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Greetings:

Thank you for the opportunity to participate on the Focus Group for the Antidegradation Policy's Implementation Plan. I appreciate the agency's efforts and commitment to moving forward with a draft document that addresses the changes mandated by EPA.

In an effort to provide meaningful feedback to ADEQ, I offer the following comments and attach a marked-up March 19, 2018 version 11 draft. I hope you will find these comments helpful in finalizing a draft document for the larger stakeholder group.

I. Tier Protection Levels

The first step in the review process should be the identification of the tier protection level for the receiving stream. This step should be clearly documented as part of the review process.

II. Degradation Determination

According to the Draft Antidegradation Plan Implementation Policy, a degradation determination first requires the establishment of the baseline water quality, which is then followed by a calculation to determine the receiving stream's total assimilative capacity. Both concepts must address technical problems.

Baseline Water Quality

Baseline water quality is defined as follows:

> The BWQ shall be representative of the water quality at or immediately upstream from the activity. Once established, BWQ is a fixed quantity expressed as a concentration. For waters receiving pollutants from a point source (where full design capacity has not been reached), the BWQ shall include the levels of pollutants already permitted to be discharged at maximum design flow. **BWQ are conditions present on or before June 1, 1987 based on mean ecoregion values or the collection of upstream water chemistry over the last five (5) years, whichever is more protective.** (Emphasis added.)

The 1987 Least-Disturbed Ecoregion Reference data were collected from "*streams that have the least amount of disturbance (in terms of agriculture, silviculture, or other similar activities) and the fewest pollution sources in their watersheds*." This data does not reflect *most* current water quality conditions. And using this data creates a high likelihood of establishing BWQ at much lower concentrations than is actually present at most sites (i.e. *most* streams and rivers, by definition, are expected to have lower water quality than least-disturbed reference streams). This situation will result in overestimating total available assimilative capacity. Using the mean 1987 ecoregion data as the 2018 BWQ for the majority of the remaining high-quality waters could pose a serious threat to our state's waters. An illustrative example is provided for total phosphorus values in **Table 1**.

Table 1. Comparison of total phosphorous by ecoregion– mean ecoregion values from 1987 Least-Disturbed Reference study, 90th percentile of 1987 data, and ecoregion means calculated from ADEQ ambient monitoring station from 1 April 2010 to 31 March 2015.

Ecoregion	1987 Mean	1987 90th	2010-2015 Mean
Ozark Highlands	0.051	0.095	0.101
Boston Mountain	0.024	0.050	0.037
Delta	0.740	0.360	0.254
Gulf Coastal Plain	0.072	0.120	0.206
Arkansas River Valley	0.061	0.095	0.144
Ouachita Mountains	0.023	0.030	0.046

Other Considerations

- A minimal number of water quality parameters were monitored during the 1987 study, and water quality criteria have not been promulgated for roughly 70 % of them. Likewise, there are numerous benchmark values and effluent limitations for parameters not monitored by Arkansas Department of Environmental Quality (ADEQ). See **Table 2**.
- Only a portion of waterbodies within the state have the last five years of water quality data present. In 2016, only 45% of perennial rivers and streams were assessed[1]; however, **many** of those assessments were carried over from previous cycles because inadequate data existed within the applicable five-year period of record.
- Finally, baseline water quality does not propose to capture the worst-case flow scenario, which would ensure that maximum protection is afforded the state's remaining high-quality waterbodies.

Assimilative Capacity

According to the draft Implementation Plan, if a *significant* lowering of water quality is proposed by an activity, then an applicant will be required to conduct an antidegradation review. A significant lowering of water quality is established when ≥ 10% of the total assimilative capacity

[1] See Table III-31, page III-71; Page II-3 of 2016 Integrated Report lists ~ 24,000 miles of perennial streams https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2016/integrated-report.pdf

of a waterbody for a given parameter is proposed to be consumed as a result of the permitted activity. The assimilative capacity is derived through the following calculation:

Baseline water quality – water quality criteria = total assimilative capacity.

First, consider the purposes of water quality criteria. These criteria, both numeric and narrative, are intended to protect beneficial uses of surface water. But for purposes of calculating total assimilative capacity only numeric criteria can be utilized. Numeric criteria establish minimally acceptable levels of pollutants. EPA describes the criteria to protect aquatic life as, "how much of a chemical can be present in surface water before it is *likely to* harm plant and animal life." And for human health criteria, EPA notes, "EPA scientists research how much of a specific chemical can be present in surface water before *it is likely* to harm human health."[2] Although criteria development uses conservative assumptions, EPA's qualified descriptions of these criteria hardly instills absolute confidence in the values derived. The development of numeric criteria is supposed to be based on the best scientific information currently available. But it would be disingenuous to suggest that there is no scientific uncertainty in the numeric water quality criteria which have been derived to date to protect human health and the environment.

According to the formula above, a determination of the total assimilative capacity first requires numeric water quality criteria, which, unfortunately, are not available for many important pollutants. For example, nutrient enrichment is one of Arkansas's main water quality pollution concerns; however, numeric nutrient criteria have yet to be adopted. Without numeric nutrient water quality criteria, nitrogen and phosphorous are pollutants that will be omitted from antidegradation review because no assimilative capacity can be calculated without water quality criteria. How can an antidegradation implementation plan which excludes these critical pollutants from consideration adequately evaluate whether lowering high quality water is appropriate?

Given the requirement for numeric criteria to ascertain the total assimilative capacity, which pollutants actually fall into the anti-degradation review universe? Is this limited universe adequate to ensure that decisions about lowering Arkansas's current high-quality waters are being adequately evaluated? Probably not. As such, I believe integrating more conservative assumptions and safeguards into the draft Implementation Plan is warranted.

<u>Suggested Revisions</u>

Given that representative upstream data likely will not be readily available for establishing a BWQ based on worst case flow scenarios and that the universe of numeric water quality criteria for calculating assimilative capacity is very limited, it appears that implementation of the antidegradation policy has a limited scope. Although the draft Implementation Plan is a good starting point, additional safeguards should be integrated into the draft Plan to increase its reach and effectiveness.

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[2] https://www.epa.gov/wqc/basic-information-water-quality-criteria

The number of active NPDES permits with existing discharges to waters of the state can be determined, but their overall impact to high-quality waters is largely unknown. According to ADEQ's Facility and Permit Summary database (PDS), there are approximately 364 active municipal NPDES permits, 189 active NPDES permits for domestic wastewater, and 166 active industrial NPDES permits, totaling 719 individually permitted NPDES discharge points. Since the effluent limits in permits are designed to meet water quality criteria and are not designed to protect high water quality which exceeds that criteria, the number of stream segments representing high quality waters which already have been degraded by permitted point sources is unknown.

According to ADEQ's 2016 305(b) Report, there are 16,682 miles of 2^{nd} - 5^{th} order rivers and streams in Arkansas (page II-3) but only 11,430.6 river miles were assessed (page lll-71). Of the 16,682 total river miles, 5251.4 river miles were not assessed and 4610.6 river miles did not support a use (mostly aquatic life). Although a total of 6820 river miles were determined to support all uses (page lll-71), well over ½ of all the state's larger streams and rivers were either not assessed or did not support a use (9862 river miles).

The number of discharges to state waters and the data gaps in assessing water quality impacts demonstrate the need for measures to be adopted that offset the risks posed by the lack of knowledge regarding the existing permit program's impacts on water quality, especially for discharges to high-quality waters. As such, for Tier 2 waters, I recommend that the implementation plan for the anti-degradation policy require representative water quality data (whether actual or modeled) for a five -year period *at critical flow conditions* when establishing the BWQ.

I also recommend that the Implementation Plan include a margin of safety to conserve a small portion of the total assimilative capacity. This margin of safety would place a certain percentage (such as 20%) of the total assimilative capacity in reserve to take into account any uncertainty between the permit limits designed to meet water quality criteria and the actual impacts on the receiving waterbody. This approach would provide better protection of high quality waters in the permitting process and greatly improve public confidence in the agency's decisions to lower water quality.

Finally, I ask ADEQ to consider conducting a one-time anti-degradation review for existing major industrial and major municipal permitted facilities that discharge into high quality waters. Both the public and these facilities would clearly benefit from the completion of an alternatives analysis, which has never been considered for these types of dischargers. Currently, there are approximately 530 individually permitted industrial and municipal facilities, and not all of these facilities are majors. To facilitate this one-time review for the major facliities, the permit reviews could be phased in over a ten-year period beginning with the major industrial permits. If, however, this approach should prove to be too resource intensive, then, in the alternative, I ask ADEQ to please consider enlarging the category of appropriate permits for anti-degradation review to encompass chronically or significantly noncompliant facilities. Such facilities are likely having a much greater impact on water quality than facilities that regularly meet their permit requirements, and they would clearly benefit from conducting an alternatives analysis to determine whether viable less-degrading treatment options exist, including such things as product or raw material substitution, improved operation and maintenance, or seasonal or controlled discharges to avoid critical water quality periods.

III. Analyses

The **Alternatives Analysis** should be clear that if a non-degrading alternative is technically and economically feasible, then it should be the selected alternative.

Including the term "economic" in two different analyses could be confusing. In the attached marked-up version of the draft Implementation Plan, I suggested shortening the name of the **Economic Efficiency Analysis** to Economic Analysis and shortening the name of the **Economic and Social Development Analysis** to Social Development Analysis. Also, I suggested relocating the discussion of the Economic Analysis to follow the Alternatives Analysis.

Again, I appreciate the opportunity to participate on the Focus Group for the Antidegradation Policy's Implementation Plan. If you have any questions concerning these comments or the proposed revisions to the attached marked-up version of the draft Implementation Plan, please do not hesitate to contact me.

Sincerely,

Ellen Carpenter

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Table 2. Water quality parameters monitored in the 1987 Ecoregion Reference Study (ERS), collected routinely as part of ADEQ's Ambient Monitoring Program, adopted as water quality criteria in Regulation No. 2 (R.2 WQC), and incorporated into NPDES permits (ARR; AR; ARG). **X** = included; / = partially included; **?** = questions about how parameter will be used to calculate assimilative capacity.

Parameter	1987 ERS	ADEQ Ambient	R.2 WQC	ARR; AR; ARG	Comments
Q, cfs	X				
Temp °C	X	X	X		
pH	X	X	X	X	
Turbidity, ntu	X	X	/?		Not traditionally used in NPDES permit limits. How would stormflow vs base flow criteria be used in assimilative capacity calculations?
TSS, mg/l	X	X	?	X	Used in NPDES permit limits. No WQC in Reg. 2.
TDS, mg/l	X	X	/?		Not traditionally used in NPDES permit limits. When site specific criteria have not been adopted in Reg. 2.511(a), will 2.511(b) or (c) be used in assimilative capacity calculations?
BOD-5, mg/l	X	X?		X	ADEQ Ambient monitoring of BOC (standard conditions) - assuming that means 5 day?
BOD-20, mg/l	X				
T.Phos., mg/l	X	X	?	X	Used in NPDES permit limits. No WQC in Reg. 2.
PO4-P, mg/l	X	X			
NO2+NO3-N, mg/l	X		?	x	Used in NPDES permit limits. No WQC in Reg. 2.
NH3-N, mg/l	X	X		X	Total ammonia nitrogen (TAN) is usually used in NPDES Permit limits, and in Reg. 2. TAN = NH_3 (unionized ammonia) + NH_4 (ionized ammonia)
Cl -, mg/l	X	X	?		When site specific criteria have not been adopted in Reg. 2.511(a), will 2.511(b) or (c) be used in assimilative capacity calculations?
SO4 =, mg/l	X	X	?		When site specific criteria have not been adopted in Reg. 2.511(a), will 2.511(b) or (c) be used in assimilative capacity calculations?
Fe, mg/l	X	X	?	X	Used in NPDES permit limits. No WQC in Reg. 2.
Conductivity µmho	X				
Alkalinity, mg/l	X	X			
T. Hardness, mg/l	X	X			Used in calculating dissolved metals toxicity.

Chlorophyll a, µg/l	X		/		Used in site specific criteria for Beaver Lake only.
Fecal coliform	X	/	X	X	
Manganese	/	X	?		Used in NPDES permit limits. No WQC in Reg. 2.
COD mg/l	/		?	X	COD only calculated for select streams. Some ecoregions without any data. Used in NPDES permit limits. No WQC in Reg. 2.
Aluminum		X		X	
Antimony		X		X	
Arsenic		X		X	
Barium		X			
Beryllium		X	X	X	
Boron		X			
Bromide		X			
Cadmium		X	X	X	
Calcium		X			
Chromium		X			
Cobalt		X			
Copper		X		X	
Dissolved Oxygen	X	X	X		1987 Ecoregion DO values from short-term continuous data; ADEQ Ambient monitoring discreet grab samples. How will Baseline DO comparisons be calculated to determine most protective of 1987 vs. 5 year average?
E. coli		/	X		
Fluoride		X		X	
Inorganic Nitrogen		X			
Lead		X	X	X	
Magnesium		X		X	
Nickel		X	X	X	
Potassium		X			
Selenium		X	X	X	
Silica		/			

Silver		X	X	X	
Sodium		X			
Specific Conductance		X			
Thallium		/			
TKN		/			
TOC		/			
Vanadium		X			
Zinc		X	X	X	
Oil & Grease				X	
Mercury			X	X	
Cyanide			X	X	