United States Department of the Interior

NATIONAL PARK SERVICE
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

IN REPLY REFER TO
1.A.1 (BUFF)

September 4, 2015

C&H Hog Farms EA
c/o Cardno, Inc.
501 Butler Farm Road
Suite H
Hampton, VA 23666

To Whom It May Concern:

My staff has completed their review of the Draft Environmental Assessment (EA) for C&H Hog Farm, Inc. produced by your company and Ecosphere Environmental Services, Inc. for the Small Business Administration (SBA) and the USDA Farm Service Agency (FSA). We have found numerous problems with the document. We submit the enclosed comments regarding the EA. These problems following:

1. Failure to comply with the orders of the District Court Judge by not considering the actual environmental impact of the facility weighed against the pre-facility conditions.
2. Improper Purpose and Need statement.
3. Significant factual errors.
4. Misrepresentation of data and facts.
5. Selective use of data which supports the facility while ignoring data which does not support the facility.
6. Over reliance upon the National Pollutant Discharge Elimination System (NPDES) permit (ARG590001) and the Nutrient Management Plan (NMP) which has been repeatedly shown to have numerous significant errors, omissions, and other flaws.

Attached are specific comments in response to the Draft EA. If you have any questions concerning this submittal, please contact Chuck Bitting, Natural Resources Program Manager, at 870-446-5547, extension 4 or chuck_bitting@nps.gov.

Sincerely,

Kevin G. Cheri
Superintendent

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National Park Service – Buffalo National River
C&H Hog Farms, Environmental Assessment Comments

Comments

Section 1.1.3, Page 1-2: The EA avers "Construction of the facilities began in 2012 and was completed in April 2013. The site is generally flat, with elevations ranging from 940 to 960 feet above mean sea level."

> COMMENT: From this discussion, the EA means the 23 acres C&H purchased to construct their Confined Animal Feeding Operation (CAFO) barns and waste storage ponds. The property is not flat, though the area where the barns and ponds were built is relatively flat. The United States Geological Survey (USGS) topo map and engineering drawings accompanying the original Notice of Intent Application (NOI) for the facility (DeHaan, Grabs, and Associates, 2012) show elevations in the immediate area of the structures to range from 865 feet to 915 feet above mean sea level (MSL), and the overall property ranges in elevation from about 820 to 940 feet MSL.

Section 1.1.3, Page 1-2: The paragraph explains that Big Creek is located approximately 2,150 feet east of the barns and flows into the Buffalo River approximately 6.8 river miles north.

> COMMENT: The actual distance from the barns to Big Creek and the Buffalo River were scaled off the USGS Mt. Judea, AR 7.5' quadrangle using the Digital Line Graph of the creek. This analysis shows the distance to Big Creek is more on the order of 2,300 feet, and the distance to the Buffalo River is 5.6 river miles as measured using ArcGIS.

Section 1.1.3, Page 1-2, C&H Hog Farms Permitting and Compliance History: In paragraph 2 of this section, the EA says the 6,503 swine would produce 2,090,181 gallons of waste annually.

> COMMENT: The original NOI and NMP (DeHaan, Grabs, and Associates, 2012; Page C-4) shows a waste stream of 279,436 cubic feet for the 180 day period of April 1 to October 1. This is equivalent to 2,090,181 gallons for 180 days (1 cubic foot = 7.48 gallons). Extrapolating this figure to 365 days (2,090,180 X 365/180) results in an annual waste production of 4,238,423 gallons. While extrapolating the number may not be precisely accurate it provides a reasonable estimate of the total waste produced in a mean precipitation year.

Section 1.1.3, Page 1-3 second paragraph: The second sentence of this paragraph states that FSA prepared a Class II EA pursuant to its regulations.

COMMENT: Farm Service Agency completed a Class II EA in 2012. This EA did not meet the standards in their NEPA regulations, particularly in regards to public participation. Because of this fact, a coalition of environmental groups filed suit in 2013. Federal District Judge D. Price Marshall found for the defendants and said the EA did not meet the requirements of FSA NEPA regulations in his ruling. (4:13-cv-00450-DPM, 2014).

Section 1.1.3, Page 1-3: This section is a timeline of activities.

COMMENT: This section does not mention the inspection which occurred on July 23, 2013. This compliance inspection was renamed "Compliance Assistance Inspection" when it was released by the ADEQ central office on September 10, 2013.

Section 1.1.3, Page 1-4: The second full paragraph describes the February 26, 2015 major modification request by C&H.

COMMENT: As this was after the judge's ruling (December 2, 2014), this modification request should be part of Alternative B, Proposed Action, rather than Alternative A, No Action.

Section 1.2, Scope of this EA, Page 1-4: In the second paragraph, the FSA and SBA indicate that the Federal loan guarantees will not have any impact upon the financial arrangements between C&H Hog Farm, Inc. and Farm Credit Services of Northwest Arkansas.

COMMENT: Generally, banks are risk averse institutions which make loans using the property as collateral against the loan. In this case, the loan was originated with federal loan repayment guarantees. Should this EA not result in a finding of no significant impact (FONSI), the loan guarantees would be vacated. This would potentially allow Farm Credit Services to modify the terms of the loan. Such a modification would likely increase the interest rate, and other costs associated with the loan payback. Such an action could result in financial problems for the CAFO.

Section 1.2, Scope of this EA, Page 1-5: The FSA and SBA use Question 3 from the Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations (CEQ 1981) to dodge the issue of developing a No Action Alternative that considers the environmental conditions prior to FSA and SBA awarding the loan guarantees to C&H.

COMMENT: Below is the verbatim discussion of item 3 in CEQs 40 most asked questions:

3. No-Action Alternative. What does the "no action" alternative include? If an agency is under a court order or legislative command to act, must the EIS address the "no action" alternative?

A. Section 1502.14(d) requires the alternatives analysis in the EIS to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. Consequently, projected impacts of alternative management schemes would be compared in the EIS to those impacts projected for the existing plan. In this case, alternatives would include management plans of both greater and lesser intensity, especially greater and lesser levels of resource development.

The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis. For example, if denial of permission to build a railroad to a facility would lead to construction of a road and increased truck traffic, the EIS should analyze this consequence of the "no action" alternative.

In light of the above, it is difficult to think of a situation where it would not be appropriate to address a "no action" alternative. Accordingly, the regulations require the analysis of the no action alternative even if the agency is under a court order or legislative command to act. This analysis provides a benchmark, enabling decision makers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the agency which must be analyzed. Section 1502.14(c). See Question 2 above. Inclusion of such an analysis in the EIS is necessary to inform the Congress, the public, and the President as intended by NEPA. Section 1500.1(a).

> The use of the answer to this question implies that the operation of C&H Hog Farm, Inc. is an ongoing program which was "initiated under existing legislation and regulations." The facts say otherwise. FSA and SBA failed to follow implementing regulations of NEPA and the Endangered Species Act (ESA) when they guaranteed the loans for C&H Hog Farm, voiding this defense. Therefore,

this effort to mislead the EA reader, and avoid taking the "hard look" as required by Judge Marshall is invalidated (4:13-cv-00450-DPM, 2014).

The EA also proposes that "it is not possible to conduct fieldwork or sampling to characterize conditions as they were prior to the land acquisition and construction that occurred in 2012 and 2013." This statement is not entirely true. A significant amount of data on water quality exists for Big Creek on the EPA STORET Website (EPA STORET 2015). The amount of data includes over 1200 data points between the years 1990 and 2012. Since 2012, 213 analyses from routine water quality samples and 6,722 analyses from emerging contaminant sampling exist for Big Creek. Aerial photography from the FSA National Agricultural Imagery Program and other sources exists for 2006, 2009, 2010, and 2013 for Arkansas (GEOSTOR, 2015). These data, when analyzed in a Geographic Information System (GIS) framework can provide a reasonably precise analysis of the amount of vegetation change by the action(s). USDA Soil Survey information is available. In 2003 the Arkansas Geological Survey (AGS) published the 7.5' geologic map of the Mt. Judea quadrangle at a scale of 1:24,000. AGS revised it in 2015 adding river paleo-terraces to match USGS mapping in the watershed (Chandler and Ausbrooks, 2015). Finally, nearly all farmers keep records on costs, profits, and losses associated with farm operations for the purposes of tax filing under IRS Schedule F, (Profit or Loss from Farming). The typical retention time for these records is three years, so conceivably, FSA and SBA could recover information on farming practices on all of the properties involved for Tax Years 2012, 2013, and 2014.

Had FSA and SBA conducted an appropriate Class II EA in 2012, they would have collected the data available for the period prior to the construction of the facility.

1.3 Purpose and Need for Action, Page 1-5: The FSA and SBA submit that "the purpose of the EA is to reinstate FSA and SBA guarantees for loans made to C&H Hog Farms." The 2012 EA was not clear on the Purpose and Need, but reading between the lines it appears their original purpose was "to provide FO funding for a Guaranteed loan with Farm Credit Services" (FSA, 2012).

COMMENT: Judge D. Price Marshall, Jr. declared the original EA and Endangered Species consultation invalid in Buffalo River Watershed Alliance ET.AL. v. United States Department of Agriculture and Small Business Administration (4:13-cv-00450-DPM, 2014). He further required FSA and SBA to "take the hard look at C&H's environmental consequences that they should

have in the beginning." This indicates it was the opinion of the court that the EA evaluate the impacts of the facility against the baseline conditions that existed prior to the loan guarantees. This is a very important consideration, as the alternatives and analyses in the EA are predicated upon the purpose and need.

2.1 No Action Alternative, Page 2-1: This short paragraph describes the No Action Alternative as C&H Hog Farms continuing to operate as they are without federal loan guarantees.

COMMENT: This No Action Alternative does not consider the opinion of the court, nor is it in line with CEQ guidance on NEPA as discussed in Sections 1.2 and 1.3. BUT FOR the loan guarantees, which the court has temporarily suspended because of lack of environmental compliance, C&H Hog Farm, Inc. would not exist. THEREFORE the existing condition cannot and should not be used as the baseline as it thwarts the very purpose of NEPA, and does not provide a benchmark condition to measure impacts against. "The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment" (40 CFR 1500.1). This EA fails to study, develop, and describe alternatives to the recommended course of action to guarantee the farm loans, even with the unresolved conflicts concerning alternative uses of available resources as required in 40 CFR 1507.2(d).

2.1.1 C&H Hog Farms, Page 2-1: In the first paragraph, the FSA and SBA claim the "Ponds are surrounded by fencing that meets local Natural Resources Conservation Service (NRCS) requirements and signs are posted to alert people of the ponds' purpose."

COMMENT: There are no fences apparent around the ponds in any of the Inspection Reports. The most recent inspection by ADEQ staff which we have seen occurred on 5 November 2014. A series of photographs of the pond area on pages 4 and 5 are date stamped 11.05.2014. None of these photos show any evidence of fences or signs around the ponds (ADEQ, 2014).

This indicates that FSA and SBA did not perform an adequate job of ground-truthing their data or fencing has been constructed since November of 2014.

The second paragraph in this section claims that at maximum capacity, the animals could generate 2,090,181 gallons of waste annually.

COMMENT: See COMMENT to Section 1.1.3 on page 2 of this document.

2.1.2 Land Application of Waste, Pages 2-1 to 2-3: Near the bottom of the second paragraph the FSA and SBA say that manure and soil is sampled and analyzed prior to

each field application, and appropriate buffers are maintained to prevent runoff of wastes to surrounding areas. FSA and SBA reference the NOI and NMP sent to ADEQ on March 18, 2015 (ADEQ, 2015b).

In the third paragraph, FSA and SBA indicate that it is not known how the application fields were managed prior to inclusion in C&H Hog Farms NMP. They also admit that these fields can have additional fertilizer applied to them, and the frequency, application rate, location, timing and application method of fertilizer not derived from C&H is unknown.

In the fourth paragraph FSA and SBA reference ADEQ Compliance Assistance Inspections, without providing a footnote to those referenced inspections. They claim the NMP contains a mapping discrepancy for field 5, and land use contracts were not available for all of Fields 12 and 16, but they included the fields in the EA to ensure that the full scope of impacts are assessed.

> COMMENT: There are no records in the March 18, 2015 NOI and NMP submitted by C&H (ADEQ 2015b) which show any analysis of the fields since manure application began. All of the numbers appear to be the same as in the original NMP submitted in 2012. There are no records in this document of manure analyses. The facility has put out several modified NMPs which show significantly different Nitrogen (N), Phosphorus (P), and Potassium (K) values for the manure, as well as significantly different values of P in the soil, all this without referencing any soil or manure test reports (ADEQ, 2015a). In many cases, the numbers for Soil Test P are so different from that in the original NMP; it calls into question methodologies of the original and subsequent sampling. Unfortunately, the FSA and SBA failed to note any of the discrepancies in the original NMP, nor do they note the significant differences in subsequent NMPs. Agencies are required to identify methodologies used and explicitly reference the scientific and other sources relied upon. These references seem to be missing.
>
> We do not know if additional fertilizer is being applied to the waste application fields. Such applications can alter the fate and transport of the swine waste by reducing uptake of nutrients. This is a serious flaw in the NMP in the NPDES permit. C&H has no control over the management of most of the fields they are using. These fields could easily become unusable for waste disposal, or waste disposal can be prohibited at the landowner's discretion.
>
> Farm Service Agency National Agricultural Imagery Program aerial imagery can be found on Google Maps and Google Earth. The east end of Field 15 abuts a

landowner who does not want hog waste on his property. Nonetheless, hog waste has been applied considerably closer than 50 feet from his property line as can be seen in the spring 2015 imagery (below). The waste application field is directly uphill of the neighboring landowner's field.

Figure 1: This photo shows Field 15 where its eastern edge abuts a landowner who has not signed his property up as a spreading field. The distance between the manure application and his property line is less than 20 feet in many places and always less than 50 feet except around the rocky area just above the Google earth logo.

FSA and SBA continue to use the acreages and mapping found in the original NMP from 2012 on Table2-1 and Appendix A, Map 3, even though they acknowledge there are "mapping errors" and land use contracts were not available for all of fields 12 and 16. They also continue to use the field "Use" in Table 2-1 which is found in the 2012 NMP, even though subsequent NMPs provide for different uses of some of the fields (ADEQ, 2015a). These discrepancies need to be cleared up as it is not possible to make any sense of the nutrient management scheme of the facility with so much conflicting information.

2.1.3 Operating Requirements, Pages 2-3 through 2-6: This section of the EA describes the requirements under the NPDES Permit ARG590001. I In the Land Application of Waste section:

FSA and SBA indicate that liquid manure is applied at agronomic rates for nitrogen (N).

FSA and SBA say that application of waste is not made within 50 feet of property lines or 500 feet of neighboring occupied buildings.

COMMENT: The waste application is to be guided by the Arkansas Phosphorus Index, not the agronomic rates for nitrogen. See comment 2.1.2 and Figure 1 above regarding at least one instance where waste has been routinely applied within 50 feet of a neighboring property without consent.

2.1.4 Proposed Modifications, Page 2-6: FSA and SBA indicate C&H Hog Farm proposes to install a 60 mm thick HDPE liner in both waste ponds, and an 80 mm thick HDPE cover and methane flare system on pond 1. The purpose of this is to prevent seepage of wastes into groundwater and to control odor and convert methane gas (CH4) to Carbon Dioxide (CO2) a less potent greenhouse gas.

COMMENT: The FSA and SBA are mistaken regarding the liner and cover thickness. C&H proposes to install pond liners of 60 mil thickness [60 thousandths of an inch (0.060 in), 1.52 mm]. The floating cover will be of 80 mil thickness [80 thousandths of an inch (0.080 in), 2.03 mm]. FSA and SBA fail to mention any of the environmental impacts associated with removing the sludge from the ponds, and installing liners. These potential impacts include short term increases in groundwater and surface water contamination from disturbance of the sludge and spreading of the sludge on the fields, potential for waste under the liners to cause bubbles and leakage, any potential impacts with the flaring of the methane, and any by-products of methane flaring.

The design drawings in the NOI for lining the ponds fail to mention leak detection technology, expected leakage of the liners (Peggs, 2006), design considerations for preventing "whales" (bubbles) from forming under the liner, and design considerations for removing the leaked water. These impacts will have to be considered in the EA.

2.2 Proposed Action, Page 2-6:

COMMENT: The Proposed Action is the same as the No Action; the No Action should be the conditions prior to the loan guarantees and prior to C&H Hog Farm in order to make meaningful comparisons.

3.1 Issues Eliminated from Consideration

Floodplains, Page 3-2: The FSA and SBA indicate there are no floodplains associated with the facility or in the spreading fields.

COMMENT: FSA and SBA relied on the NOI and NMP submitted by C&H Hog Farm. In fact, there are floodplains present anywhere the Razort Loam, Occasionally Flooded, and Spadra Loam, Occasionally Flooded, occur. In this

case, that is in Waste Application Fields 3, 5, 6, 7, 9, 12, and 16 at a minimum. The Federal Emergency Management Administration has not developed floodplain maps of this area (FEMA, 2015), but Executive Order 11988: Floodplain Management would still appear to apply.

Air Quality, Page 3-2: The EA says air emission sources associated with the facility include the rearing unit, incinerator, and land application of manure. The EA states that air emissions from the rearing unit, including ammonia and methane, are controlled by guidelines for operations and maintenance outlined in Section 2.1.3. Air Quality is regulated by the NPDES Permit and compliance with the permit will prevent significant air quality impacts.

COMMENT: Section 2.1.3 of the EA is simply a listing of requirements under the NPDES permit. The purpose of the EA is to estimate the degree and severity of impacts from the operation of this facility and to compare this to the no-action alternative. The NPDES permit is a starting area, but simply relying upon the NPDES permit does not eliminate the need to review the impacts in the EA. The rugged terrain of the Buffalo River basin routinely results in dramatic inversion layering. These inversion layers can and do trap odorants and other pollutants in a thick blanket of fog. The pollutants are then free to migrate throughout the valleys in this lower air layer. Anaerobic swine waste lagoons and spreading of these wastes onto fields emits considerable amounts of air pollutants to the surrounding area. The permit requirements for Arkansas are very lax with regards to air quality associated with CAFOs, and the NOI for C&H only contains guidelines which the operators are free to implement or ignore. Swine waste emits odorant compounds such as ammonia (NO3), hydrogen sulfide (H2S), and volatile organic compounds (VOCs) (Wing and others, 2013). Inhalation of these compounds can have adverse impacts upon neighbors of these facilities including increased blood pressure, stress, inability to conduct time honored and traditional rural activities such as picnics, gardening, or simply sitting on the porch in a rocking chair. These are all impacts of air quality that are not addressed in the EA, or in the NPDES permit. NPS staff has reported smelling the odor of hog waste on the Buffalo River between Hasty and Carver.

3.2 Water Resources, Pages 3-3 to 3-5: The handling of water resources primarily takes into account drinking water and recreation. The first sentence describes surface waters to include rivers, streams, creeks, lakes, reservoirs, and other impoundments that support everyday life through provision of water for drinking and other public uses, irrigation, and industry. The EA very briefly describes the Arkansas Pollution Control and Ecology Commission (APCE) Regulation 2 as it deals with nutrient pollution, and bacteria. The EA attempts, unsuccessfully, to describe what a geometric mean is.

COMMENT: The EA fails to take into account the importance of water quality for aquatic life. Aquatic life includes fish, shellfish, crayfish, aquatic insects, and other species that live a significant portion of their lives in the water. This is an important omission as water quality standards are designed to be protective of aquatic life as well as recreation and the other uses, particularly water quality standards as they relate to the Buffalo River. The Buffalo River is critical habitat for the Rabbitsfoot Mussel a Threatened species (Quadrula cylindrica cylindrica) (Federal Register, 2013) (Federal Register, 2015). This mussel is believed to be very sensitive to pollutants. Big Creek and the Buffalo River also have populations of the Endangered Gray and Indiana Bats as well as the Threatened Northern Long-Eared Bat (Harvey, 1985; Gore, 2015). All of these species forage over the water, relying upon good water quality to produce an abundance of aquatic insects which emerge at night.

The EA uses the definition of a geometric mean which is verbatim from Wikipedia (Wikipedia, 2015).
A better definition is the geometric mean is the nth root of the product of n numbers ($geometric\ mean = \sqrt[n]{x_1 \times x_2 \times x_3 \times \dots x_n}$). Based upon the definition of the geometric mean provided by FSA and SBA, it is difficult if not impossible to determine what the geometric mean actually is.

The EA fails to consider the impacts of the swine waste upon the Threatened and Endangered species which forage along Big Creek and the Buffalo River, as well as those which live in the Buffalo River. The EA also fails to address the Antidegradation Policy [40 CFR 131.12(a)(3)], a key part of the protections the Federal and State governments are supposed to apply to the Buffalo River as a Tier 3 water resource. The NPDES permit for C&H is a discharge permit. The intent of this general permit was not to allow direct discharge to surface streams, except if the ponds are overtopped by rainfall. Unfortunately, this permit does not take into account the varying geology of the State of Arkansas. The waste storage ponds are allowed to leak. The permit allows the waste storage ponds to leak up to 5,000 gallons per acre per day. At capacity, this amounts to roughly 5,200 gallons per day. Because the lagoons are built upon karst mantled with the insoluble residue from limestone decomposition, it is reasonable to believe that much if not all of this leakage is finding its way into the karst groundwater system. A considerable amount of dye tracing of karst aquifers in the general area of C&H Hog Farm has occurred at Buffalo National River since 1984 (See Figure 2).

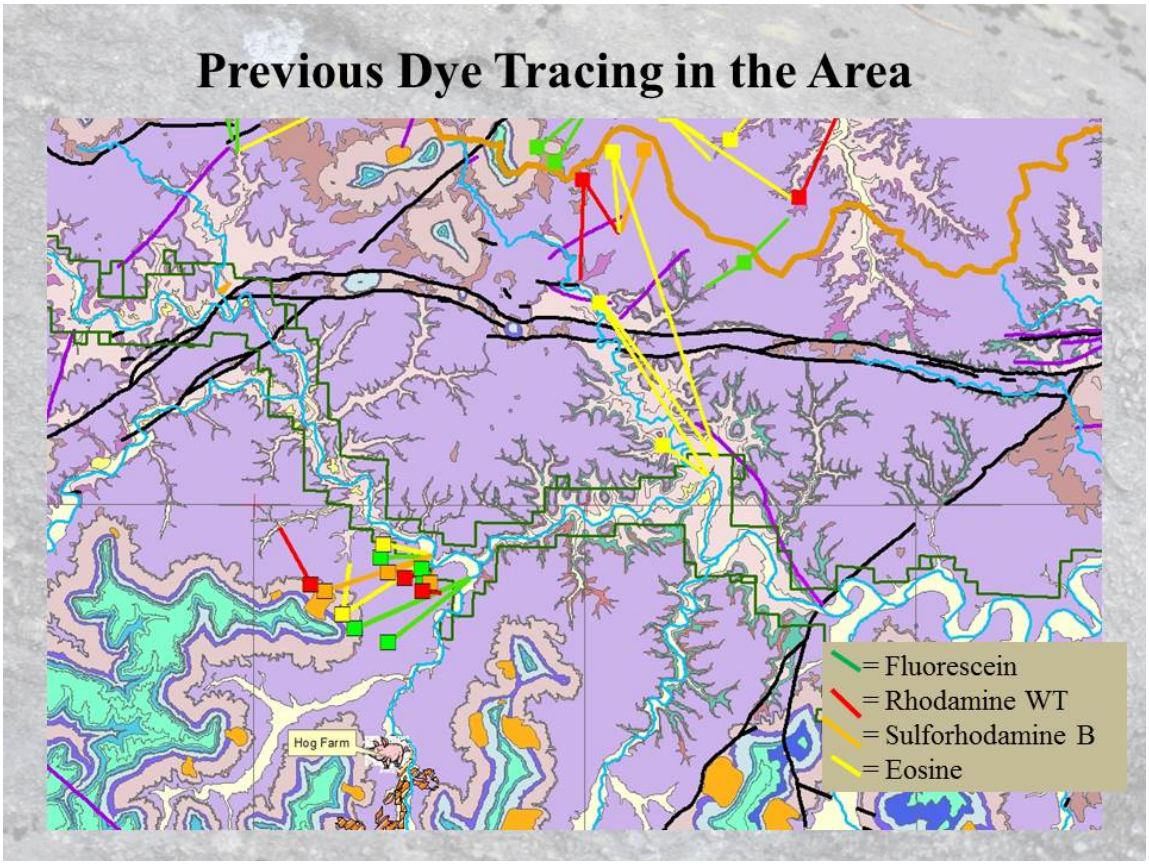

Figure 2: Previous dye tracing in area by NPS and Aley superimposed upon the geologic map.

These studies indicate that water entering the karst groundwater can rapidly move long distances, even crossing drainage divides, without any natural cleansing of contaminants. More recent groundwater tracing in the area (Brahana, pers. Comm., 2014) indicates groundwater in the vicinity of spreading field 15 moves directly to the Buffalo River through the karst aquifer system, and comes out in a distributary pattern into the river (See figure 3).

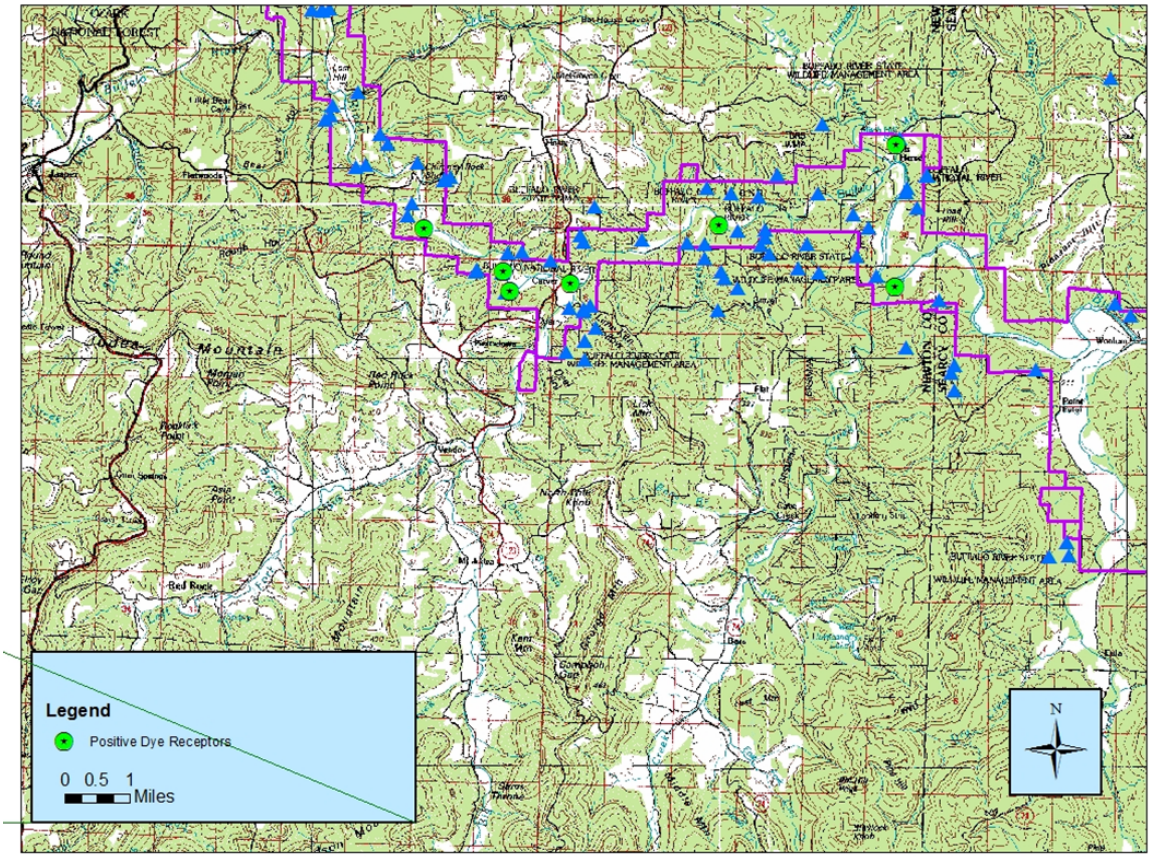

Figure 3: Results of dye tracing from vicinity of Waste Application Field 16. Positive dye detections at seven locations in the Buffalo River are represented by the green circles with black centers (Brahana, 2015)

Finally, the Electrical Resistivity Imaging study conducted on fields 5 and 12 show what appears to be a very large doline (sinkhole) in field 12 (left hand side of part A of Figure 4) (Fields and Halihan, 2015). This study also indicates there is an electrical signature which may have been left by the swine waste as it descended the sinkhole. For these reasons, it is reasonable to believe that the facility may be directly discharging contaminants into the Buffalo River and surface streams flowing directly into the Buffalo River. This would indicate that the Antidegradation Policy needs to be discussed in some detail.

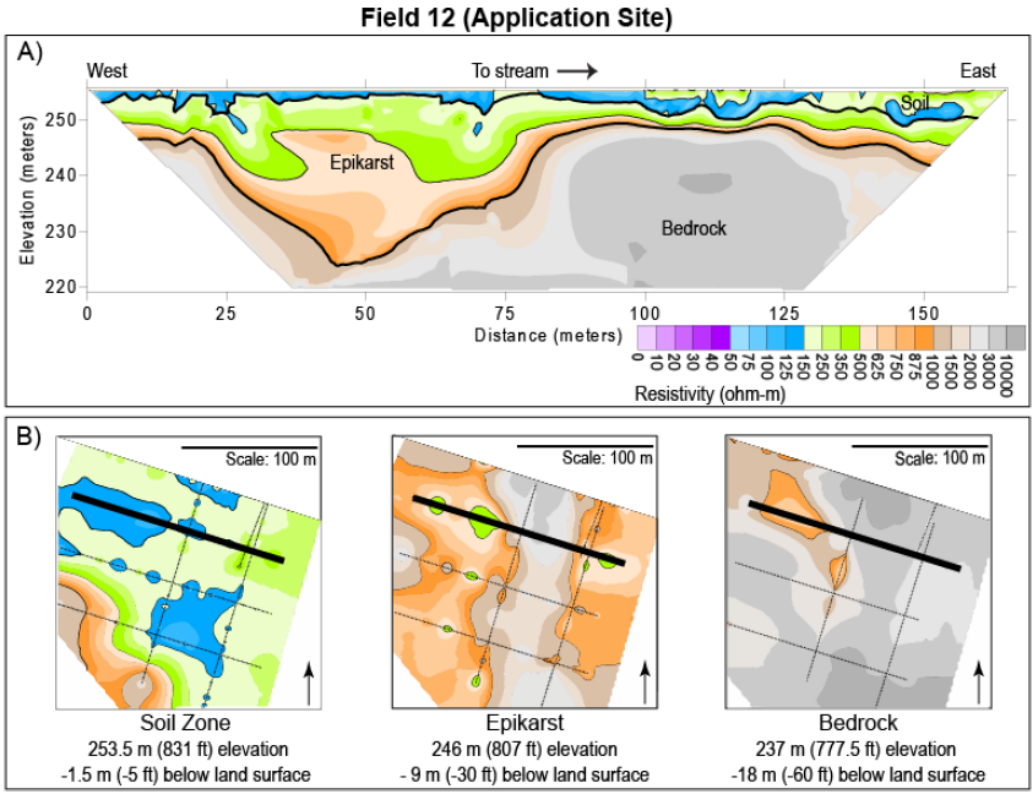

Figure 4: A) Interpreted Soil-Epikarst boundary and Epikarst-Bedrock boundary for Field 12 from ERI dataset MTJ12 (Application site) cross sections. B) Interpolated 2D depth slices of resistivity at differing elevations illustrating a map view of the subsurface. Heavy black line indicates the location of the cross section from A) (Fields and Halihan, 2015, pg. 18).

3.2.1 Affected Environment, Surface Water, Pages 3-5 to 3.9: This lengthy section of the EA describes a little bit about the water quality of Big Creek, mainly focusing on the Big Creek Research and Extension Team (BCRET) study.

COMMENTS: This section has a number of mistakes.

The first paragraph describes the CAFO as being 6.8 river miles from the Buffalo River. In actuality, the distance is only 5.6 miles as measured in ArcGIS environment. The second paragraph describes the distance to BNR water monitoring station T-06 as being 6 miles downstream of the CAFO when it is only 5.1 miles downstream as measured in ArcGIS environment.

The third paragraph describes how the Buffalo River is an Extraordinary Resource Water and Outstanding National Resource Water, but fails to make the connection to the Antidegradation Policy requirements. Instead it launches into a discussion of the 303(d) impaired stream segments of the Buffalo River, and how far downstream they are.

The fourth paragraph describes Nutrient Surplus Areas, but fails to mention that these were put in place by the Arkansas General Assembly because of widespread

pollution of streams by unrestricted poultry litter applications. Because the Buffalo River is not a Nutrient Surplus Area, but abuts Nutrient Surplus areas on two sides, it is a prime candidate for nutrient enrichment by unrestricted poultry litter applications. To add an additional large source of nutrients to the watershed such as a large swine CAFO could have cumulative impacts on the watershed and the river, dramatically reducing the water quality of the river, and potentially impairing aquatic life and other significant resources.

The fifth paragraph alludes to water quality data taken up to 2012. As discussed in the comments on Section 1.2.

In the sixth paragraph, there continue to be mistakes in distances reported. FSA and SBA appear to lack any understanding of the dynamics of groundwater flow in a karst dominated watershed. They believe that the study Big Creek Research and Extension Team (BCRET) is conducting will determine if there are impacts to water quality as they are taking samples immediately above and below the spreading fields in Big Creek. They have failed to take into account the diverse flow possible in karst, and the long distance transport of groundwater, and contaminants. Tracer dyes injected into the ground near spreading fields 15 and 16 was recovered on six tributaries to the Buffalo River along a 15 mile stretch, and the Buffalo River itself (Brahana, pers. Comm.) (Figure 3). A similar complex radial flow pattern had previously been documented by Aley in 1987 while investigating the permitting of a landfill near Pindall, Arkansas (Aley, 1988).

The seventh paragraph notes the BCRET study was "designed to evaluate the potential impact and sustainable management of the C&H Hog Farms operation." The EA also notes the study was peer-reviewed by a panel of four independent out of state water quality experts (Bolster and others, 2014). BCRET chose to implement some of the recommendations and not act on several others from the peer-review panel (BCRET, undated).

The eighth paragraph claims the BCRET study is the best available scientific information. Some of the monitoring stations BCRET uses are in disrepair; auto samplers are not operated in the winter season when nutrient runoff is most likely. The data reported has many examples of no data reported for parameters with no explanations, there is no dye tracing data, there is no data on many aspects of the operation which would better help describe the impacts.

In the ninth paragraph FSA and SBA show a lack of understanding of the hydrology in the area, as well as a lack of factual data. The reported vandalized monitoring station was actually removed by the landowner, who first conferred with the Newton County Sheriff, as he had never been approached for permission. The flume in Field 12 only catches a very small portion of the runoff from the field. Field 5a is not part of the original NMP, or any of the subsequent modifications. The three fields do not give representative strata of all the fields where hog waste will be applied. They do not cover all of the soil types, or geologic formations present in the spreading fields. They appear to be simply fields of convenience for the investigators, places where they could get permission.

Paragraph ten describes the Left Fork gauging station and how there are no CAFOs up left fork. The FSA and SBA would have been well advised to talk with Dr. Brahana as some of his dye traces near fields 15 and 16 came out in springs on the Left Fork (Brahana, pers. Comm.).

Somehow, the FSA and SBA failed to note the USGS gaging station co-located with BUF T-06 on Big Creek. This station has been up and running longer than any of the BCRET stations, and records the conditions of Big Creek, just before it discharges into the Buffalo River, a very important consideration because of the Antidegradation Policy and critical habitat status of the river. They failed to consider groundwater discharging directly into the Buffalo River, or via other tributaries, and the potential of reduced dissolved oxygen from increased nutrients in the water which are not attenuated while flowing through the karst aquifers as there is no sunlight to stimulate plant growth.

The graphs in Figure 3-1 on page 3-9 indicate several spikes in the Nitrate plus nitrite parameter which appear to be associated with rain events and presumably overland flow of nutrients, or flushing of nutrients stored in the groundwater. These pulses of nutrients are not examined or analyzed in the EA.

3.2.1 Affected Environment, Groundwater, Pages 3-9 to 3-12: The EA makes an attempt to describe karst terrain and the Springfield Plateau karst aquifer. The EA briefly describes the groundwater flow which has been shown to occur based upon NPS and Ozark Underground Laboratory studies as summarized by Limaris Soto (Soto, 2014). The EA then goes on to describe work done by BCRET to look at the soil-bedrock interface and epikarst on two waste spreading fields.

COMMENT: In their description of karst terrain, the FSA and SBA mention caves, sinkholes, and springs, but fail to mention losing stream segments and sinking streams, which are the best developed karst features in the vicinity of C&H. They reference a paper by Adamski, Peterson, Freiwald, and Davis from 1995 which describes the number of sinkholes per 100 square miles. It is unclear why this was used, but perhaps they were trying to imply the area around Mt. Judea is not an important karst forming area. The information about those sinkholes originally comes from a paper by Edward J. Harvey (Harvey, 1980). The area covered by his paper where sinkholes were quantified did not include the Big Creek watershed. He was only able to quantify sinkholes which appear on the USGS topographic maps. The Mt. Judea 7.5" map was published in 1980 (USGS, 1980). Presumably he had access to a pre-publication copy of the 1980 map with its 40 foot contour interval, otherwise he would have used the Mt Judea 15" map published in 1933 (USGS, 1933) with a 50 foot contour interval. There are probably many more sinkholes in this region than show on either topographic map because the sinkholes would require have an aerial extent which is large enough to depict on the map, typically 100 feet in diameter or more for the 7.5" map (200 ground feet = 0.1 map inches), and a depth of at least 40 feet so it can be shown with contours. The area around Springfield Missouri is depicted with 20 foot contours, and the sinkhole plain has many broad, but relatively shallow sinkholes, resulting in a greater number of mapped sinkholes. To get a real understanding of the number of sinkholes in the area, Light Detection and Ranging (LiDAR) could be flown, resulting in 1m or better X-Y resolution and 0.1m or better vertical (Z) resolution. This would provide a much better picture of sinkholes and subsidence features associated with karst. The Big Creek Valley has relatively little LiDAR coverage, but the Buffalo River corridor has complete coverage which NPS would be able to provide to the FSA and SBA at 1m X-Y resolution. There are hundreds of sinkholes present in this data set which do not appear on the USGS topographic maps.

In the section on "Site Groundwater Quality and Use" the FSA and SBA make several statements that contradict other areas of the EA, or provide only superficial information regarding the research data available in the area. The first example is in describing the Ground Penetrating Radar (GPR) survey of fields 1, 5, and 12. In Section 3.3.1, FSA and SBA note that the interpretation of the GPR data indicates gravel lenses and cavities. It is also interesting to note the GPR did not occur on Field 5, but on either

Field 5a, or the Revised Field 5. The same is true of the Electrical Resistivity Imaging (ERI) survey. It did not occur on field 5 as shown in the NMP and NOI, but rather on some other field. Dr. Halihan's name is also misspelled.
The Electrical Resistivity Imaging survey did find what appear to be significant karst features in both fields 5a and 12. In field 12, the report documents what appears to be a large doline (sinkhole) 61m (200 ft.) wide by 23m (75 ft.) deep (Fields and Halihan, 2015).

The first paragraph goes on to describe how piezometers were installed in these three fields by BCRET. Then it describes how the fields were flooded in the spring, presumably the spring of 2015, and the landowners would not allow access. This raises the question, "If the fields were flooded, were they in the floodplain?" If they were in the floodplain, why does the EA claim no floodplains are present?
The second paragraph says no data or results are available from the groundwater characterization, karst inventory, and fluorescent dye tracing study. This study was undertaken by Dr. Brahana and his team of volunteers. The data was available, but the FSA and SBA failed to contact him (Brahana, pers. Comm.).

The FSA and SBA describe the geologic investigation of the barn and pond locations conducted by Geotechnical and Testing Services. The results of this investigation were in the original NOI (DeHaan, Grabbs, and Associates, 2012). The borings showed no evidence of karst features below the facilities. The group was not looking for karst features, they were only interested in the depth of regolith to see if it was possible to construct ponds of the depth required, and what kinds of material were present. Regolith or insoluble residue in this case, is the material left over after decomposition of the surface of a rock. Karst on the other hand is a three dimensional framework of dissolved conduits in carbonate bedrock, in this case Mississippian age Boone Formation limestone. Drilling vertical holes is an inefficient method to find karst features. Electrical resistivity imaging such as was done by Fields and Halihan, or other geophysical methods are much more efficient at locating such features as they can cover a larger area at depth.

The FSA and SBA claim that it is unknown if there are karst features beneath the waste application fields. The BCRET Response to the Expert Panel Review notes that there are indeed sinkhole features in waste

application fields 1, 5a, and 12 (BCRET, undated, Item C(v)). Waste application field 17 shows evidence of sinkholes. It is hard to believe that there are not karst features under all of the waste application fields and the barn and pond complex. The sinking streams around many of the fields, and the spring near waste application fields 1 and 2 are good evidence of the pervasive existence of karst features in and around the waste application fields. It is unclear where the rock quarry within Field 1 was examined.

The description of the trench to intercept waste pond leakage is poorly described when it says the methodology to detect pond leakage is confounded by the small amount of potential leakage. The lower potential for leakage is based upon a homogenous 18" clay liner which has the properties required to seal leakage. The first inspection report indicates erosion rills, desiccation cracks, and gravel and cobble size material in the pond liner. The gravel and cobble show the liner material is not homogenous, the desiccation cracks and rills mean the effective thickness of the liner is less than the required 18". All this points to a greater than expected leakage of the waste ponds than is calculated in the NOI. According to the Drilling Record for the C&H well the static water level is 138 feet. The FSA and SBA made a mistake in the document. It appears that the drillers hit water bearing areas at 145 feet, 265 feet, and 285 feet. The 145 foot water bearing area probably indicates the base of the Boone Formation. The 265 and 285 depths would correlate with water bearing sections of the Ordovician age Everton Formation. The base of the Boone Formation, where the St. Joe limestone member crops out is an area of a very high incidence of karst development. (Hudson and others, 2011) Once the hole was completed, the static water level rose to 138 feet below the land surface. The drill hole appears to have effectively integrated the three perched aquifers. This may help explain the increase in contaminants seen in the well water in BCRET reports, and the increases in nitrate and nitrite in Big Creek which BCRET reports.

3.2.2 Impacts from Alternative A: No Action Alternative, Direct and Indirect Impacts:

COMMENTS: This analysis is inaccurate. The FSA and SBA rely upon the Comprehensive Nutrient Management Plan and the General Permit for CAFOs. Unfortunately for Big Creek and the Buffalo River, these are not as protective of the environment as they should be. The EA does not take into account the fragile nature of the karst system on Surface Water or

Ground Water, which are intimately connected throughout the Buffalo River watershed. The dissolved oxygen (DO) in Big Creek is already reaching impairment levels. Any depression of dissolved oxygen below 6 mg/l is considered an impairment of the water quality. Dissolved oxygen often shows wild swings when nutrient loading in a stream create algal blooms which give off oxygen during the daytime and absorb oxygen at night. See attached graphs.

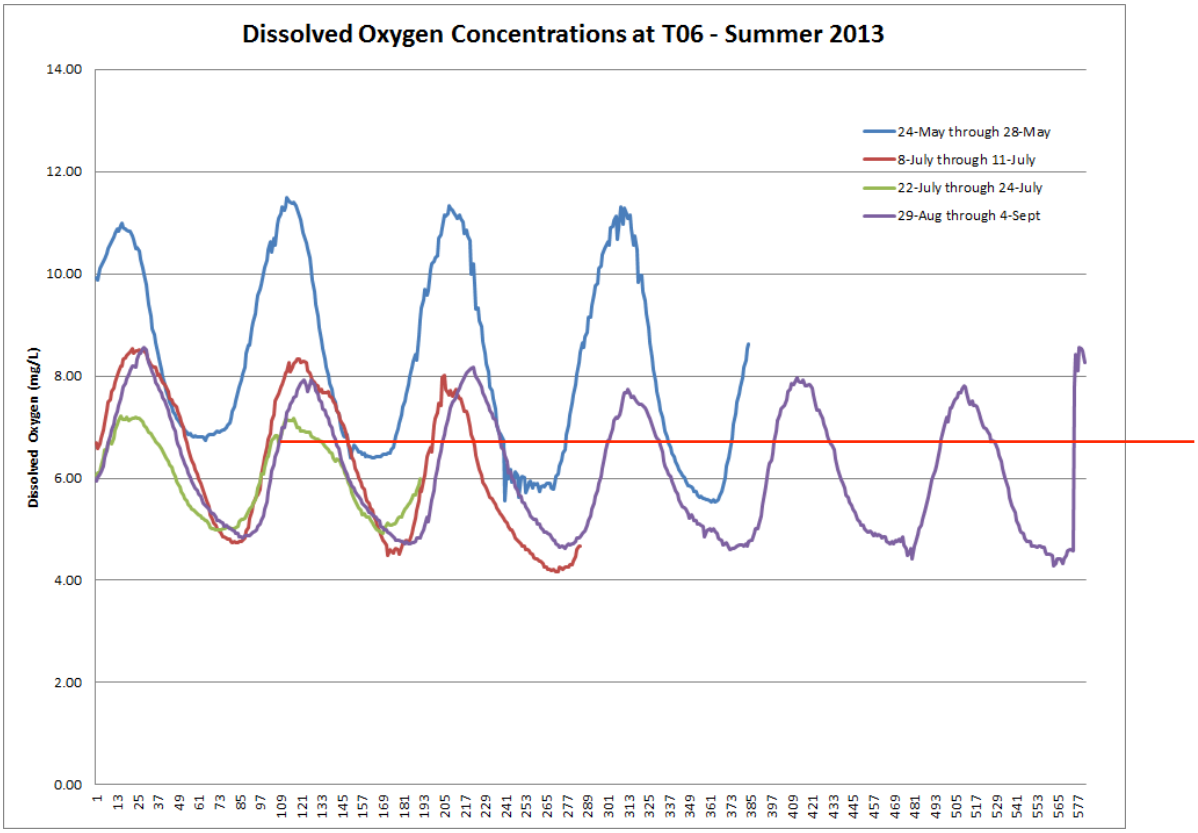

Figure 5: Diurnal dissolved oxygen concentration in Big Creek during part of the summer of 2013. The lower limit for dissolved oxygen in this stream is 6.0 mg/l; any number below this indicates the stream is impaired with regard to dissolved oxygen, probably as a result of nutrient contamination. Source NPS Data taken with YSI data sonde.

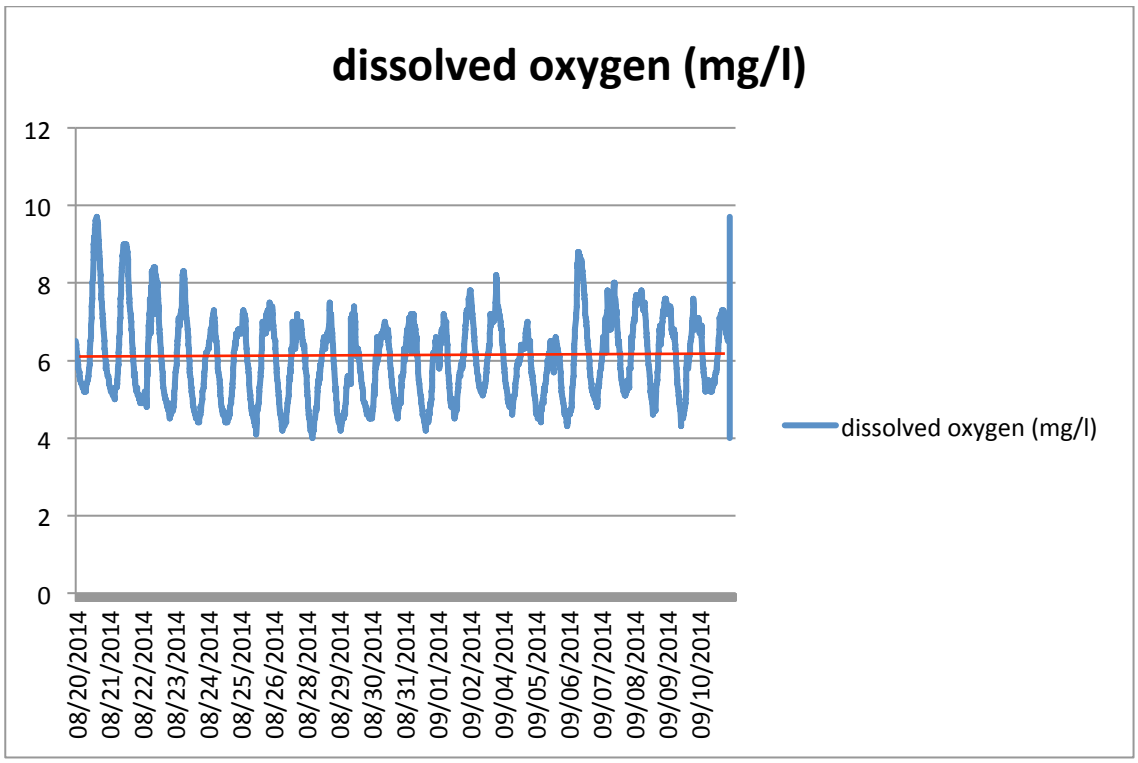

Figure 6: Dissolved oxygen data for Big Creek for the 23 day period of August 20, 2014 through September 10, 2014. Dissolved oxygen values were below 6 mg/l for 271 hours and 15 minutes, or 49 percent of the time. Source USGS Big Creek at Carver, Station 07055814.

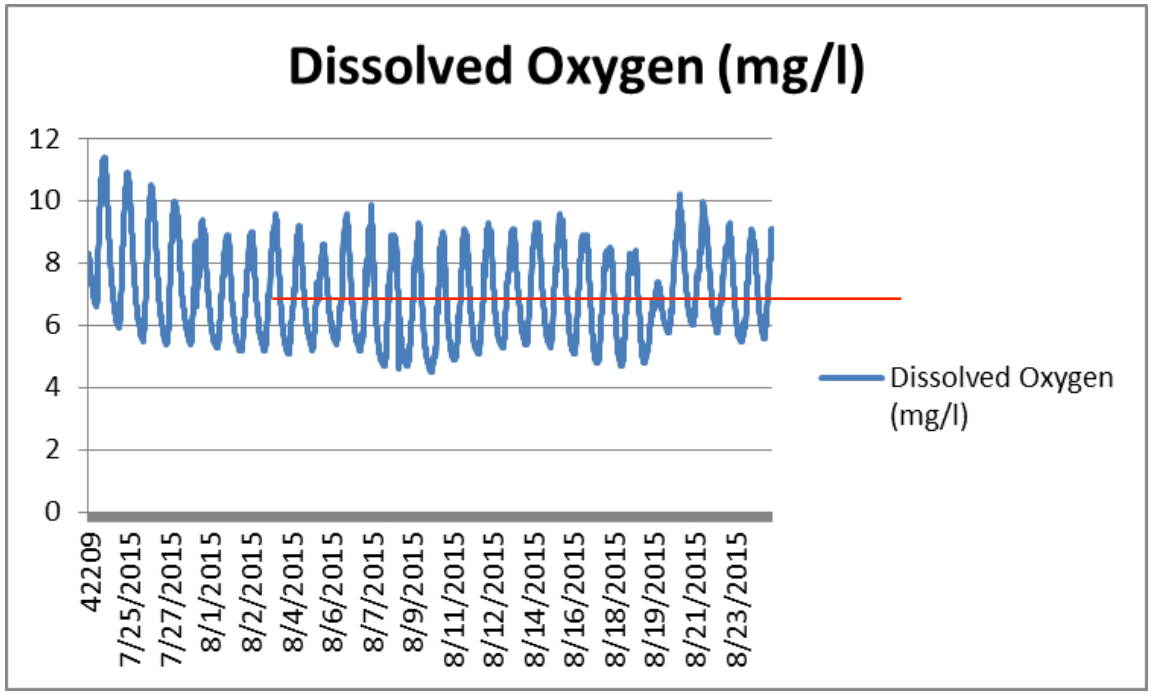

Figure 7: Dissolved oxygen data for Big Creek for the 28 day period of July 24 to August 24, 2015 (DO meter was down for nearly 3 days). Dissolved oxygen values were below 6 mg/l for 204 hours and 15 minutes, or 29.5 percent of the time. Source USGS Big Creek at Carver, Station 07055814.

Increasing the nutrient load in the watershed is certain to result in runoff or leaching of nitrogen compounds, as well as phosphorus. The data from BCRET already indicates the nutrient levels downstream of the CAFO are higher than those upstream (BCRET, 2015). This will result in more algae and phytoplankton growth, further reducing the dissolved oxygen values in the creek where it confluences with the river.

The Comprehensive Nutrient Management Plan (CNMP) (DeHaan, Grabs, and Associates, 2012) has yield estimates that are much higher than those expected for this area. This will result in less N, P, and K being removed from the fields in the form of hay, leaving more to saturate the soil and runoff or leach into the groundwater. The CNMP is for growing season applications; however, waste application occurs during the dormant season also, this makes the nutrients easier to runoff or leach into the groundwater as the plants are not taking them up. The CNMP does not use the Arkansas Phosphorus Index (API) for three of the fields. Furthermore, the facility has rolled out several Nutrient Management Plans which do not agree with the original CNMP, calling into question the validity of the original plan and all succeeding plans. The EA continues to claim the CAFO has 630.7 acres to apply waste, even though this number is closer to 400 acres based upon GIS analysis of the facility. The CAFO operators are further constrained by the private landowners of the majority of the waste spreading fields who may not allow waste application to the rates shown in the CNMP or subsequent NMPs. For all these reasons, and more, the CNMP cannot be relied upon as a valid tool to manage the environmental impacts to surface water and ground water from the facility.

The FSA and SBA note that C&H and the waste application fields are located along a perennial waterway. In the summer much of Big Creek runs dry on the surface during the summer. Because of the fact that the water from this valley is flowing through the karst aquifers, it is not reasonable to assume that measuring the nutrient levels and bacteria just downstream of the CAFO is an accurate method to determine pollution potential. In fact, work by Dr. Brahana has shown a distributary flow of groundwater to the Left Fork of Big Creek and several tributaries of the Buffalo River. The FSA and SBA should have considered the data Dr. Brahana has collected over the past two years.

The FSA and SBA claim there is no evidence that the operation of C&H Hog Farms is adversely affecting surface water quality. They apparently

did not look at the NPS data from site BUF-T06 or the USGS data from Station 07055814 which show increased E-coli from prior sampling and a serious reduction in the concentrations of dissolved oxygen. They go on to state that the application of wastes by C&H could result in better water quality than what existed prior to their formation as a business. This is an unsubstantiated claim that assumes the land managers were indiscriminately applying fertilizer to their fields prior to this point, even though the price of chemical fertilizer has been excessive for nearly 10 years. Had they taken the time and effort to discuss the historic management of their farms with the landowners, they would have some basis to make such a statement.

The FSA and SBA assume it is highly unlikely there would ever be a permitted discharge from the waste ponds. This is an unreasonable assumption.

The FSA and SBA claim there have been no significant differences in the concentrations of nutrients or bacteria between the upstream and downstream sites BCRET is sampling. The Nitrate-N data shown by the BCRET report (BCRET, 2015) (EA Figure 3-4) indicates there is an increase in Nitrate-N downstream of the facility. They go on to say that it will take a 50 or 100 year rain event to cause overflow of the waste storage ponds, when actually, it will only take a rainfall greater than the 25 year 24 hour event, or several smaller rainfalls in rapid succession.
In the groundwater section, the FSA and SBA claim that the allowed waste pond leakage of 5,000 acres per day would be a vertical drop of 0.0013 inches per day. However, this appears to be incorrect.

- There are 7.48 gallons in a cubic foot of water. So leakage of 5000 gallons is equal to leakage of 668.4 cubic feet.
- One acre is equal to 43,560 square feet.
- If we evenly spread the 668.4 cubic feet the ponds are allowed to leak each day over the 43,560 square feet in an acre we would get a layer of water which is 0.0153 feet in depth.
- When we multiply 0.0153 feet X 12 inches/foot we get a loss of 0.18 inches per day.
- The ponds at full capacity can be expected to leak up to 0.18 inches per day per acre of surface area, 140 times more than shows in the EA.

This may be a best case scenario as the numbers used to calculate leakage from the pond are based upon a homogenous clay liner. The liner has

shown erosion rills, desiccation cracks, and gravel to cobble sized course content within the liner clay (ADEQ, 2013). These flaws in the liner effectively reduce the liner thickness wherever they occur.
The geotechnical investigations did not indicate there were "no karst features or topography" in the area of the buildings and waste storage ponds. They stopped before bedrock, so they could not say if there was karst or not.

THOUGHT EXPERIMENT: Imagine drilling three holes each into two wheels of cheese, one Swiss and one Cheddar, each with a thick wax covering. The Swiss represents karst, the Cheddar, non-karst. If you drill into the wax, but never penetrate into the cheese (cheese = bedrock), the test would not determine which is Swiss and which is Cheddar.

ANALYSIS OF EXPERIMENT: This is exactly the scenario presented by the geotechnical investigation. The drill holes never completely penetrated the wax coating of the cheese wheel, or in this case the soil and regolith. One could look at the label on the cheese wheel, which in this case would be the Geologic Map of the Mt. Judea, AR quadrangle (Chandler and Ausbrooks, 2015), and conduct minimal research to conclude this area is indeed a karst area, and the likelihood of karst features under the facility is reasonably high. Even further analysis of the area would show the large number of losing streams, and would result in finding a number of karst springs. All the lines of evidence point to this area being karst.

Nitrate-N is very mobile in the groundwater and can move rapidly through the soils into karst groundwater where it can be distributed far away without being taken up. The idea that it would be bound to soil particles is not proven or demonstrated in the EA. E coli could also move through the soil voids into the karst where there is no effective filtration. It can move long distances without being eliminated by sunlight. Dye traces in the area show relatively rapid movement of groundwater, thousands of feet per day (Hudson and others, 2011) fast enough to reduce the die off of E. coli, potentially resulting in serious contamination of surface water and ground water at some distance from the facility and the spreading fields. The HDPE pond liners and cover should be part of the Action Alternative, not the No Action alternative as they were not proposed when the Judge made his order.

Section 3.2.3 Impacts from Alternative B: Proposed Action:

COMMENT: The impacts of the proposed action will likely be the same as the so called "No Action" alternative. All the same erroneous analysis results apply.

Section 3.3, Soils and Geology:

COMMENT: This section indicates RUSLE-2 was used to estimate soil erosion rates. This is true of the original NMP, but in December of 2013 a cool season nutrient management plan using significantly lower RUSLE-2 rates was developed (ADEQ, 2013b). There is no explanation of these lower numbers. It would seem that these would calculate lower soil transport from the fields in the cool season than the warm season. In other words, when the plants are dormant and not taking up any nutrients, the erosion potential of the soils is significantly lower than when the plants are actively growing. This is counter intuitive and needs to be explained.

Arkansas Nutrient Managemnt Planner with 2009 PI (ver 3/3/2010)

Planner:	Nathan A. Pesta, P.E.								Date:	5/25/2012		
Plan Description:	Jason Henson: Fields 1-10											
H1	83	110	42	3	8	5	5.5	15	75	45	45	None
H2	72	96	43	8	20	14	14	15	30	20	45	None
H3	42	56	48	0	3	2	14	15	75	45	23	Occasional
H4	50	67	43	8	20	14	14	15	30	20	23	None
H5	65	86	48	#N/A	#N/A	#N/A	0.2	#N/A	#N/A	#N/A	5	#N/A
H6	76	101	48	#N/A	#N/A	#N/A	0.2	#N/A	#N/A	#N/A	4	#N/A
H7	178	237	48	#N/A	#N/A	#N/A	0.2	#N/A	#N/A	#N/A	4	#N/A
H8	46	61	51	2	5	2.5	3.5	15	75	45	12	None
H9	52	69	50	#N/A	#N/A	#N/A	0.2	#N/A	#N/A	#N/A	7	#N/A
H10	69	92	51	2	5	2.5	3.5	15	75	45	15	None

Field	Field Area (ac)	Buffer Length (ft)	Buffer Width (ft)	Appl Area (ac)	Predominate Vegetation	Percent Ground Cover	Conservation Support Practices (P)	RUSLE 1 (ton/ac)	RUSLE 2 (ton/ac)
H1	19.70	1,800	100	15.57	Grass	95-100	None in place	0.12	0.18
H2	19.30	1,000	100	17.00	Grass	95-100	None in place	0.34	6.60
H3	15.90	1,000	100	13.60	Grass	95-100	None in place	0.24	0.01
H4	10.40	700	100	8.79	Grass	95-100	None in place	0.28	5.40
H5	24.90	500	100	23.75	Grass	95-100	None in place		0.05
H6	36.60	900	100	34.53	Grass	95-100	None in place		0.05
H7	79.80	2,400	100	74.29	Grass	95-100	None in place		1.10
H8	15.50			15.50	Grass	95-100	None in place	0.66	1.30
H9	45.10	1,680	100	41.24	Grass	95-100	None in place		0.49
H10	34.30	500	100	33.15	Grass	95-100	None in place	0.06	1.30

Figure 8: Arkansas Nutrient Management Planner worksheet from original CNMP (DeHaan, Grabs, and Associates, 2012). Note how RUSLE-1 and RUSLE-2 numbers do not match. Note yellow highlighted RUSLE-2 numbers for H3, H9, and H10. Also note yellow highlighted "Slope Used" numbers for Fields H3, H5, H6, H7, and H9. This does not match the numbers used in the table on page 3-22 of the EA.

Arkansas Nutrient Managemnt Planner with 2009 PI (ver 3/3/2010)

Planner:										Date:	5/25/2012	
Plan Description:	C&H Hog Farms: Fields 11-17											
Field	ppm	lb/ac	Soil Map Unit	Min	Max	Rep	Used	Min	Max	Rep	Used	Flooding Frequency
H11	57	76	43	8	20	14	14	15	30	20	20	None
H12	19	25	50	0	3	2	2	15	75	45	45	Occasional
H13	48	64	43	8	20	14	14	15	30	20	20	None
H14	52	69	43	8	20	14	14	15	30	20	20	None
H15	15	20	43	8	20	14	14	15	30	20	20	None
H16	48	64	50	0	3	2	2	15	75	45	45	Occasional
H17	50	67	1	3	8	5	5.5	15	75	45	45	None

Field	Field Area (ac)	Buffer Length (ft)	Buffer Width (ft)	Appl Area (ac)	Predominate Vegetation	Percent Ground Cover	Conservation Support Practices (P)	RUSLE 1 (ton/ac)	RUSLE 2 (ton/ac)
H11	20.70			20.70	Grass	95-100	None in place	0.28	5.20
H12	28.70	2,200	100	23.65	Grass	95-100	None in place	0.05	0.91
H13	66.90	2,300	100	61.62	Grass	95-100	None in place	0.28	5.20
H14	18.00			18.00	Grass	95-100	None in place	0.28	5.20
H15	66.30	2,300	100	61.02	Grass	95-100	None in place	0.28	5.20
H16	79.60			79.60	Grass	95-100	None in place	0.05	0.91
H17	88.70			88.70	Grass	95-100	None in place	0.12	1.10

Figure 9: Arkansas Nutrient Management Planner worksheet from original CNMP (DeHaan, Grabs, and Associates, 2012). Note how RUSLE-1 and RUSLE-2 numbers do not match. Note yellow highlighted RUSLE-2 figures for fields H15 and H16. Also note yellow highlighted "Slope Used" numbers for field H17. This does not match the numbers used in the table on page 3-22 of the EA.

Field P Index Calculations

Fields Shown	Soil Test P		Soil Map Unit	Slope Gradient (%)				Slope Length (ft)				Flooding Frequency
7	ppm	lb/ac		Min	Max	Rep	Used	Min	Max	Rep	Used	
JH 3	42	56	48	0	3	2	2	15	75	45	45	Occasional
JH 9	52	69	50	0	3	2	2	15	75	45	45	Occasional
JH Part of 10	69	92	51	2	5	2.5	2.5	15	75	45	45	None
JH Part of 15	15	20	43	8	20	14	14	15	30	20	20	None
JH Part of 17	50	67	1	3	8	5	5	15	75	45	45	None

Field	Field Area (ac)	Buffer Length (ft)	Buffer Width (ft)	Appl Area (ac)	Predominate Vegetation	Percent Ground Cover	Conservation Support Practices (P)	RUSLE 1 (ton/ac)	RUSLE 2 (ton/ac)
JH 3	15.90	1,437	100	12.60	Grass	95-100	None in place	0.05	0.05
JH 9	45.10	4,487	100	34.80	Grass	95-100	None in place	0.05	0.05
JH Part of 10	25.70	523	100	24.50	Grass	95-100	None in place	0.05	0.05
JH Part of 15	42.60	3,615	100	34.30	Grass	95-100	None in place	0.28	0.28
JH Part of 17	52.30	3,703	100	43.80	Grass	95-100	None in place	0.12	0.12

Figure 10: Arkansas Nutrient Management Planner worksheet from Cool Season Application Rates, December 2013. Worksheet completed by Monica Hancock, December 18, 2013. Note that RUSLE-1 and RUSLE-2 numbers are the same. In every case but H3, the RUSLE-2 number is significantly lower for cool season application than the RUSLE-2 number for warm season application. Also note the "Slope Used" column has highlighted numbers which do not match the numbers in the table on page 3-22 of the EA.

The Field Average Slope used in the table on page 3-22 has different numbers than that reported in the original NMP for some of the fields. Where did these numbers come from? How were they derived? Why is the field slope for fields 5 and 6 equal to one-hundredth of a percent? In terms of degrees that is equal to six-hundredths of a degree! That seems like a very unrealistic number.

In the Geology description on page 3-23, the FSA and SBA reference a paper by Tennyson and others. It is true that uplift near the Buffalo National River has resulted in bluffs and vertically oriented caves. The same uplift occurred on Big Creek in the vicinity of C&H Hog Farm and the waste application fields. The EA seems to imply that the geology around the Buffalo River is different than that around Mt. Judea which is not supported by the data (Hudson and Turner, 2014) (Chandler and Ausbrooks, 2015).

On page 3-24, the EA discusses the Ground Penetrating Radar surveys conducted on fields 1, 5A and 12. The interpretation of the survey indicates gravel lenses and solution cavities. Solution cavities are also known as karst or epikarst. For some reason the EA states the survey was inconclusive regarding the presence of karst features. The EA also reports that there is at least 49 inches of soil overlying any bedrock. This seems pretty strange as there appears to be bedrock visible in recent aerial images of many of the waste application fields.

Finally, the EA states there would be no impact to geologic resources from operation of the facility and there are no karst features within the C&H Hog Farms parcel. The EA needs to be clear what is meant by C&H Hog Farms parcel. Is it the 23 acres owned by the corporation, or is it the 23 acres plus all of the waste spreading fields. What of the potential for geologic resource impacts from the gravel and rock quarry within the

boundary of field 1? Are there no geologic impacts from quarrying gravel for road material to make it easier for spreader trucks to travel the county roads? Are there no geologic impacts from the hog waste seeping into the easily corroded Boone Formation limestone? Is the hog waste alkaline, neutral, or acidic? Will the increased liquid content being applied to the fields increase the rate of dissolution of the underlying limestone resulting in collapse? These are a few of the questions not discussed by the EA. There are no mitigations listed in this section. Is soil compaction in the fields from repeated trips by heavy waste tankers not an issue?

Section 3.3.3 Impacts from Alternative B: Proposed Action

COMMENTS: All the comments that apply to Section 3.3.2 apply to this section.

Section 3.4 Threatened and Endangered Species

COMMENTS: It is good to see the EA mention critical habitat, destruction and adverse modification, and continued existence of any endangered or threatened species.

Section 3.4.1 Affected Environment

COMMENTS: The EA notes that no federally listed species have been recorded within 2 miles of C&H Hog Farm and associated waste application fields, but there is no indication that the distance of 2 miles has some significance.

The EA immediately dismisses bat species because they are terrestrial species, and because the type of vegetation present prior to construction of C&H would not be suitable roosting habitat for any of the four listed species. There is considerable literature on the roosting habits of the Indiana bat (Myotis sodalis) and the Northern long-eared bat (Myotis septentrionalis). The Northern long-eared bat, in particular, has been found using quite small hollow trees for maternity roosts. They are often netted in road ruts along logging roads. It seems quite possible that the 23 acres could have contained habitat for this species. It is also possible that it contained habitat for the Indiana bat, though this is much less likely. Acoustic bat surveys combined with mist net surveys during the EA development would have informed FSA and SBA about what species are present in the area.

The EA does not discuss the foraging habits of the Gray bat (Myotis grisescens) while a summer roost cave for this species is less than 3 stream miles away. Gray bats forage primarily over water. They prefer a diet of mayflies, caddisflies, and stoneflies which they catch as the insects emerge from the water. These classes of aquatic insects are known as indicators of good water quality. Increased nutrification of Big Creek as a result of the additional nutrients being transported into the basin in the form of hog

feed has a very real potential of leading to a significant reduction in the water quality of the creek. Such changes can result in a species shift away from this group of insects, reducing the quality of diet for the Gray bat. The Gray bat is a fairly strong flyer and can forage a significant distance from its roost caves. The C&H facility and all of the waste application fields are within the foraging distance of at least one Gray bat roost, and likely within the foraging distance of two additional Gray bat roosts located on the Buffalo River and the Ozark National Forest.
In the table on page 3-28, under the Indiana Bat section, the EA states the species has not been recorded as occurring within 10 miles of the farm. This is not true. An Indiana bat hibernation cave (hibernaculum) is located on Ozark National Forest land within 6 miles of the barns and pond and much closer to some of the waste application fields.
A very recent study commissioned by the Buffalo River Watershed Alliance surveyed the bats foraging over Big Creek during late summer 2015 (Gore, 2015). This study of three sites along the creek detected Gray bats, Indiana bats, and Northern Long Ear bats.

Because of the demonstrated potential to impact them, Bats need to be retained for analysis.

On page 3-30 in the description of the Rabbitsfoot mussel (Quadrula cylindrica cylindrica) (Note the correct spelling of the species name), the last two paragraphs contradict one another regarding when these mussels were last seen in the Buffalo River. The 2011 date appears to be correct and the 1995 date appears to be incorrect.

In the discussion of Designated Critical Habitat, the EA once again gives an incorrect distance as determined by ArcGIS mapping to the Buffalo River from the facility and the waste application fields.

Section 3.4.2 Impacts from Alternative A: No Action Alternative

The EA makes a statement that there is no data to suggest the operation is negatively affecting water quality by increasing the concentrations of nutrients in Big Creek. This statement is clearly contradicted by the graph in the BCRET report for the second quarter of 2015 (BCRET, 2015) which shows higher NO3-N downstream of the hog farm compared to upstream.

The EA describes how the NMP uses estimated crop yields and many other factors to design the waste application rates. It goes on to note that testing of the soil and manure prior to application is required so rates can be adjusted. Unfortunately, the estimated crop yields are far above what is normal in the area and instead are closer to best case scenarios. This means less nutrients are being taken off as forage than the NMP calculates

for. The soil and manure testing may be occurring, but it is difficult to see where this is happening at a greater frequency than annually.
The EA claims the waste application is more stringently managed than the historic management of the fields. This is untrue. The private landowner can continue to apply as much fertilizer as he chooses; the NMP and NPDES Permit do not prevent this. The EA provides no data on the historic management of the fields; they cannot simply make the statement that it is now managed better. This data needs to be gathered from the private landowners who have waste application agreements with C&H if it is to be believed and relied upon.

The EA states that no nutrients are expected to leach into groundwater from the application of wastes to the fields. This statement seems to be contradicted by the ERI report (Fields and Halihan, 2015), where they noticed what appears to be a plume of higher conductivity in field 12, possibly indicative of migrating waste.

The EA again states it is unlikely there will be a permitted discharge from the waste storage ponds; in other words, the EA says the ponds are unlikely to overflow. The ponds are only designed to handle a single 25 year-24 hour event. They are not designed to handle a 26 year-24hour event, or consecutive 20 year-24 hour events. It seems quite likely that the ponds could overflow based upon the extreme weather events, such as those predicted under a global climate scenario. One only has to look at the events in North Carolina to see where these types of ponds overflow, polluting surface streams to get an idea of the potential (Nicole W, 2013).
The EA again states the same mistaken daily drop of the pond surface from seepage. The EA also states there is no evidence of pond leakage. This seems to run counter to the evidence which the Buffalo River Watershed Alliance submitted in their Complaint to ADEQ on August 12, 2015 (BRWA, 2015). From the information in the complaint, there seems to be evidence that the ponds may indeed be leaking into the karst groundwater.

The EA states there is no evident conduit for groundwater to reach surface water in the area. This fails to mention the spring on Big Creek in the vicinity of field 5a which is the primary resurgence of Big Creek in dry weather and the location of the former Mt. Judea municipal water well.
The EA alleges it is unknown if karst features underlie the fields. This is refuted by the ERI report (Fields and Halihan, 2015). It is also refuted by the fact that there is a karst spring on waste application field 1, and there are numerous dry creeks running through or immediately adjacent to the waste application fields, not to mention the shallow closed depressions visible from the county road in field 17.

The EA says it is unclear how surface water and groundwater discharge and recharge within the area. This data has been available for some time, but FSA and SBA failed to seek it out.

The EA relies entirely upon the NPDES general permit conditions and does not take into account the geologic parameters of the site, nor the Endangered and Threatened species or their designated critical habitat. The EA notes the proposed action may affect but is not likely to adversely affect rabbitsfoot mussel or its critical habitat. Consultation with the USFWS based upon a Biological Assessment would be expected.
A Biological Assessment should also be completed for the bat species, particularly in light of the cumulative impact of White Nose Syndrome upon the cave dwelling bats of North America, and the recent report by James Gore.

Section 3.4.3 Impacts from Alternative B: Proposed Action

COMMENTS: The comments for this section are the same as Section 3.4.2.

Section 3.5 Buffalo National River

COMMENTS: The EA fails to mention that the Buffalo River is a Tier 3 stream with regard to the Antidegration Policy in the Clean Water Act (40 CFR 131.12(a)(4)). As such a stream, the water quality of the river is to be maintained, and an Antidegradation Review is required. The State of Arkansas is required to conduct this review, but the EA should clearly reference the review, if any such review exists.

Section 3.5.1 Affected Environment

COMMENTS: The EA gives an old number of 800,000 visitors per year. The actual number is 1,357,057 according to the 2014 report on visitor impacts to local economies (Cullinane and others, 2015). This number is 1.7 times higher than the EA claims.

The EA notes that C&H is 2,200 feet west of Big Creek, but seems to only include the waste storage ponds and barns, as several of the fields are within 100 feet of the creek. The EA also uses the wrong information about the distance of Buffalo National River from the facility and waste application fields. The exterior boundary of Buffalo National River is only about 3 stream miles away as determined through ArcGIS analysis, not 6.8 miles distant.

Section 3.5.2 Impacts from Alternative A: No Action Alternative

COMMENTS: The EA claims there are no data to suggest the operation is negatively affecting water quality. The data USGS and NPS have collected on dissolved oxygen, as well as recent E. coli data compared to historic bacterial data for Big Creek and the Buffalo River seem to

indicate there is increased pollution of Big Creek. The obvious change in the watershed is the CAFO. The nutrient data collected by BCRET also indicates increasing NO3-N downstream of the waste application fields, waste storage ponds, and barns.

Section 3.5.3 Impacts from Alternative B: Proposed Action Alternative
COMMENTS: Same as above.

Section 3.6.1 Odor, Affected Environment
COMMENTS: The EA alleges that CAFOs are common in Newton County. This is not really the case. There are several turkey and broiler barns, a few small swine operations, and C&H.

Section 3.6.2 Impacts from Alternative A: No Action Alternative
COMMENTS: There appear to be several occupied homes within ½ mile of the C&H barns and waste storage ponds. This is closer than the Mt. Judea School. The proximity of the barns and waste storage ponds to Mt. Judea, however; does indicate the needs of the neighbors were not taken into consideration. Odor is not a benign issue. It has been shown to cause increases in stress and blood pressure as well as reducing mucosal immunity (Horton and others. 2009) (Schinasi and others, 2011) (Wing and others, 2013).

The operating procedures in Section L of the NMP are not enforced by ADEQ, they are merely boilerplate within the NMP. There is no requirement for the operators to follow the guidelines. Compliance with the terms of the General Permit are not enough to prevent significant odor impacts from the hog operation, not when park employees and visitors report the strong hog odor between Hasty and Carver. The permit terms are not working and should not be expected to work in the future.

Section 3.6.3 Impacts from Alternative B: Proposed Action
COMMENTS: Same as above.

Section 3.7.1 Socioeconomics, Affected Environment
COMMENTS: In the comments on employment in Newton County, it must be remembered that many Newton County residents work in Boone or Pope Counties, so the number of jobs does not accurately reflect the number of people working. An important and apparently growing source of income in the county is through tourism. This includes cabin rentals and other accommodations, cafes and restaurants, canoe rentals, and support industries such as convenience stores, gas stations, and grocery stores.

Section 3.7.2 Impacts from Alternative A: No Action Alternative

COMMENTS: The analysis completely fails to note the economic impact of tourism to Newton County. Buffalo National River falls within four counties in Northern Arkansas (Newton, Searcy, Marion, and Baxter) Buffalo National River probably receives more visitation in the Newton County portion than any of the other counties. In 2014, it is estimated that Buffalo National River received 1,357,057 recreation visits which resulted in $56,575,700 in visitor spending. This translates into 890 jobs and includes $22,278,500 in labor income and $36,471,300 in value added revenue (Cullinane and others, 2015).

As Big Creek and the Buffalo River and the fresh air become more polluted as a result of the CAFO, Newton County can expect to see the income from tourism contract. The number of jobs and value added income provided by the CAFO is miniscule compared to that provided by tourism.

Section 3.7.3 Impacts from Alternative B: Proposed Action

COMMENTS: Same as above.

Section 3.8.2 Environmental Justice: Impacts from Alternative A: No Action Alternative

COMMENTS: The EA claims there will be no disproportionate effect to low-income populations because C&H must operate under their NPDES permit. This makes no sense. The odor from the facility will be breathed in by those who live, work and recreate nearby. Those who have to breathe the foul air day after day will be impacted. The potential for a reduction in jobs associated with the tourism industry was not considered in the EA. It should have been because the tourism industry provides jobs to many of the residents of the county.

Section 3.8.3 Environmental Justice: Impacts from Alternative B: Proposed Alternative

COMMENTS: Same as above.

Section 4.1 Cumulative Impacts: Past, Present, and Reasonably Forseeable Actions.

COMMENTS: The EA contains several mistakes under the Buffalo National River heading. The national river encompasses 95,730 acres and hosted over 1.3 million visitors in 2014. The NPS does not use timber harvest to reduce hazardous fuels.

Under the Agriculture heading, there are only three other active swine CAFOs in Newton County. EC Farms (Permit 3540-WR-6) has a permit, but has no waste holding ponds or swine. There are no active dairy farms in Newton County which have a permit from ADEQ.

Section 4.2 Cumulative Impacts

COMMENTS: The EA alleges that no significant impacts resulted from the construction of C&H Hog Farm, but this is a statement they cannot support because it does not address the condition of the area prior to the construction of C&H. Use of the General Permit and Nutrient Mangement Plans has been demonstrated to be unreliable in addressing the unique conditions of geology, hydrology, and their associated resources.

Section 4.3 Irreversible and Irretrievable Resource Commitments

COMMENTS: The EA preparers should have considered reduction in land values in the vicinity of the CAFO. These value reductions will potentially impact people who live in the area. The youth who are educated in the Mt. Judea School are also a non-renewable resource who must be considered. Finally, groundwater is almost impossible to clean up once it is contaminated.

Section 5 Consultation, Coordination, Preparers

COMMENT: It is incorrect to list Buffalo National River Aquatic Ecologist Faron Usrey and Natural Resource Program Manager Chuck Bitting in this table. Ecosphere Environmental Services requested data and information from the park for this draft EA and they provided it.

REFERENCES CITED

4:13-cv-450-DPM, 2014. Buffalo River Watershed Alliance; Arkansas Canoe Club; National Parks Conservation association; and Ozark Society v. Department of Agriculture; Small Business Administration; and Farm Service Agency. December 2, 2014.

Adamski JC, Peterson JC, Freiwald DA, and Davis JV. 1995. Environmental and Hydrologic Setting of the Ozark Plateaus Study Unit, Arkansas, Kansas, Missouri, and Oklahoma, USGS Water Resources Investigations Report 94-4022.

ADEQ, 2013a. Letter to Jason Henson, September 10, 2013 in reference to Compliance Assistance Inspection performed on July 23, 2013.

ADEQ, 2013b. Cool Season Application Rates for C&H Hog Farm. https://www.adeq.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/PermitInformation/ARG590001_Cool%20Season%20Application%20Rates_20131222.pdf Accessed August 25, 2015.

ADEQ, 2014. Letter to Jason Henson, November 25, 2014 in reference to C&H Hog Farm Inspection of November 5, 2014. https://www.adeq.state.ar.us/downloads/WebDatabases/InspectionsOnline/081071-insp.pdf Accessed August 13, 2015.

ADEQ, 2015a. C&H Hog Farm 2014 Annual Report, Aggregate Phosphorus Index Spreadsheets. February 26, 2015. https://www.adeq.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/PermitInformation/ARG590001_2014%20Annual%20Report%20Aggregate%20Phosphorus%20Index%20Spreadsheets_20150226.pdf, Accessed August 14, 2015.

ADEQ, 2015b. Public Notice of Public Hearing, ARG590001 AFIN 51-00164, C&H Hog Farm. March 18, 2015. https://www.adeq.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/PermitInformation/ARG590001_NOI_20150318.pdf, Accessed August 14, 2015.

Aley, Thomas. 1988. Complex radial flow of ground water in flat-lying, residuum-mantled limestone in the Arkansas Ozarks. Proceedings of the Second Conference on Environmental Problems in Karst Terranes and Their Solutions. Nashville, TN Pp. 159-170.

BCRET, undated. Response to the Expert Panel Review of the BCRET Project.

BCRET, 2015. Demonstrating and monitoring the sustainable management of nutrients of C&H Farm in Big Creek Watershed: Quarterly Report – April 1 to June 30, 2015. University of Arkansas System Division of Agriculture.

Bolster C. Et Al., 2014. Memorandum to Mark J. Cochran, Vice President for Agriculture, University of Arkansas, regarding Report from Expert Panel – C&H Farms Research Project.

BRWA, 2015. Complaint filed by Buffalo River Watershed Alliance with ADEQ. August 12, 2015. http://buffaloriveralliance.org/Resources/Documents/BRWA%20Complaint%20to%20ADEQ.pdf Accessed August 25, 2015.

CEQ. 1981. Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. Council on Environmental Quality. http://energy.gov/sites/prod/files/G-CEQ-40Questions.pdf. Accessed 13 August 2015.

Chandler AK and Ausbrooks SM, 2003, Revised 2015. Geologic Map of the Mt. Judea Quadrangle, Newton County, Arkansas. Arkansas Geological Survey. 2015 http://www.geology.ar.gov/maps_pdf/geologic/24k_maps/Mount%20Judea.pdf, Accessed August 13, 2015.

Cullinane Thomas, C., C. Huber, and L. Koontz. 2015. 2014 National Park visitor spending effects: Economic contributions to local communities, states, and the Nation. Natural Resource Report NPS/NRSS/EQD/NRR—2015/947. National Park Service, Fort Collins, Colorado.

DeHaan, Grabs & Associates, LLC. 2012. C&H Hog Farms, Major Construction Approval Application, Section 26, T-15-N, R-20-E Newton County, Arkansas. May 18, 2012.

Environmental Protection Agency, STORET. 2015. http://www.epa.gov/storet/dbtop.html. Accessed and searched August 31, 2015.

Farm Service Agency, 2012. Environmental Assessment, C&H Hog Farms Inc. 03-072xxxxx. September 26, 2012. United States Department of Agriculture.

Federal Register, 2013. Final Rule for Endangered and Threatened Wildlife and Plants; Endangered Status for the Neosho Mucket and Threatened Status for the Rabbitsfoot. 78 FR 57076. Pp. 57076 to 57097.

Federal Register, 2015. Endangered and Threatened Wildlife and Plants: Designating Critical Habitat 80 FR 24691. Pp. 24691 – 24774.

FEMA, 2015. Federal Emergency Management Agency. Flood Map Service Center. https://msc.fema.gov/portal/search. Accessed August 18, 2015.

Fields J, Halihan T, 2015. Preliminary Electrical Resistivity Surveys of Mount Judea Alluvial Sites, 2nd Quarter 2015 Report. Oklahoma State University, Boone Pickens School of Geology.

GEOSTOR, 2015. Arkansas Geographic Information System Office (AGIO). http://gis.arkansas.gov/. Accessed August 31, 2015.

Gore JW, 2015. Survey of Threatened and Endangered Bat Species on Big Creek. http://www.buffaloriveralliance.org/Resources/Documents/Bat%20Survey.pdf Accessed August 31, 2015.

Gurian-Sherman D, 2008. CAFOs Uncovered, The Untold Costs of Confined Animal Feeding Operations. Union of Concerned Scientists. http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/cafos-uncovered.pdf . Accessed August 31, 2015.

Harvey EJ. 1980. Ground water in the Springfield-Salem Plateaus of southern Missouri and northern Arkansas: U.S. Geological Survey Water Resources Investigations 80-101, 66 p.

Harvey MJ, 1985. Status of Endangered Bat Populations at Buffalo National River, Arkansas. Memphis State University and Tennessee Technological University.

Horton RA, Wing S, Marshall SW, Brownley KA. 2009. Odor as a trigger of stress and negative mood in neighbors of industrial hog operations. American Journal of Public Health: Vol. 99 p. S610-615.

Hudson MR, Turner KJ, and Bitting C, 2011. Geology and karst landscapes of the Buffalo National River area, northern Arkansas, in Kuniansky, E.L., ed., U.S. Geological Survey Karst Interest Group Proceedings, Fayetteville, Arkansas, April 26-29, 2011: U.S. Geological Survey scientific Investigations Report 2011-5031, p. 197.

Hudson MR, and Turner KJ. 2014. Geologic map of the west-central Buffalo National River region, northern Arkansas. Scientific Investigations Map 3314. United States Geologic Survey

Nicole Wendee, 2013. CAFOs and Environmental Justice, The Case of North Carolina. Environmental Health Perspectives, Vol. 121, No. 6, pp. A182 to A189. June 2013.

Peggs, Ian D., 2006. Geomembrane Liners in Wastewater Treatment Ponds: Whales and Their Prevention in Land and Water, Volume 50, No. 4. Page 38. http://www.landandwater.com/features/vol50no4/vol50no4_1.html Accessed August 18, 2015

Schinasi L, Horton RA, Guidry VT, Wing S, Marshall SW, Morland KB. 2011. Air Pollution, Lung Function, and Physical Symptoms in Communities near Concentrated Swine-Feeding Operations. Epidemiology: Vol 20, p. 208-215.

USGS, 1933. Topographic map of Mt. Judea, Arkansas: N3545-W9300/15. 1933

USGS, 1980. Topographic map of Mt. Judea, Arkansas: N3552.5-W9300/7.5. 1980

Wikipedia. 2015. Definition of Geometric Mean. https://en.wikipedia.org/wiki/Geometric_mean. Accessed August 18, 2015

Wing S, Horton RA, and Rose, KM. 2013. Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents. Environmental Health Perspectives. 121:92-96.