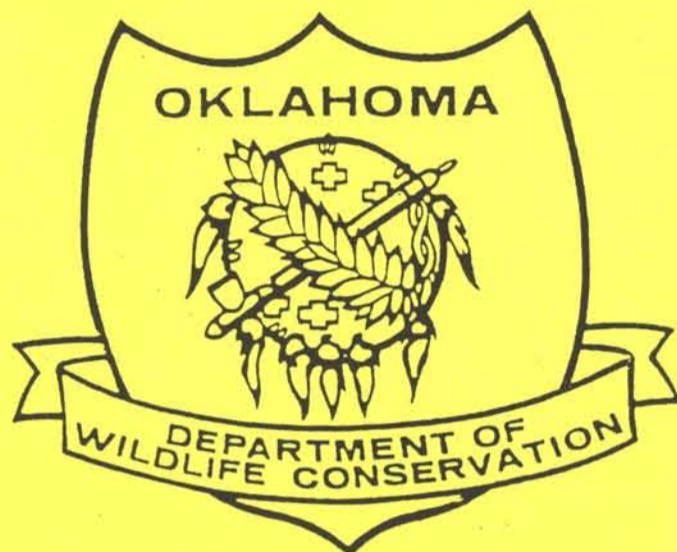


PERFORMANCE REPORT

SECTION 6

ENDANGERED SPECIES ACT



FEDERAL AID PROJECT E-22-9

MANAGEMENT AND CAVE PROTECTION FOR THE
OZARK BIG-EARED BAT AND GRAY BAT IN OKLAHOMA

OCTOBER 1, 2001 - SEPTEMBER 30, 2002

ANNUAL PERFORMANCE REPORT

STATE: Oklahoma

PROJECT NUMBER: E-22-9

PROJECT PERIOD: 1 October 2001 – 30 September 2002

PROJECT TITLE:

Management and Cave Protection for the Ozark Big-eared Bat
(*Corynorhinus townsendii ingens*) and Gray Bat (*Myotis grisescens*) in Oklahoma

PROJECT OBJECTIVE:

To locate, determine ownership and develop and implement cave protection management plans for Ozark Big-eared and/or gray bat caves in Oklahoma.

INTRODUCTION:

About 18 of the 45 species of bats found in North America rely substantially on caves throughout the year, and 13 use caves year-round (McCracken, 1989). All North American bats listed as endangered or threatened by the U.S. Fish and Wildlife Service are cave-dwelling species or subspecies (McCracken, 1989; Harvey et al., 1999; Pierson, 1999). Two cave-dwelling species, the gray bat (*Myotis grisescens*) and Indiana Bat (*Myotis sodalis*), and one subspecies, the Ozark big-eared bat (*Corynorhinus townsendii ingens*), are of particular concern to recovery biologists because each is federally listed as endangered (U.S. Fish and Wildlife Service 1982, 1984, 1995).

Persistent or casual human disturbance at maternity and hibernacula caves has been implicated as a major cause for the decline in population of these and other cave-dwelling bats (Barbour and Davis, 1969; Humphrey and Kunz, 1976; Tuttle, 1979; American Society Mammalogists, 1992). Conservation efforts concentrating on protecting these caves and the colonies of bats that they harbor are among the most important contemporary issues in bat conservation in the United States (American Society of Mammalogists, 1992).

Management efforts to provide protection for cave-dwelling bats usually are intended to eliminate disturbance resulting from human entry to caves. Protection typically is accomplished by constructing gates at cave entrances, fencing cave entrances, placing warning signs at entrances, and maintaining a close and positive rapport with private landowners. Protection of populations of cave-dwelling bat populations by placing gates in entrances of caves can be an effective, immediate, and long-term method to deter human access to critical bat roosts (Humphrey, 1978; Tuttle,

1977; Tuttle and Stevenson, 1977).

Populations of bats presently are protected with internal gate systems at 25 entrances to caves in northeastern Oklahoma. Seven of those caves have been inhabited historically by colonies of gray bats. Populations of Ozark big-eared bats, big brown bats (*Eptesicus fuscus*), eastern pipistrelles (*Pipistrellus subflavus*), northern long-eared myotis (*Myotis septentrionalis*), and a single hibernaculum of Indiana bats also are protected.

Each of the 25 caves that have been gated in Oklahoma have unique physical characteristics regarding passage size, location of the nearest bat roost to the entrance, and number of entrances used by bats. Internal gates are placed in such a manner as to protect the nearest historical roost area to the cave entrance. Gate distances from cave entrances range from 3-17 m. Passage areas where gates are located range from 1.4 m² – 15 m². An often-used management approach in some areas of the gray bat's range involves gate construction that leaves the upper part of the passage open. Although this design may be perceived to be less obstructive to bat flights, it does not afford the same protection from human disturbance that a full passage gate does. In contrast, all internal gates in Oklahoma caves completely fill cave passages. Furthermore, two gray bat caves that are gated in Oklahoma have two entrances that are used during entrance and exit by bats. In those particular caves, both entrances are protected with complete gates, and estimates continue to indicate stable populations (Martin et al. 2000). Relatively small colony sizes (<30,000), relatively small gated passages conducive to lower volumes of airflow, and internal positioning of grill structures in "dark zones" of cave passages probably contribute to the apparent acceptance of full passage gates by resident bat populations in eastern Oklahoma. Acceptance is further substantiated by the presence of bat colonies, with stable population sizes, using caves with manipulated passages and entrances (Martin et al. 2000; Puckette 2000)

The objectives of this project are the identification of caves that are considered critical habitat for Ozark big-eared bat and gray bat colonies in northeastern Oklahoma. Management/protection plans for one to three of these caves are developed and implemented during the project year as funding and time allow. These management/protection plans are coordinated with the appropriate landowners and may include posting a warning sign at the cave entrance, placing human restrictive structures at or within the cave such as fencing around cave entrance or constructing a gate/grill structure within the cave. Each cave is monitored to determine the effectiveness of the management plan, particularly for gated caves, and to determine the impact of the structure or other protection measures implemented at the site. As problems are identified with the cave protection plans, they will be corrected.

PROCEDURES:

- Objectives listed below are designed to accomplish tasks B 1.6 and 1.7 of the 1995 Revised Ozark Big-eared Bat and Virginia Big-eared Bat Recovery Plan, and objectives 1, 1.2, 1.3.1, 3, and 3.2 of the 1982 Gray Bat recovery plan.

1. The current landowner of each site will be identified, and after determined, proposed plans for the specific site will be discussed and permission to implement those plans will be sought.
2. Determine the projected cost for the implementation of the recommended management plan.
3. Obtain approval for the proposed management plan from all pertinent agencies including the Oklahoma Department of Wildlife Conservation Wildlife Diversity Program, the U.S. Fish and Wildlife Service and individual landowners of each site.
4. Upon approval of the management plan for each site, the plan will then be implemented. Implementation of individual management plans will be determined on a priority basis. This priority will depend on the ability to effectively utilize available funds, in conjunction with the amount of human disturbance each site is receiving and the status of the population of Ozark big-eared bats or gray bats inhabiting the site.
5. Each site where structures are placed for protection will be monitored twice annually after installation. One inspection will be conducted during the uninhabited season to inspect the structure or structures for possible vandalism. An additional monitoring visit will take place while the bats are utilizing the site. These surveys will be conducted as exit counts at maternity sites using infrared lighting and night vision scopes. This type of survey accurately determines the population of Big-eared bats using the site and if the newly constructed structures are inhibiting the flight of the bats into and out of the site.
6. Reports of the progress of each management plan will be submitted to the Oklahoma Department of Wildlife Conservation Wildlife Diversity Program and the U.S. Fish and Wildlife Service. A final report will be submitted after the fifth project year. An annual performance report will be submitted at the end of each segment year.

- The following is a description of caves and procedures that were involved in the project during the 2001 - 2002 project year.

Cave OT-13: This cave is inhabited by a maternity colony of gray bats during the summer. An internal gate system was installed in the passage in April-May 2001. A final coat of rust-prohibitive paint was applied to the grill system on 22 December 2001.

Cave AD-29: Permission was obtained from a private landowner in Stilwell, Oklahoma to construct internal gate systems inside multiple entrances to cave AD-29 on his property. The cave historically has maintained a small population of Ozark big-eared bats in summer and winter. Installation of support structures for the grill system in the largest entrance took place in December 2001. Construction of the actual gate/grill system was initiated in January 2002 and completed in March 2002.

Construction of gate/grill systems in two secondary passages to cave AD-29 were initiated in March and completed in June 2002. The cave has multiple entrances, two that remain ungated, that connect to main passage. Attempts were made in August 2002 to determine if the remaining two entrances led to passages that connected to the previously gated entrances. Although not passable, all passages and entrances appear to connect. This information is essential in considering gating the remaining two entrances to ensure that the bat populations are fully protected.

- In addition to construction and installation of internal gate systems, the following monitoring efforts were conducted during the project year:

Cave AD-8: This cave is protected with an internal gate system. It houses a maternity colony of gray bats during summer months and a population of hibernating bats in winter. A monitoring visit was made at the cave on 27 February 2002 when 423 eastern pipistrelles (*Pipistrellus subflavus*) in torpor were noted.

Cave AD-14: Project personnel sampled bats entering and exiting a gated entrance to cave AD-14 in July 2002. A total of 34 individuals were caught using mist nets and a single harp trap. Bats were identified, sexed, and released within three-four minutes after capture. Two endangered Ozark big-eared bats (one male and one female) were captured in addition to 19 eastern pipistrelles (one female and 18 males) and 13 northern long-eared bats (one female and 12 males).

Cave DL-91: This cave is inhabited by a maternity colony of gray bats in summer. A general inspection of the internal grill system and cave were made on 11 February 2002. A total of 153 eastern pipistrelles were noted throughout the passage. Additionally, 2 blind cavefish (*Amblyopsis rosae*) and 7 blind crayfish (*Cambarus spp.*) were noted in two pools in the cave passage.

Cave DL-34: This is a gated cave typically inhabited by a small number of eastern pipistrelles and maintains a small population of cavefish and crayfish. A monitoring visit was made to the cave on 11 February 2002. A single blind cavefish and five eastern pipistrelles were noted.

- The following gated caves were monitored during an annual survey of caves inhabited by hibernating bats:

AD-15: 30 eastern pipistrelles, 1 big brown bat (*Eptesicus fuscus*), 1 Ozark big-eared bat

AD-21: 3 eastern pipistrelles

CZ-18: 221 eastern pipistrelles, 1 Ozark big-eared bat

AD-14: 1 eastern pipistrelle

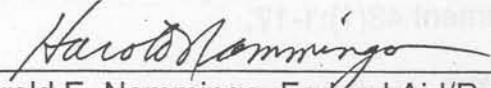
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DATE:

December 11, 2002

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LITERATURE CITED:

- American Society of Mammalogists. 1992. Guidelines for the protection of bat roosts. *Journal of Mammalogy* 73:707-710.
- Barbour R.W., and W.H. Davis. 1969. *Bats of America*. University of Kentucky Press, Lexington. 286 p.
- Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. *Bats of the United States*. Arkansas Game and Fish Commission, Little Rock. 64 p.
- Humphrey, S.R. 1978. Status, winter habitat, and management of the endangered Indiana Bat (*Myotis sodalis*). *Florida Scientist* 41:65-76.
- Humphrey, S.R. and T.H. Kunz. 1976. Ecology of a Pleistocene Relic, the Western Big-eared Bat (*Plecotus townsendii*), in the Southern Great Plains. *Journal of Mammalogy* 57:470-494.
- Martin, K. W., W.L. Puckette, S.L. Hensley, and D.M. Leslie, Jr. 2000. Internal cave gating as a means of protecting cave-dwelling bat populations in eastern Oklahoma. *Proceedings of the Oklahoma Academy of Science* 80:133-137.
- McCracken, G. F. 1989. Cave conservation: Special problems of bats. *National Speleological Society Bull.* 51:49-51.
- Pierson, E.D. 1999. Tall trees, deep holes, and scarred landscapes: conservation biology of North American bats. Pages 309-325 in *Bat biology and conservation*. T. H. Kunz and P. Racey, editors. Smithsonian Institution Press, Washington D.C.
- Puckette, W.L. 2000. Annual report to the U.S. Fish and Wildlife Service. FWS Agreement No. 1448-0002-95-0860. Ecological Services Office, Tulsa, Oklahoma. 2pp.

Tuttle, M.D. 1977. Gating as a means of protecting cave dwelling bats. Pages 77-82 in Proc. National cave management symposium. Speleobooks, Albuquerque, New Mexico.

Tuttle, M.D. 1979. Status, causes of decline and management of endangered gray bats. Journal of Wildlife Management 43(1):1-17.

Tuttle, M.D., and D.E. Stevenson. 1977. Variation in the cave environment and its biological implications. Pages 108-120 in Proceedings of the 1976 National Cave Management Symposium. T. Aley and D. Rhoades, editors. Speleobooks, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 1982. Gray Bat recovery plan. Washington, D.C. 94 pp.

U.S. Fish and Wildlife Service. 1984. A recovery plan for the Ozark Big-eared Bat and the Virginia Big-eared Bat. Twin Cities, Minnesota. 61 Pp.

U.S. Fish and Wildlife Service. 1995. Ozark Big-eared Bat Recovery Plan, Revised. Albuquerque, New Mexico. 80 Pp.

