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Distribution, Conservation and Current Status of the Little Brown Bat (*Myotis lucifugus*) in Arkansas

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The little brown bat (*Myotis lucifugus*) is a common insectivorous bat found across much of North America with the exception of parts of Kansas, Nebraska, and the southern tier of states from Louisiana to southern California. Arkansas represents the southwestern edge of its range in the eastern United States.

The Natural Heritage Program state ranking for this species is S3 (Vulnerable) and it is considered an Arkansas Species of Greatest Conservation Need (Anderson 2006). In the northeastern United States, there have been significant declines in little brown bat populations from White Nose Syndrome in this and other bats that hibernate in caves (Frick et al. 2010). Prompted by the threat of White Nose Syndrome, this paper reviews little brown bat distribution, summer ecology, populations, and conservation measures taken to protect winter hibernacula in Arkansas.

Recent maps of the distribution of this species indicate it has been found in 29 counties, primarily in the Ouachita and Ozark Mountains (Fokidis et al. 2005, Medlin et al. 2006, Sasse and Saugey 2008, Sealander and Heidt 1990).

New records are reported from four counties. Thirty bats were observed in Bennett Cave in Carroll County on May 17, 2005. Two bats were seen in Bat Cave in Marion County on January 16, 2002, though none were present in this cave on surveys of 2007-08 and 2009-10. Three bats were counted in Chalk Mine in Montgomery County on February 25, 2010 but were absent during a survey conducted in the winter of 2010-11. Twenty bats were seen at Coldwater Creek Cave in Baxter County on March 21, 2001 (Figure 1).

Additionally, Sealander and Heidt (1990) and subsequent authors overlooked previously published records of museum specimens from Prairie (Sealander 1956), Searcy (McDaniel and Gardner 1977), Sebastian (Sealander 1956), and Sharp Counties (McDaniel and Gardner 1977)(Figure 1).

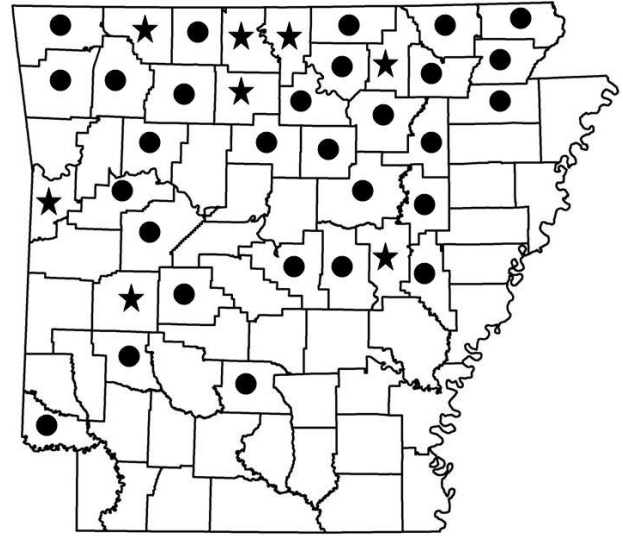


Figure 1. Distribution of the little brown bat in Arkansas. “Stars” indicate new county records or previously published records that were not included in recent analyses of statewide distribution. “Solid circles” indicate historical records from Fokidis et al. 2005, Medlin et al. 2006, Sasse and Saugey 2008, Sealander and Heidt 1990.

Although widely distributed across Arkansas in summer months, little brown bats are rarely captured during mist net surveys, even in areas with heavy concentrations of winter hibernacula. During 80 nights of netting from 1996-1999 in Stone County near some of the most important Arkansas hibernacula, only 1 of 1,087 captured bats was a little brown bat (Harvey et al. 1999, Wilhide et al 1998). In Newton County, only one little brown bat was captured during 32 nights of netting in 2008-09 (Sasse, unpublished data). Fokidis et al (2005) and Medlin et al. (2006) captured a few specimens in bottomland hardwood forests in the Mississippi Delta and Gulf Coastal Plain, but they were not common.

Although this species is known to form summer colonies in buildings where they would likely encounter humans, only 21 specimens were submitted

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for rabies testing by the Arkansas Department of Health from 1983-2010 (Sasse and Saugey 2008, Saugey *unpublished data*). Nineteen specimens were submitted during the months of March through September, although single males from Independence County were submitted during December, 1985 and 1996. The paucity of rabies submissions compared to their higher relative frequency in samples taken near their core range in the northeastern United States (Wang et al. 2010) suggests that they are rare in Arkansas. However, Fletcher et al. (1991) found that they can occur in large numbers at some urban sites.

Fletcher et al. (1991) studied maternity colonies consisting of 300-500 bats in houses in Jackson County where they stayed as late as early November. Banded bats from these colonies were later recovered at hibernacula in Stone County (JD Wilhide, personal communication).

Little brown bats currently use 34 known caves and mines. Largest numbers of hibernacula are in Stone (13), Newton (6), Independence (3), Searcy (2), and Sharp (2) counties. Single hibernacula were found in Baxter, Garland, Izard, Logan, Madison, Marion, and Montgomery counties. Additionally, Bennett Cave in Carroll County is most likely a stopover point during migration because they have only been observed in this site once in May.

Because little brown bats hibernate in sites with characteristics favorable to the endangered Indiana bat (*Myotis sodalis*), they are most often found while conducting surveys for that species. Unfortunately, population estimates were not regularly recorded at many sites prior to 2000 because they were not the target species. Many hibernacula sites have been surveyed once or only a few times in the last 35 years and it is not possible to determine reliable population trends.

At 18 hibernacula, the maximum number of bats observed was less than 25; from 25-99 bats were recorded from 6 sites, and 100-1,200 bats at 5 sites. At five other sites, their presence was noted but no counts were made. These limited data suggest that there may only be a few thousand little brown bats wintering in Arkansas.

All 5 sites with a history of more than 100 bats were located on the Ozark National Forest in Stone County. Prior to 2007, maximum populations were 145 at Amphitheatre Cave, 200 at Biology Cave, 115 at Gustafson Cave, 445 at Hidden Springs Cave, and 1,000 at Rowland Cave.

These caves were all surveyed multiple times in the last 5 winters, but only 2 (Hidden Springs and

Rowland Caves) harbored populations greater than 100 bats, and the largest winter population estimate for this species in Arkansas (1,200 bats) was at Hidden Springs Cave during winter, 2009-10.

Population estimates at Amphitheatre, Gustafson, and Rowland Caves are confounded by high ceilings that make it difficult to distinguish this species from Indiana bats. Both species often cluster in the same areas, but several recent surveys did not separate these species while making population estimates.

Although known to be rare in Arkansas (Anderson 2006), this species has no formal legal protection other than that offered to all nongame species, which prohibits them from being killed except to protect human health or personal property. Fortunately, 19 caves are owned by the federal government, 2 by the state government and only 13 are in private ownership. Because they often use the same caves as the endangered Indiana bat, they have benefited from conservation actions taken to protect that species. Seven caves are gated, 3 are fenced, and 5 have closure signs designed to prevent human disturbance while caves are occupied by bats. With one exception these caves are closed to public access on federal and state lands in Arkansas due to concerns relating to potential human spread of the fungus associated with White Nose Syndrome. Blanchard Springs Caverns in Stone County is managed as a tourist attraction by the U.S. Forest Service and is open to the public during year-round. The portion of the cave used by hibernating bats is closed during winter.

Other than human disturbance, there are few threats to caves used by little brown bats in Arkansas. Rowland Cave is subject to occasional flooding of the entrance, which could trap bats inside the cave for extended periods of time. One mine in Garland County that was known to be used by little brown bats was flooded by the construction of Blakely Dam for Lake Ouachita in the 1950s (Davis et al. 1955, Sealander and Young 1955).

Existing conservation actions may be adequate to maintain the current population of little brown bats in Arkansas. However, extirpation is a possibility if White Nose Syndrome spreads into the state.

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