United States Department of the Interior
NATIONAL PARK SERVICE
Buffalo National River
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IN REPLY REFER TO:

1.A.2 (BUFF)

OFFICIAL CORRESPONDENCE SENT VIA ELECTRONIC MAIL

September 07, 2018

Water Quality Planning Branch
Arkansas Department of Environmental Quality
Office of Water Quality
5301 Northshore Drive
North Little Rock, AR 72118

Dear Director Keogh:

The National Park Service (NPS) at Buffalo National River has reviewed the 2018 Assessment Methodology and draft 303(d) list of impaired waterbodies. Below are NPS comments regarding the 2018 Integrated Water Quality Monitoring and Assessment Report.

General Comments

Two assessment units located on the Buffalo River (AR_11010005_011 and AR_11010005_010) and one unit on Big Creek (AR_11010005_022) were assessed for unknown sources of pathogens (*E. coli*). An additional unit on Big Creek (AR_11010005_020) was listed as impaired for an unknown source for depleting dissolved oxygen. Arkansas Department of Environmental Quality (ADEQ) states that the assessment units (AUs) were placed in category 4b instead of category 5 due to the recent development of the non-regulatory and voluntary Buffalo River Watershed Management Plan (BRWMP).This plan focuses on landowners within the Buffalo River watershed, particularly priority subwatersheds, implementing best management practices (BMPs).

Investigations conducted on the successes and failures of using BMPs for reducing water pollution have found that lag times vary depending on the type of pollutant, landscape topography, groundwater flow rates, and watershed scale, among other factors (Meals, Dressing, and Davenport 2010). A timeline for implementing BMPs or target dates for meeting standards is not addressed by ADEQ in the draft 2018 Integrated Water Quality Monitoring and Assessment Report. Additionally, Environmental Protection Agency (EPA) guidance states, "segments are

not required to be included on the Section 303(d) list if "[o]ther pollution control requirements (e.g., best management practices) required by local, State, or Federal authority" are stringent enough to implement applicable water quality standards (WQS) (see 40 CFR 130.7(b)(1)) within a reasonable period of time." The BRWMP is non-regulatory and voluntary and is not "required by local, State, or Federal authority," and thus does not meet EPA's requirements of "other pollution control requirements." ADEQ does not establish what a "reasonable period of time" would be for implementing the BRWMP. The guidance goes on to list six elements ADEQ must address when submitting an AU as category 4b:

1. Identification of segment and statement of problem causing the impairment;
2. Description of pollution controls and how they will achieve water quality standards;
3. An estimate or projection of the time when WQS will be met;
4. Schedule for implementing pollution controls;
5. Monitoring plan to track effectiveness of pollution controls; and
6. Commitment to revise pollution controls, as necessary.

ADEQ fails to address these elements in documentation submitted for complying with assessment of waters per the Clean Water Act (CWA), Category 4b listing. Since a source has not been identified, there are no guarantees the BMPs mentioned in the BRWMP will reduce the source causing the impairment.

Additionally, during the development of the 2016 303(d) list, these same sections were recommended by numerous agencies to be listed as Category 5 using the same data sets during this assessment period. Noted in recent correspondence between ADEQ and EPA, EPA has decided to only partially approve the 2016 list. The National Park Service would like to see these sections added to the 2016 listings by ADEQ or EPA to show impairment existed prior to the current report. Ongoing monitoring by the Big Creek Research Extension Team (BCRET) and the NPS on Big Creek and the Buffalo River will cover some of the element requirements; however, given the national significance of the involved resources within the Buffalo River, an increased sampling presence from ADEQ would show commitment to "achieve ultimate attainment of water-quality standards in the Buffalo National River."

Finally, NPS is concerned of placing these units in Category 4b as the inclusion of two other watersheds (Illinois River and Beaver Lake) with similar plans written in 2012 do not include a timeline for delisting or how pollution controls will be implemented and monitored to ensure units will meet their designated use(s) "…within a reasonable period of time."

Antidegradation Policy

The Buffalo River has experienced persistent widespread algae blooms over the past three summers. Although algal blooms have been documented in previous years, the extent and density of current blooms have exceeded those on record. Most of the nuisance algae have been

noted in the portions of the Buffalo River where it flows through the Ozarks ecoregion. These algal blooms have caused Buffalo National River and the Arkansas Department of Health to issue press releases in the past several months advising visitors and recreationists of the hazards associated with algae. The press releases make it clear that swimming near thick algae accumulations is potentially hazardous. 40 CFR 131.12(a)(3) states: "Where high quality waters constitute an outstanding National resource, such as waters of National or State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected" (emphasis added). Additionally, APC&E Regulation 2.509(A) indicates that materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. Buffalo National River was established to conserve the unique scenic and scientific features for the benefit and enjoyment of present and future generations. Algal production in the Buffalo River is limiting the ability of park visitors to enjoy swimming, canoeing, fishing, and nature photography on the river. In this way, the algal production has impacted the Buffalo River. The water quality has not been maintained as required by 40 CFR 131.12(a)(3).

Comments Specific to Impairments for Numeric Criteria

The National Park Service interprets the CWA to give Extraordinary Resource Waters (ERW) status to those tributaries within the jurisdictional boundaries of the Buffalo National River. Visitors come to the river to swim and recreate; however, those activities are not limited to the mainstem of the river itself, but occur along the public lands within the tributaries. Under those conditions, visitors recreating in the tributaries are exposed to levels of bacteria far above those recommended by EPA for primary contact. On that basis, the NPS would recommend the following sites be listed for pathogens (*E. coli*) in Category 5, along with all other AUs within the 2018 report, for exceedance of geometric mean standards for primary contact within an ERW:

BUFT04 – Mill Creek near Pruitt – geometric mean exceeded 20 times in 2015

BUFT05 – Little Buffalo – geometric mean exceeded 5 times in 2015

BUFT06 – Big Creek near Carver – geometric mean exceeded 13 times (2014-10 times; 2015-3 times)

Specific Comments related to the Draft Assessment Methodology – 2018

We understand these comments cannot be used for this current assessment period; however, while reading through both documents to complete assessments, these items were noted.

Table of Contents

- "6.3 pH 44" missing decimal
- "6.11 Non-Site Specific Mineral Quality; and Domestic, Agricultural, and Industrial Water Supply Uses 69" missing decimal

2.0 Integrated Reporting Categories

- The category 2 description needs more elaboration because the wording is similar to the category 5 description.
- According to 40 CFR 130.7 (b)(4), "The priority ranking shall specifically include the identification of waters targeted for TMDL development in the next two years." Assessment units should only be listed in the 4b category for less than two years because high priority category 5 listings theoretically have Total Daily Maximum Loads (TMDL) developed within two years. If the purpose of the 4b category is to speed up the process of reducing impairment using "other management alternatives," then these "other management alternatives" should reduce impairment faster than the process of developing a TMDL.
- It is unclear in the Assessment Methodology how ADEQ will differentiate between categorizing a waterbody as 3b and low priority 5 if both categories are for assessment units with insufficient data.

3.1.1 Data Types and 3.11 Final Attainment Decision Process

- The wording "most appropriate" is very subjective to the person or people making the decision about which type of data should be used for the assessment unit. What one person perceives as being most appropriate may not be what someone else believes is most appropriate. The wording "most protective" is more definitive and objective.

3.1.1.2 Continuous Data AND throughout document

- Why are continuous dissolved oxygen data averaged into hourly readings, if taken more frequently than every hour? Data resolution is lost, and efficiency is not increased. It takes more time to average the data than to just analyze it in Excel. Additionally, it is not mentioned if rolling averages will be calculated.

3.2.2 Absence of Data

- Some watershed characteristics may appear similar between monitored segments of a waterbody, but in all practicality may be different. For example, monitored segments with similar watershed characteristics may actually be quite different if they are located in areas with known karst geology. Thus, assuming standard attainment of an assessment unit only based on watershed similarities to it and another assessment unit may be an inaccurate characterization.

3.3 Data Quality Considerations

- It seems implied here that laboratory analyzed parameters must be processed in an EPA-certified laboratory. Why must data be analyzed in a certified lab to meet the Phase I data quality requirements, if supporting documentation on QA/QC and procedures and protocols followed are as strict as or stricter than ADEQ/USGS lab protocols? State Environmental Laboratory Certification Program Act, Ark. Code 8-2-201 states, "Certification for laboratories other than consulting laboratories shall not be mandatory."

3.3.1 Individual Data Sets

- This section does not mention what will happen if water quality data sets indicate an Assessment Unit is homogenous. Individual data sets should be combined if they are similar types of data, and if data sets are not similar, then the most protective data set should be used for assessing the assessment unit.

3.3.2.2 Partially aggregating data sets

- This section applies to discrete, not continuous, data, but the word "discrete" is not mentioned. The word "discrete" is particularly important in this section when referring to how "duplicate data points per day will be omitted, retaining only the most protective data point per day."

3.5 Data Quantity Considerations

- Why did ADEQ choose 10 samples as the minimum sample number for use in attainment decisions? Is there a document that could be referenced here for additional guidance on why 10 was chosen?

3.7 Statistical Confidence

- Washington State Department of Ecology is referenced in the first paragraph, but it is not listed in the references.
- The change in method of statistical analysis is to reduce the chance of type I error (i.e., saying an assessment unit is impaired when, in reality, it is not). However, the formerly used "10% method" is a more conservative approach to assessing possible impairment. By reducing the change of type I error, would the chance of making a type II error increase (i.e., saying an assessment unit is not impaired, when in reality it is impaired)? If so, this is a less conservative and less protective approach to assessing possible impairment.
- If the data received and collected by ADEQ are not binomially distributed, can the binomial distribution method still be used?
- What are the assumptions of the binomial distribution method? What if the data do not meet these assumptions?
- Please provide references to documentation that describes the binomial distribution method.

- The "whole waterbody" is mentioned in this section. How does ADEQ know the collected samples will actually represent the "waterbody as a whole," especially in environments where different sections of a waterbody may have different entry points for pollutants, possibly leading to different assessment statuses (e.g., in areas with karst geology)? Perhaps this should be changed to assessment unit?

3.8 Internal Data Assessment Method

- This section does not mention what, if any, quality assurance/quality control procedures are in place to reduce errors in the data analysis process while using Water Quality Analysis Reporter (WQAR) to analyze ADEQ's data.

3.9 External Data Assessment Method

- Why is there not a standardized format for submitting external data to ADEQ?
- Why not format external data so that it could be input into WQAR, when possible?

3.11 Final Attainment Decision Process

- Again, the wording "most appropriate" should be replaced due to the word's subjective nature.

Table 4: Designated Uses for Arkansas's surface waters and regulations used for assessment.

- Toxic substances should be used for the assessment of primary and secondary contact use.

5.0 Biological Integrity

- Nutrients should be listed as a potential indicator of water quality impairment for aquatic life.

Aquatic Life Use Attainment Determination, Delisting Methodology

- A minimum of two seasons worth of paired biological and physical data are required to be collected to list a stream due to impaired biological integrity, so at least two seasons worth of data must be allowed to delist the stream for the same use.

6.1 Temperature AND 6.4 Dissolved Oxygen

- There needs to be additional clarification about what exactly "critical season" means. For example, if there is one day in October when temperature readings are greater than 22 C, is this day included as part of the critical season?
- Discrete data should not be used to delist assessment units that were originally listed using continuous data. Continuous data are more refined and representative of the assessment unit.

6.2 Turbidity

- The definitions of storm and base flow should be clarified better to show that they are referring to particular times of the year, not necessarily water levels or the degree of influence of groundwater versus precipitation.

6.3 PH AND 6.4 Dissolved Oxygen

- The definition of long-term continuous data has been changed, but no reason or defensible reference is given for the change. Long-term continuous data, as defined in section 3.1.1.2 Continuous Data, "spans long time periods, from several weeks to years." Long-term continuous data should cover the times of year when dissolved oxygen is generally lowest and temperatures highest in Arkansas (late spring through early fall). At most, this is 5 months (May through September), not 10 month. Most data loggers are unable to safely be deployed for 10 months due to the threat of being destroyed or lost in flooding events. By requiring 10 months of data to meet the long-term continuous standard, ADEQ is placing extreme limits on the external data sources that can provide valuable long-term continuous data by the Assessment Methodology's current definition.
- The definition of "POR" is not explained.
- Discrete data should not be used to delist assessment units that were originally listed using continuous data. Continuous data are more refined and representative of the assessment unit and less easy to use in biasing the assessment results with than discrete data.

6.6 Bacteria

- During the primary contact season (usually May through September) ADEQ generally collects 5 discrete water samples at select sites to assess for bacteria (1 sample per month). However, the requirements are that no less than 8 individual samples be used for assessing for possible assessment unit impairment. This means ADEQ will not be able to assess for bacteria using individual samples if only 5 samples are collected during the primary contact season. Does this mean ADEQ plans to change its sampling frequency to at least 8 individual samples collected during the primary contact season? If not, how will ADEQ assess for bacterial impairment using individual samples during the primary contact season if its data is the only data available for a specific assessment unit?
- The information requiring data from at least two seasons for placement in category 5, versus category 3 for data from only one season, should be more apparent at the beginning of the section. Additionally, it is not apparent whether the two season requirement applies to geometric mean data.
- If two seasons of data are required to place an assessment unit in category 5, then it should take two seasons of data to delist the same assessment unit. This is not apparent in the delisting methodology section for individual samples or geometric means.

6.9 Nutrients

- We request more explanation and defensible documentation about why the 75th percentiles of total nitrogen and total phosphorus were chosen to represent the cutoff points for helping to assess for nutrient impairment. If all available total nitrogen and total phosphorus data from assessment units in a given ecoregion are used for determining the 75th percentiles, then there will always be the potential to have shifting baselines as water quality improves or degrades within the ecoregion. The definition of what is considered impaired based on the 75th percentile method may vary throughout time. According to Evans-White et al. (2014), the 75th percentile method is less conservative (e.g., less protective) than the 25th percentile method.
- Evans-White, M. A., Haggard, B. E., & Scott, J. T. (2014). A review of stream nutrient criteria development in the United States. *Journal of environmental quality*, *42*(4), 1002-1014.

References Cited

- The link for the last reference does not work properly-

Washington State Department of Ecology. 2002. Additional Clarification of the Binomial Distribution Method. Addendum to 2002 Water Quality Policy 1-11. Accessed online at: http://www.ecy.wa.gov/programs/wq/303d/2002/2004_documents/binomialclarification.pdf

General document comment

- Please reference literature describing how and when the various standards were developed so readers may more easily access these documents.

Sincerely,

Mark A. Foust
Superintendent

References:

Arkansas Department of Environmental Quality, 2018a.
https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/category-4b-determinations.pdf. Accessed July 26, 2018

FTN Associates, 2018. Buffalo River Watershed-Based Management Plan. https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-05-22-final-buffalo-river-wmp.pdf. 794 pp.

Meals, D.W., Dressing, S.A. and Davenport, T.E. 2010. Lag time in water quality response to best management practices: A review. *Journal of environmental quality*, *39*(1), pp.85-96.

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U.S. Environmental Protection Agency. 2006. Information concerning 2008 Clean Water Act sections 303(d), 305(b), and 314 integrated reporting and listing decisions. Memorandum from the Office of Wetlands, Oceans, and Watersheds. October 12, 2006. Washington, D.C.

U.S. Environmental Protection Agency, 2012. Water Quality Standards Handbook, Chapter 4: Antidegradation. Office of Wetlands, Oceans, and Watersheds, EPA-823-B-12-002.