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Department of Geosciences

April 8, 2016

Arkansas Department of Environmental Quality
ATTN: Katherine McWilliams
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Ms. McWilliams:

This letter is written to be placed in the public record on the permit modification for EC Farms, permit tracking number 3540-WR-7.

I very strongly oppose the permit modification for EC Farms, and want to go on record to explain why, and share this with those who have responsibility to stop this egregious action.

Our research team (Karst Hydrogeology of the Buffalo National River), which is composed of a diverse range of professional individuals who have donated their time and expenses to study the karst hydrogeology of Big Creek and the Buffalo National River, collected data starting from the summer of 2013. Downgradient from the fields used for spreading C & C Hog Barn waste (feces and urine) we monitored karst springs to get background data on Left Fork of Big Creek, and results from state approved labs indicated that NO_3 values in karst spring water was above the EPA maximum limit of 10 mg/L, registering concentrations as high as 11.3 mg/L. Obviously, these fields are near saturation now, they are underdrained by karst into the Left Fork of Big Creek and thus not subject to natural attenuation. EC Farms currently show anomalously high concentrations of impacts from the current animal husbandry in the basin.

I have been studied karst geology, hydrology, and hydrogeology for more than 50 years, both with the U.S. Geological Survey and the University of Arkansas, and the lack of background information and the misinformation provided by tracking number 3540-WR-7 indicates that good documentable science is not being honored if this permit modification is approved. I strongly encourage you to reject this permit request.

Sincerely yours,

John Van Brahana
Professor Emeritus

Buffalo National River supporters gather in 2015.

Why is KHBNR needed?

In 2012, a 6,500-hog Confined Animal Feeding Operation (CAFO) was built. Ten of the hog waste spray fields lie beside Big Creek that flows into the Buffalo National River, about 6 miles away.

After unprecedented public objections to the first CAFO of its size in the Buffalo National River watershed, the Arkansas legislature authorized up to $740,000 of State funds for a study to test the water that the C&H CAFO could affect.

Area residents and stakeholders had no say on the study's scope or on the team that would conduct it.

The University of Arkansas Division of Agriculture (UADA) entered a Memorandum of Agreement (MOA) promising to: *"Undertake and complete a study of the* ***potential for water quality impacts*** *within the Buffalo River Watershed* ***from animal wastes produced by the permitted CAFO C&H Hog Farm,*** *and its operations within the watershed."* UADA formed the Big Creek Research Team, adding the Extension Agency to become BCRET.

Has BCRET's mission changed?
The title of their quarterly reports suggests so:

"Demonstrating and monitoring the ***sustainable management of nutrients on C&H Farm*** *in Big Creek Watershed."*

KHBNR formed to develop scientific studies that aid in monitoring **the potential impact of C&H hog waste** within the Buffalo River Watershed.

KHBNR Study Design — Expanding What We Need to Know

KHBNR monitors **water quality** in rivers, creeks, springs, wells and cave streams with a suite of data collection that includes:

- **Dissolved oxygen (DO).** A clean, healthy stream has plenty of dissolved oxygen that allows fish and other key aquatic species to thrive. Low oxygen levels indicate nutrient overload.
- **E. coli.** Presence of E. coli bacteria indicate that water has been contaminated by fecal material and could contain dangerous pathogens.

To fully understand **water dynamics** – water moving through karst -- KHBNR also conducts tests and procedures to determine where, when, and how water and liquid waste move on the ground, go underground, and come back up again.

- **Dye tracing** helps to define the natural boundaries where water flows and the rate at which it can move throughout the watershed. KHBNR dye tracing has already shown water traveling as far as 2,500 feet per day, while most groundwater moves only 10-15 feet per year.
- **Trace constituent analysis** can reveal both the mineral "fingerprints" of formations through which water has flowed, and also minute amounts of elements such as copper and zinc isotopes, which are major additives to pig feed and would show up in their excrement.

Descriptive place names on USGS topographic maps such as Dry Creek, Sinking Springs and Dry Branch indicate we have long understood that in karst areas, water can disappear underground and reappear in unexpected places.

Karst Hydrology in the Buffalo River Region

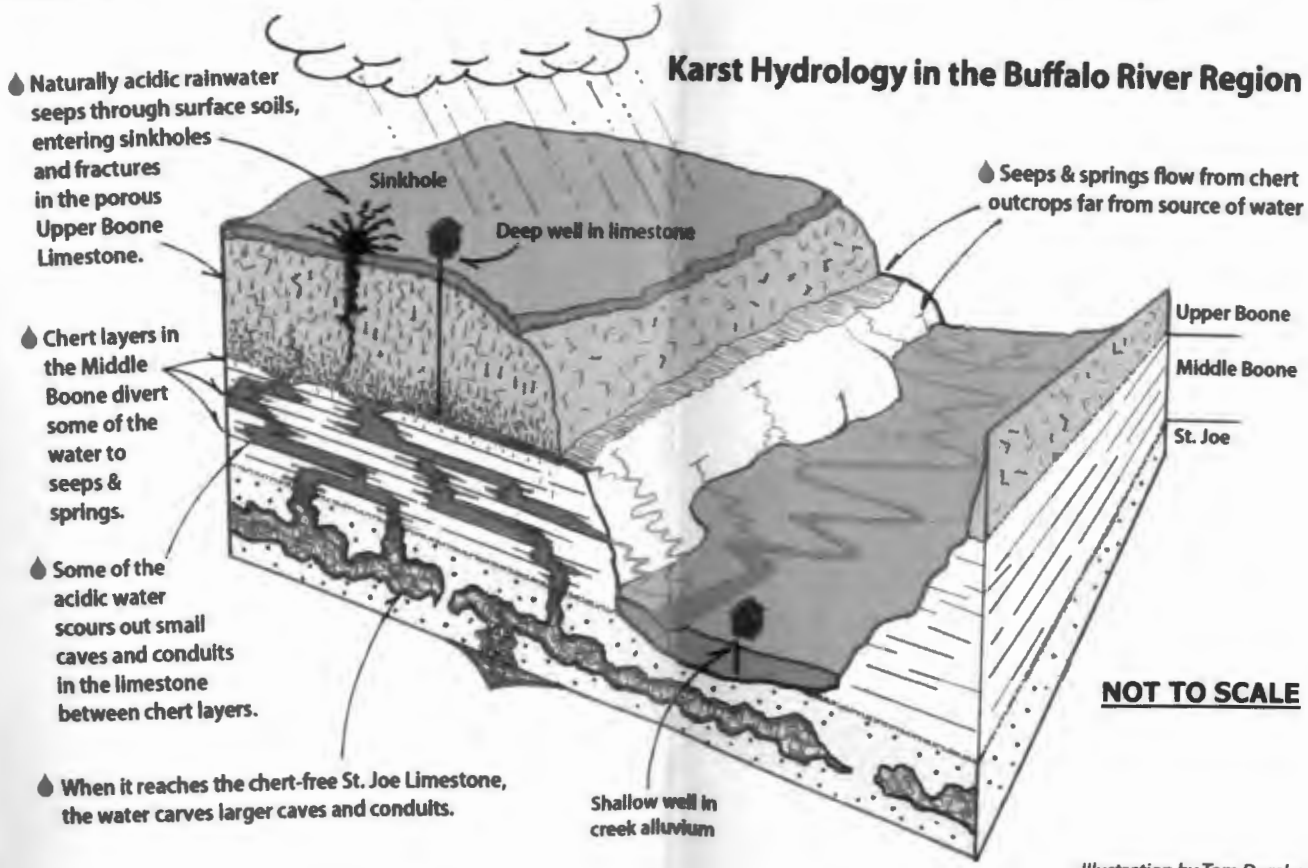

Illustration by Tom Dureka

KHBNR was conceived and is directed by eminent karst hydrogeologist Dr. Van Brahana

KHBNR team members take a break from water testing.

Who is on the KHBNR project team?

- **Dr. Van Brahana, Ph.D., P.G.**, University of Arkansas Karst Hydrogeology Professor Emeritus; Research Scientist, U.S. Geological Survey (USGS); Retired
- **Dr. Joe Nix Ph.D.**, Ouachita Baptist University, Distinguished University Professor of Chemistry; Professor Emeritus; Retired
- **Ray A. Quick M.S., P.G.**, AR Operations Mgr. Woodward-Clyde Group, URS Corp., Retired; ADEQ-Water & Haz. Waste Divisions; Retired
- **John Murdoch B.S.**, Division of Agriculture-Instrumentation, Univ. of Arkansas; Retired
- **Teresa Turk M.S.**, NOAA-National Marine Fisheries Service, Research Fisheries Scientist; Retired
- **Carol Bitting,** Newton County liaison; Field Coordinator
- **Katarina Kosič Ficco, M.S.**, candidate for Ph.D. in Karstology, University of Nova, Gorica, Slovenia
- **Brian Thompson B.S.**, Tyson Foods, Inc.; Retired
- **Dr. Steve Johnson M.D.**, Internal Medicine, specializing in public health impacts of waterborne substances, MANA; Retired

WHAT CAN YOU DO?

The KHBNR project is funded in part by a grant from Patagonia Foundation and from donations of professional expertise, services, sweat equity and cash from people who care about preserving the crown jewel of Arkansas and our country's first National River.

With your support the KHBNR project can collect and analyze more field data, improving BRWA's ability to protect the Buffalo River Watershed now and for future generations.

Dr. Van Brahana stands in a narrow slot canyon on Shop Creek, a tributary to the Buffalo National River. The creek slices through limestone bedrock to reveal cracks and interconnected openings and voids typical of the karst nature of the limestone. *—Photo by Carol Bitting*

To donate or for more information please visit:

buffaloriveralliance.org/KHBNR

Buffalo River Watershed Alliance is a 501(c)(3) organization.

BRWA's mission is to preserve and protect the scenic beauty and pristine water quality of the Buffalo National River for future generations through public outreach and education, advocacy, and direct actions.

Your generous donations are tax deductible.

Thank You!

~ DEEP SCIENCE ~

of the Buffalo River Watershe

Understanding What's Underne

Buffalo River bluffs at Steel Creek *— Photo by Rita Szabo*

presented by the

KARST HYDROGEOLOGY OF THE BUFFALO NATIONAL RIVER PROJECT

What is the KHBNR project?

This independent research project assesses and documents the water quality of surface and groundwater as it flows across and through karst to the Buffalo National River.

Patagonia Foundation awarded a grant to the **Buffalo River Watershed Alliance (BRWA)** to help fund the KHBNR project.

Van Brahana
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