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Comments on Regulation 5 Revisions

Submitted via electronic delivery to reg-comment@adeq.state.ar.us
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The following are comments from the Buffalo River Watershed Alliance on proposed revisions to APC&EC Rule 5 Liquid Animal Waste Management Systems, Markup Draft July, 2019.

We fully support the proposed changes to Rule 5 in their entirety and particularly Rule 5.901 regarding issuance of permits for medium and large swine CAFOs in the Buffalo National River watershed. We appreciate the leadership of Governor Hutchinson in taking the necessary steps to protect our state's most significant Extraordinary Resource Water, as well as the direction of both ADEQ and APC&E in the furtherance of these new rules for protecting the Buffalo River National Park watershed. In support of this, we offer the following important reasons as to why this protection should be made permanent.

Why permanent protections in regard to medium and large CAFOs in the Buffalo River watershed are important (points A through F):

A) The watershed is that of a *National River* under the care of our state

The Buffalo River was established as the nation's first "national river" on March 1st, 1972 by an act of Congress. It accommodates three wilderness areas and one wildlife management area. Images of its pristine waters backdropped by majestic painted bluffs adorn the state's maps and promotional materials. The Buffalo National River is iconic to the Arkansas identity. In addition to being an Arkansas ecological crown jewel, it is also arguably the state's most important economic engine in regard to tourism, generating an estimated $62 million dollars in output in gateway communities and supporting more than 900 jobs (National Park Service 2017). Due to the volume of material waste generated by CAFOs, their operation within the watershed would place undue risk to the value of the Buffalo as an economic, ecological, and cultural resource.

B) The geology of the drainage area is underlain by the Boone Formation which is karst geology, making the Buffalo watershed particularly vulnerable to pollutants

The bluffs, springs, and caves that make the Buffalo so valuable as a nationally recognized tourism destination, also highlight its sensitivity to pollutants. The presence of karst is not subjective but obvious to the casual observer from the weathered dissolution features exposed throughout the watershed. Though karst geology in the area has long been scientifically recognized, there has been intense discussion on this topic over the last six years in regard to its nature and importance in regard to safeguarding the Buffalo. To that end, we are including limited selective references to recent studies and quotations to illustrate the importance of considering karst in regard to protecting the Buffalo River watershed from pollutants.

- Thomas Aley, Arkansas Professional Geologist 1646, president Ozark Underground Laboratory, Inc. in a report regarding C&H Farms provided to Ozarks Society and Buffalo River Watershed Alliance on May 24, 2018:

  "It is my opinion that an average of about 65% of the water that reaches the Buffalo River from areas underlain by the Boone Formation has passed into and through the karst aquifer. The remaining 35% of total water yield is surface runoff. Water enters the karst aquifer through both discrete and diffuse recharge. Discrete recharge zones include sinkholes, losing streams, and multiple other points that have little or no surface expression. Sinkholes and losing stream segments are abundant in the Boone Formation." "It is my opinion that karst groundwater systems, specifically including those in the Boone Formation, are highly vulnerable to groundwater contamination and pollution."

- J. Berton Fisher, Ph.D., CPG, PG (TX#0201) of Lithochimeia, LLC from expert opinion prepared for BRWA regarding C&H Farms provided May 27, 2017:

  "Specifically, the Facility and nearly all Fields are located on the Lower Mississippian Boone Formation, a course-grained fossiliferous and fine grained limestone interbedded with anastomosing and bedded chert. The Boone Formation is well known for dissolution features, such as sinkholes, caves and enlarge fissures." "Karst terrain presents

hazards to both water quality and the integrity of physical structures. In karst terrain, surface water can rapidly enter groundwater systems after passing through thin layers of permeable soil and solution-enlarged fractures in bedrock."

- Michael D Smolen, Ph.D. Lithochimeia, LLC from expert opinion prepared for BRWA regarding C&H Farms provided June 1, 2018:

    "Groundwater flow direction is an important concern to this application because of the karstic geology, where it cannot be assumed that groundwater follows surface topography. Dye studies by Brahana et al., Electrical Resistivity studies by Fields and Halihan, Ground Penetrating Radar studies by Berry et al., and drilling by Harbor(2016), have confirmed the existence of karstic limestone, epikarst vadose zone, and gravel deposits in the application fields that result in diverse patterns of subsurface flow."

- Lee J. Florea, Ph.D., P.G., from expert opinion prepared for Ozark Society in the matter of C&H Farms, June 4th, 2018:

    "The area surrounding Mt. Judea, and the larger Big Creek watershed are most certainly a karst landscape. Sinkholes, cave entrances, and springs were all observed during my 2014 visits, first sponsored by BCRET and later that same year as a participant in the Friends of Karst meeting hosted by Dr. Matt Covington, also of the University of Arkansas. Sections of Big Creek may gain and lose flow along the reach of the main step and of the tributaries, a strong indication of underflow through conduits." "Karst is easily one of the most complex aquifer types to develop accurate models to predict groundwater flow."

- James C. Petersen, aquatic biologist and a water-quality hydrologist and worked for more than 36 years with the U.S. Geological Survey Arkansas Water Science Center, in opinion prepared for Ozark Society in the matter of C&H farms on May 31, 2018:

    "In my opinion, the karst topography and geology of the area near C&H Hog Farms, including part of Big Creek located upstream from BCRET monitoring site BC6 and downstream to the Buffalo River, present issues for agricultural activities and the collection of data used for hydrologic studies. These issues are not applicable, or not applicable to the same degree, in areas without karst. These karst-specific attributes include rapid movement of groundwater (up to thousands of feet to miles per day; Brahana and others, 2017), little decrease of contaminants, relatively common movement of groundwater beneath surface elevation divides, loss of surface water from streams to groundwater, and gain of groundwater to streams."

- Dr. Robert Blanz chief technical officer for ADEQ in deposition on the matter of C&H farms responding to questions regarding ADEQ's permit denial determination:

"We don't know anything about the subsurface permeability, nor do we know the flow direction, which in karst is very difficult to determine. So the question there is, what — which way is the groundwater going and in what speed and what amount, and given the environment there, it could very well be impacting the surface water."

- Jamal Solaimanian, Engineering Supervisor at ADEQ in deposition on the matter of C&H farms responding to a question of where waste might end up if there were a catastrophic failure in a pond liner:

  "You know, as we discussed that before, the karst is very -- the karst is very difficult to basically know the groundwater flow directions because, you know, it's -- but if we hit that, you know, this can pretty much -- if it gets such a hole, it's pretty much all the ways you get to the groundwater and eventually it recharges to any type of spring or to any -- recharges back into any of the surface waters, then that would be a problem, yes."

- Jon Fields and Dr. Todd Halihan of Oklahoma State University prepared a taxpayer funded report for the Big Creek Research & Extension Team entitled: *Electrical Resistivity Surveys of Applied Hog Manure Sites, Mount Judea, AR.* The geographic description in the report included the following:

  "The hydrologic setting for the sites is a mantled epikarst (soil over epikarst over competent carbonate bedrock). Precipitation enters the subsurface through the soil zone and enters the epikarst area. Fluids move through the epikarst area and enter the unweathered competent bedrock through fractures and other openings. Understanding the storage and transmission properties of these three zones is essential to understanding the migration of nutrients from applied hog manure in the area. This section will discuss the hydrologic settings of the soil zone, epikarst zone, bedrock, the local water table and the application of hog manure at the time of data collection."

- David Mott, an engineering geologist, former hydrologist with NPS, former regional hydrologist with the U.S. Forest Service, and having held various leadership positions with the USGS states in the *Water Resources Management Plan prepared for the Buffalo National River* at the request of the National Park Service in 2004 states:

  "Discrete recharge is a concentrated, rapid movement of water to the subsurface drainage network, most common in areas dominated by karst, which is typical in the Ozarks. Sinkholes and losing streams are examples of discrete recharge. Most sinkholes and losing streams (where a portion of the reach goes dry) are found to be underlain by the Boone formation in northwest Arkansas and most springs emerge in the Boone, as shown in Figure 19 (Aley, 1999). Groundwater pollution is most common in limestone and dolomite areas such as the Boone formation because discrete recharge does not allow for the effective

filtration and absorption of pollutants. Faster travel rates provide less time for bacterial and viral die off as well. This is important for water quality management of the Buffalo River since almost 32% of the watershed is underlain by the Boone formation (Aley, 1982).”

- Dr. Van Brahana produced a peer reviewed report (in press 2017) entitled: “*Utilizing Fluorescent Dyes to Identify Meaningful Water-Quality Sampling Locations and Enhance Understanding of Groundwater Flow Near a Hog CAFO on Mantled Karst—Buffalo National River, Southern Ozarks”.* Dr. Brahana’s conclusions were as follows:

  “Based on the results of the dye tracing described herein, the following observations of groundwater flow in the Boone Formation in the Big Creek study area can be used for designing a more reliable and relevant water-quality sampling network to assess the impact of the CAFO on the karst groundwater and to gain further understanding of the karst flow.”

  1. ***Although the study area is mantled karst, subsurface flow is very important, and forms a significant part of the hydrologic budget.***
  2. ***Groundwater velocities in the chert/limestone portion of the middle Boone Formation were conservatively measured to be in the range of 600-800 m/d.***
  3. ***Conduits in pure-phase limestones of the upper and lower Boone have flow velocities that can exceed 5000 m/d.***
  4. ***Groundwater flow in the Boone Formation is not limited to the same surface drainage basin, which means that anomalously large springs should be part of the sampling network (Brahana, 1997).***
  5. ***Because the Buffalo National River is the main drain from the study area, and the intensive contact of the river water by uses such as canoeing, fishing, swimming, and related activities, large springs and high- yield wells should be included in the sampling network.***
  6. ***Maximum potential transport times of CAFO wastes from the land surface appear to be greatest during and shortly after intense precipitation events. Minimum groundwater flow occurs during droughts. Sampling should accommodate these considerations.***

- ADEQ statement of basis in the denial of CAFO permit No. 5264-W AFIN 51-00164:

  “The facility is located on the Boone Formation, an area known to have karst. The hydrology of karst terrain is ‘created from the dissolution of soluble rocks, principally limestone and dolomite.’ Karst terrain is characterized by springs, caves, and sinkholes.6 ‘Karst hydrogeology is typified by a network of interconnected fissures, fractures and conduits emplaced in a relatively low-permeability rock matrix.’ In karst, the groundwater flow usually occurs through these networks of interconnected fissures, and groundwater may be stored in that matrix. Aquifers in karst are extremely vulnerable to contamination.

The presence of karst triggers additional considerations for siting and design as stated in the Animal Waste Management Field Handbook (AWMFH). The following examples illustrate some of the issues presented by karst:

> ***AWMFH, 651.0702(c) states:***
> ***Sinkholes or caves in karst topography or underground mines may disqualify a site for a waste storage pond or treatment lagoon.***
>
> ***AWMFH, 651.0702(l) states:***
> ***Common problems associated with karst terrain include highly permeable foundations and the associated potential for groundwater contamination, and sinkholes can open up with collapsing ground. As such, its recognition is important in determining potential siting problems.***

ADEQ has determined that a detailed geological investigation of the facility is required because karst includes highly permeable foundations with the associated potential for groundwater contamination and potential for sinkholes to open up with collapsing ground or cause differential settlement."

- John Bailey, Arkansas Farm Bureau Federation, in public comments submitted in regard to permit 5264-W:

> ***"Although ADEQ spends a significant amount of time in the statement of basis discussing karst, Arkansas Farm Bureau has never argued that karst was not present."***

C) CAFO waste is spread on pastures using the Arkansas Phosphorus Index (API) which fails to account for groundwater or karst.

The API formula used in CAFO nutrient management planning uses special calculations in regard to surface run-off allowing an operator to distribute phosphorus in excess of what crops can absorb. A significant weakness of the API is its failure to consider karst or any subsurface geological risk factors when determining the risk of waste applications to waters of the state. As the API fails to account for groundwater or karst, this presents undue risks relative to CAFOs in regard to the Buffalo River watershed. Smolen (2017) had this to say in regard to limitations of the API in regard to various aspects including subsurface flows:

> ***"The API, as used in planning the NMP, has several severe shortcomings. First, although it purports to address risk of degrading water quality, it does not address some important factors affecting transport to the receiving waters. In reality it only compares the source term of the Index not the risk of polluting the receiving waterbody. The PI was derived from a series of rainfall simulator studies of runoff produced from application of a synthetic rainstorm on a small area of soil. This makes it very sensitive to application rate and characteristics of the waste, but not to many other physical factors such as karst, surface drainage, gravel bars, or management factors that affect delivery to the stream."***
>
> ***"Because it was developed from very short-term, micro-studies, it cannot address the larger- scale effects of season, groundwater pathways, or weathering, leaching, or eroding of enriched soils."***
>
> ***"The API does not address the risk due to increased runoff due to soil compaction from livestock hoofs or increased drainage efficiency due to subsurface gravel bars, karst geology, or increased drainage efficiency through surface or subsurface features."***

The allowed use of the API by CAFO operators in Arkansas is a compelling reason to not permit CAFOs in the sensitive geological watershed of Arkansas' singular national river.

D) Soils in the Buffalo River watershed are too thin to accommodate industrial level distribution of CAFO waste

An electrical resistivity survey commissioned by the Big Creek Research and Extension Team (BCRET) under the authorization of ADEQ was performed on three of the spreading fields. As part of this study Dr. Todd Halihan's Oklahoma State University team performed a *Soil Structure Analysis.* The following discussion from the reporting results (6.2.1) Fields, Halihan (2016) will reference fields as they were numbered under their prior Reg 6 permit. An excerpt from the analysis:

> "***The soil structure analysis consists of soil thickness and soil properties. Soil thicknesses for each site were picked and confirmed through hand dug borings on site conducted during previous University of Arkansas work on these fields. The borings were dug to refusal, or where the soil turns to epikarst (significantly weathered bedrock)."***

The following are excerpts from the soils analysis of the three distinct fields. The reader should take note of the thinness of soils particularly to references under 40" in depth and also under 20" in depth.

Field 5a analysis:

“***Field 5a is a low-lying grazing area with low relief and an uneven topsoil surface. Field 5a exhibits average soil thicknesses of 0.5 to 4.5 meters (1.5 to 14.75 feet). Soil thickness on Field 5a varies throughout. There is a significant resistivity difference between the highly to very resistive north and more electrically conductive southern portion (Figure 10). A broad topographic mound is situated northwest of the center of Field 5a; the soil thickness is thinner to the far north and far west of the field (see Appendix 3). This trend is consistent with the direction to which the alluvium would be deposited nearest to the stream. Soils on transects MTJ06 and MTJ07 (Figure 12A) are electrically conductive features, which thin to near zero soil thickness toward the far north.”***

Field 12 analysis:

“***Field 12 exhibits similar average soil thicknesses at 0.7 to 4 meters (2.25 to 13 feet). Soil thickness on Field 12 is not as variable as Field 5a, but there is a very resistive region of the site in the shallow soil area of the southwest portion of the investigation area (Figure 11). Field 12 is flatter and the soil thins to the west (see Appendix 3). MTJ12 (Figure 13A) shows thinning where the electrically conductive features become thicker as the image gets closer to the stream. This trend is consistent with the direction to which the alluvium would be deposited nearest to the stream. Areas where the soil profile is thinner on the images are consistent with the rocky soils encountered when electrodes were placed for data collection.”***

Field 1 analysis:

“***Field 1 is a grazing area situated on a hillside east of the stream. It has low to moderate relative relief and an uneven topsoil surface. Field 1 shows an average soil thickness of 0.5 meters (1.5 feet) determined from the ERI surveys of MTJ111 and MTJ112 (Figure 17) and soil sampling. Hand dug confirmation borings were not conducted on this field. This site was not studied extensively enough to determine differences in resistivity correlations across the entire field. Field 1 has thinner and rockier soils than either Fields 5a or 12.”***

The AWMFH 651.0504(d) *Soil Characteristics, depth to bedrock* states the following in regard to thin soils:

“The depth to bedrock or a cemented pan is the depth from the soil surface to soft or hard consolidated rock or a continuous indurated or strongly cemented pan. A shallow depth to bedrock or cemented pan often does not allow for sufficient filtration or retention of agricultural wastes or agricultural waste mineralization by-products. Bedrock or a cemented pan at a shallow depth, less than 40 inches, limits plant growth and root penetration and reduces soil agricultural waste ad- sorptive capacity. Limitations for application of agricultural wastes are slight if bedrock or a

cemented pan is at a depth of more than 40 inches, moderate if it is at a depth of 20 to 40 inches, and severe at a depth of less than 20 inches."

"Agricultural wastes continually applied to soils that have moderate or severe limitations because of bed-rock or a cemented pan can overload the soil retention capacity. This allows waste and mineralization byproducts to accumulate at the bedrock or cemented pan soil interface. When this accumulation occurs over fractured bedrock or a fractured cemented pan, the potential for ground water and aquifer contamination is high. Reducing waste application rates on soils that have a moderate limitation diminishes ground water contamination and helps to alleviate the potential for agricultural waste overloading. If the limitations are severe, reducing waste application rates and split applications will lessen overloading and the potential for contamination."

Field 1's average depth falls into the *severe limitation* range. Field 5a has areas that include both *moderate* and *severe* limitations and field 12 has areas that fall under the *moderate limitation*. In addition, it is a serious concern that the point of refusal is epikarst which means that unabsorbed nutrients applied to thin soils will filter directly into fractured limestone pathways. The Oklahoma State study identifies epikarst beneath the soil layer for all three fields:

6.2.2 Epikarst Structure

"The epikarst zone consists of the weathering profile of the underlying competent bedrock. Epikarst is visible on Field 5a (Figure 12), Field 12 (Figure 13), and Field 1 (Figure 17) as a more resistive to electrically conductive region below the base of the soil and above the highly resistive competent bedrock zones. No confirmation borings are available to evaluate rock properties in these zones on any of the sites. The thickness of the epikarst zone is highly variable (thicknesses range from 2 to 23 meters or 6.5 to 75.0 feet) throughout each field but averages 4 to 7 meters (13 to 23 feet) thick."

AWMFH 651.0703(2) page 7-15 *Factors affecting groundwater considered in planning* states the following regarding shallow soils over epikarst:

"Deeper soil increases the contact time a contaminant will have with mineral and organic matter of the soil. The longer the contact time, the greater the opportunity for attenuation. Very shallow (thin to absent) soil overlying permeable materials provides little to no protection against groundwater contamination."

As testing was limited to only three fields and they *all* had thin soil limitations, it is reasonable to expect that most pastures in the Buffalo River watershed will have similar thin soil limitations.   These were not upland pastures of which there are many in the watershed. Such highlands will be particularly prone to cherty thin soils underlain by epikarst.   The thinness of soils in the watershed combined with karst groundwater flows clearly underscores the potential risk from the spreading of industrial levels of CAFO waste to a watershed that supports national tourism destination.

E) The record shows agency concerns and degradation in regard to the single facility permitted.

During the operation of the C&H CAFO from 2013 to present, there have been a number of concerns expressed by state and federal agencies along with data from studies that indicate degradation potentially linked to CAFO run-off.   We have listed a handful of these here:

- Big Creek Research & Extension Team (BCRET) testing of Big Creek immediately downstream of the facility shows degradation for nitrates

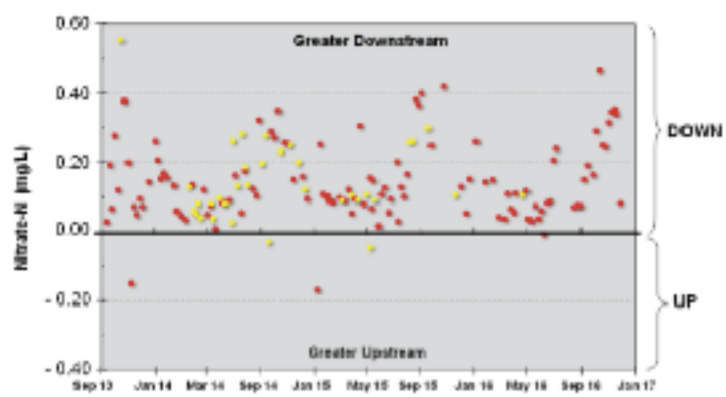

Figure 1. Difference in NO_x-N concentration in Big Creek up- and downstream from the C&H CAFO. Following the "upstream vs. downstream" comparative criterion that is the basis of the BCRET study, the data clearly indicate that the C&H CAFO is contaminating Big Creek with nitrate. From BCRET (2017a; note that explanation was not given for the yellow versus red color-coding).

Nitrates are being measured by the *Big Creek Research and Extension Team* (BCRET) of the *University of Arkansas Division of*

Agriculture both upstream and downstream of the facility and nearby spreading fields Figure 1.

Regarding this data illustration, Burkholder in a report to Buffalo River Watershed Alliance (2017) states:

> ***"The data clearly indicate that the C&H CAFO is contributing swine waste pollution to adjacent public trust waters. The nitrate levels downstream from this CAFO commonly are levels that have been shown in other research to be toxic to sensitive aquatic life (Camargo et al. 2005, Guillette et al. 2005). The nitrate signal is stronger than the E. coli signal because nitrate does not adsorb to sediment particles and settle out (Stumm and Morgan 1996); instead, nitrate is highly soluble and is transported rapidly from swine CAFOs to receiving surface and groundwaters (Evans et al. 1984, Stone et al. 1998, Ham and DeSutter 2000, Mallin 2000, Krapac et al. 2002), the latter problem being exacerbated in underlying karst geology (Mellander et al. 2012, Knierim et al. 2015) which is characteristic of the region that includes the C&H CAFO (Hudson et al. 2001, 2011)."***

ADEQ has acknowledged Petersen's analysis (aquatic biologist and a water-quality hydrologist) as compelling evidence that between the upstream and downstream stations, C&H is likely to be a contributing factor:

> ***"-BCRET data document that nitrate-N is variable; however, Figure 12 of the April 1 to June 30, 2018 BCRET Quarterly Report demonstrates that nitrate-N is higher downstream (BC7) than upstream (BC6). Chlorides and nitrates follow similar seasonal fluctuations in that they are higher during summer and autumn months when stream discharge is most influenced by groundwater. ADEQ reviewed Petersen's May 31, 2018 expert report, which presents an analysis of temporal trends among nitrate-N and E. coli from January 2014–December 2017 at ---BC6 and BC7. Mr. Petersen's analysis presents decreasing trends of ammonia and chlorides and increasing concentrations of E. coli at BC6. Yet, increasing concentrations of nitrate-N were observed downstream at BC7. The conflicting temporal analysis prompted Mr. Petersen to further review trends upstream to downstream. By analyzing paired concentration data (collected same day) at BC6 and BC7 from January 2014 through December 2017, Mr. Petersen reports significant increases in total nitrogen, ortho-phosphorus, and chlorides, but nonsignificant changes in E. coli and nitrate-N. The significant increase of nitrate-N in the house well and ephemeral stream does correspond to increases of total nitrogen at BC7. Mr. Petersen's analysis illustrates the complexities of evaluating water chemistry in karst systems. "***

- M.D. Smolen, PH.D. who's specialty is water quality analysis as affected by agricultural waste management, examined the BCRET data and had this to say in regard to phosphorus measurements captured at the monitoring stations upstream and downstream of C&H:

> ***"Total Phosphorus concentration increases with low stream flow, and this relationship is stronger at the downstream station than at the upstream station, supporting the conclusion that C&H is the source."***

- M.D. Smolen, PH.D. examined the BCRET data and noted statistically significant changes in nitrate contamination in the C&H house well and also the ephemeral stream:

> ***"Sampling of the ephemeral stream and house well both suggest there is nitrate contamination from hog manure sources. The results, however, are difficult to interpret definitively due to lack of controls."***

- In a letter dated October 6, 2015, Kevin Cheri, Superintendent for the National Park Service (NPS) to Director Keogh of ADEQ noted the following (excerpt):

> ***"NPS has also been monitoring the United States Geological Survey (USGS) sites collecting dissolved oxygen data on tributaries to the Buffalo River. Two of these sites have chronically been below the allowable limits in Regulation 2.505. These are Bear Creek near Silver Hill (USGS Site 07056515) (ADEQ site- BUFT12) (Figure 2) and Big Creek at Carver (USGS Site 07055814) (ADEQ site- BUFT06) (Figure 3). These streams have had minimum dissolved oxygen values of 3.9 and 4.5 mg/L, respectively, well below the standards."***

- Chris Racey, Chief - Fisheries Division, Arkansas Game and Fish Commission wrote to Jim Wise of ADEQ on March 16, 2016 (excerpt):

> ***"AGFC Biologists are also concerned with the Dissolved Oxygen levels of Big Creek, a Buffalo River tributary in Newton County near Gene Rush Wildlife Management Area. Summer algal blooms, likely caused by excess nutrient levels, appear to be impairing this creek. Smallmouth bass require 6.0 mg/L DO for optimal growth, and this water quality standard is not being met for several months of the year, per the USGS gage station at Big Creek. We concur with the recommendations of the National Parks Service that Big Creek should be considered for the list of 303(d) streams."***

- On December 15th, an *Assessment Methodology* session was sponsored by ADEQ at their N Little Rock headquarters to review with selected stakeholders the process for producing the 303(d) list. During this meeting, Billy Justus and Lucas Driver of the *U.S. Geological Survey (USGS) Lower Mississippi-Gulf Water Science Center* presented a slide presentation entitled: *An Evaluation of Continuous Monitoring Data for Assessing Dissolved-Oxygen in the Boston Mountains.* Big Creek was one of five waterbodies reviewed in the presentation. Notable was the slide listed in Appendix D5 showing dissolved oxygen at 20.5% of unit values below 6mg/L. The exceedance level over which impairment is indicated is 10% at 20 degrees centigrade. These USGS statistics show a clear indication of impairment.
- ADEQ's 2018 proposed 303(d) list of impaired waterbodies include Big Creek and 14.32 miles of the Buffalo National River. The Buffalo shows impairment both upstream and downstream of Big Creek's confluence. ADEQ describes the proposed impairment of Big Creek and the Buffalo in the following response to comments on the Regulation 5 permit from January:

> **"ADEQ considers all readily available data to determine the status of water quality in Arkansas and to identify waterbodies that fail to meet standards defined in APC&EC Regulation 2. ADEQ recently completed water quality assessments for the development of a proposed 2018 303(d) List and 305(b) Integrated Report as required by the Clean Water Act. In the Buffalo River Watershed, four Assessment Units (two sections of Big Creek and two sections of the Buffalo National River) have been identified as impaired: three for bacteria, and one for dissolved oxygen. Based on data for submitted by USGS for the 2018 303(d) list, ADEQ proposes listing Big Creek (AR_11010005_022) as impaired for dissolved oxygen."**

The concerns and the data speak for themselves in that allowing medium and large CAFO operations in the watershed of a National River presents undue risk to the value of the resource.

F) Avoidance of repeating future public payouts

In order to understand why permanent protection of the Buffalo River Watershed from future medium and large CAFOs is important, we must look at the circumstances of C&H Farms that led to this point. The farm family followed the rules of a special process that ADEQ led them through at that point in time. After it was realized by both the state and the public that this was a serious risk to the Buffalo National River, the state has moved forward with funding a buyout that involves both public and private funds. Although we are currently at a point where no-one could imagine that there would be another CAFO applicant in the watershed, this certainly becomes a greater possibility as the years go by. We do not want to incentivize future permit applicants to acquire another CAFO permit in this watershed with the mistaken understanding that this could lead to a possible lucrative buy-out. We do not, in any way, shape, or form, want this to be mistakenly identified as a way to turn a profit at the expense of the taxpayer. For this reason, along with the others regarding the thin soils and sensitive geology surrounding Arkansas' singular National River, these protections from CAFOs must be implemented.

In addition, regarding Rule 5.402, we support the continued requirement to comply with the Field Office Technical Guide and Agricultural Waste Management Field Handbook. These guidelines provide the most informative and detailed information on protective design and planning and proper compliance will ensure future facilities are properly constructed.

Further, to the extent that it has a bearing on the rule making, we reserve the right to respond to the Big Creek Research and Extension Team's final report, whenever it is issued.

We incorporate all other comments supportive of a permanent moratorium on medium and large CAFOs in the Buffalo River watershed.

Thank you for the opportunity to submit these comments.

Gordon Watkins, President,

Buffalo River Watershed Alliance

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