterion for this water is listed as 100mg/L. No documentation to explain this change has been provided.

      Until such documentation can be provided, or this criterion can be corrected in Appendix A, EPA is taking no action on this revision to the TDS criterion for the above water. The previously listed criterion of 110mg/L will remain the CWA-effective TDS criterion.

- ***South Central Plains Ecoregion***

    - Footnote 43, as noted for Secondary Contact Recreation, Domestic, Industrial and Agricultural Water Supply, and Aquatic Life is incorrect and should reference footnote 41. EPA is taking no action on footnote 43 for these designated uses and recommends that the DEQ correct these in the next WQS revision.

    - In the table Temporary Variations Supported by Environmental Improvement Project, the footnote citation for Scull Creek (46) appears to be a typo and should be corrected to reflect footnote 45. EPA is taking no action on footnote 46 for these waters and recommends that the DEQ correct these citations in the next WQS revision.

- ***Mississippi Alluvial Plain Ecoregion***

    - Footnote 48, as noted for Secondary Contact Recreation, Domestic Industrial and Agricultural Water Supply, and Aquatic Life is incorrect and should reference footnote 46. EPA is taking no action on footnote 48 for these designated uses and recommends that the DEQ correct these citations in the next WQS revision.

    - The minerals criteria for Strawberry River struck from 8 CAR § 21-511 included a criterion for sulfates of 30mg/L. However, in the site-specific criteria variations tables in Appendix A, the sulfates criterion was listed as 20mg/L. No documentation to explain this change has been provided.

      Until such documentation can be provided, or this criterion can be corrected in Appendix A, EPA is taking no action on this revision to the sulfates criterion for the above water. The previously listed criterion of 30mg/L will remain the CWA-effective sulfates criterion.

Appendix E Criteria to be Considered in Determining Whether the Designated Use of Extraordinary Resource Water, Ecologically Sensitive Waterbody, or Natural and Scenic Waterway Should be Maintained

- EPA is taking no action on Appendix E, associated with Rule 2.310. These rules do not establish and are not themselves designated uses, water quality criteria, or an antidegradation policy. Therefore, they do not constitute new or revised WQS.

Appendix F Factors Considered in Adding the Designated Use of Extraordinary Resource Water, Ecologically Sensitive Waterbody, or Natural and Scenic Waterway to a Waterbody or Waterbody Segment

- EPA is taking no action on Appendix F, associated with Rule 2.311. These rules do not establish and are not themselves designated uses, water quality criteria, or an antidegradation policy. Therefore, they do not constitute new or revised WQS.

IV. Provisions the EPA Previously Disapproved

- ***8 CAR § 21-511. Mineral quality***

  Following the EPA's 2008 "Phase II" triennial action disapproving portions of this provision, the language in 8 CAR § 21-511(a)(1) that remains effective for CWA purposes is as follows:

  "Mineral quality shall not be altered by municipal, industrial, other waste discharges or instream activities so as to interfere with designated uses. The following criteria apply to the streams

indicated, and represent concentrations of chloride (Cl^-), sulfate (SO_4^{-2}) and total dissolved solids (TDS) not to be exceeded in more than one (1) in ten (10) samples collected over a period of not less than 30 days or more than 360 days."

The EPA acknowledges that there may be new information available to the DEQ that supports the DEQ's use of an alternative assessment approach found in its assessment methodology. The EPA would welcome further discussions with the DEQ to determine a pathway forward on reconciling the above provision with the state's assessment methodology for minerals.

V. Additional Considerations

Antidegradation Implementation Methods

Antidegradation is an integral part of state and Tribal water quality standards, as it provides important protections that are critical to the fulfillment of the CWA objective to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The federal regulation at 40 CFR 131.12(a) specifically requires states and authorized Tribes to develop methods for implementing their antidegradation policy that are at a minimum, consistent with the state's policy and with 40 CFR § 131.12(b).

The DEQ developed draft antidegradation implementation methods (AIMs) during mid-2020, providing for public involvement as required by federal regulations. The EPA provided comments on the 2020 document and subsequent 2022 and 2025 draft versions of the AIMs document. The EPA recommends that the DEQ fully address the EPA's recommendations and finalize its AIMs to bring the state into compliance with 40 CFR 131.12. The DEQ has the option of submitting its AIMs as an additional revision to Part 21, submitting a revised CPP document (see 40 CFR 130.5(b)(6)) with a clear reference to the AIMs, or including AIMs in a separate guidance document.

Antidegradation is most commonly triggered through activities that could lower water quality and are regulated such as through NPDES permit issuance or renewal. No permit may be issued, without an antidegradation review, to a discharger to high-quality waters with effluent limits greater than actual current loadings if such loadings will cause a lowering of water quality.[31] The antidegradation review will assure that the applicable level of protection is being provided to that water body. The AIM makes it clear how Arkansas intends to implement its antidegradation policy and, specifically, how it currently carries out required Tier II reviews prior to issuing NPDES permits.

Toxic Substances

The EPA's 2015 amendments to 40 CFR § 131.20(a) requires any state that chooses not to adopt any parameters for which the EPA has published new or updated criteria

[31] USEPA. (1989). Application of Antidegradation Policy to the Niagara River. (Memorandum from Director, Office of Water Regulations and Standards to Director, Water Management Division, Region II; August 4.) Washington, DC.

recommendations under CWA § 304(a) to explain its decision when reporting the results of its triennial review to the EPA. The goal of this revised provision is to ensure public transparency about state water quality standards decisions. As of today's action, the DEQ has identified toxic contaminants not currently discharged in Arkansas and those that it is considering for inclusion in future triennial revisions consistent with 40 CFR § 131.20(a).

Endangered Species Act Consultation

The EPA's approval of revised WQS and associated aquatic life criteria is subject to the consultation requirement of Section 7(a)(2) of the Endangered Species Act (ESA).[32] Under Section 7(a)(2) of the ESA, the EPA has the obligation to ensure that its actions on Arkansas's revised water quality standards are not likely to jeopardize the continued existence of threatened and endangered species or result in the destruction or adverse modification of designated critical habitat of such species in Arkansas.

The EPA initiated informal ESA consultation with the US Fish and Wildlife Service (USFWS) via email on August 13, 2025. Prior to consultation, the EPA requested USFWS to provide a technical review of a draft biological evaluation (BE) in which the EPA determined that its proposed approval of Arkansas's revised ammonia and cadmium aquatic life criteria is not likely to adversely affect listed species nor adversely modify critical habitat in affected areas of the state. Following USFWS's technical review and comment, and the EPA's revision of the BE, the EPA requested formal concurrence by the USFWS on its determinations in the BE. In a letter dated August 22, 2025, the USFWS's Arkansas Ecological Service Field Office concurred with the EPA's determinations.[33] This effectively closed informal ESA consultation with USFWS on this matter. The EPA has determined that all other revisions to aquatic life uses or criteria in this triennial revision will have no effect on listed species or critical habitat in the state. These "no effect" determinations are documented in memos to the file located in the administrative record of EPA's action on this triennial revision.

[32] USFWS. (1973). Endangered Species Act, Section 7, 16 U.S.C. §1536.

[33] Letter from Christopher Davidson, For Ira Hight, Field Supervisor, Fish and Wildlife Service, Arkansas Ecological Service Field Office, to Mike Schaub, Environmental Scientist, US EPA Region 6. August 22, 2025.