

Arkansas's 2018 List of Impaired Waterbodies

Executive Summary

Section 305(b) of the Federal Water Pollution Control Act (Clean Water Act) requires an assessment of Arkansas's water quality to be reported to the U.S. Environmental Protection Agency (EPA) every two years. In addition, Section 303(d) of the Clean Water Act requires Arkansas to establish a priority ranking of waters not achieving state water quality standards and requiring the development of a TMDL or other corrective actions. There is a supplemental list of impaired waters separate from the 303(d) List. This supplemental list includes segments of waters that can be addressed through already-established, state-controlled measures. Water-quality assessments are reported biennially, through the 305(b) Integrated Report. In the 2018 assessment cycle, 1,097 Assessment Units (AU) of Arkansas waterbodies were reviewed. A summary of assessments is provided below:

2018 Draft 303(d) List of Impaired Waterbodies (Category 5)	
Total Stream Miles Assessed	15,787
Total Assessment Units	1,097
Total Stream Miles Impaired	3,471.4
Total Impaired Assessment Units	182
New Pollutant Pair Listings (Category 5,)	97
Delisted Pollutant Pair*	50
Total Lake Acres Assessed	285,213
Total Lake Acres Impaired	6,470
Total Lake Assessment Units	197
Total Impaired Lake Assessment Units	12
*Pollutant Pair refers to a combination of an AU and a parameter	

2018 Draft Category 4 Waterbodies	
Total Stream Miles in Category 4	2,044.5
Total Assessment Units in Category 4	122
Total Lake Acres in Category 4	15,349
Total Lake Assessment Units in Category 4	42

The Arkansas Pollution Control & Ecology Commission's (APC&EC) Regulation No. 2 (Reg. 2) provides the foundation for the Integrated Report by establishing water-quality standards for surface waters of the State of

Arkansas, designated uses associated with those water-quality standards, and established criteria to protect, maintain, and restore designated uses. Water-quality data are assessed for compliance with Reg. 2 to determine impairment and designated use support based on the frequency, duration, and/or magnitude of water-quality standard exceedances as identified in Arkansas Department of Environmental Quality's (ADEQ) Assessment Methodology and Reg. 2.

Review Process & Structure

Stakeholder Workgroup Process

ADEQ initiated a three-phase review of the Assessment Methodology (AM) to encourage public participation and collect valuable input from interested stakeholders. Phase I included a public listening session to gather input on potential revisions to the AM and identify additional topics to consider during the stakeholder workgroup process.

During Phase II, a stakeholder workgroup was established to address possible modifications to the AM through a series of scheduled meetings. The stakeholder workgroup included representatives from state and federal agencies, agricultural and industry groups, and environmental organizations. Six meetings were held from December 2016 through July 2017, and a revised AM was drafted based on input received from the stakeholder workgroup.

Phase III initiated a 30-day public comment period to gather feedback on the final draft AM. ADEQ staff reviewed and considered comments received during the public comment period and modified the draft AM accordingly. The final AM has been made available on ADEQ's website: <https://www.adeq.state.ar.us/water/planning/integrated/assessment/>.

Major Revisions to the Assessment Methodology and Results

To include methodologies for newer data collection techniques and improve specific data analysis procedures, two significant additions were made to the AM.

1. **Continuous Data**: Assessment methodologies were developed for the analysis of continuous data collected for dissolved oxygen, pH, and temperature. The addition of these methodologies allows ADEQ to complete assessments based on data collected from short-term (72 hours) and long-term (permanent) deployment of water-quality probes.
2. **Binomial Distribution**: The addition of the binomial distribution method for analysis of temperature, turbidity, pH, dissolved oxygen, and minerals provides a more robust statistical analysis resulting in higher confidence levels of the final decisions for water quality assessment.

In addition to these revisions, appropriate modifications were made to the AM based on constructive input from the stakeholder workgroup. ADEQ staff carefully considered all topics and concerns identified during the stakeholder workgroup process. Key issues discussed in the stakeholder workgroup meetings are listed below:

- Appropriate sample depth for chlorophyll-a in Beaver Lake
- Data quality requirements
- Modification of metrics used in Biological Integrity determinations
- Revision of a table providing the criteria and the designated uses they protect
- Clarification on the use of ADEQ assessment software (WQAR)
- Reporting categories in the listing process
- Assessment of nutrient criteria, including the methodology for using screening values

- Revising methodology for *Escherichia coli* (*E.coli*)
- Appropriate depth for measurement of parameters in lakes
- Use of a “weight of evidence” approach in attainment decisions

Listing Categories

Arkansas’s assessments are formatted to reflect EPA’s most current Integrated Report guidance, which suggests placing AUs into one of five categories. AUs supporting all water-quality criteria and designated uses will be placed in Category 1. Category 2 waters are defined as AUs where available data/or information indicate that some, but not all, designated uses are supported. This category is rarely used by states. AUs lacking enough data to make a decision will be placed in Category 3. Those assessed as not supporting all water-quality criteria and designated uses will be placed in Category 4 or Category 5. A description of the categories used in this assessment cycle is included in Table 1.

Continuous Data

Procedures that have been developed allow ADEQ to assess data generated by water quality probes capable of collecting data at regular intervals over an extended period of time, which were not included in the Assessment Methodology for previous assessment cycles. The 2018 AM includes procedures to evaluate and assess short and long-term continuous data.

Twenty-eight, long-term continuous data sets containing millions of data points were made available to ADEQ. After assessing in accordance with the AM, three pollutant pairs (parameter plus assessment unit) were identified as impaired: two for dissolved oxygen and one for pH. Those streams were South Fork Little Red River and Big Creek (near Mt. Judea) for dissolved oxygen; and South Fork Little Red River for pH. In addition, short-term continuous data were evaluated from 118 sites at lakes, rivers, and streams across the state, of which 18 pollutant pairs were identified.

Bacteria

The scope for evaluating *E. coli* data was expanded to allow multiple years of data within the period of record to be analyzed. The modification allows data collected over multiple years to be comprehensively assessed when data are available.

ADEQ received bacteria data collected at 470 sites at lakes, rivers, and streams throughout the state. For 2018 six new AUs were identified as impaired. Corrective actions have been developed for the above six AUs in addition to 40 AUs previously listed as impaired for bacteria. These AUs were placed in Category 4b, as described in greater detail below.

Minerals

Revision of minerals standards, specifically chlorides, sulfates and total dissolved solids (TDS), has been an on-going effort involving Arkansas, EPA, and permittees. In October 2017, ADEQ submitted its Mineral Criteria Development Strategy to EPA. The strategy is designed to evaluate minerals, conductivity, and biological data and will be used to revise minerals criteria. Key objectives include the review of background mineral concentrations, analysis of sensitive species shifts, and analysis of effects from elevated minerals and conductivity on macroinvertebrate community structure. These comprehensive analyses will be used to develop appropriate criteria for minerals and tiered aquatic life uses (TALUs). The incorporation of TALUs in Reg. 2 will expand the aquatic life designated use to specifically protect Outstanding Resource Waters to limited use waterbodies.

Deferred Actions

On July 19, 2017, EPA approved Arkansas’s 2016 303(d) List of Impaired Waterbodies. At the same time, EPA deferred action on 45 potential pollutant pairs not included on Arkansas’s list. EPA agreed to continued review of all existing and readily available water-quality data and to continue discussion with ADEQ regarding these pollutant pairs. For the 2018 assessment cycle, ADEQ proposes to include 27 of the 45 deferred pollutant pairs in Category 1, three in Category 1b, seven in Category 3, and eight in Category 5.

Focused Initiatives

Illinois River Watershed

Seven AUs in Muddy Fork Illinois River, Illinois River, Moore’s Creek, and Little Osage were identified as impaired for pathogens for the 2018 listing cycle. These AUs will be placed in Category 4b because alternative pollution control strategies are in place to bring these waterbodies into attainment. (See 4b Justifications)

Data for the Illinois River Watershed were collected by ADEQ, the Arkansas Water Resources Center, the United States Geological Survey, and the University of Arkansas at Fayetteville.

Buffalo River Watershed

In the Buffalo River Watershed, four AUs have been identified as impaired and placed in Category 4b: three for bacteria, and one for dissolved oxygen. . Of the three impaired for bacteria, two assessment units exceeded the geometric mean criteria for *E.coli*. Data used to make this determination met the all minimum sample distribution and quantity requirements to assess using the geometric mean criteria. The remaining AU was assessed according to individual sample criteria.

Category 4b recognizes other, comparable management solutions are expected to result in the attainment of the water-quality standard. Such an approach exists in this watershed where the Beautiful Buffalo River Action Committee (BBRAC) has been established for the purpose of addressing potential water-quality concerns throughout the Buffalo River Watershed and to protect the vitality of the Buffalo National River as a national, state, and local landmark. Governor Asa Hutchinson directed five agencies to develop an Arkansas-led approach to identify and address potential issues of common concern in the watershed. A key priority of BBRAC was to initiate the development of a Buffalo River Watershed Management Plan. The nine-element watershed management plan was developed for the Buffalo River Watershed, and the final plan was submitted and accepted by EPA in June 2018. Watershed management plans are recognized by EPA as comparable, state-led management approaches expected to result in the attainment of water-quality standards.

Priority Studies

Since 2012, the Planning Branch of the Office of Water Quality has been involved in research to develop nutrient criteria and establish a monitoring network for aquatic biological communities throughout Arkansas. Throughout the past six years, the Planning Branch has collected water quality, periphyton, macroinvertebrate, and fish community data from more than 100 sites in three ecoregions. As a result of these intensive studies, a number of AUs in these ecoregions have been listed as impaired. As ADEQ continues to work in these areas, the Office of Water Quality will develop strategies for addressing these impairments.

Planning Branch Priority Studies

Ecoregion	Year	# Sites
Ozark Mountain	2012-2013	14
Boston Mountain	2014-2015	25

Table 1: Assessment Categories and Descriptions

Attains all water quality criteria and supports all designated uses; categorized by the existence of a TMDL (Total Maximum Daily Load) or not for one or more constituents.	
CATEGORY 1	<p>1a Attaining all water quality criteria and supporting all designated uses. No TMDL exists for any constituents.</p> <p>1b Attaining all water quality criteria and supporting all designated uses; however, a TMDL remains in place for one or more constituents.</p>
Attains some but not all water quality standards; supports some but not all designated uses.	
CATEGORY 2	<p>2 Available data and/or information indicate that some, but not all, of the designated uses are supported.</p>
Insufficient data and/or information are available to make a use support determination.	
CATEGORY 3	<p>3a No data are available.</p> <p>Insufficient data are available.</p> <ul style="list-style-type: none"> • Data do not meet all quality requirements outlined in this assessment methodology. • Waters in which the data are questionable because of Quality Assurance and/or Quality Control (QA/QC) procedures, and/or the Assessment Unit requires confirmation of impairment before a TMDL is scheduled. <p>3b</p> <ul style="list-style-type: none"> • Where limited available data and/or information indicate potential impacts or downward trends in water quality. The following waterbodies in Category 3 will be prioritized (on a case-by-case basis) for additional investigation: waters designated as ERW, ESW, or NSW; domestic water supplies; and waters located in known karst areas.
Water quality standards are not attained for one or more designated uses, but the development of a TMDL is not required because:	
CATEGORY 4	<p>4a A TMDL has been completed for the listed parameter(s).</p> <p>4b Other management solutions are expected to result in the attainment of the water-quality standard.</p>
The waterbody is impaired, or one or more water quality standards are not attained, and a TMDL is required.	
CATEGORY 5	<p>5 Waterbodies in Category 5 will be identified as high, medium or low priority.</p> <ul style="list-style-type: none"> • High - Truly impaired; develop a TMDL or other corrective actions. • Medium - May be de-listed with future revisions to water-quality standards, or future permit restrictions for dischargers are expected to correct impairment. • Low - One or more water-quality standards not met, but designated uses are supported, or insufficient data are available to determine designated use attainment, or ADEQ assessed as unimpaired, but EPA assessed as impaired.