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**Conserve Gray Bat to Achieve Recovery:
Survey of gray bat (*Myotis grisescens*)
summer caves in Tennessee**

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**SURVEY OF GRAY BAT (*Myotis grisescens*) SUMMER CAVES IN
TENNESSEE**

Submitted to:

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Introduction

Gray bats (*Myotis grisescens*) occur throughout the cave region of the eastern United States, with major populations occurring in Arkansas, Missouri, Tennessee, Alabama, and Kentucky. Gray bats are unique among members of the genus *Myotis* in the eastern United States in that they utilize caves throughout the year (Barbour and Davis 1969), although they have also been found roosting in storm sewers and barns (Gunnier and Elder 1971; Hays and Bingham 1964). Use of several caves throughout the year results from the different energetic demands placed on the bats. The move between caves is due to the fact that bats need cold stable temperatures for hibernation, but require warmer cave temperatures when active. Because of the differing requirements between the 2 seasons, only rarely are caves used during both the summer and winter seasons.

Gray bats hibernate throughout the winter in large accumulations in a small number of caves. Females emerge first from hibernation and migrate to form maternity colonies, while males emerge later and move to form bachelor colonies. Typically, bachelor and maternity colonies inhabit separate caves, but when they utilize the same cave, the 2 groups roost in different portions of the cave. Once young become volant, gray bats start to move from their summer caves roosts and gather at transition caves until they move on to their winter roosts.

Due to human disturbance at roost sites, populations of gray bats were declining in the 1960's and 1970's (Barbour and Davis 1969; Tuttle 1979). The

gray bat was listed as endangered species in 1976. Since its initial listing, the gray bat population has increased throughout most of its range. Currently, there is ongoing discussion about the need of down-listing their status to threatened. As part of this process, the need for recent population estimates has been exposed. This project was initiated to compile needed data on the population of gray bats in Tennessee during the summer.

Methods

Twenty-four caves were selected for surveying during this project. Prior to conducting the survey, landowners were contacted to obtain permission. The researcher arrived at the cave ~ 30 minutes before sunset and selected a site in which they could see all of the bats that emerged from the cave entrance. Bats were counted as they emerged, and counting continued until no bats were observed leaving the roost. For some caves, night vision equipment was used to assist in conducting the exit counts. Once all of the bats had left the cave, we entered the cave to determine if the colony was a bachelor or maternity colony. The colony type was determined mainly by the presence of young bats in the cave. After young became volant, we searched guano piles for evidence of dead young bats. During the time spent in the cave, we were careful to keep disturbance to a minimum.

Results

A total of 201,563 bats were counted exiting 21 caves during this project (Table 1). Counts ranged from 0 to 84,650 (Table 1). Additionally, 4 caves could not be surveyed due to lack of permission or access. The landowners denied access to Pearson (Hawkins County) and Cripps Mill (DeKalb County) Caves. The new landowners of Bat Cave in Lincoln County could not be contacted on 3 separate site visit attempts. Finally, permission could not be obtained in time for a trip into Hound Dog Drop Cave in Wayne County.

Discussion

Several caves could not be surveyed during this project. Part of the trouble resulted from the relatively short time frame of this survey. The off-season could be used to foster working relationships with landowners to try and gain access for future surveys. This is particularly important for Pearson Cave, one of the most significant gray bat hibernacula in Tennessee.

Determination of the type of colony present in the cave was difficult. For example; when we entered Bellamy cave after emergence, we failed to locate any juvenile bats despite the fact that we visited all of the large known summer roosts in the cave. When we returned in mid-July, we placed a harp trap in the middle of the cave entrance and caught several juveniles, lactating females, and adult males. Therefore, Bellamy Cave houses both a maternity and a bachelor colony. Thus, future surveys of these gray bats caves should include at least some harp trapping at the entrance to determine the colony type and the relative numbers if both a bachelor and maternity colony is present. Trapping should be

done soon after the young become volant to minimize disturbance, but should not be too late as gray bats start to move around by early August.

Future Research

1. Caves should be regularly visited to ensure that there has been no major disturbance. This can be done when the bats are not present to help minimize disturbance. With the large numbers of bats in some caves and the fact that many of these caves are not protected, it is important to monitor the conditions of these roost sites.
2. Caves that are currently protected with a gate or fence should be visited to ensure that the bats are not being negatively impacted by the presence of these structures. For example, while conducting the exit count at Tobaccoport Cave, we heard several bats striking the gate despite the presence of several modifications to the cave gate. Structures that are currently up or that will be erected in the future should be checked and modified to lower the impact on bats of these structures.
3. Bats should be trapped at the entrances to determine the number of females and adult males in the cave. For example, even though we saw juveniles when we entered the cave, a bachelor colony may still have been present. Knowledge on the numbers of adult males and females will provide valuable data on the cave population and thus species' trends.

Acknowledgements

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Table 1. Survey results of 24 known gray bat summer caves in Tennessee during 2006.

County	Cave	Date	# of bats	Colony Type	Notes
Clairborne	White Buis Cave	6/11/06	11,020	Maternity	Dead juveniles found in guano pile
Clay	Marcom	7/7/06	4	Unknown	Landowner stated bats were present in fall and spring
DeKalb	Cripps Mill and Goat Caves	6/24/06	N/A	N/A	Landowner denied access
Grainger	Indian Cave	6/10/06	6,100	Maternity	Dead juveniles found in guano pile
Hawkins	Pearson Cave				Landowner denied access
Hickman	Bat Cave	7/18/06	13,640	Maternity	Dead juveniles found in guano pile
Jackson	Dud's Cave	6/24/06	1,500	Maternity	Juveniles observed in cave
Jackson	Haile Cave	6/24/06	0	N/A	
Lincoln	Bat Cave				Landowner could not be contacted
Montgomery	Bellamy	6/21/06	84,650	Unknown	No bats observed during trip through cave
Montgomery	Coleman Cave	6/22/06	2,375	Maternity	Juveniles observed in cave
Perry	Alexander Cave	7/17/06	11,875	Maternity	Dead juveniles found in guano pile
Rhea	Grassy Creek Cave	6/14/06	15,100	Unknown	Cave not entered
Rhea	Harris Cave	6/14/06	0	N/A	
Rutherford	Herron Cave	6/15/06	25	Unknown	Cave not entered
Smith	Bridgewater	7/6/06	11,220	Maternity	Dead juveniles found in guano pile
Smith	New Piper Cave	7/6/06	2,975	Unknown	No dead juveniles noted
Smith	Piper Cave	7/6/06	0	N/A	
Stewart	Tobaccoport Cave	6/20/06	26,885	Unknown	Cave not entered, roost site is inaccessible
Sullivan	Morrell Cave	6/13/06	0	N/A	Cave entered during the day based on info from owner
Union	Oaks Cave	6/12/06	4,120	Unknown	No bats observed during trip through cave
Warren	Knowles Ridge Cave	7/7/06	9,400	Unknown	
Wayne	Hound Dog Drop Cave				Permission was not obtained in time for this study
White	Rose Cave	7/12/06	14,300	Maternity	Dead juveniles found in guano pile

Appendix 1. Current landowner information for the cave surveyed during this project.

County	Cave	Landowner	Phone #
Clairborne	White Buis Cave		
Clay	Marcom	Mrs. Kelly Collins	931-243-2480
DeKalb	Cripps Mill and Goat Caves	Larry and Cheryl Yoder	615-597-9636
Grainger	Indian Cave		
Hawkins	Pearson Cave	Tunnel	423-323-3446
Hickman	Bat Cave	Ed Penrod	931-388-7131
Jackson	Dud's Cave	US Army Corps of Engineers	615-735-1034
Jackson	Haile Cave	US Army Corps of Engineers	615-735-1034
Lincoln	Bat Cave	Scott and Gwen Shelton	Unlisted; Fayetteville, TN
Montgomery	Bellamy	The Nature Conservancy	
Montgomery	Coleman Cave	Dean Hutchinson	931-237-2015
Perry	Alexander Cave	The Nature Conservancy	
Rhea	Grassy Creek Cave	Carl Harris	423-775-6460
Rhea	Harris Cave	Carl Harris	423-775-6460
Rutherford	Herron Cave	James Bowers	615-896-1918
Smith	Bridgewater		
Smith	New Piper Cave		
Smith	Piper Cave		
Stewart	Tobaccoport Cave	Tim Atwater	931-232-6845
Sullivan	Morrell Cave	Jeff Watson	423-391-0103
Union	Oaks Cave	Tennessee Wildlife Resources Agency	865-278-3248
Warren	Knowles Ridge Cave	Jerry Campbell	931-668-3791
Wayne	Hound Dog Drop Cave	Southeastern Cave Conservancy	615-642-8008
White	Rose Cave	Tennessee Wildlife Resources Agency	931-935-3280