Exhibit 3
Survey of Threatened and Endangered Bat Species on Big Creek
by James W. Gore, B.S., M.S. Candidate
Survey of Threatened and Endangered Bat Species On Big Creek

Prepared for:
Buffalo River Watershed Alliance

Prepared by:
James W. Gore
Endangered Bat Species Presence/Absence Survey

At the request of the Buffalo River Watershed Alliance, a survey was performed in order to determine the possible presence of any endangered or threatened bat species along Big Creek, an integral part of the Buffalo River watershed. Big Creek is located within the known ranges of three species of bat that are currently included on the U.S. Fish & Wildlife Service’s List of Threatened and Endangered Species. These are the endangered Indiana bat (*Myotis sodalis*), the endangered gray bat (*M. grisescens*), and the threatened northern long-eared bat (*M. septentrionalis*). Acoustic monitoring was conducted within the project area in order to determine the presence or absence of these species. One Anabat II bat detector (Titley Scientific, Inc.) was placed at each of three locations along the banks of Big Creek in Newton County, near the community of Mt. Judea, AR (Fig. 1, Photo Log) on the nights of August 19-20, 2015. Detectors were positioned to detect bats foraging over large pools within the creek, and programmed to record beginning 30 minutes before sunset until approximately 30 minutes after sunrise. Recorded bat calls were then identified to species using Bat Call Identification (BCID) auto-i.d. software. Calls identified as one of the listed species were then manually inspected for confirmation and/or correction. Three Indiana bats and several hundred gray bats were detected within the study area, as well as several northern long-eared bats (BCID Data Summaries).
Figure 1. Locations of deployed acoustic devices along Big Creek in Newton Co. Arkansas.
The **Indiana Bat** (*Myotis sodalis*) is a medium-sized bat species with dull gray and chestnut colored fur. Indiana bats are migratory, mating in September and begin hibernation in October. Young are born in June and July. During the summer, Indiana bats roost under tree bark or in tree cavities along streams or in upland forests, with females and their young forming small colonies of 50 to 100 individuals. Limestone caves with stable temperatures of three to six degrees Celsius and 66 to 95 percent humidity are required for winter hibernation. In Arkansas, Indiana bats are known to occur in Benton, Clay, Independence, Izard, Johnson, Madison, Marion, Newton, Searcy, Stone, and Washington Counties. Pesticides, commercialization of roosting caves, and loss of foraging habitat all pose threats to the species. However, the most severe current threat to Indiana bat populations is the continued spread of white-nose syndrome which was first detected in Arkansas in January of 2014. The Study Area is located within the suitable limestone habitat that is required by Indiana bats for hibernation during the winter months. Additionally, Indiana bats were detected foraging along Big Creek within the Study Area during the August survey.

The **Gray Bat** (*Myotis grisescens*) is a medium-sized bat species with dull gray or chestnut colored dorsal fur, and paler ventral fur. Gray bats are migratory, roosting almost exclusively in caves. In winter, deep vertical caves with temperatures between 5 and 11°C are preferred, while maternity colonies in the summer prefer domed caves between 14 and 24°C, with flowing water. Occasionally, gray bats will use alternative roost structures such as the storm drain located in Newark, AR which houses a maternity colony during the summer. Summer roosts are most often located within one kilometer of a stream or lake, over which the gray bats forage. Mating occurs in September and October, immediately before hibernation. Young are born in May or June, with larger colonies exhibiting higher rates of reproductive success. In Arkansas, Indiana bats are known to occur in Baxter, Benton, Boone, Carroll, Cleburne, Crawford, Franklin, Fulton, Independence, Izard, Jackson, Johnson, Lawrence, Madison, Marion, Newton, Pope, Searcy, Sebastian, Sharp, Stone, Van Buren, and Washington Counties.
Human disturbance of maternity roosts and hibernacula, pesticides, and loss of foraging habitat are the most critical threats to the species. The Study Area is located within the suitable habitat required by gray bat maternity and bachelor colonies. Additionally, gray bats were detected foraging along Big Creek within the Study Area during the August survey.

The **Northern Long-Eared Bat** (*Myotis septentrionalis*) is a medium-sized bat species with olive or light brown fur above and light gray fur below and ears that extend well beyond the muzzle when folded forward. Northern long-eared bats mate in late summer or early fall and usually begin hibernation in October. Hibernation occurs in cool caves (6 - 9°C) with high humidity, and little or no air flow where the bats tuck themselves into small cracks and crevices in the cave wall. Young are born in May and June. During the summer, northern long-eared bat maternity colonies roost under tree bark or in tree cavities found in upland pine forests. The bats will also frequently roost in buildings, bat houses, or under bridges. Northern long-eared bats occur in virtually every county in Arkansas. Currently, the most severe threat to northern long-eared bat populations is the continued spread of white-nose syndrome which has caused 99% population reductions in the eastern United States, and has been detected in Arkansas since January of 2014. The Study Area is located within the suitable upland forest habitat that is required by northern long-eared bats. Additionally, northern long-eared bats were detected foraging along Big Creek within the Study Area during the August survey.
References


U.S. Fish and Wildlife Services. “Species Profile: Gray Bat.”
http://ecos.fws.gov/speciesProfile/profile/speciesProfile?spcode=A04J

U.S. Fish and Wildlife Services. “Species Profile: Indiana Bat.”
http://ecos.fws.gov/speciesProfile/profile/speciesProfile?spcode=A000

U.S. Fish and Wildlife Services. “Species Profile: Northern Long-eared Bat.”
http://ecos.fws.gov/speciesProfile/profile/speciesProfile?spcode=A0JE
James W. Gore
Wildlife Biologist / Environmental Technician

Summary of Qualifications

**Education**
- Bachelor of Science
  Wildlife Ecology & Management
  Arkansas State University
- Master of Science Candidate
  Biology
  Arkansas State University

**Work Experience**
- Six years surveying for Indiana bats throughout Ozark National Forest in Arkansas
- Captured and processed all Threatened & Endangered bat species native to Arkansas including:
  - Hundreds of threatened northern long-eared bats (*Myotis septentrionalis*)
  - Hundreds of endangered gray bats (*M. grisescens*)
  - Twenty-two endangered Ozark big-eared bats (*Corynorhinus townsendii ingens*)
  - Ten endangered Indiana bats (*M. sodalis*)
- Located Indiana bat and evening bat roosts throughout Ozark National Forest using radio telemetry
- Performed multiple threatened & endangered bat surveys for Arkansas Highway and Transportation Dept.
- Performed multiple threatened & endangered bat surveys for U.S. Department of Defense

**Professional Credits and Affiliations**
- Techniques and Identification Bat Acoustics Course
- Southeastern Bat Diversity Network Annual Meeting, 2015
- Bat Capture Technique Demonstrator for Devil’s Den State Park
- Member of Southeastern Bat Diversity Network
- Member of Bat Conservation International
Photographic Log
## PHOTOGRAPHIC LOG

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Pitch: 26° (2.6°)
Time: 08:19-2015 18:29

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Location: Newton AR 19 Aug 2015  
County State Date

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Location: Newton AR 19 Aug 2015  
County State Date
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### Photo Number: 5

**Photo Description:**
Facing west from Site A

![Photo 5](image5)

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**Photo Description:**
Anabat and microphone setup at Site B

![Photo 6](image6)
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**Photo Number:** 7  
**Photo Description:** Facing north from Site B

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![Photo 9](image)

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| Photo Description:    | Anabat and microphone setup at Site C |

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| State                 | 19 Aug 2015                      |

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![Facing east from Site C](image1)

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![Facing south from Site C](image2)
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Pages 19 to 100 of this report, containing the remainder of the Bat Call Identification Summaries, is available online at http://buffaloriveralliance.org/Resources/Documents/Bat%20Survey.pdf