

The input received during Phase I is included below in summary and is organized according to the Assessment Methodology table of contents, such as “**1.0 Assessment Background**.” The entity providing the input is also noted, such as “*Ozark River Stewards*.” The sections of the Assessment Methodology that received no input are not included below. Input regarding topics other than the Assessment Methodology is included at the end of this document.

Specific Input

Foreword

Carol Bitting

To remove the language (subsurface) weakens the 2018 assessment of the states waters. As in the 2014 Assessment Methodology “Among the numerous activities is the management of the State Water Quality Monitoring Networks for both **surface and subsurface waters**. Other activities include routine monitoring and intensive, special investigations of the physical, chemical, and biological characteristics of waterbodies and/or aquifers”. I suggest it remain.

1.0 Assessment Background

Dane Schumacher

I urge the Department to ensure that the draft revised Assessment Methodology (AM) and any and all subsequent reports/recommendations are in accordance with all relevant and applicable parts of 40 CFR 122, 40 CFR 130, and 40 CFR 131.

2.0 Integrated Reporting Categories

Ozark River Stewards

Revise the current hierarchy of Category 5 waters to be considered for a TMDL and improve the definition of “impairment”. The 2016 Assessment Methodology identifies 3 tiers of high, medium and low to category 5 streams that have met the criteria for impairment. The “High” category states “Truly impaired”. What does that mean? All of these streams have met the definition of impairment under the ADEQ criteria. It seems that it is completely at the State’s discretion on whether to consider a stream “truly impaired” although the stream has already met the definition.

The “Medium” category is as unsound in reason as the “High” category. “Waters...may be delisted with future revisions to APC&E Regulation 2...” or “Waters which are impaired by point source discharges and future permit restrictions are expected to correct the problem”. This category is all about knowing the future. Yogi Berra said, “It’s tough to make predictions, especially about the future.” That is the case here and this category should be removed.

The ADEQ designated “Low” category 5 for creating a TMDL contains the following “Waters ADEQ assessed as unimpaired but where assessed as impaired by EPA”. This speaks to the very low environmental criteria and standards of ADEQ and should be removed.

Recommended hierarchy of Category 5 waters for development of TMDLs:

1. Any national river or ORW stream that is not attaining one or more water quality standards.
2. Waters assessed by EPA or ADEQ to be impaired.

JoAnn Burkholder – via APPP

Integrated reporting Categories 4b, 5-medium, and 5-low fail to provide protection to impaired waters and instead allow them to continue to degrade indefinitely.

[Please see Dr. Burkholder’s full comments for specifics]

3.2 Data Quality Considerations

ADEQ

Understanding and clarity of the bulleted list of data quality considerations could be increased by separating the list into two lists, one for “Individual data sets” and another for “aggregate data sets”. A flowchart of these lists may also increase understandability.

3.2.1 Tiered Approach to Qualifying Data

Table I will be revised for clarity.

3.2.2 Biological Integrity Data

Tables II, III, IV, and V will be revised for clarity.

3.2.1 Tiered Approach to Qualifying Data – Table 1

JoAnn Burkholder – via Arkansas Public Policy Panel (APPP)

Quarterly or bimonthly sampling is inadequate to assess attainment of water quality criteria and designated uses.

[Please see Dr. Burkholder’s full comments for specifics]

United States Department of the Interior (USDI) – National Park Service (NPS)

Section 3.2.1 - Table I states that "continuous monitoring devices" and "continuous monitoring (e.g. use of thermographs, sondes, or similar devices)" would be used for assessments; however, when mentioned during the 2016 listing period, ADEQ stated they were unable to assess continuous data for listing purposes. Upon reading the "Physical, Chemical, and Biological Characteristics of Least-Disturbed Reference Streams in Arkansas' Ecoregions," the authors used continuous data for determining certain values reported in Arkansas Pollution Control and Ecology Commission Regulation NO.2 (APC&EC Reg. 2). We believe that continuous data

better represents stream conditions and should be used in the 2018 Assessment Methodology presented in Table I as Tier IV, when available, above the use of grab samples (noted as Tier III).

3.3 Data Representativeness Considerations

ADEQ

Understanding and clarity of Section 3.3 can be increased by rearranging the text and putting it before Section 3.2.1.

Understanding and clarity of Spatial and Temporal distributions for both individual and aggregate data sets may need clarification.

3.4 Instrument Error

ADEQ

ADEQ will evaluate the considerations needed regarding instrument error and may propose revisions to this section.

3.5 Aggregation of Samples within a Monitoring Segment

ADEQ

Understanding and clarity of Section 3.5 can be increased by rearranging the text and putting it before Section 3.2.1.

3.6 Data Quantity Considerations

ADEQ

Understanding and clarity of Section 3.6 may be increased by more clearly stating what the data quantity considerations are for data used for assessment purposes.

3.7 Adequate Data Sets for Attainment Determinations

ADEQ

Understanding and clarity of Section 3.7 may be increased by better explanation and description of aggregate data sets and their requirements.

Monitoring activities will be updated to more accurately describe ADEQ's current monitoring strategies.

JoAnn Burkholder

As few as 10 water quality samples, over as long as 5 years, is inadequate to assess average conditions accurately, or to determine whether a waterbody supports its designated uses. [Please see Dr. Burkholder's full comments for specifics]

3.10 WQAR

ADEQ

Revisions the WQAR section may necessary to reflect any modifications or updates to the WQAR program since the 2016 cycle.

4.1 Antidegradation

Ozark River Stewards

Create an anti-degradation procedure and method for implementing a policy. 40CFR 131.12 of the Clean Water Act requires states to “develop and adopt a statewide anti-degradation policy and identify the methods for implementing such a policy pursuant to subpart.” The state of Arkansas has a minimal anti-degradation policy at Regulation 2.203 that is absent of process or enforcement of this key requirement of the Clean Water Act. The underlying concept of the anti-degradation regulations is that it does not allow loss of existing use nor does it allow water quality to drop below levels needed to “maintain an existing use that was actually attained in the waterbody on or after November 28, 1975.” At present ADEQ does not have any regulations that are in compliance with the CWA’s Anti-Degradation requirement.

Development and implementation of this policy should include the following:

- Processes for identifying the anti-degradation protection level (i.e., the “*tier*”) that applies to a surface water;
- Procedures for determining baseline water quality (BWQ);
- Approaches for assessing water quality degradation;
- Procedures for identifying and assessing less degrading or non-degrading alternatives;
- Procedures for determining the importance of economic or social development to justify significant degradation of high quality surface waters;
- Information on intergovernmental coordination and public participation processes.

USDI - NPS

Finally, as an Outstanding National Resource Water with Extraordinary Resource Waterbody and Natural and Scenic Waterbody designations from ADEQ, the Antidegradation Policy should be used to determine whether the River is impaired or not. If the impairment level was based upon the quality of the water in the "Ten-Years of Water Quality Monitoring, NPS, Buffalo

National River" (Mott, 1997) we would be looking at impairment in a different fashion. The Antidegradation Policy supersedes the numeric and narrative criteria in Regulation 2.

5.0 General Standards

Reg. 2.402 Nuisance Species – [If added, a new section would need to be created before 5.1]

Carol Bitting

Develop a method to assess Reg. 2.402 Nuisance Species states All waters shall be free from substances attributed to man-caused point or nonpoint source discharges in concentrations that produce undesirable aquatic biota or result in the dominance of nuisance species.

Reg. 2.408 Bottom Deposits/Scum – [If added, a new section would need to be created after 5.1]

United States Fish & Wildlife Service (USFWS)

The 2018 AM should establish the procedures required to implement and interpret the existing narrative bottom deposits standard to identify conditions of excessive sedimentation and siltation in streams in amounts that adversely affect aquatic life.

The Service recommends ADEQ review of the Arizona Department of Environmental Quality 2015 Implementation Procedures for the Narrative Bottom Deposits Standard (ADEQ 2015; https://legacy.azdeq.gov/environ/water/standards/download/draft_bottom.pdf) as a guide to develop similar Assessment Methodology for embedded sediments in Arkansas

5.1 Biological Integrity

JoAnn Burkholder

The protocol for assessment of Biological Integrity does not stipulate that temperature extremes should be avoided during data collection, and does not account for inter-annual variation which can be substantial, even extreme.

The Biological Integrity Assessment protocol fails to protect already-impaired surface waters because substantially compromised Partially Supporting communities are wrongly “transformed” into a Fully Supporting designation.

The Biological Integrity assessment protocol is not protective of fish communities because it evaluates decreased taxa richness and loss of sensitive aquatic life as wholly “supporting” designated uses.

[Please see Dr. Burkholder’s full comments for specifics]

Arkansas Environmental Federation (AEF)

To make fisheries use attainment decisions using macroinvertebrates, the ADEQ is following a multi-metric analysis that includes six metrics. Each metric is scored with a 0, 2, 4, or 6 following comparison with a reference site. This ADEQ analysis is modified from the procedures for Rapid Bioassessment of the EPA.

The EPA Rapid Bioassessment Biological Condition Scoring Criteria from which the ADEQ scoring criteria are based appear to result in considerably different endpoints with respect to the Biological Condition Category. The EPA uses different narrative titles for the Biological Condition Categories (i.e., Nonimpaired, Slightly Impaired, Moderately Impaired, and Severely Impaired) compared to the scoring criteria used in Arkansas. The following table presents the EPA categories from its publication entitled Rapid Bioassessment Protocols for Use in Streams and Rivers (EPA/440/4/89/001).

BIOASSESSMENT		
% Comp. to Ref. Score^(a)	Biological Condition Category	Attributes
>83%	Nonimpaired	Comparable to the best situation to be expected within an ecoregion. Balanced trophic structure. Optimum community structure (composition and dominance) for stream size and habitat quality.
54-79%	Slightly impaired	Community structure less than expected. Composition (species richness) lower than expected due to loss of some intolerant forms. Percent contribution of tolerant forms increases.
21-50%	Moderately impaired	Fewer species due to loss of most intolerant forms. Reduction in EPT index.
<17%	Severely impaired.	Few species present. If high densities of organisms, then dominated by one or two taxa.

(a) Percentage values obtained that are intermediate to the above ranges will require subjective judgement as to the correct placement. Use of the habitat assessment and physiochemical data may be necessary to aid in the decision process.

Our understanding of the historical use of the EPA scoring system was that the categories of Slightly Impaired and Nonimpaired translate to fully supporting of the aquatic life (fisheries) use. If a test site and a reference site were 54% similar (or greater) in score then the test site was determined to be Slightly Impaired and Fully Supporting.

The Arkansas assessment method for macroinvertebrates (below) contains attainment status categories based on percent similarity to determine community structure. There are four types of Attainment Status; Comparable to Reference, Supporting, Partially Supporting, and Non-Supporting.

Attainment Status	% Comparable Estimate	Attribute
Comparable to reference	≥90%	Expected to support the community structure present at the reference site
Supporting	75-88%	Should support a diverse community similar to the reference site
Partially Supporting	60-73%	Difference in the biological community may be due to the poor habitat. Comparisons may be difficult
Non-supporting	<58%	Should not be expected to support the community present at the reference site

However, the difference appears that in order to be considered supporting, the percent similarity between the test site and the reference site has to be a minimum of 75%. Another important difference is that the ADEQ process shows that <58% similar is Non-Supporting whereas EPA would find a similarity score of 57% as only slightly impaired and therefore supporting.

We request that ADEQ provide the background and the technical documentation utilized in the development of this benthic scoring system. We also request a response as to why Arkansas elected to be more restrictive in their benthic analysis than EPA.

John Murdoch

In the above example¹ the response was “currently meeting water quality standards”. Where is the data and did you include all tools for this assessment, like Biological Monitoring of Macroinvertebrates.

It appears to me many of the streams in your data base have vintage surveys. When one reads, “currently meeting water quality standards” can I assume your group have current data for things like the suggested impaired water bodies in the example comment and response above or do we just have to have lots of “faith”?

The list of streams below² is a lot of water and streams to monitor for both the EPA and Arkansas ADEQ. I agree. I also feel water quality needs to be monitored, protected and flagged if any of it does not meet the EPA standards. More effort trying to identify possible threats and organize plans to address them rather than doing a re-write if one hits a bump in the road. Other words, don't water down the EPA standards because it is easier than saying things are impaired

¹ “National Park Service – Main Stem Buffalo River Comment 1: The commenter is concerned that the lower 11.3 miles of the Buffalo River, stream segment 001, was removed from the list of impaired water bodies but did not show up on the removed list spreadsheet. In addition, segment 005 of the Buffalo was not on the impaired list and was also not on the removed spreadsheet.

Response 1: ADEQ removed each of these stream segments from the 303(d) List because each are currently meeting water quality standards. The removed stream spreadsheet is simply a reference spreadsheet and is not part of the list of impaired waterbodies. ADEQ acknowledges the comment and appreciates the commenter identifying this typographical error. The removed listing spreadsheet has been revised to the removal of Buffalo River reach 001.

² See APC&EC Regulation No. 2 Appendix D “List of current ERWs, ESWs, and NSWs”

or impacted. This is only my opinion, but I hope I can make one example³ for the ease at which things can be watered down or over “streamlined” at the state level.

6.0 Specific Standards

Beaver Water District (BWD) - Colene Gaston

The traditional rule of thumb for pollutants other than toxic pollutants (which may require a more stringent assessment methodology) has been that a water body is in non-attainment when more than ten percent (10%) of measurements exceed the water quality criterion (WQC). Possible exceptions to the ten-percent rule would be when the WQC is expressed as an instantaneous maxima (or minima) not to be surpassed (or gone below) at any time or when the WQC is expressed as an average concentration over specified times. In those instances where ADEQ departs from the ten-percent rule, BWD suggests that ADEQ provide the scientific justification and rationale for doing so in the Assessment Methodology. In addition to providing this information as to specific WQC, BWD recommends that the introductory section of the Assessment Methodology describe ADEQ’s decision rules and associated rationale for different types of pollutants (*e.g.*, toxic, conventional, and non-conventional pollutants) and types of standards (*e.g.*, acute versus chronic criteria for aquatic life or human health).

ADEQ

ADEQ will evaluate the use of the rounding method and strive to provide scientific justification of the use of this method in assessments.

Revisions are needed to Sections 6.1 through 6.12 regarding the sample depth language for lakes to more accurately reflect the sampling methods used by ADEQ and other sources of data and to be consistent with the most recent EPA approved Reg. 2.

³ **Responsiveness Summary to Comments Concerning Arkansas’s Draft 2016 303(d) List**

Comments Concerning the Buffalo River Tributaries More than 150 comments were received requesting three tributaries to the Buffalo River, Mill Creek, Big Creek, and Bear Creek be added to the 2016 list of impaired waterbodies. The commenters were concerned *Escherichia coli* concentrations in Mill Creek exceeded the state water quality standard. The concern was that Mill Creek would not be safe to swim in nor would the Buffalo River downstream of Mill Creek. 4 The commenters were also concerned the dissolved oxygen concentrations in Big Creek and Bear Creek are not meeting the state water quality standard. They were concerned that the aquatic life communities in these two streams, and downstream in the Buffalo River may be adversely affected. ADEQ has assessed the data associated with these three tributaries in accordance with the current Assessment Methodology established for the development of the list of impaired waterbodies for 2016. Most of the data used by the commenters did not meet the requirements as set forth in the methodology as being distributed over at least three seasons and two years. In addition, ADEQ does not currently have an assessment methodology to address continuous recording in situ data. ADEQ appreciates these comments from individuals who have taken an interest in protecting the waters of the state and hopes that this interest will continue. ADEQ will be investigating methods to assess continuous recorded data to assist in the evaluation of data for future assessments. In addition, ADEQ will stay informed about the water quality in these waterbodies and will continue to monitor the issue.”

Mike Armstrong

Section 6 of the 2016 Assessment Methodology (AM) describes the protocol for rounding up to the nearest 10 the number of actual samples used to calculate the number of exceeding the standard for determining non-support. This practice of always rounding up creates a higher threshold of exceedances than is actually described in the AM.

6.2 Turbidity

ADEQ

Revisions are needed to conform with the recently EPA approved Regulation No. 2. The term “all flow(s)” needs to be replaced with “storm flow(s).” This will keep the Assessment Methodology consistent with the most current CWA approved version of Reg. 2.

6.3 pH

United States Department of the Interior (USDI) – National Park Service (NPS)

Sections 6.3 and 6.4 - Both pH and dissolved oxygen impairment determinations require the use of continuous or repeated measurements from a water body within a 24-hour period... Can any stream be listed for these parameters when ADEQ collections are not made to APC&EC Reg. 2 standards without the use of continuous data?

6.4 Dissolved Oxygen

JoAnn Burkholder – via APPP

The reservoir DO criterion applies only to near-surface waters (depth 1 meter) and, thus, fails to protect beneficial aquatic life in lower-water-column and benthic (bottom) habitats.

United States Department of the Interior (USDI) – National Park Service (NPS)

Sections 6.3 and 6.4 - Both pH and dissolved oxygen impairment determinations require the use of continuous or repeated measurements from a water body within a 24-hour period... Can any stream be listed for these parameters when ADEQ collections are not made to APC&EC Reg. 2 standards without the use of continuous data?

Ozark River Stewards

Improve scientific, statistical and analytical capabilities within ADEQ. The USGS has many gauging stations within the state of Arkansas that provide critical water quality data to ADEQ. These data are often collected at 15 minute intervals. During the analysis and review of dissolved oxygen data on Big Creek (Newton County), ADEQ noted that they did not have

the analytical capabilities or identified methodologies capable of utilizing the rich dataset provided by USGS. This is a serious oversight on the part of ADEQ. It is very easy to subsample a large data set and be able to apply this information to determine if a stream meets the impairment standard. For example, Washington State uses the lowest dissolved oxygen sample reading within a 24 hour period to characterize the daily sample. ADEQ should adopt similar procedures that are most protective of our state's waters instead of rejecting the use of a robust dataset.

6.6 Bacteria

USDI - NPS

Section 6.6 - A recent creel survey completed by Buffalo National River and the Arkansas Game and Fish Commission, noticed increased river use outside of the defined "primary contact season" in the bacteria section. Notably during March, spring break float trips expose visitors to bacteria levels in the secondary contact criteria. Additional use continues into the month of October, before river use drops during the late fall and winter months. We propose an extension of the primary contact season to include the period of spring break to the current start of primary contact season of May 1 and continue until the end of October (primary contact season for Buffalo National River March 1 October 31).

Additionally, we recommend that bacteria assessment criteria applied to ERW, ESW, and NSW waters include reaches of tributaries within the jurisdictional boundaries of the Buffalo River. We believe that visitor protection does not end at the river, but should continue within the reaches of the river's tributaries that are frequently used as camping locations and swimming holes.

BWD - Colene Gaston

The 2016 Assessment Methodology for the bacteria criteria allows, in general, a twenty-five percent (25%) exceedance of an applicable criterion. BWD suggests that ADEQ examine the rationale for this departure from the ten-percent rule and refer to current U.S. Environmental Protection Agency recommendations regarding water quality criteria and assessment methodology for bacteria.

6.9 Nutrients Assessment

USDI - NPS

Section 6.9 - Under the "Listing Methodology for Wadeable Streams" the first bullet represents a shifting baseline for nutrient comparisons. A major assumption of this criterion is that surrounding sites within the same ecoregion, sites used for the computation of the 75th percentile values, will not experience similar increases in nutrients. Comparing sites among themselves during the same time period removes the ability to document slow increases in nutrients over time, both short and long-term. Figure 2, for example, shows a spring within the

Buffalo River which has experienced a 300+% increase in nitrate concentrations at base now over the past 25 years. If this site were used as a comparison for another segment or water body it would be possible neither site would be listed if both sites experienced similar increases in nutrients over time. Also, this section uses dissolved oxygen fluctuation, dissolved oxygen concentrations, and dissolved oxygen percent saturation within 72-hour data sets as a listing mechanism for nutrients. This seems to: 1) contradict part of Section 6.4 on duration of allowable levels below the applicable standard (4 hours compared to 8 hours), and 2) require the use of a continuous data set (as does the ability to determine if dissolved oxygen fluctuates more than 3 mg/L in concentration). Does ADEQ collect 72-hour dissolved oxygen data? If so, what instruments and methodology are used for collection?

Mike Armstrong

Section 6.9 Nutrients establishes a high threshold for non-support, particularly considering nutrient enrichment is considered one of the leading causes of water quality degradation in Arkansas and Arkansas lacks numeric criteria for nutrients statewide. ADEQ and the stakeholder panel should review and affirm whether the AM's requirement that all three conditions of evaluation (i.e. N and P concentrations compared to ecoregion conditions, water quality translators, biological assemblage assessments) must be met for a non-support designation.

BWD - Colene Gaston

Consideration should be given to the inclusion of an assessment methodology for the narrative nutrient criteria as applied to waterbodies other than wadeable streams and rivers.

Also, there needs to be a definition of "wadeable."

In the 2016 Assessment Methodology for the narrative nutrient criteria as applied to wadeable streams and rivers, there is a three-prong test for listing. The first prong involves comparison of the total phosphorus (TP) and total nitrogen (TN) concentrations of a particular monitoring segment to the *seventy-fifth* percentile of TP and TN data from *all* wadeable streams in the ecoregion. The seventy-fifth percentile should be used as a benchmark only if the data used is taken from *pristine reference streams* in the ecoregion. In the absence of data from true reference streams, the *twenty-fifth* percentile of the data from all wadeable streams in the ecoregion should be used as the benchmark.

JoAnn Burkholder – via APPP

Arkansas has no numeric nutrient criteria. The Report describes an inadequate approach for assessing nutrient-related impairment, which biases against finding nutrient-related impairment and fails to protect Arkansas surface waters from loss of designated uses due to nutrient pollution.

(a) The ADEQ protocol design sets thresholds for excess TN and TP at a much higher, much less protective level than would be set from use of U.S. EPA's recommended protocols.

(b) The ADEQ protocol flow chart for evaluating whether Wadeable streams within a given ecoregion have nutrient-related impairment requires “paired data” that are not paired.

(c) The ADEQ protocol includes arbitrary stipulations that do not appear to have basis in science.

(d) The protocol for continuous monitoring data for assessing “nutrient-related impairment” of Wadeable streams will easily miss or underestimate the DO translators.”

BWD – Colene Gaston

BWD believes that it should not be easier to delist a waterbody than it is to list it. This appears to be the case with the 2016 Assessment Methodology for, among other things, the narrative nutrient criteria as applied to Wadeable streams and rivers. The Assessment Methodology regarding each parameter should be reviewed to make certain that the Delisting Methodology is at least as stringent as the Listing Methodology.

Buffalo River Watershed Alliance

It would benefit ADEQ to be proactive and to change the way it assesses algae, especially ERWs (Extraordinary Resource Waters) in karst terrain.

Beaver Lake

BWD – Colene Gaston

BWD recommends that the 2016 Assessment Methodology for nutrients for Beaver Lake, which allows the growing season mean Chlorophyll-a criterion to be exceeded two out of five years (*i.e.*, forty percent (40%) of the time) and the annual average Secchi Transparency criterion to be exceeded two out of five years, be evaluated to ensure that the Assessment Methodology is sufficiently protective of the drinking water use. Consideration should be given to clarifying the assessment methodology to provide for a finding of non-attainment when the total number of yearly excursions of the Chlorophyll-a or the Secchi Transparency criteria combined are three or more in a five-year period. Consideration should also be given to including an absolute maximum concentration for Chlorophyll-a in a given year.

JoAnn Burkholder – via APPP

(e) The numeric criteria (chlorophyll a, turbidity) set for the upper end of Beaver Lake are poorly conceived and do not protect this reservoir from impairment due to nutrient pollution.

(f) The Report provides no explanation as to why ADEQ has designed unbalanced listing versus delisting criteria for upper Beaver Lake.
[See full comment for specifics.]

ADEQ

Revisions may be needed to clarify the implementation of site specific Beaver Lake nutrient criteria assessments.

6.10 Mineral Quality

ADEQ

Revisions are needed regarding the assessment of site specific minerals criteria. The “1 in 10” language was stricken in 2007 paving the way for the 25 percent exceedance; however this removal was disapproved by EPA in 2008. As a result, the stricken language that specifies minerals are not to exceed in more than “1 in 10 samples collected over a period of not less than 30 days or more than 360 days” is in place for CWA purposes and must be added back to the Reg. 2.511(a) language. Site specific minerals criteria must be assessed according to the EPA approved language.

6.11 Domestic, Agricultural, and Industrial Water Supply Uses

AEF

The 2016 303d list review protocols use the EPA’s Secondary Drinking Water Criteria of 250 mg/L for chloride and sulfate and 500 mg/L for TDS to assess impairment of Agricultural and Industrial Water Supply uses. This is the same criteria used to assess impairment of Domestic Water Supply uses.

In many cases, it is not technically appropriate to use Secondary Drinking Water Criteria to assess water quality for Agricultural and Industrial uses. The quality of water needed to support those uses is very specific to a particular agriculture practice or industrial use. We strongly recommend that the ADEQ determine appropriate assessment criteria for those uses in the development of the 2018 303d list. This is needed to minimize the possibility of erroneous Category 5 listings due to using criteria unrelated to the Agricultural and Industrial uses

6.12 Ammonia Toxicity

Mike Armstrong

Section 6.12 Ammonia uses chronic concentration criteria based on the presence or absence of early life stages of fish based on a critical season of April 1 through October 31. ADEQ and the stakeholder panel should review these chronic criteria in light that the salmonid *Salmo trutta* (brown trout) is a fall spawner and critical life stages occur through the winter.

General Input

Carol Bitting

I have received many FOIA documents about the assessment methodology and even though there are regulations and criteria, the standards are set to low. The ADEQ staff or director determines what is put on the 303 d list and even though a stream fits the criteria for impairment ADEQ does not include them choosing to make alterations and forfeit water quality for whims. Therefore it makes it difficult for the general public to understand the assessment methodology or the Regulations.

Geology/Karst

Ozark River Stewards

Add geology as a risk assessment parameter. Although the ADEQ engages in an eco-region approach to assessment of water quality throughout the state, the ADEQ does not include critical factors, such as the geology of the eco-region. At present the ADEQ does not direct appropriate restrictions to areas that are underlain by highly-fractured karst limestone, and this lack of restrictions significantly increases the potential pollution from surface water of our lakes and streams. Creating a “geo-region” approach should be a factor in environmental assessments, methodology, and standards that incorporate risk associated with geological subsurface conditions.

Carol Bitting

We have a uniqueness in the NW area of Arkansas and it needs special protection due to karst environments that do not filter waters like other terrains. This should be considered in the methodology assessment. The Buffalo River like other streams in karst terrain have multiple sources of water. Until streams and lakes are thoroughly studied for their sources careful consideration should be made to the highest standards of collection and analysis of water data adding TMDL's as important scientific criteria.

Public Participation Process

Central Arkansas Water (CAW)

(1) The ADEQ needs to define what "input" information is being gathered and will be presented to the stakeholder group. This is important because identifying which aspects of the 2016 Assessment Methodology that should be considered for revision will be dependent on what information is presented. Data, in and of itself, is normally not biased. However, what data is presented, putting that data in context, and interpreting how that data is related to ADEQ 's charge of protecting the waters of the state can be misconstrued, whether intentional or not. Specifying which "input" information will be gathered and presented will help to maintain the thoroughness and transparency of the ADEQ process.

(2) ADEQ staff need to clarify the makeup and process for the stakeholder group; specifically, which stakeholder groups will be invited to participate; identify the representatives of each group; identify where the meetings will be held; identify whether the meeting will be open to the public; and identify whether a record of those meeting will be kept. Whether or not the above information is publicly provided will speak to the thoroughness and transparency of the Assessment Methodology process as well as ADEQ's overall intentions.

(3) Paramount for consideration in the 2018 Assessment Methodology should be the relationships between the ADEQ's Reg 2 Antidegradation Policy, Public Health, and the quality of those state waters used for public drinking water. Consideration of these relationships should take precedent over any other water quality issues. ADEQ and the stakeholder group need to be provided educational information on these relationships, on which waters of the state are used for public drinking water, and on which of those source waters are impaired or threatened. In particular, ADEQ needs to give special attention to the issues of the degradation of state waters due to elevated mineral levels, due to high fecal and E.coli counts, due to high turbidity levels, and due to elevated nutrient levels. Each of those contaminants has a direct correlation to the ability of public water systems to meet current and upcoming federal drinking water regulations, and their ability to provide drinking water that protects Public Health.

Input on topics other than the Assessment Methodology

Reporting the 303(d) list

Input was received concerning the reporting of the 303(d) list and the 305(b) Report, collectively known as the Integrated Report (IR). While the Assessment Methodology is part of the IR these comments would be more appropriate during the public participation phase of the IR, not during the review process of the Assessment Methodology.

APPP

Give a brief justification as to why certain waterbodies are delisted.
Include the water quality assessment table – aka Tables III -4, 5, & 6

BWD - Colene Gaston

BWD suggests that ADEQ release its 2018 draft 305(b)/Integrated Report simultaneously with a its 2018 proposed 303(d) list for public review and comment, and that it include a brief narrative justification for any proposed new listing or delisting of a stream segment and for the addition or removal of any individual water quality parameter.

Water Quality Standards

Input was received that was out of scope for this Assessment Methodology review, but is appropriate for the Reg. 2 Triennial review. This input pertains to water quality standards creation or revision.

Carol Bitting

Arkansas has exceptionally beautiful landscapes that are enjoyed by all lets improve our streams and waters to exceptional health so that all can enjoy the streams and lakes that we love to fish and re-create within their boundaries, The criteria to protect our waters should be equally or as stringent as the EPA's.

BWD – Colene Gaston

The public often assumes that the WQC in Arkansas Pollution Control and Ecology Commission (APCEC) Regulation No. 2 (hereinafter, “Reg.2”) are instantaneous maxima or minima to be applied at all times, unless explicitly stated otherwise. In the process of preparing the Assessment Methodology for 2018, BWD encourages ADEQ to make note of where revisions to Reg. 2 are needed to clarify how and when a WQC applies and to address such instances in the next triennial review of Reg. 2.

Buffalo River Watershed Alliance

(1) Because ADEQ's current assessment methodology for algae as it relates to water quality relies on a narrative description, the Alliance asks that numerical thresholds be added to augment enforcement and maintenance of water quality standards for recreation and drinking water. In addition, frequent and regular monitoring of waterways for algae should be included, defined and funded. These additions should conform to the recommended guidelines of the EPA and the WHO (World Health Organization), which have experience and understanding of this growing problem.

(2) In addition Regulation 2 must include the updated and latest 2012 EPA recommendations for pathogen thresholds.

(3) Algal blooms have typically appeared seasonally on many surface waters, but at what point do these become an issue for modifying water quality regulations?

Tate Wentz from the ADEQ HAB (Harmful Algal Bloom) Working Group brought up Reg. 2.509 during his presentation as a means to approach algae and HABs in Arkansas at the recent Arkansas Water Resources Center (AWRC) Annual Water Conference in Fayetteville in July of 2016. This year's conference title was, “**Nutrients, Water Quality and Harmful Algal Blooms**”. The Alliance agrees with Mr. Wentz that modifying this regulation would be the best approach.

(4) The Alliance proposes that ADEQ, ANRC, and the ADH collaborate to rigorously monitor and assess pathogens, E-coli, and algae types, characteristics, and growth patterns according to the most recent World Health Organization (WHO) 2012 and EPA 2015 recommendations, to proactively implement recommended thresholds, and to update these as newer guidelines emerge, for recreational waters and drinking water. Attached are current plans and recommendations. Note that rivers and nutrients are referenced.

(5) Besides algae concerns and the necessity of including specific precautionary thresholds for them, Regulation 2 must include the latest 2012 EPA recommendations for pathogen thresholds recognizing the increase in CAFO waste outputs through leakage and land applications, especially in karst terrains.

(6) The Alliance proposes that ADEQ, ANRC, and the ADH collaborate to rigorously monitor and assess pathogens, E-coli, and algae types, characteristics, and growth patterns according to WHO and 2012/15 EPA recommendations, to proactively implement recommended thresholds in regulation 2, and to update these as newer guidelines emerge for recreational waters and drinking water. Such a collaborative arrangement has been described for one watershed in the Governor's new "**Buffalo River Watershed Management Plan**":

Task 2, Characterize watershed Costs \$11,992

Objective: Review existing studies of the Buffalo River watershed to characterize pollutants, sources, and loads

Subtask 2.1 Gather existing data and information from previous studies and modeling

Subtask 2.2 Identify data gaps

Subtask 2.3 Characterize pollutant trends, sources, and causes

Subtask 2.4 Estimate pollutant loads

The Alliance requests that Regulation 2 include this plan's Task # 2, making sure to gather and include additional existing watershed water quality data from the National Park Service and the Karst Hydrogeology of the Buffalo National River (KHBNR) team as well, in order to create a well-rounded and more complete assessment for estimations and conclusions.

Dane Schumacher

Currently, Arkansas has no numeric nutrient criteria. This inadequate approach fails to protect Arkansas waters from loss of designated uses to nutrient pollution, especially with respect to nitrogen (N) and phosphorus (P).

Ozark River Stewards

(1) Expand the primary recreational contact season for the Buffalo National River, Kings River, and Mulberry River to March 1-October 31 and include key tributaries of ORWs. Arkansas is known for its beautiful rivers and is a kayaking and canoeing destination for many tourists and locals. Currently, the primary recreational contact season is from May 1-September 30. Many people start kayaking and canoeing at the beginning of March, and, if we experience an extended summer as we have this year, they continue to kayak and canoe until the end of October. These recreational users are in contact with the water during this time period. Recreational users are not

confined to the main stem of the 3 rivers, but frequently use many of the main tributaries of these streams. The state limits for E. coli and other pathogens should be most protective when people are in contact with the water and should be informed and guided by user activity, rather than solely by the State's current water use designation. Climate change and better outdoor clothing also allow recreational users to be in contact longer with our water resources than in the past.

(2) Replace the current E.coli limits with the 2012 EPA recommended limits and lower the exceedance rate to 10%. Current E.coli limits (Regulation 2.507) for bacteria are significantly less protective of human health than the EPA recommended 2012 limits found at <https://www.epa.gov/sites/production/files/2015-10/documents/rec-factsheet-2012.pdf>.

(3) The 2016 Assessment Methodology prescribes that levels for E. coli bacteria cannot exceed these values more than 25% of the time in no less than eight samples in a season. The EPA recommendation is that the exceedance rate be no more than 10% of samples collected. Once again, the regulations in Arkansas are not as protective as needed to ensure healthy streams for Arkansas residents and visitors. In all cases, ADEQ should implement the most protective human health guidelines available and be consistent with EPA recommendations and regulations. Develop and Implement Numeric Criteria for Nutrients. Arkansas' waters are most vulnerable due to agricultural runoff primarily in the form of phosphorous and nitrogen. "Nutrient pollution contributes to increasing harmful algal blooms (HABs) that can release toxins that pose risk to human health", the loss of potable drinking water, and the loss of aquatic life. Please see the EPA's HAB link for additional information: <https://www.epa.gov/nutrient-policy-data/cyanohabs>

(4) In 2015, 183 community water systems exceeded the allowable level of nitrate in drinking water. (Beauvais, 2016). By developing and implementing nutrient criteria ADEQ will be able to provide a measureable water quality standard.

JoAnn Burkholder - via APPP

A hypoxic DO concentration of 2 mg/L, known to severely stress and kill many aquatic species, is irrationally "acceptable" for ecologically important, small perennial headwater streams throughout the state . This standard is not science-based.

JoAnn Burkholder - via APPP

Arkansas criteria for Escherichia coli in surface waters sanction **much** higher fecal bacteria densities than the threshold criteria recommended by the U.S. EPA (2012) to protect human health safety. Moreover, the Arkansas criteria allow violations of those criteria in up to 25% of samples as "acceptable"

Arkansas Phosphorus Index (API)

There was input received concerning the Arkansas Phosphorus Index (API). The API is under the purview of ANRC, not ADEQ.

Dane Schumacher

Additionally, I urge the Department to revise the Arkansas Phosphorus Index (API) and adopt a more quantitative method, one which includes the physical, geological and hydrological conditions and characteristics of the Watershed.

Ozark River Stewards

Remove the Arkansas Phosphorous Index (API) as the standard to determine the rates and limits of phosphorus levels and replace this standard with agronomic rates. The current Arkansas Phosphorous Index (API) is not an appropriate standard for use in karst environments of the state. The API does not consider geology in its application and is not precautionary in its approach to ensuring that high concentrations of nitrogen and phosphorous are not present on fields and does not allow a timely response to this standard. The API is not transparent as it requires intensive calculations with many parameters that may not be available or appropriate, and it is not easily understood by the general public. Many states employ an age old technique of using the agronomic rate (utilization capacity of plants) to absorb nutrients-phosphorous and nitrogen. While agronomic rates do not include consideration of geology, these rates are more transparent and protective of potential over application of manure that degrades water quality.

Confined Animal Feeding Operations (CAFOs)

Input was received concerning CAFOs which do not fall under the purview of the Assessment Methodology. The Assessment Methodology does not contain language concerning the permitting or the building of such facilities.

Ozark River Stewards

Implement a permanent moratorium on medium and large size CAFOs in the Buffalo National River Watershed (BNRW) and prohibit any CAFO animal waste from other operations to be deposited within the BNRW. At present a five year moratorium is in place to prevent any additional medium or large scale hog CAFOs from being built in the Buffalo National River watershed. The current moratorium is inadequate because waste could be transported from an area outside of the BNRW and applied on fields that will contaminate the BNRW. A long term solution and prohibition are needed to protect the first national river. This action requires rulemaking and sufficient enforcement to be effective.