

**BUFFALO RIVER WATERSHED ALLIANCE
PO Box 101, Jasper, AR 72641
buffalowatershed@gmail.com**

January 28, 2016

Via Email

C&H Hog Farms EA
c/o Cardno, Inc.
501 Butler Farm Road, Suite H
Hampton, VA 23666
CHHogFarmComments@cardno-gs.com

**Re: Comments on FSA and SBA Final Environmental Assessment and
Draft Finding of No Significant Impact, C&H Hog Farms**

Dear Administrator Dolcini and Administrator Contreras-Sweet,

The Buffalo River Watershed Alliance respectfully submits these comments on the Final Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) prepared by U.S. Department of Agriculture Farm Service Agency and the Small Business Administration.

As explained in our comments below, we find the EA and FONSI to be inadequate, inaccurate and flawed and there is sufficient risk that environmental damage may or will occur at C&H Hog Farms. Therefore, a full Environmental Impact Statement should be prepared.

These comments are primarily focused on new information contained in the Big Creek Research and Extension Team (BCRET) Quarterly Reports for the periods July-Sept. 2015 and October-Dec. 2015, particularly information which was not available during the previous draft EA comment period ending Sept 4, 2015. Additional new information referenced includes: Kotic, Oct 27, 2015: <http://link.springer.com/article/10.1007/s40899-015-0032-5/fulltext.html> , National Park Service 303(d) Letter to ADEQ dated Oct 6, 2015: [http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/NPS%20303\(d\)%20Letter.pdf](http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/NPS%20303(d)%20Letter.pdf)

Excerpts (in italics) and related comments are keyed to specific pages of the EA

EA: Reasons for Finding of No Significant Impact

1. *Water quality data collected before and after operation of the farm began and at sites upstream and downstream from the farm, as well as data collected by a study designed specifically to monitor the water quality effects of the farm, show no evidence of adverse impacts.*

Comment 1: BCRET 9/30/15: Executive Summary states , “Nitrate-N concentration in Big Creek below the C&H Farm continue to be greater than those measured at the upstream site.”

2. *No significant direct or indirect impacts to groundwater quality are expected based on protections provided by rigid adherence to the farm’s NPDES General Permit requirements as well as additional voluntary measures employed by the operators.*

Comment 2: BCRET 9/30/15: Executive Summary states , “Concentrations of nitrate-N and bacteria collected from the house well, which is approximately 400 ft deep and adjacent to the manure holding ponds have periodic high values”

- 6.. *Based on water quality data, as well as park visitation metrics since the farm began operating, no impacts to the Buffalo National River are anticipated.*

Comment 3: On October 6, 2015, NPS recommends that Big Creek be determined “impaired waters” and be added to 303(d) list:
[http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/NPS%20303\(d\)%20Letter.pdf](http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/NPS%20303(d)%20Letter.pdf)

2.1.4 Proposed Modifications

On May 7, 2015, C&H submitted a Major Modification Request to the ADEQ to install 60-mil HDPE liners over a geotextile base material in both waste ponds and to install an 80-mil HDPE cover and methane flare system on Pond 1 (ADEQ 2015c). The geotextile is designed to allow gasses to travel between the clay liner and the HDPE liner and escape, preventing the formation of bubbles beneath the liner. Sludge would be removed from the ponds prior to installation of the liners as is currently allowed under the terms of the farm’s NPDES General Permit. These modifications would address concerns about potential seepage of wastes into groundwater, would control odor, and would convert methane into carbon dioxide, a far less potent greenhouse gas. As with the farm’s previous requests for Major Modifications to the facility NPDES General Permit, a decision-making process and public comment period will follow the submittal. This process could take up to 180 days to complete and it is not clear when or whether the changes would be approved.

Comment 4: There are numerous references to the pond liner modification throughout the EA . 8 months have passed and ADEQ has not yet responded to the request. Jason Henson asked, “should ADEQ's final decision allow for the installation of Pond liners/cover, C & H Hog Farms may choose not to move forward with the actual installation of said liners/cover and may rather opt to continue utilizing the existing clay liners. Please confirm that this understanding is accurate.” It is speculative to assume that this modification will be approved and, if approved, that it will be implemented.

In a letter to ADEQ after a formal modification request, Jason Henson, owner of C&H, wrote a follow-up letter that brings into question whether C&H intends to install pond liners even if they be approved. It should be noted that JBS has purchased Cargill's U.S. swine division and C&H may not have the support for such a project any longer. The EA needs to ascertain the status of this issue before offering it as a resolution to the pond liner issue.

Pg 3-4

Animal waste can impact surface water quality from organic matter, nutrients, and fecal bacteria. Arkansas water quality standards for nutrients (phosphorus [P] and N) are:

“Materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. Impairment of a waterbody from excess nutrients are dependent on the natural waterbody characteristics such as stream flow, residence time, stream slope, substrate type, canopy, riparian vegetation, primary use of waterbody, season of the year and ecoregion water chemistry. Because nutrient water column concentrations do not always correlate directly with stream impairments, impairments will be assessed by a combination of factors such as water clarity, periphyton or phytoplankton production, dissolved oxygen values, dissolved oxygen saturation, diurnal dissolved oxygen fluctuations, pH values, aquatic-life community structure, and possibly others. However, when excess nutrients result in an impairment, based upon Department assessment methodology, by any established, numeric water quality standard, the waterbody will be determined to be impaired by nutrients.”

Comment 5: There is objectionable algal growth in Big Creek indicative of nutrient stimulation. Dr. JoAnn Burkholder, Ph. D., in testimony presented for the draft EA, stated,

“Photos provided in the first two [BCRET] progress reports (e.g. photo #9 from the first progress report; and pp. 26-27 of the second progress report, submitted in March 2014) show abundant benthic filamentous algae/cyanobacteria downstream from the C&H CAFO in comparison to conditions upstream from the CAFO. Yet, the report authors did not address the algal overgrowth. Benthic algae should be quantified throughout this study because benthic algal proliferation can be a direct impact of swine CAFOs on water quality degradation. Noxious filamentous green algae and cyanobacteria commonly thrive in waters degraded by animal wastes, as apparent in photos of Big Creek downstream from the C&H

CAFO.”

Additional photos documenting algal mats in Big Creek have been sent separately to Hannah.

Pg 3-5

Under Section 303(d) of the CWA, States, territories, and authorized Tribes are required to develop lists of impaired waters. These waters do not meet water quality standards that have been set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology.

Comment 6: See NPS 303(d) letter

Pg 3-6

The Buffalo River has been designated as an Outstanding National Resource Water and Extraordinary Resource Water; therefore, it is subject to more stringent water quality standards than undesignated streams. In 2008, two segments of the Buffalo River were assessed and listed on the State 303(d) list. Stream segment 1 was found to be impaired for temperature and stream segment 5 was found to be impaired for dissolved oxygen (ADEQ 2008).

Comment 7: See NPS 303(d) letter

Pg 3-7

Buffalo River water quality is generally very good with the exception of the two stream segments listed on the 303(d) list (ADEQ 2008). Bacteria levels monitored in the river are well below State water quality standards (Mott and Laurans 2004, Usrey 2013).

Comment 8: See NPS 303(d) letter.

To accurately assess the potential point source impacts from C&H Hog Farms on water quality, concentrations of nutrients and bacteria would need to be monitored at and adjacent to the site and the fields where nutrients are applied. By monitoring immediately upstream and downstream of the farm and at the fields, any measurable increase in nutrient or bacteria concentrations discharging from the operations would be recorded and the contribution from other sources would be eliminated or minimized.

Comment 9: BCRET 9/30/15: Executive Summary states, “Nitrate-N concentration in Big Creek below the C&H Farm continue to be greater than those measured at the upstream site.”

Although the NPS water quality monitoring program may indicate chronic conditions or long-term trends, quarterly sampling for nutrients and bacteria is insufficient data to capture actual conditions in the dynamic stream system, particularly given the highly variable concentrations of nutrients and bacteria in relation to stream flow volumes (Usrey 2013).

Comment 9a: That quarterly sampling is not frequent enough in a dynamic system the writer is correct, but this does not allow complete dismissal of the longterm trend of degradation that the NPS data presents. Again, it can only be assumed that the writer is attempting to minimize any unfavorable narrative regarding Big Creek degradation. The EA goes on to say:

Additionally, the entire Left Fork Creek sub-watershed (HUC 110100050301) encompassing approximately 38 square miles, empties into Big Creek above the sampling site. Therefore, land use and development occurring in these sub-watersheds (or portions of) are contributing to the concentrations of nutrients and bacteria sampled at the BUFT06 monitoring site.

Though the EA has discredited NPS data, it goes on to direct our attention to the Left Fork of Big Creek and other sub-watersheds as possible sources for the degradation. The Left Fork by the way is the "control stream" against which the BCRET team is measuring Big Creek. It seems the proponents of the farm would have it both ways... as a control against which to measure, but also as a possible source of degradation.

Pg 3-8:

While the BCRET study does have limited baseline data, it has been ongoing for 21 months, was developed to specifically evaluate C&H Hog Farms potential impacts to water quality, and is considered the best available scientific information.

Comment 10: The EA continues to ignore, disregard or dismiss other available scientific information, including studies by NPS, KHBNR, Kasic
<http://link.springer.com/article/10.1007/s40899-015-0032-5/fulltext.html>

The EA limits itself to considering what it states "is considered the best available scientific information." There is no objective rationale that supports this selective consideration of data. For instance, these concurrent studies reveal quite different information yet are not considered. To obtain a "harder look" understanding of what is happening in the BNR watershed, all relevant studies must be considered.

The BCRET study currently has eight monitoring stations that are sampled on a weekly basis and following storm flow events (Map 5). Ten stations have been established over the course of the study; however, one station was abandoned following vandalism and one due to access issues. The two locations upstream and downstream of the farm on Big Creek and the spring located below Field 1 have been sampled since September 2013. Runoff from three of the application fields is also sampled; Field 1 (pasture/slurry applied), Field 12 (hay/slurry applied), and Field 5a (hay/no slurry applied) (BCRET 2014b). Field 5a somewhat serves as a control since no slurry from the farm is applied, but it is likely the landowner does fertilize the field on a routine basis using chicken litter and/or Triple 19 or another commercial product (pers. comm. Sharpley 2015). Field 5a is not a natural baseline but can be compared to the fields where slurry is applied at a managed rate to evaluate the differences in nutrient or bacteria contributions to surface water. The three fields give a range in landscape position, topography, and soil fertility levels and are

considered a representative strata of all the fields where C&H Hog Farms is permitted to apply nutrients (BCRET 2013).

Comment 11: The EA characterizes BCRET as “the best available scientific information” when in fact it is seriously flawed in design. Out of 17 C&H application fields, only Field 1 and part of field 12 are included in the BCRET study. Field 5a “somewhat serves as a control” but is admittedly “not a natural baseline”. It is included because of mapping discrepancies. It does not receive C&H swine waste and BCRET has no knowledge of how fertility is managed on this field therefore it is not representative. These 3 fields are, at best, weak examples of the overall C&H operation and, at worst, lead to inaccurate and misleading interpretations of C&H waste management practices and field conditions.

According to the Memorandum Of Agreement between ADEQ and BCRET, ADEQ agrees to “assist the University with obtaining access to conduct the study if access is denied by any property owner.” See B. 1 in the document: http://posting.arktimes.com/media/pdf/moa_adeq_div_of_ag_-_buffalo_watershed_water_testing_9-5-13.pdf Lack of access is not a reasonable excuse for a weak study design by BCRET.

In May/June 2015, an additional monitoring station was established in Left Fork as it enters Big Creek and the USGS has installed height gage at that location (USGS 07055792). Nutrient and bacteria concentrations from this location, which drains a watershed similar to Big Creek but does not contain a CAFO operation, can be compared to the concentrations sampled at the site downstream of the farm (BCRET 2015b).

Comment 12 : Kosc, October 27, 2015 <http://link.springer.com/article/10.1007/s40899-015-0032-5/fulltext.html> shows that a dye trace study was conducted with dye injected in the vicinity of Field 16 and found, “Based to the data available to the authors, fifty-nine positive detections were identified in the tracer test, some of which were located in different surface-drainage basins.” including detection in the *Left Fork* of Big Creek This indicates that C&H may well be contributing to contamination of the *Left Fork* through karst features beneath the surface that channel runoff laterally along a chert plane to the *Left Fork* as evidenced in this study, and is therefore it is not a suitable comparison. This is yet another example of the flawed design of the BCRET study.

An independent, in-depth case study of C&H Hog Farms is currently being conducted by scientists from the University of Arkansas System Division of Agriculture. The Big Creek Research and Extension Team (BCRET) is comprised of faculty and staff from the Division, USGS specialists, Newton County Extension agents, and several technicians. The team includes the region’s foremost experts in the fields of agricultural impacts to water quality, livestock nutrient management, soil quality and sustainability, and ecosystems.

Comment 12a: BCRET is indeed a highly credentialed team, but the concern is that this EA relies on the results to the exclusion of all other studies. BCRET is composed of highly qualified individuals from the U of A Division of Agriculture who work on a daily basis in the support of farmers. By necessity, they have close working and financial relationships with members of the Farm Bureau, and corporate agricultural interests. One need look no further than the name of

their quarterly reports: ***“Monitoring the Sustainable Management of Nutrients on C&H Farm in Big Creek Watershed”***. As the report label implies, their job is to help the farmer be successful, which is their typical and appropriate role in support of the agriculture industry. It is not that the validity of their data that is being questioned, but their “independence” in regard to the design of the study itself. Other studies and professional resources who are not connected directly with agriculture have specific expertise with the Big Creek watershed and the Mt. Judea area. These scientific resources are readily available but are either minimized or not mentioned at all. Consequently, this EA is fairly narrow in regard to where it has chosen to find its guidance.

Pg 3-9

BCRET water quality sampling methodology uses EPA approved sampling protocols and analyses. Samples are analyzed for dissolved P, total P, ammonia, nitrate-N (nitrate plus nitrite), total N, total suspended solids, dissolved organic carbon, E. coli, and total coliform (bacteria).

Comment 13 : Comment deleted

Pg 3-10

*Groundwater flow in karst systems can cross the surface watershed boundaries, and may not correspond with surficial drainage basin divides (Soto 2014). **Such conditions are not observed in the southern part of the Buffalo River watershed where the farm is located.***

Pg 3-11

*Because much of the Bull Shoals watershed is covered by agricultural land, consisting mostly of livestock operations, **it is possible that nutrient contaminants from these agricultural activities reach the Buffalo River by interbasin transfer of groundwater** (Murray and Hudson 2002).*

Comment 14: The two excerpts above (emphasis added) are contradictory. Also see Kopic, 2015: *“Forty-four detections were located in various springs and streams, 26 of which are privately owned. Fourteen of the detections were located in caves or springs managed by the BNR, and three of these detections were located in the BNR itself. One of the positive detections occurred in a private well that is used for extraction of potable water.”* Groundwater flow from the C&H vicinity across surface watershed boundaries has been shown to occur.

Pg 3-12

An electrical resistivity imaging (ERI) analysis of Fields 5a and 12 was initiated in December 2014 by the School of Geology, Oklahoma State University. The preliminary analysis showed that additional data were needed and a second field effort was conducted in May 2015 (BCRET 2014c, pers. comm. A. N. Sharpley 2015). For the second quarter of 2015, a preliminary report on

the December 2014 analysis was completed. The results of the May surveys are not yet available. The 2014 ERI surveys confirmed the soil thickness, presence, extent, and depth of epikarst features and bedrock material. The average epikarst thickness underlying the two fields was found to be highly variable ranging from 6 to 75 feet thick. There appears to be a large doline feature, a closed topographic depression caused by dissolution or collapse of underlying rock or soil, within the weathered bedrock underlying Field 12. Additional analysis could enhance the delineation of possible karst features and further information is needed to have a more complete view of the field to understand connections between surface and groundwater (Fields and Halihan 2015). These studies need ground truthing to determine the correlation of ERI data to epikarst and alluvium and especially to characterize those units' hydraulic characteristics.

Comment 15: The June 30, 2015 BCRET Quarterly report stated, “A final report detailing findings of the Electrical Resistivity Imaging (ERI) analysis conducted on application fields was not available at the time this Quarterly Report was due. The ERI report will be released as soon as it is available to us.” Subsequent reports, including the most recent Dec 31, 2015 report, have made no mention of a final ERI report. The EA preparers should have requested this final report to clarify questions raised in the draft report. According to the MOA between the ADEQ and the UofA BCRET each quarterly report: "shall include a summary of all Project Plan activities performed by University during the preceding quarter."
http://posting.arktimes.com/media/pdf/moa_adeq_div_of_ag_-_buffalo_watershed_water_testing_9-5-13.pdf

A groundwater characterization, karst inventory, and a fluorescent dye tracing study are being conducted on Big Creek. However, no published data or results are available from these studies (Soto 2014). Dr. John Van Brahana provided a comment on the Draft EA that referenced an experiment conducted near the C&H barns and application fields. Dr. Van Brahana’s comment, along with a preliminary white paper and PowerPoint presentation that are available online, were reviewed. The experiment involved injecting dye into a “dug well” and then observing the dye in nearby springs and surface waters to identify the direction and velocity of subsurface water flow. While scientific methodology, assumptions, and data are not provided, the available documents state that preliminary calculations at the locations where the experiment was conducted indicate rapid subsurface flow and a connection to surface water. Water quality data collected by the Karst Hydrogeology of the Buffalo National River (Dr. Van Brahana’s team) is not available through the USGS or EPA water quality databases.

Comment 16: See Kotic, 2015

Pg 3-13

The BCRET study team has installed an interceptor trench below the ponds and is sampling water quality at that location to determine whether the holding ponds are leaking (BCRET 2014b, 2014c). There are few methods to accurately quantify potential pond leakage and the methodology is confounded given the small amount of potential leakage and variable evaporation and precipitation rates. The study team is collecting electrical conductivity tests during water quality sampling, which may help determine whether the water sampled is groundwater or wastewater (pers. comm. A. N. Sharpley 2015). Available data to date are presented in Table 3-3 and discussed in the paragraph preceding the table.

One groundwater well (ID# 93043955545) is located adjacent to the farm buildings and supports farm operations (ANRC 2015c). The well was completed in 2013. It was drilled to a total depth of 325 feet below ground surface (bgs), and the static water level in the well was 138 feet bgs. The well yields 30 gallons per minute.

Comment 17 : The Sept. 30, 2015 BCRET report provides evidence of the presence E. coli and nitrate in the House well and interceptor trenches as well as the nearby ephemeral stream, all of which are being used to monitor for potential pond leakage. It is reasonable to conclude that swine waste from pond leakage is the source of the E. coli and nitrate in these locations.

While the BCRET Dec. 31, 2015 report indicates that a new sampling port has resolved the E. coli contamination question in the House well, it is unclear how the well is “purged” prior to sampling. In addition, nitrate levels continue to be high in the well, typically higher than nitrate levels in Big Creek, and the trenches and ephemeral stream continue to have high nitrate E. coli and coliform levels, suggesting there continues to be possible leakage of the waste storage ponds and contamination of surface and groundwater. There are methods at the disposal of the BCRET to determine the source of these contaminants, including DNA microbial source tracking for E. coli and stable isotope testing for nitrate. BCRET team members Mary Savin and Phil Hays have the ability to make such a determination.

Pg 3-15

Since C&H Hog Farms and the fields where wastes are applied are located along a waterway, it is reasonable to assume that there is localized recharge and discharge of surface and groundwater in the area. If the waste ponds were leaking, or nutrients or bacteria applied to fields were leaching into upper alluvial groundwater, any measurable contribution of those pollutants would be realized at the downstream water quality monitoring station or the field monitoring stations.

Comment 18 : There is in fact evidence provided in the BCRET Sept 30, 2015 report and the Dec 31, 2015 report showing the presence of E. coli (see comment 15) as well as elevated nitrate at the downstream monitoring station. Downstream nitrate levels are consistently 2 to 3 times higher than upstream readings and the downstream levels are higher than those detected at the Left Fork station.

Pg 3-17

As shown in Figure 3-4, nitrate concentrations are greater (0.1 mg/L) downstream from the application fields and the higher concentration is probably reflective of the land use continuum and historic management of the greater catchment area that drains into and is monitored at the downstream site.

Comment 19: The Sept 30, 2015 and Dec 31, 2015 BCRET reports indicate continuing elevated nitrate levels at the downstream station. The stated purpose of the upstream and downstream monitoring stations is to determine the nutrient and bacteria contributions of C&H operations to Big Creek. Page 3-7 of the EA states, “ By monitoring immediately upstream and downstream of the farm and at the fields, any measurable increase in nutrient or bacteria concentrations discharging from the operations would be recorded and the contribution from other sources

would be eliminated or minimized.” The contention on page 3-17 that elevated nitrate levels are “...probably reflective of the land use continuum and historic management of the greater catchment area...” contradicts the stated purpose of these stations, negates the validity of the data provided by these monitoring stations and, if accepted as accurate, points to a serious flaw in the BCRET study design.

Pg 3-20

In the BCRET December 2014 quarterly report, the study found no statistically significant difference in E. coli or total coliform concentrations when comparing upstream to downstream monitoring sites. E. coli concentrations were high in the trench flow samples collected on October 13, 2014 below the waste holding ponds. These high levels appeared to be isolated at the time and likely resulted from construction contamination flushing. Additionally, there are limited data regarding water quality sampling at the trench (BCRET 2014c, 2015b

Comment 20: The Sept. 30, 2015 and Dec 31, 2015 BCRET reports indicate continued presence of E. coli and total coliform in the monitoring trenches. The ongoing contamination suggests that “construction contamination flushing” is not in fact the source of the problem. BCRET has also hypothesized that wild animals are contaminating the trench sampling locations. These trenches were installed specifically to detect pond leakage, yet when evidence of leakage is found it is attributed to other sources. If correct, this again points to poor study design. Further, as stated in Comment 17, BCRET has the ability to determine the source of E. coli and nitrate in the monitoring trenches.

Pg 3-22

There are no data or other evidence to indicate that the operation of C&H Hog Farms is adversely affecting surface water quality. While it is recognized that the available data are somewhat limited, these data are considered sufficient to conclude that if the farm’s operation over the last 18 months was contributing measureable concentrations of nutrients or bacteria then it would be apparent in the water quality monitoring data collected to date, or be observed in emerging trends.

Comment 21: There is in fact evidence contained in the Sept. 30, 2015 and Dec 31, 2015 BCRET reports which indicates that C&H is adversely affecting both surface and ground water quality, as indicated by downstream nitrate levels and bacterial and nitrate contamination of the House well, monitoring trenches and nearby ephemeral stream. However, BCRET has repeatedly stated that more study is required before any conclusions can be reached and its reports merely present data without interpreting it. In addition, BCRET has identified sites that warrant “close monitoring”. Therefore it is inaccurate to state that “these data are considered sufficient to conclude” that C&H is not adversely affecting water quality.

Pg 3-23

Any discharge during a rainfall event would be restricted to an overflow minimizing the volume of discharge; the entire contents of the ponds would not be discharged. An overflow during a significant rainfall event could have short-term impacts to surface water quality since nutrients and bacteria concentrations would dilute or be available for biological uptake during downstream transport through the system. However, stream volumes and velocities would be greater during a severe weather event and nutrients and sediment would dilute and disperse at rates much greater than base flow and would move rapidly through the system.

Comment 22 : Mike Smolens, Ph. D, stated in testimony previously submitted for the draft EA,

“Because the waste pond design assumes there will be no discharge, the second pond in the series has no stabilized, emergency outlet. If the pond were to overtop the embankment due to a very large storm (much greater than the design storm) or a prolonged period of wet weather, or a combination of wet weather and extreme storm, there would be a danger of catastrophic failure of the embankment. Such failure could release as much as 2 million gallons of waste into the Buffalo River, a disaster not unlike the recent mine waste disaster in Colorado. In high risk areas, it is standard practice to include a stabilized outlet to allow discharge without failure of the embankment.”

The ponds were engineered to specifications to avoid rupture and minimize leakage. The proposed modification that would line the waste holding ponds would further protect water quality from increased nutrient and bacterial concentrations.

Comment 23: See Comments 22 and 4.

An intensive scientific study has been ongoing since September 2013 to determine if the C&H Hog Farms operation is adversely affecting surface water quality. Water quality samples are taken weekly and following storm events at eight locations on the farm, including three of the fields, nearby waterways, and a spring. The monitoring sites include sites on Big Creek upstream and downstream of the operation. There are no observable trends related to the timing of slurry applications and nutrient or bacterial concentrations recorded during water quality sampling (BCRET 2014c, pers. comm. A. N. Sharpley 2015). There have been no consistent or significant differences in the concentrations of nutrients or bacteria between the upstream and downstream sites. There have been no measurable increases in the concentrations of nutrients or bacteria downstream of the operation (BCRET 2014c, 2015b)

Comment 24 : See Comments 20 and 21

Pg 3-24

While the General Permit has a limit for potential seepage that does not necessarily mean the C&H Hog Farms waste ponds are seeping fluids at that rate or at any rate. To date there are no data available to determine whether the ponds are leaking at a measurable rate. The pre-construction geotechnical investigations boring logs encountered no karst features in the area where the buildings or holding ponds were constructed. Clays with variable and generally low

chert or sand content beneath the ponds as indicated in the geotechnical report (ADEQ 2012a) would suggest low hydraulic conductivity and low propensity for vadose zone leaching of agricultural contaminants. No water bearing soils or formations were encountered during the geotechnical investigation. There is no evident conduit for surface water to reach groundwater in the area of the ponds.

Comment 25 : See Comments 20 and 21

A manure slurry chemical analysis was conducted in 2013 on the C&H Hog Farms holding ponds and the results for monitored electrical conductivity, total N, and total P are listed in Table 3-3 (BCRET 2013). Water quality monitoring has been ongoing in the trench placed below the ponds, which was designed to intercept any subsurface flow of seepage moving along a restricting or less permeable layer. This type of trench collection system has been widely used to monitor shallow subsurface flows in karst systems and in the past to monitor seepage from a swine lagoon (BCRET 2014c). The mean concentrations of total N and P, and the electrical conductivity from water sampled from the trench are also shown in Table 3-3 (BCRET 2015b). Any seepage from the ponds would be expected to have similar concentrations of total N and P, and electrical conductivity properties. However, the water quality sampled in the trench is significantly different from the slurry composition, indicating that no measurable seepage from the pond is occurring and that no significant adverse impacts to groundwater quality are occurring. Given its characteristics, the water monitored in the trench is groundwater.

Comment 26: See Comment 20

Pg 3-25

Since C&H Hog Farms and the fields where wastes are applied are located along a waterway, it is reasonable to assume that there is localized recharge and discharge of surface and groundwater in the area. If the waste ponds were leaking, or nutrients or bacteria applied to fields were leaching into upper alluvial groundwater, any measurable contribution of those pollutants would be realized at the downstream water quality monitoring station or the field monitoring stations. No significant direct or indirect impacts to groundwater quality are expected since it is protected by rigid adherence to the farm's NPDES General Permit requirements and BMPs.

Comment 27: See Comments 17, 18, 19, 20 and 21.

Pg 3-31

Significant changes in water quality could adversely affect macroinvertebrate populations occurring in Big Creek, which indirectly could affect bat species through a reduction in prey base. However, no measureable adverse impacts to surface water quality in Big Creek have been identified based on the BCRET and NPS water quality monitoring data.

Comment 28: deleted

Comment 29: See Comments 18, 19, 21.

Pg 3-40

*C&H Hog Farms has been in operation (waste applied to fields) for more than 18 months and water quality sampling has been ongoing. There are no data to suggest the operation is negatively affecting water quality by increasing the concentrations of total N and P, dissolved P, ammonia-N or nitrate-N in Big Creek or the Buffalo River. Monitored levels of nitrate, nitrite, and total phosphorus downstream of the C&H Hog Farms are not at levels expected to cause mortality or sub-lethal effects to freshwater bivalves or other aquatic invertebrates. NPS data collected at Big Creek (BUFT06) do not show any emerging trends in nutrient related parameters or any measurable increases. Dissolved oxygen levels measured downstream on Big Creek near Carver (USGS 07055814) appear to be within normal variation and similar to concentrations in other Buffalo River tributaries. These nutrient and dissolved oxygen levels are not expected to cause adverse effects to aquatic insects. Refer to **Section 3.2.2** for further information on surface and groundwater quality. The application of wastes to fields adjacent to Big Creek is closely managed under the terms and conditions of the NPDES General Permit. Monitored water quality parameters on Big Creek are well below those criteria established to protect aquatic wildlife.*

Comment 30: See NPS 303(d) letter

Pg 3-41

Including the freeboard, the ponds have sufficient storage to hold the volume generated by a 100-year, 24-hour storm event. Any discharge during a rainfall event would be restricted to an overflow; the entire contents of the ponds would not be discharged.

Comment 31: See Comment 22

The NPDES General Permit limits potential seepage from the waste holding ponds to 5,000 gallons/acre/day. At pond installation, liners were tested and met with specifications to ensure that soil used met engineering specifications for permeability. While the NPDES General Permit has a limit for potential seepage that does not necessarily mean the C&H Hog Farms waste ponds are seeping fluids at that rate or at any rate. There is no evident conduit for surface water to reach ground water in the location of the ponds. The trench system below the ponds serves as a leak detection system. There is no indication that the waste holding ponds are seeping at a measurable rate or adversely affecting surface or groundwater quality.

Comment 32: See Comments 17, 20

In May 2015, C&H submitted a Major Modification Request to ADEQ to install 60-mil HDPE liners over a geotextile base material in both waste ponds and to install an 80-mil HDPE cover and methane flare system on Pond 1 (ADEQ 2015c). These design modifications would further minimize the potential seepage of wastes into groundwater from the ponds.

Comment 33: See Comment 4

*Pre-construction geotechnical investigations did not encounter any limestone or water-bearing formations, which would indicate karst topography and the abundance of chert at the site indicates a lower propensity for large-scale karst landform development (see **Section 3.2.2** for more details). How surface water and groundwater discharge/recharge within the C&H Hog Farms and application fields is unclear. However, even with the assumptions that localized recharge and discharge of surface and groundwater occurs in the area, no adverse impacts to groundwater quality are anticipated given the requirements of the NPDES General Permit and the rigorously managed farm operations.*

Comment 34: The Well Drilling Log for the House well

<http://buffaloriverwatershedalliance.wildapricot.org/resources/Documents/CH%20Well%20Driller%20Log.jpg> shows that there are in fact water-bearing formations present.

PG 3-43

Installation of liners in waste storage ponds would provide further protection to surface and groundwater beyond those practices currently employed on the facility and waste application fields.

Comment 35: See Comment 4

Mitigations

No significant impacts to the Buffalo National River are anticipated and no mitigation measures are required.

Comment 36: See NPS 303(d) letter

Pg 3-44

The owners of each tract of land where wastes could be land applied entered Land Use Contracts with the operators of C&H Hog Farms. The contracts specified wastes would be applied according to the NMP and ADEQ guidelines and allowed owners to add additional requirements. None were specified by any of the landowners (ADEQ 2012a).

Comment 37: This statement is inaccurate. Land Use Contracts for 3 of the application fields, or parts thereof, were signed by individuals who were not the land owners of record.

Pg 3-45

The proposed major modification to the NPDES General Permit, which would allow for installation of a floating cover and methane flare system, would further reduce odor at the C&H Hog Farms' waste storage ponds.

Comment 38: See Comment 4.

Pg 4-3

In July 2014, EC Farm (Permit No. 3540-WR-6) applied for a Major Modification to become a land application site only permit. All land proposed for application has been permitted in the past to receive swine nutrients. The swine fertilizer would be obtained from C&H Hog Farms. A Site Management Plan was developed by a certified planner for the Major Modification request. If approved, the Major Modification would allow for application of swine waste using the P-Index to 596.5 acres, of which 38.7 acres will be removed as the P-Index calculations place these fields in the high or very high range. Those fields will be included in the Site Management Plan and retested for future revisions to the plan. A total of 557.8 acres would be available to apply swine nutrients. The fields are pastureland or hayland and are located in Newton County, Arkansas. This proposal is in the approval process. The ADEQ is the agency responsible for evaluating the permit including its potential effects to threatened and endangered species. The addition of these fields for land application of C&H Hog Farms manure would allow for greater flexibility in land application and decreased applications on those fields already approved for application.

Comment 39: Page 3-15 states, “only an estimated 251 acres is needed based on the amount of wastes being produced “. If correct, why is an additional 557.8 acres required? This modification request has yet to be approved by ADEQ.

Pg 4-5

*In the case of C&H Hog Farms, it is not necessary to predict the effects of operations on water quality because its operations are ongoing and any contribution to cumulative effects are represented in water quality data collected since 2013. As detailed in **Section 3.2**, a review of water quality data do not indicate any measureable negative effects from the operation of the farm ... No significant negative cumulative contribution to water quality is anticipated.*

Comment 40: See NPS 303(d) letter

Sincerely,

Gordon Watkins, President

Buffalo River Watershed Alliance

