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THE GRAY BAT, MYOTIS GRIESENS IN THE SOUTHWEST PORTION
OF THE OZARK PLATEAU: MOVEMENT PATTERNS, MATERNITY
COLONIES, HIBERNACULA AND PHILOPATRY

The University of Oklahoma

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PORTION OF THE OZARK PLATEAU:
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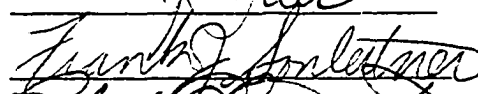
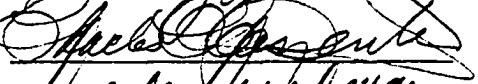
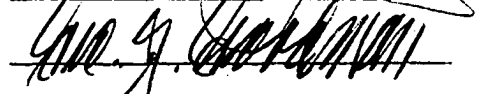
A DISSERTATION
SUBMITTED TO THE GRADUATE FACULTY
in partial fulfillment of the requirements for the
degree of
DOCTOR OF PHILOSOPHY

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EVERETT MONROE GRIGSBY
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THE GRAY BAT, MYOTIS GRISESCENS, IN THE SOUTHWEST
PORTION OF THE OZARK PLATEAU:
MOVEMENT PATTERNS, MATERNITY COLONIES,
HIBERNACULA AND PHILOPATRY.

APPROVED BY

DISSERTATION COMMITTEE

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THE GRAY BAT, *MYOTIS GRISESCENS*

The gray bat, *Myotis grisescens*, is a colonial bat found in greatest concentrations in the cave regions of Missouri, Kentucky, Tennessee and Alabama. Howell (1909) first described *M. grisescens* from Nickajack Cave, near Shellmound, Marion County, Tennessee. *M. grisescens* was first reported in Oklahoma from Adair Bat Cave in Adair County by Blair (1939); he found that it was numerous in the limestone caves of the Ozark Biotic District, where it is often associated with the eastern pipstrelle, *Pipistrellus subflavus subflavus*. I have found that *P.s. subflavus* is abundant in the limestone caves of the Ozark Biotic District of Oklahoma during the winter months, during which time *M. grisescens* is absent. Glass and Ward (1959) reported *M. grisescens* from eight northeastern Oklahoma caves, noting that it is the only bat in the area that gathers in large aggregations, leaving large guano piles in the caves. I concur that the large guano piles in the caves are strong presumptive evidence of the presence of this species in northeastern Oklahoma. Tuttle (1979) used the size of the guano piles, along with the reddened roosting areas stained on the ceilings, to estimate population densities.

The gray bat is not the only gregarious species of bat in Oklahoma. In western Oklahoma, two colonial species inhabit the gypsum caves, where

large deposits of guano have accumulated beneath their summer roosts. The cave myotis, *M. velifer*, is one of these that has been intensively studied in Oklahoma by Glass and Ward (1959). Another western Oklahoma bat that is gregarious and is found in large numbers during the summer months is the Brazilian free-tailed bat, *Tadarida brasiliensis* (I. Geoffroy), reported by Glass (1958, 1959), Perry (1965), and Twente (1956).

Laval *et al.*, (1977) observed that *M. grisescens* usually forages over water and adjacent riparian vegetation. Most of the foraging is done below the tree tops and occasionally as low as 2 m or lower over water. They prefer to forage over the larger open portions of streams. Large numbers of mayflies along with other insects are consumed by gray bats (Tuttle, 1979). Tuttle (1976a, 1976b) found that *M. grisescens* summer colonies prefer caves that are within 1 km of a major river or lake and are rarely located greater than 4 km from water. The bats emerge from their cave roost in a continuous column, which they maintain to the water's edge. The column will disperse upon arrival at a feeding area, and the bats will capture insects within 3 m of the water's surface.

Vaughan (1959), working with *Eumops*, *Myotis* and *Macrotus*, found that small insectivorous bats usually feed in a series of nearly continuous pursuits. Thomas and Suthers (1972) indicate that this type of foraging requires the expenditure of a large amount of energy. According to Tuttle (1976b), success in growth and survival of newly volant young *M. grisescens* was closely correlated with distance traveled by the colonies to their feeding areas. The flight speed of *M. grisescens* in a confined area was determined

by Kennedy and Best (1972) to be 18 km per hour. The mean migratory flight speed calculated by Tuttle (1976a) was 20.3 km per hour. Tuttle (1979) did not note the temperature, but observed that gray bats limited their feeding activities to the forested areas near their caves during exceptionally cold spring evenings. He also observed that they flew in the protection of the forest canopy en route to rivers or reservoirs to forage (Tuttle, 1979).

Grigsby (1965) observed that *M. grisescens* emerged from a summer roost 59 ± 13 minutes after sunset in Kansas. They were observed to return in the morning by 31 ± 12 minutes before sunrise.

Guthrie (1933b) discovered that gray bats reached sexual maturity during their second spring. She found that the females gave birth to only one young per year and that this occurred during their third summer. Mohr (1933) found that the young of *M. grisescens* were born between 5 and 25 June 1932, in Indian Cave, Grainger County, Tennessee. The mother carried the young for a week or more after birth. According to Glass and Ward (1959), the gray bats in Adair Cave, Adair County, Oklahoma, were giving birth to young 15 June 1950 and 1951. In Kansas, Grigsby (1965) observed the first young 17 June 1964 and 2 June 1965. Maternity colonies of gray bats will be discussed in greater detail in later sections.

ABSTRACT

To determine the seasonal movements, maternity sites, hibernacula and philopatry of the gray bat, *Myotis grisescens*, in the southwest portion of the Ozark Plateau, 6858 gray bats were banded at seven locations in Missouri and Oklahoma. Thirteen per cent of these bats were recovered at 14 locations in Arkansas, Missouri and Oklahoma, from 1968 through 1978. There were several multiple recaptures and roundtrip recoveries between maternity and hibernating caves. The gray bats arrived at their summer feeding grounds in northeastern Oklahoma in late March and early April. In May they moved into four maternity caves, where parturition began in early June. The young were volant by mid-July and the gray bats began returning to their hibernacula in early September. The gray bats from northeastern Oklahoma flew 130 km and 194 km to their respective hibernacula in Missouri and Arkansas. The individual bats frequented only one hibernaculum, thus demonstrating site fidelity or philopatry to their wintering cave.

THE GRAY BAT, *MYOTIS GRISSESCENS*, IN THE SOUTHWEST
PORTION OF THE OZARK PLATEAU:
MOVEMENT PATTERNS, MATERNITY COLONIES,
HIBERNACULA AND PHILOPATRY.

CHAPTER I

INTRODUCTION

The decline in the population density within certain regions of the range of the gray bat, *Myotis grisescens*, resulted in their being listed as an endangered species (Federal Register, 28 April 1976). Considerable attention is being directed toward the acquisition of data that will provide a better understanding of the biology of cave bats experiencing declining populations (Elder and Gunier, 1978; Laval *et al.*, 1977; Tuttle 1975: 1976a: 1976b). *M. grisescens* was first reported from Oklahoma by Blair (1939). Glass and Ward (1959) noted that *M. grisescens* was the most numerous bat in the caves of the Ozark Biotic District. The hibernating sites of the gray bats present during the summer in the southwestern portion of the Ozark Plateau were unknown (Sealand, 1956), until Myers (1964) reported the recapture in a central Ozark hibernaculum of a bat banded in northeastern Oklahoma.

Elder and Gunier (1978), Guthrie (1933) and Myers (1964) established that *M. grisescens* in Missouri moved from the caves occupied during

the summer feeding and maternity periods to deep vertical-shaft caves to hibernate.

The purpose of this study, which began in March 1968, was to determine the seasonal movements, maternity sites, hibernacula and philopatry of the gray bat, *Myotis grisescens*, in the southwestern portion of the Ozarks. Data on these factors are essential for the establishment of a comprehensive management plan for this species (Tuttle, 1979).

CHAPTER II

DESCRIPTION OF STUDY AREA AND SITES

All banding sites were in limestone caves, surrounded by forest and pasture, with a stream running within them most of the year. These sites extended from Delaware County, Oklahoma, (Caves 4-6) east and north to Stone County, Missouri (Cave 15). The recovery sites of gray bats banded during this study occurred in three states: Arkansas, Oklahoma, and Missouri, as shown in Figure 1. Recoveries occurred as far east as Baxter County, Arkansas (Cave 16). In Oklahoma the caves used by gray bats were in the Illinois and Grand River drainage system. In Missouri and Arkansas the caves used were in the White and Buffalo River drainage systems respectively (Fig. 1).

The locations of the Oklahoma Caves (2, 4, 5, 6, 7, & 10) are reported in Glass and Ward (1959), the Missouri Cave (15) in Myers (1964), and the Arkansas Caves (12 & 16) in Sealander and Young (1955).

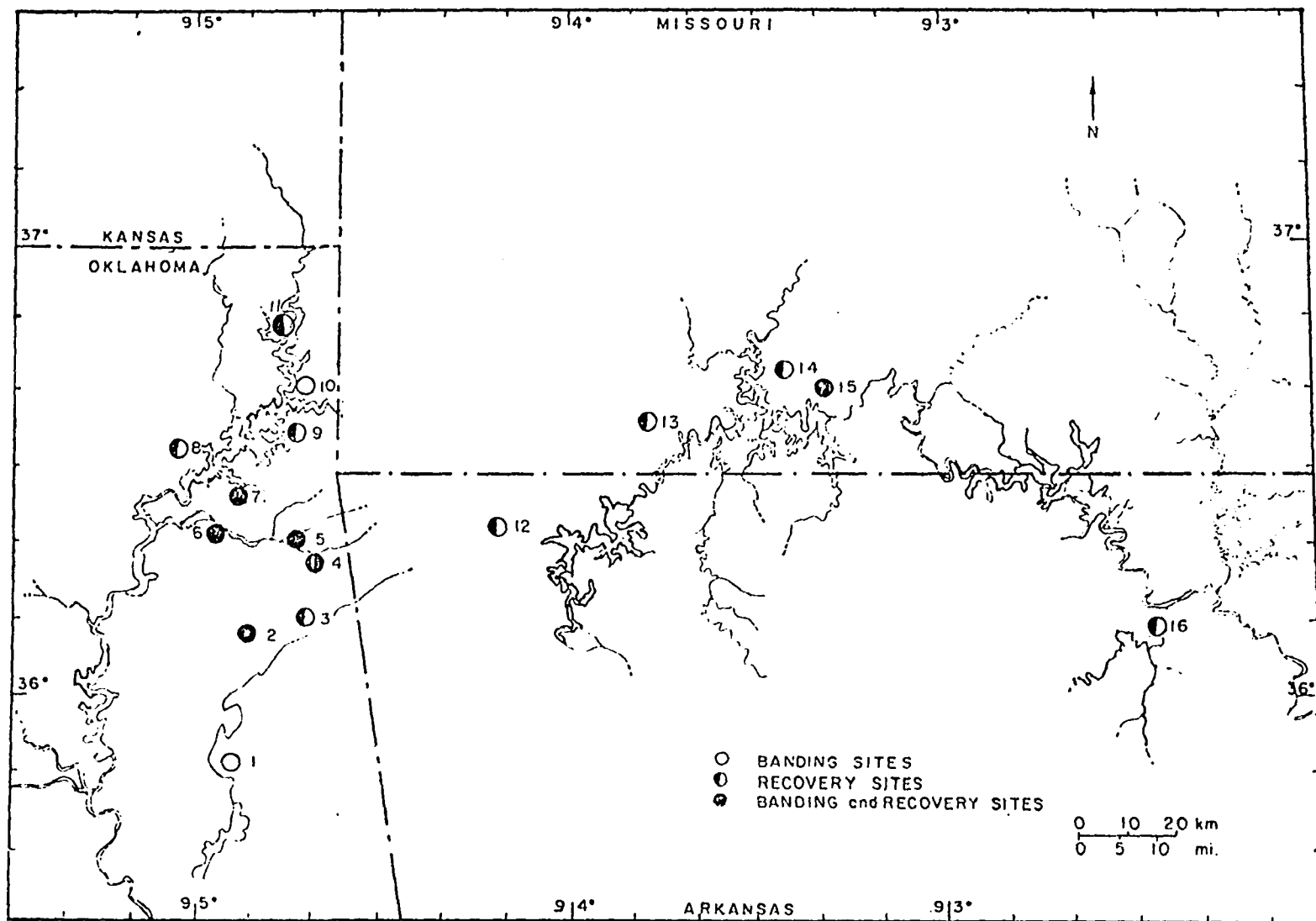


FIGURE 1. The banding and recovery sites of *Myotis grisescens* involved in this study.

CHAPTER III

MATERIALS, METHODS AND DEFINITIONS

The bats captured during this study were acquired using both hand net and hand grab techniques. Initially the samples were taken at random throughout the colony with a 38 centimeter diameter hand net. Later in the study the netting effort was directed toward the recovery of banded bats. Also, netting was supplemented with hand capture of banded bats to insure the acquisition of previously banded bats. Once captured, the bats were held in net bat buckets described by Myers (1964). These buckets could hold 400 specimens of *M. grisescens*. All bats were banded on the right forearm with number two bands supplied by the Bat Banding Office, National Fish and Wildlife Laboratory, National Museum, Washington, D.C., as recommended by Greenhall and Paradiso (1967).

Attempts were made to visit all major study caves (2, 4, 5, 6, and 7) during all seasons. Recovery data acquired by individuals other than myself were coordinated by the Bat Banding Office in Washington.

The following definitions are given: banding site - one of seven caves where the banding occurred; hibernaculum - a cave in which the hibernation occurs from November through March; summer cave - a cave used after spring migration and prior to fall migration; staging cave - a

cave used during spring dispersal prior to entering the maternity caves and in the fall prior to movement to the hibernacula; inplace recovery - a bat that was recovered at the same cave in which it was banded; foreign recovery - a bat that was recovered at a cave other than where it was banded; philopatry - the tendency of a bat to return to the same cave during the same season in following years.

Chapter IV

BANDING RESULTS

During this study 6858 gray bats, *Myotis grisescens*, were banded at seven locations in the southwest portion of the Ozark Plateau. Recoveries of 894 (13%) of these gray bats were made at 14 locations between 1968 and 1978, and 84 were recovered three or more times. Recoveries were the primary means used to determine movement patterns and the location of the maternity colonies and hibernacula, as well as their fidelity to these winter roosts.

To establish the foundation for a management plan for *M. grisescens*, I include the following summary of banding and recovery data, along with a brief description of each cave involved in this study.

Cave 1. This cave is located above the floodpool of Lake Tenkiller in Cherokee County, Oklahoma. On the initial visit to Cave 1, two males were banded and neither was recovered. The entry room was small and the guano pile was old and dry, indicating little use in recent years.

Cave 2. Located in the northwestern corner of Adair County, Cave 2 is the only major cave in Oklahoma in the Illinois River drainage system included in this study. This cave was sixth in total number (594) of gray bats banded. They were found as early as 27 March and as late as 30 November.

The colony was largest in June and July during the maternity period as indicated in Table 1. Of those banded, 73% (436) were females; 12% of those banded were recovered. Fifty-four (9%) were recovered at eight other locations (3, 4, 5, 6, 13, 14, 15, or 16), with the largest number (28, 5%) recovered at Cave 15. There were 27 foreign recoveries from four banding sites (4, 5, 6 and 7), with the largest number (17) coming from Cave 5 (see Table 2). The total number of banded bats handled at Cave 2 was 636, of which 75% were females.

Cave 4. This cave was the longest of the Oklahoma caves included in this study with nearly one kilometer of passage, with long pools of water providing protection for the colony in this cave. The fourth largest number (676) of *M. grisescens* was banded in this cave, of which 79% (531) were females. March 24 was the earliest date gray bats were found in this cave. October 15 was the latest date, as indicated in Table 3. Of the total number recovered (88), all were recovered at six other sites (2, 5, 6, 7, 15 and 16), with the largest number (35) at Cave 15. There were 31 foreign recoveries from three banding sites (2, 5, and 6) with the largest number (22) from cave 5, just 4.5 kilometers away (Table 4). The total number of banded bats handled at Cave 4 was 707 of which 78% were females.

Cave 5. This cave has evidence of a former maternity colony cave with a large entrance, a large guano pile near the entrance in the total dark zone, and a large stained area on the ceiling above the guano pile characteristic of the other maternity colony caves of *M. grisescens*. No maternity colony was discovered in this cave throughout this study. It functions as a staging cave.

The second largest number (1833) of bats was banded in this cave, with 1214 (66%) being females. Of the total banded bats processed (1942) in this cave, 1273 (66%) were females (Table 5). Of these, 39 (2%) were in-place recoveries and 70 (4%) were foreign recoveries from four caves (2, 4, 6 and 7) with the greatest number (45) banded at Cave 6, just 18.2 kilometers downstream (Table 6). Bats banded at Cave 5 and recovered elsewhere totaled 233. They were recovered at 9 different locations (2, 4, 6, 7, 8, 9, 14, 15 and 16) with the largest number (112) being recovered at Cave 15 and the second largest number (58) being recovered at Cave 6. March 29 was the earliest and November 6 was the latest that gray bats were found in Cave 5. The largest colony of approximately 20,000 gray bats was encountered on 22 July, 1968, in the back cavern of this cave. The estimate was based on ceiling area covered and the average density for gray bat colonies.

Cave 6. The largest number (2293) of gray bats was banded at Cave 6, of which 1629 (71%) were females (Table 7). The total number banded and recovered here was 2526, of which 1742 (69%) were females. The recoveries included 133 in-place and 100 foreign recoveries. The foreign recoveries represented 4 banding sites (2, 4, 5, and 7), with the most (58) coming from Cave 5 (Table 8). Of the 210 banded at Cave 6 and recovered at 7 other locations (2, 4, 5, 7, 12, 15 and 16), the highest number (123) was recovered at Cave 15, with the second highest (45) recovered at Cave 5. March 5 was the earliest and October 29 was the latest that gray bats were found in Cave 6, with the largest colonies occurring in May, June and September.

Cave 7. This cave is 9.3 kilometers north-northeast of Cave 5 in the Grand River (Grand Lake of the Cherokees) drainage. It ranked third in total number banded (801) with 78% (626) females being banded (Table 9). Of the 94 band recoveries 5 were in place; and 89 were recovered at 7 other locations (2, 5, 6, 8, 11, 12 and 15), with the most (62) being recovered at Cave 15. Foreign recoveries totaled 23 and came from 3 locations (4, 5 and 6), as shown in Table 10. Bats were found as early as March 25 to as late as October 5. Of the 829 banded and recovered in this cave, 78% (648) were females.

Cave 10. This cave in Ottawa County, Oklahoma was visited only once. It yielded one male (Bat 6-58011) that was recovered in Cave 15. It was a moist cave but showed little potential for further *M. grisescens* study. There was no large guano pile characteristic of those caves occupied by gray bats.

Cave 15. The fifth largest number (658) of *M. grisescens* was banded in this large hibernating cave of the gray bats, with 47% (311) being females (Table 11). Of the 27 band recoveries from these, all were recovered in place. Foreign recoveries accounted for 361 of the 1046 banded and recovered at Cave 15. Females accounted for 56% (585) of this total, with bats from 6 locations (2, 4, 5, 6, 7 and 10) being represented (Table 12). Cave 6 was represented by 123, Cave 5 by 112, and 62 from Cave 7. September 29 was the earliest and April 3 was the latest date for retrievals of gray bats in Cave 15.

Cave 16. No bats were banded at this cave during this study, but it did provide a hibernating site for gray bats from Northeastern Oklahoma.

Of the 53 recoveries, 40 (75%) were females (Table 13). They represented foreign recoveries from four banding sites (2, 4, 5, and 6) with the greatest number (26) coming from Cave 6 (Table 14). The earliest recovery was January 27 and the latest was March 20.

SUMMARIZATION OF BANDING AND RECOVERY DATA:

Of the 6,858 gray bats banded during this study, 894 (13%) recoveries were made between 1968 and 1978 (Table 15). Recoveries were made at 14 locations as indicated in Table 16. Eighty-four gray bats were recovered three or more times. The most recoveries were 15% for bats banded at Caves 5 and 6, of which 272 and 343 respectively were recovered one or more times. The per cent recoveries from those banded at Cave 4 was 13% (88); from Cave 7, 12% (94); from Cave 2, 12% (69); and only 4% (27) from Cave 15, where only in-place recoveries occurred. Of these, 675 (10%) were captured away from the banding site, while 219 (3%) were recovered in-place. In-place recoveries were highest at Cave 6 with 16% (133) recovered. The in-place recoveries for Cave 15 was 4% (27); for Cave 2, 3% (15); and for Cave 5, 2% (39). Fewer than one percent (5) were recovered in-place at Cave 7.

These banding and recovery data for the gray bat, *Myotis grisescens*, in the southwest portion of the Ozark Plateau have provided the tool for the determination of the movement patterns between their maternity colony caves in northeastern Oklahoma and their hibernacula in Arkansas and Missouri.

TABLE 1. Summary of numbers banded and in-place and foreign recoveries of *Myotis grisescens* at Cave 2.

Date	Banded		Recoveries				All Banded and Recoveries			
	Females	Males	Inplace		Foreign ¹		Number		Ratio	
			Females	Males	Females	Males	Females	Males	Females	Males
March 27	2	1	0	0	0	0	2	1	67	33
March 30	0	0	0	0	1	0	1	0	100	0
May 4	2	0	0	0	0	0	2	0	100	0
June 5	0	0	2	0	0	0	2	0	100	0
June 9	3	0	0	0	0	0	3	0	100	0
June 21	44	1	0	0	3	0	47	1	98	2
June 27	129	43	2	0	9	0	140	43	77	23
July 9	68	15	3	0	3	0	74	15	83	17
July 15	116	60	0	0	1	0	117	60	66	34
July 17	0	0	3	0	2	0	5	0	100	0
July 21	27	14	2	0	1	0	30	14	68	32
July 24	40	19	2	0	2	0	44	19	70	30
Aug. 6	0	0	1	0	4	0	5	0	100	0
Sept. 22	0	0	0	0	0	1	0	1	0	100
Sept. 28	4	5	0	0	0	0	4	5	44	56
Nov. 30	1	0	0	0	0	0	1	0	100	0
TOTALS	436	158	15	0	26	1	477	159	(75)	(25)

¹See Table 2 for banding site.

TABLE 2. The number of male and female Myotis grisescens recovered at Cave 2, but banded at another site.

Date of Recovery	Banding Site							
	4		5		6		7	
	F	M	F	M	F	M	F	M
Mar. 30	0	0	0	0	1	0	0	0
June 21	0	0	3	0	0	0	0	0
June 27	2	0	6	0	0	0	1	0
July 9	2	0	1	0	0	0	0	0
July 15	0	0	1	0	0	0	0	0
July 17	0	0	1	0	1	0	0	0
July 21	0	0	1	0	0	0	0	0
July 24	1	0	1	0	0	0	0	0
Aug. 6	1	0	2	0	0	0	1	0
Sept. 22	0	0	0	1	0	0	0	0
TOTALS	6	0	16	1	2	0	2	0

TABLE 3. Summary of numbers banded and Inplace and foreign recoveries of Myotis grisescens at cave 4.

Date	Banded		Recoveries				All Banded and Recoveries			
	Females	Males	Inplace		Foreign ¹		Numbers		Ratio	
			Females	Males	Females	Males	Females	Males	Females	Males
March 24	12	5	0	0	0	0	12	5	71	29
July 18	0	0	0	0	4	1	4	1	80	20
Aug. 10	54	58	0	0	0	0	54	58	48	52
Aug. 11	464	68	0	0	15	9	479	77	86	14
Oct. 15	1	14	0	0	1	1	2	15	12	88
TOTALS	531	145	0	0	20	11	551	156	(78)	(22)

¹ See Table 4 for banding site.

TABLE 4. The number of male and female Myotis grisescens recovered at cave 4, but banded at another site.

Date of Recovery	Banding Site					
	2		5		6	
	F	M	F	M	F	M
July 18	1	0	1	1	2	0
Aug. 11	2	0	9	9	4	0
Oct. 15	0	0	1	1	0	0
TOTALS	3	0	11	11	6	0

TABLE 5. Summary of numbers banded and in-place and foreign recoveries of Myotis grisescens at cave 5.

Date	Banded		Recoveries				All Banded and Recoveries			
	Females	Males	Inplace		Foreign ¹		Number		Ratio	
			Females	Males	Females	Males	Females	Males	Females	Males
March 27	1	0	0	0	0	0	1	0	100	0
March 29	14	9	0	2	1	4	15	15	50	50
April 1	0	0	0	0	0	1	0	1	0	100
April 9	253	58	4	6	11	11	268	75	78	22
May 4	214	292	0	0	2	0	216	292	43	58
June 8	2	1	0	0	0	0	2	1	67	33
July 22	506	115	3	8	20	1	529	124	81	19
July 24	182	100	0	1	5	0	187	101	65	35
July 25	42	32	4	0	4	6	50	38	57	43
July 27	0	0	0	0	0	1	0	1	0	100
Sept. 9	0	0	0	0	0	1	0	1	0	100
Sept. 24	0	0	0	0	1	0	1	0	100	0
Sept. 28	0	11	0	8	0	0	0	19	0	100
Oct. 3	0	0	3	0	0	0	3	0	100	0
Nov. 6	0	1	0	0	1	0	1	1	50	50
TOTALS	1214	619	14	25	45	25	1273	669	(66)	(34)

¹ See Table 6 for banding site.

TABLE 6. The number of male and female Myotis grisescens recovered at Cave 5, but banded at another site.

Date of Recovery	Banding Site							
	2		4		6		7	
	F	M	F	M	F	M	F	M
Mar. 29	0	0	1	0	0	4	0	0
Apr. 1	0	1	0	0	0	0	0	0
Apr. 9	0	0	5	1	3	9	3	1
May 4	0	0	0	0	2	0	0	0
July 22	3	1	0	0	17	0	0	0
July 24	2	0	0	0	3	0	0	0
July 25	0	0	2	1	1	5	1	0
July 27	0	0	0	0	0	0	0	1
Sept. 9	0	0	0	1	0	0	0	0
Sept. 24	0	0	0	0	0	0	1	0
Nov. 6	0	0	0	0	1	0	0	0
TOTALS	5	2	8	3	27	18	5	2

TABLE 7. Summary of numbers banded and in-place and foreign recoveries of Myotis grisescens at Cave 6.

Date	Banded		Recoveries				All Banded and Recoveries			
			Inplace		Foreign ¹		Number		Ratio	
	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males
March	5	0	0	1	0	0	0	1	0	100
March	28	20	6	0	0	0	20	6	77	23
April	15	174	9	3	2	9	186	12	94	6
May	5	431	31	2	0	5	438	35	93	7
June	8	102	8	1	0	0	103	9	92	8
June	28	36	45	4	3	5	45	49	48	52
July	25	0	0	1	0	1	2	0	100	0
August	8	0	0	5	6	5	10	9	53	47
August	22	0	0	5	5	5	10	6	62	38
Sept.	1	149	142	2	0	12	163	144	53	47
Sept.	9	55	9	8	2	0	63	12	84	16
Sept.	13	202	31	5	9	4	211	41	84	16
Sept.	22	336	27	10	13	9	355	46	89	11
Sept.	29	124	352	3	24	6	133	384	26	74
Oct.	25	0	0	1	11	1	2	19	10	90
Oct.	29	0	4	1	5	0	1	11	8	92
TOTALS	1629	664	51	82	62	38	1742	784	(69)	(31)

¹See Table 8 for banding site.

TABLE 8. The number of male and female Myotis grisescens recovered at Cave 6 but banded at another site.

Date of Recovery	Banding Site							
	2		4		5		7	
	F	M	F	M	F	M	F	M
Apr. 15	0	0	2	1	6	0	1	0
May 5	0	0	0	0	5	4	0	0
June 28	0	0	1	0	3	0	1	1
July 25	0	0	0	0	1	0	0	0
Aug. 8	0	0	2	0	2	3	1	0
Aug. 22	0	0	4	0	1	0	0	1
Sept. 1	0	0	3	0	4	2	5	0
Sept. 9	0	0	0	0	0	1	0	0
Sept. 13	0	0	2	1	2	0	0	0
Sept. 22	1	0	1	2	7	4	0	0
Sept. 29	3	0	2	0	1	6	0	2
Oct. 25	0	0	1	1	0	5	0	2
Oct. 29	0	0	0	0	0	1	0	1
TOTALS	4	0	18	5	32	26	8	7

TABLE 9. Summary of numbers banded and Inplace and foreign recoveries of Myotis grisescens at Cave 7.

		Banded		Recoveries				All Banded and Recoveries			
				Inplace		Foreign ¹		Number		Ratio	
		Females	Males	Females	Males	Females	Males	Females	Males	Females	Males
March	25	25	2	0	0	0	0	25	2	93	7
June	28	67	5	1	0	2	0	70	5	93	7
July	24	76	108	0	0	0	0	76	108	59	41
Aug.	31	380	30	1	1	16	1	397	32	93	7
Oct.	5	78	30	1	1	1	3	80	34	70	30
TOTALS		626	175	3	2	19	4	648	181	(78)	(22)

¹See Table 10 for banding site.

TABLE 10. The number of male and female Myotis grisescens recovered at Cave 7, but banded at another site.

Date of Recovery	Banding Site					
	4		5		6	
	F	M	F	M	F	M
June 28	1	0	0	0	1	0
Aug. 31	5	0	9	0	2	1
Oct. 5	1	0	0	0	0	3
TOTALS	7	0	9	0	3	4

TABLE 11. Summary of numbers banded and in-place and foreign recoveries of *Myotis grisescens* at Cave 15.

Date		Banded		Recoveries				All Banded and Recoveries			
		Females	Males	Inplace		Foreign ¹		Number		Ratio	
				Females	Males	Females	Males	Females	Males	Females	Males
Jen.	18	0	0	0	0	17	5	17	5	77	23
Feb.	7	0	0	7	4	3	6	10	10	50	50
Feb.	20	0	0	0	0	36	7	36	7	84	16
Feb.	28	0	0	3	3	0	4	3	7	30	70
Mar.	0	0	0	0	0	1	1	1	1	50	50
Mar.	5	0	0	2	0	24	12	26	12	68	32
Mar.	8	0	0	0	2	15	4	15	6	71	19
Mar.	10	0	0	0	1	15	4	15	5	75	25
Mar.	27	0	0	0	0	22	6	22	6	79	21
Apr.	3	0	0	0	0	9	4	9	4	69	31
Sept.	29	0	0	0	0	1	0	1	0	100	0
Oct.	24	0	0	1	0	6	0	7	0	100	0
Oct.	25	0	0	0	0	1	0	1	0	100	0
Nov.	14	0	0	2	2	30	8	32	10	76	24
Dec.	13	0	0	0	0	2	1	2	1	67	33
Dec.	20	311	347	0	0	62	31	373	378	50	50
Dec.	29	0	0	0	0	15	9	15	9	62	38
TOTALS		311	347	15	12	259	102	585	461	(56)	(44)

¹See Table 12 for banding site.

TABLE 12. The number of male and female Myotis grisescens recovered at Cave 15, but banded at another site.

		Banding Site											
		2		4		5		6		7		10	
		F	M	F	M	F	M	F	M	F	M	F	M
Jan.	18	1	0	1	0	4	1	7	2	4	1	0	1
Feb.	7	0	0	0	0	1	2	1	4	1	0	0	0
Feb.	20	3	1	7	1	10	2	8	2	8	1	0	0
Feb.	28	0	0	0	1	0	2	0	0	0	1	0	0
Mar.		0	0	0	0	0	0	0	1	1	0	0	0
Mar.	5	2	0	3	2	15	7	2	2	2	1	0	0
Mar.	8	0	0	0	1	7	1	7	1	1	1	0	0
Mar.	10	1	0	0	1	5	1	8	1	1	1	0	0
Mar.	27	3	1	3	0	3	4	8	1	5	0	0	0
Apr.	3	1	0	0	1	2	1	2	2	4	0	0	0
Sept.	29	0	0	0	0	0	0	1	0	0	0	0	0
Oct.	24	0	0	0	0	1	0	4	0	1	0	0	0
Oct.	25	0	0	0	0	0	0	1	0	0	0	0	0
Nov.	14	2	2	1	2	6	2	14	2	7	0	0	0
Dec.	13	0	0	1	0	1	0	0	1	0	0	0	0
Dec.	20	8	3	7	1	18	7	17	17	12	3	0	0
Dec.	29	0	0	2	0	3	6	5	2	5	1	0	0
TOTALS		21	7	25	10	76	36	85	38	52	10	0	1

TABLE 13. Summary of numbers banded and in-place and foreign recoveries of Myotis grisescens at Cave 16.

		Banded		Recoveries				All Banded and Recoveries			
				Inplace		Foreign		Number		Ratio	
Date		Females	Males	Females	Males	Females	Males	Females	Males	Females	Males
Jan.	27	0	0	0	0	24	7	24	7	77	23
Jan.	30	0	0	0	0	1	2	1	2	33	67
Feb.	16	0	0	0	0	12	3	12	3	80	20
Mar.	20	0	0	0	0	3	1	3	1	75	25
TOTALS		0	0	0	0	40	13	40	13	(75)	(25)

TABLE 14. The number of male and female Myotis grisescens recovered at Cave 16, but banded at another site.

Date of Recovery	Banding Site							
	2		4		5		6	
	F	M	F	M	F	M	F	M
Jan. 27	4	1	2	1	6	2	12	3
Jan. 30	1	0	0	0	0	1	0	1
Feb. 16	1	1	1	1	1	1	9	0
Mar. 20	1	0	1	0	0	1	1	0
TOTALS	7	2	4	2	7	5	22	4

TABLE 15. A Summary of the number and sex ratio of Myotis grisescens banded and recovered for each banding site.

Banding Site	Total Banded					Total Recoveries			Percent Recoveries		
	Number			Ratio		Number					
	Female	Male	Total	Female	Male	Female	Male	Total	Female	Male	Total
1	0	2	2	0	100	0	0	0	0	0	0
2	436	158	594	73	27	56	13	69	13	8	12
4	531	145	676	79	21	68	20	88	13	14	13
5	1214	619	1833	66	34	167	105	272	14	17	15
6	1629	664	2293	71	29	197	146	343	12	22	15
7	626	175	801	78	22	71	23	94	11	13	12
10	0	1	1	0	100	0	1	1	0	100	100
15	311	347	658	47	53	15	12	27	5	3	4
TOTALS	4747	2111	6858	(69)	(31)	574	320	894	(12)	(15)	(13)

¹See Tables 15 and 18

TABLE 16. Summary of all Myotis grisescens banded and recovered at each site during this study.

Banding Site	Banded		Recoveries				All Banded and Recoveries			
			In Place		Foreign		Number		Ratio	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
1	0	2	0	0	0	0	0	2	0	100
2	436	158	15	0	26	1	477	159	75	25
3	0	0	0	0	1	0	1	0	100	0
4	531	145	0	0	20	11	551	156	78	22
5	1214	619	14	25	45	25	1273	669	66	34
6	1629	664	51	82	62	38	1742	784	69	31
7	626	175	3	2	19	4	648	181	78	22
8	0	0	0	0	1	1	1	1	50	50
9	0	0	0	0	1	0	1	0	100	0
10	0	1	0	0	0	0	0	1	0	100
11	0	0	0	0	0	1	0	1	0	100
12	0	0	0	0	2	0	2	0	100	0
13	0	0	0	0	0	1	0	1	0	100
14	0	0	0	0	0	2	0	2	0	100
15	311	347	15	12	259	102	585	461	56	44
16	0	0	0	0	40	13	40	13	75	25
TOTALS	4747	2111	98	121	476	199	5321	2431	69	31

Chapter V

MOVEMENT PATTERNS

There is a consistent movement pattern of the gray bat, *Myotis grisescens*, in the southwest portion of the Ozark Plateau both annually and seasonally. In late March and early April, the gray bats emerge from their hibernacula and depart for their summer roosts. In the fall they return to their hibernacula. The pattern of movement of the gray bat in the southwest portion of the Ozark Plateau was very similar to the movement patterns observed by Tuttle (1976a) for the gray bats east of the Mississippi River. A large number of gray bats were handled by Tuttle in his extensive study, so his dates were used for comparative purposes in this paper.

The latest date Oklahoma banded bats were reported in Cave 15, a hibernaculum, was 3 April 1970, where nine females and four males represented five Oklahoma Caves (2, 4, 5, 6, and 7). The latest dates reported for Oklahoma banded bats recovered in Cave 15 in other years were for an unknown day in March 1969, 5 March 1972, 8 March 1975, and 10 March 1973.

At Cave 16, in Arkansas, another hibernaculum, the latest date reported of *M. grisescens* banded in Oklahoma was 20 March 1978. In other years the latest dates reported were 30 January 1970, 27 January 1973, and 16 February 1975.

The earliest recovery of *M. grisescens* in an Oklahoma cave was made 5 March 1972 and was a single male in Cave 5, which may have remained over winter instead of migrating to a hibernaculum. Other early discoveries are shown in Tables 2, 4 and 5. Larger groups were discovered 9 April 1971 and 15 April 1972. In 1971 at Cave 5 the band and recovery sample included 268 (78%) females and 75 (22%) males. At Cave 6 on 15 April 1972 the total number banded and recovered was 198, of which 94% (186) were females.

A female (Bat 6-82938) banded 11 August 1968 at Cave 4 was recovered in a hibernaculum (Cave 15) the first winter (20 February 1969) and recaptured in Oklahoma early the same year (29 March 1969) in Cave 5. Another link between the late winter recoveries of Oklahoma gray bats in a hibernaculum (Cave 15) and spring dispersal to Oklahoma was a female (Bat 7-52407) banded first in Cave 5 on 9 April 1971, recovered the first winter in Cave 15 on 10 March 1972, and recovered in Oklahoma thirty-five days later (15 April 1972) in Cave 6. A total of 13 gray bats banded in Oklahoma caves were subsequently recovered in the winter in Cave 15 (a hibernaculum) prior to being again recovered in Oklahoma Caves 5 and 6.

Following the arrival of the gray bats from their hibernacula to their summer feeding grounds, they moved between Caves 5 and 6 prior to the establishment of the maternity colonies, as shown in Figure 2.

Maternity colonies were discovered at Caves 2, 4, 6 and 7. Movement into Cave 2 was from Cave 6 via Cave 5, as indicated by those banded at Cave 5 on 4 May 1968. Nine of those banded bats were recovered the next day at Cave 6, and three were recovered at Cave 2 during the maternity

period (21 June 1968). Again in 1972, gray bats from a group banded 22 July 1968 in Cave 5 were recovered in the spring (15 April 1972), and subsequently two from that initial banded group were found during the maternity period (27 June 1972) at Cave 2.

The only indication of the staging cave used by the bats moving into the maternity colony in Cave 7 was from a female (Bat 6-58915) banded in Cave 6 on 5 May, 1968, and then recovered in Cave 7 on 28 June, 1969.

Once the young were flying and the maternity colonies began to break up, gray bats from maternity colonies began to move to other caves, as shown in Figure 3; females moved to Caves 4 and 5. Two females banded in Cave 2 on 21 June 1968 were subsequently recovered at Cave 5 on 22 July 1968, and one female from Cave 2 was recovered at Cave 4 on 11 August 1968, indicating movement from Cave 2 to Cave 4 via Cave 5.

The movement of *M. grisescens* following the maternity period (4 July) and prior to migration to the hibernacula (21 November) was complex, as seen in Figure 4.

For example, gray bats banded 15 July 1968 at Cave 2 were recovered at Cave 5 on both 22 and 24 July 1968, as indicated in Figure 4; some were recovered at Cave 3 on 22 September 1968 and then at Cave 6 on 29 September 1968 (Figure 5). Another circuitous post-maternity period movement was revealed by those banded 11 August 1968 at Cave 4. Some were recovered 31 August 1968 at Cave 7, others back at Cave 4 on 5 October 1968 (Figure 4), others 31 August 1968 in Cave 7 and others in Cave 6 on 1 and 29 September 1968 (Figure 5).

Three multiple recaptures are involved in these movements. One male (Bat 6-58229) banded at Cave 5 on 4 May 1968 was recaptured in Cave 4 on 11 August 1968 and then in Cave 6 on 29 September 1968. Traveling with that male was another male (Bat 6-58237) banded at Cave 5 on 4 May 1968 recaptured in Cave 4 on 11 August 1968, but recovered in Cave 5 on 28 September 1968. Bat 6-58253 (a male) was banded along with the previous two bats at Cave 5 on 4 May 1968 and recaptured in Cave 4 on 11 August 1968 and then recovered in Cave 6 on 1 September 1968.

The *Myotis grisescens* in northeastern Oklahoma experience considerable movement between caves following the maternity period and prior to migration to the hibernacula as shown in Figures 3, 4, 5, and 6. The latest dates in which *M. grisescens* were found in these Oklahoma caves prior to migration to their hibernacula are as follows: Cave 2, November 30; Cave 4, October 15; Cave 5, November 6; and Cave 7, October 5. A female (Bat 6-58962) banded 5 May 1968 at Cave 6 was the earliest recovery in the hibernacula, being captured 20 September 1968. The second earliest Oklahoma bat recovered was a male (Bat 7-50568) banded in Cave 6 on 13 September 1970 and recovered in Cave 15 on October 24, 1970.

For each year with a fall record the last recovery in Oklahoma was as follows: In the fall of 1968 the last *M. grisescens* were found in Cave 7 on 5 October; in 1969 in Cave 6 on 9 September; in 1970 in Cave 5 on 6 November; in 1971 in Cave 6 on 29 October; in 1972 in Cave 2 on 30 November and in 1974 in Cave 6 on 25 October. Therefore from 1968 through 1974 the gray bats were last reported in Oklahoma from as early as 9 September 1969 and to as late as 30 November 1972.

The 361 migrants from Oklahoma caves to Hibernaculum 15 and the 53 from Hibernaculum 16 came from six different banding sites as depicted in Figures 7 and 8. Of the 21 different dates when recoveries were made in the hibernacula, 17 occurred in Cave 15 and 4 in Cave 16, with a total of 414 *M. grisescens* being recovered in the two hibernacula.

Following fall migration to the hibernacula the earliest dates in which Oklahoma banded *M. grisescens* were recovered in hibernaculum Cave 15 were 29 September 1968, 20 December 1969, 24 October 1970, 14 November 1971, 10 March 1973, and 25 October 1974.

Discussion. The gray bat, *M. grisescens*, in the southwest portion of the Ozark Plateau, exhibits movement patterns similar to those reported by Elder and Gunier, 1978; Grigsby, 1965; Guthrie, 1933; Hall and Wilson, 1966; Myers, 1964; and Tuttle, 1975, 1976a, 1976b, 1978.

Hall and Wilson (1966) discovered gray bats in their summer caves as early as 2 April 1959 and 4 April 1958. Elder and Gunier (1978) did not indicate when they first picked up the gray bats in their summer roosts. Myers (1964) defined the period for spring dispersal in the Missouri Ozarks from 16 March until 30 April. Both Myers (1964) and Guthrie (1933) felt that the males and females migrated separately. Tuttle (1976) stated that the adult females emerged from hibernation the last week of March and were first captured in a transitory cave on 7 April, 17 April, and 28 April. He found that adult males departed later with the first arrival at the transitory cave on 28 April.

I found that the gray bats annually moved from their hibernacula in Missouri and Arkansas to their summer roosts and feeding grounds in north-eastern Oklahoma. The Missouri hibernaculum (Cave 15) was 130 km from Cave 6 in Oklahoma. The flight to Cave 6 was 194 km from the Arkansas hibernaculum (Cave 16). Reports of movements in North America for *Myotis* spp. (Davis and Hitchcock, 1965; Elder and Gunier, 1978; Fenton, 1970; Grigsby, 1965; Hall and Wilson, 1966; Humprey and Cope, 1976; Rice, 1957; and Tuttle, 1976a) suggest that the majority of these seasonal movements are less than 200 km. Tuttle (1976a) reported movements of more than 580 km for *M. grisescens* which appear to be the longest regular movements between summer roosts and hibernacula for a species of *Myotis* in North America. Griffin (1970) reports flights greater than 1600 km between Russia and Bulgaria for *Myotis mystacinus*. An increase in mortality occurs in *M. grisescens* during this seasonal movement (Tuttle and Stevenson, 1977). The gray bats disperse from the hibernacula to warmer summer caves near large bodies of water that provide optimum growth rates for their development (Tuttle, 1976b).

FIGURE 2. The number of movements of *Myotis grisescens* that occurred from March 26 through May 24 for the years 1968 through 1975.

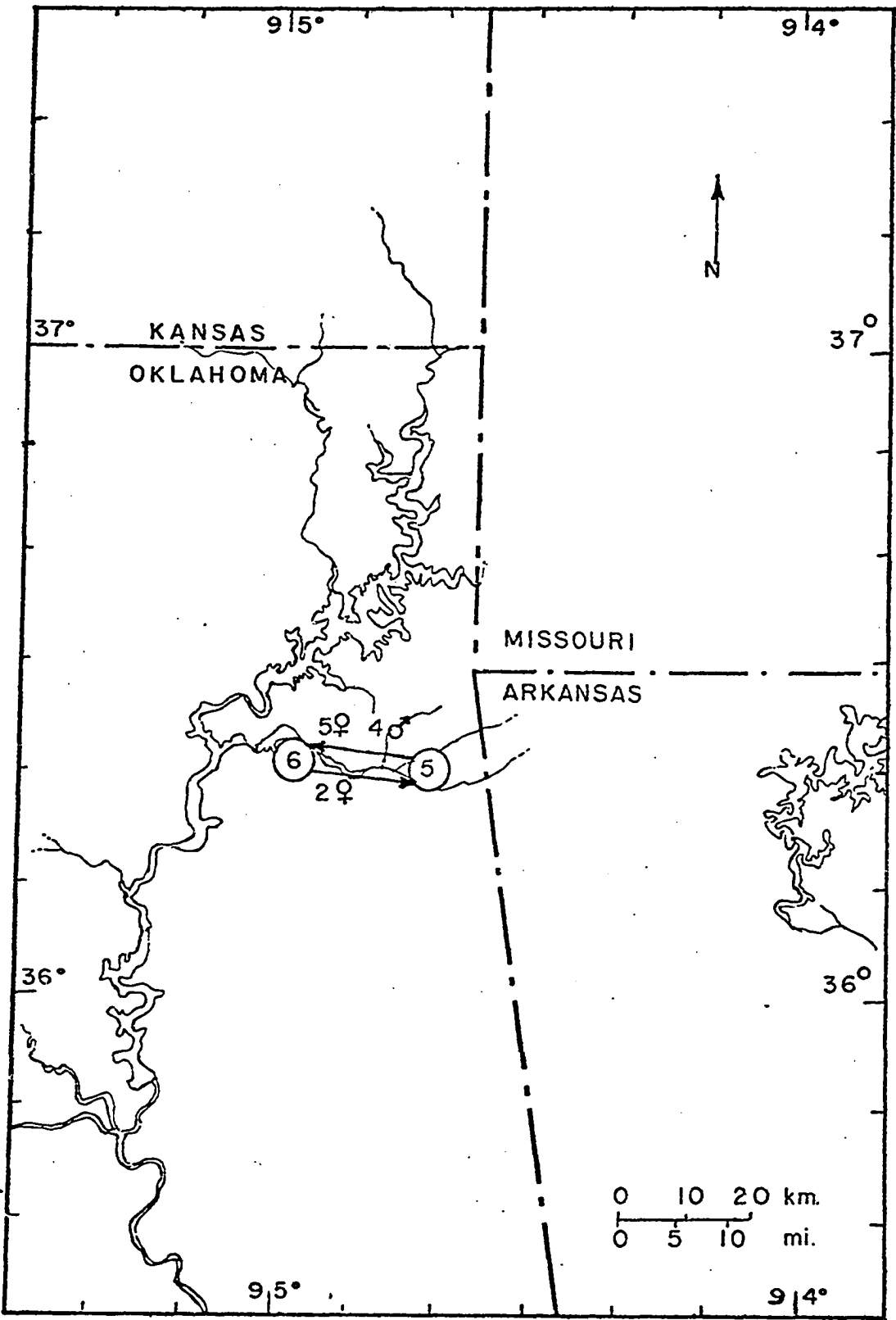


FIGURE 3. The number of movements of Myotis grisescens that occurred from June 4 through August 22 for the years 1968 through 1975.

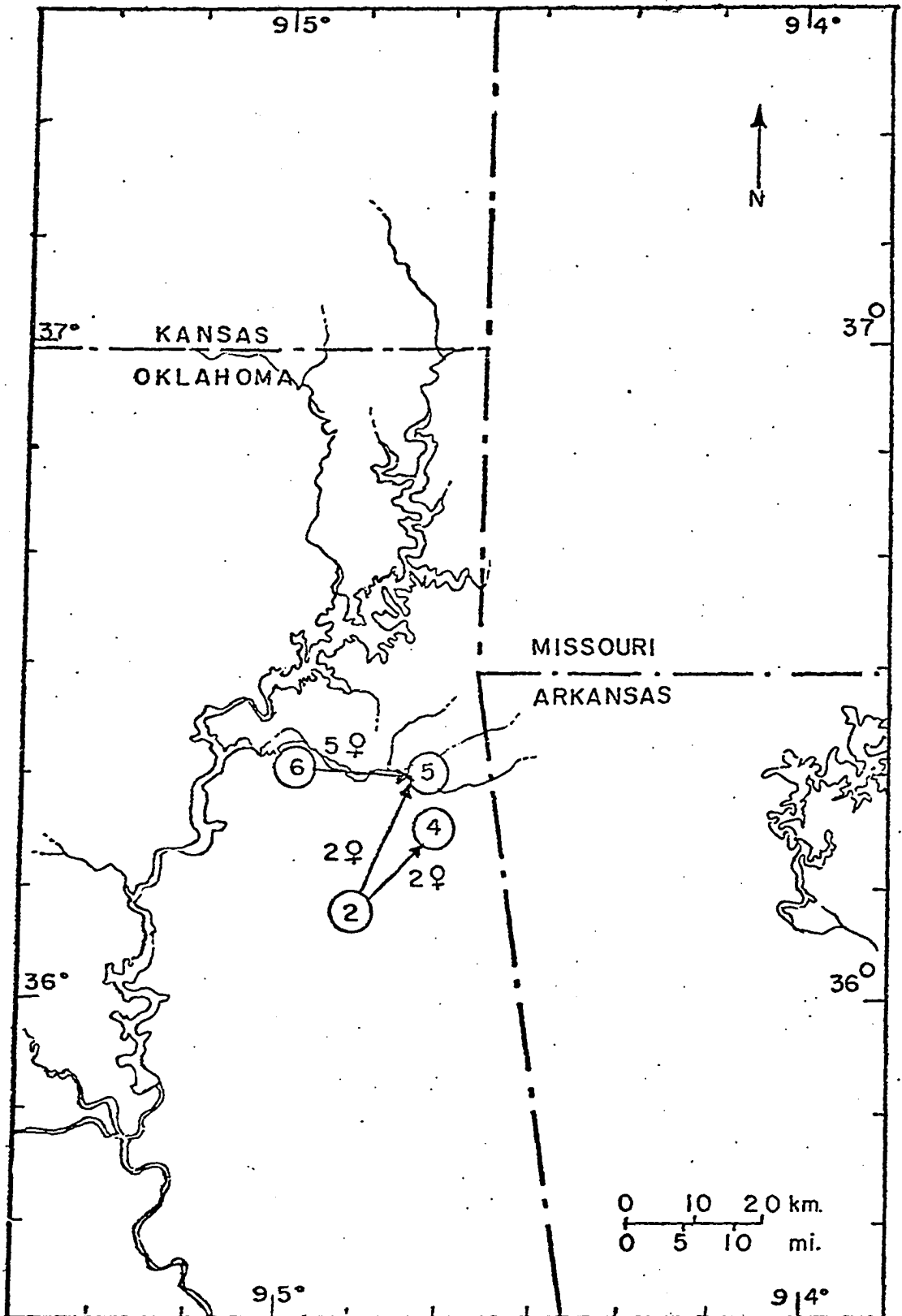


FIGURE 4. The number of movements of Myotis grisescens that occurred from July 4 through August 22 for the years 1968 through 1975.

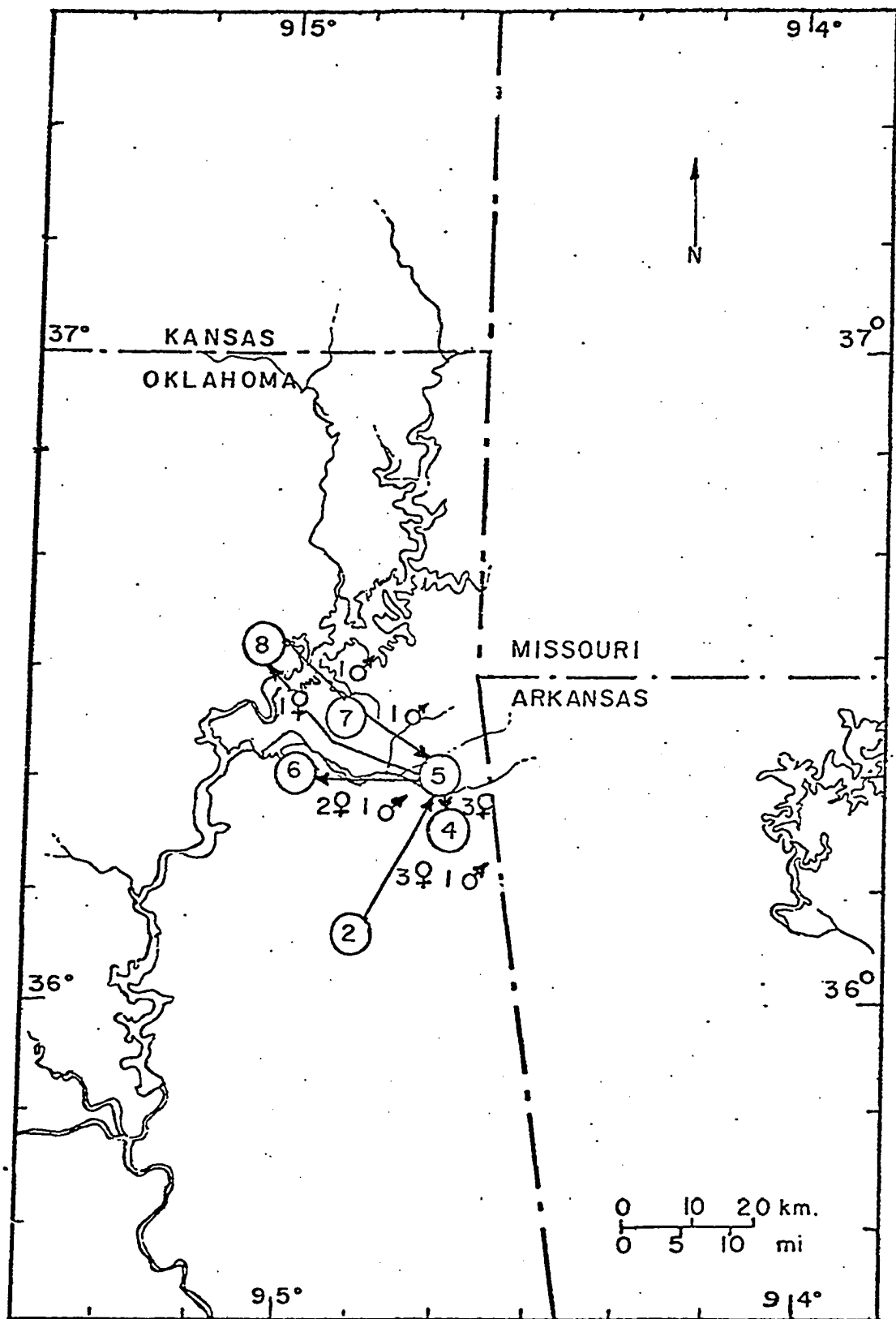


FIGURE 5. The number of movements that occurred from July 4 through November 20 (exclusive of those shown in Figure 4).

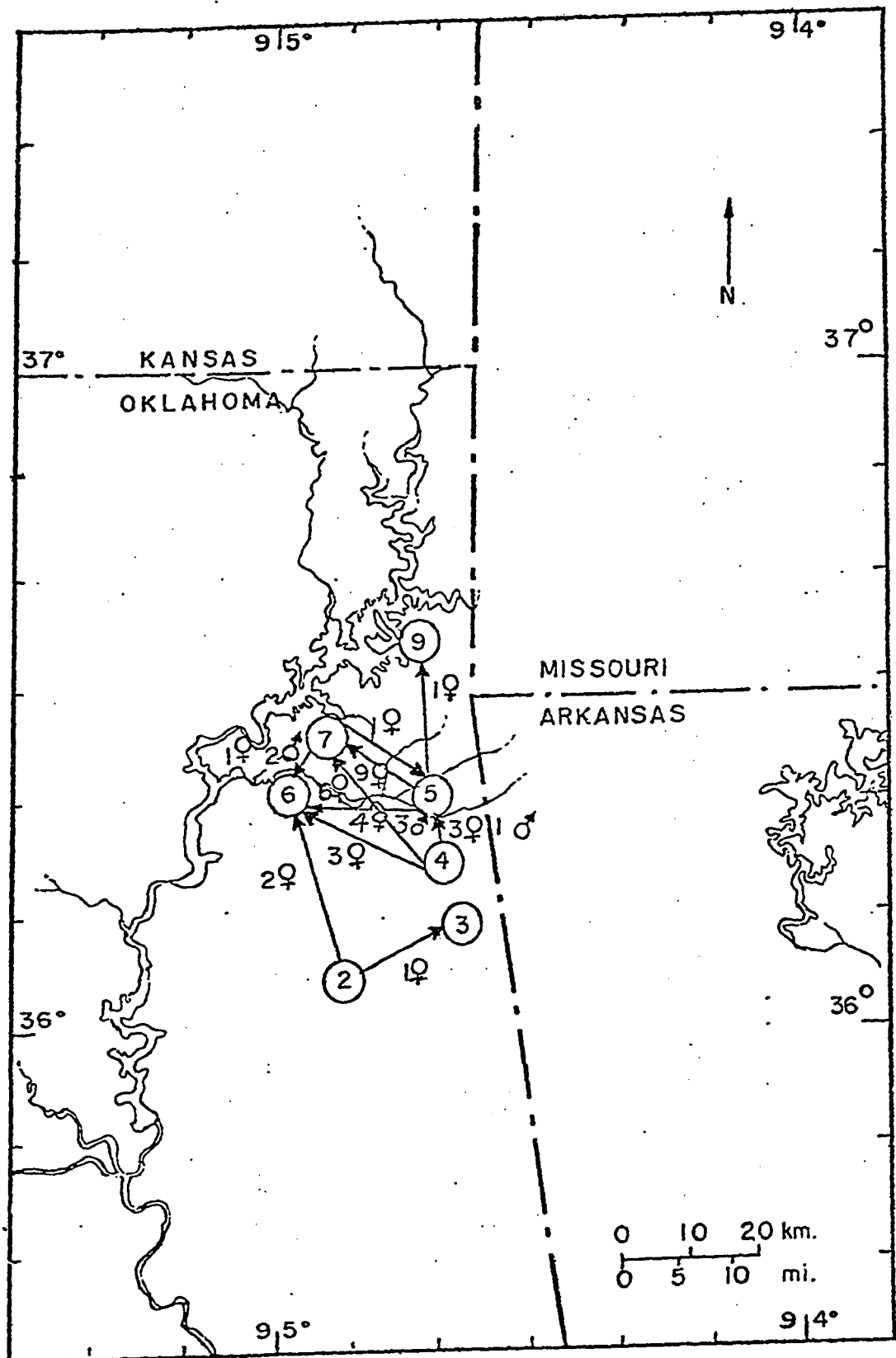
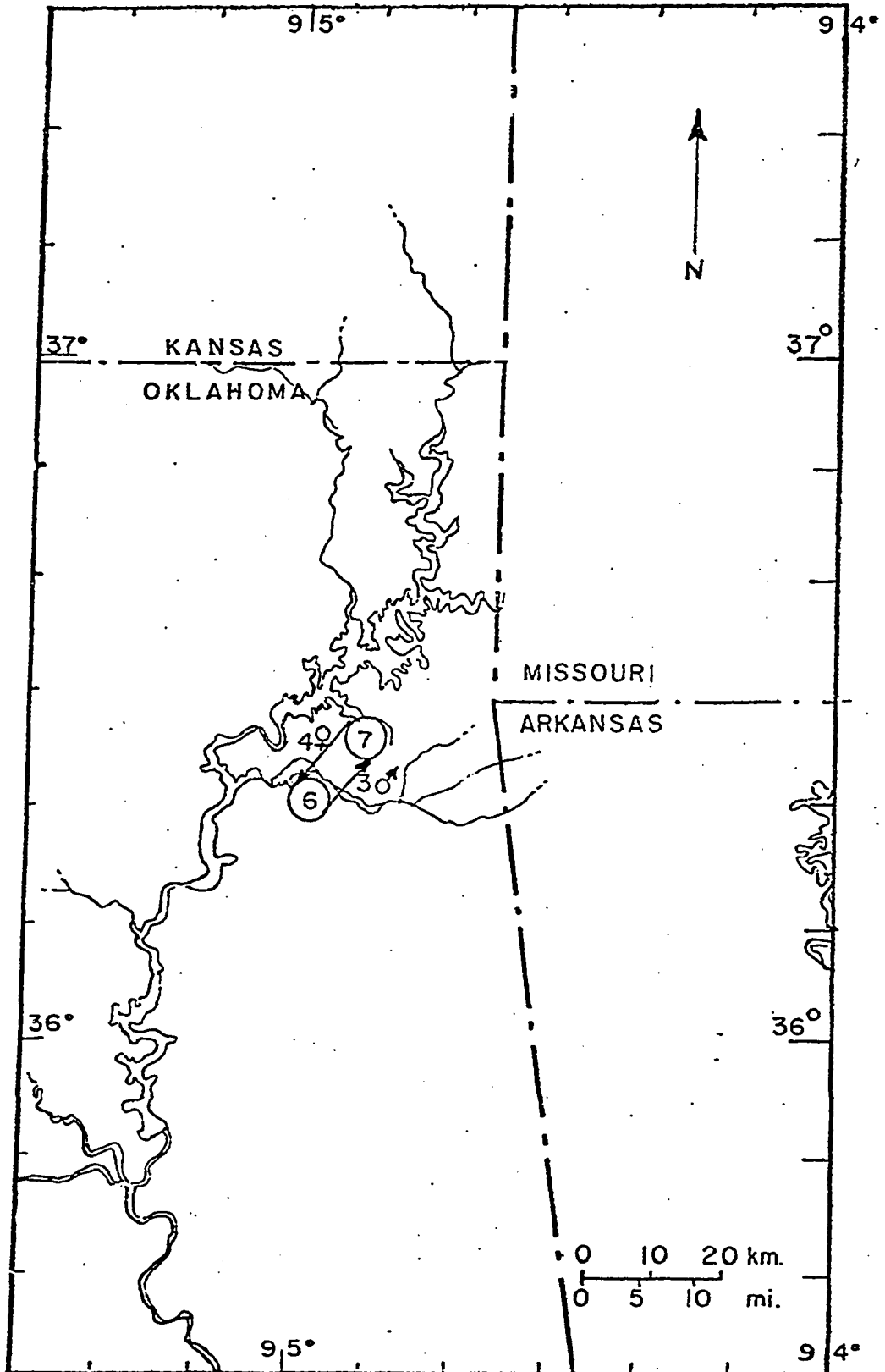


FIGURE 6. The number of movements of *Myotis grisescens* that occurred from August 23 through November 20 for the years 1968 through 1975 (exclusive of those shown in Figure 5).



Chapter VI

MATERNITY COLONIES

Four Oklahoma Caves (2, 4, 6, and 7) in this study contained maternity colonies of *M. grisescens*. At Cave 2 the first maternity colony was encountered on 9 June 1968, in the back room over a guano pile. They were too high to capture. An estimated 200 young remained on the ceiling after an estimated 2000 adults and volant young had dispersed. Only three females in the rustic phase were captured, banded and released. Twelve days later, on 21 June 1968, the maternity colony in this cave was located nearer the entrance at the south end of the first passage which is perpendicular to the entrance passage. The colony was smaller with 44 (94%) females and one male being captured, banded and released. Of the 38 adult females examined only two were noted to be pregnant, indicating that the maternity period was almost completed. Upon my return to Cave 2, on 15 July 1968, the colony was located just inside the entrance, too high to reach with the nets. As the bats were driven back into the cave, 117 (66%) females and 14 males were captured and released after banding.

The following year (9 July 1969) the maternity colony in Cave 2 was not disturbed until the young were all flying. Over 2000 gray bats were found in the same location as on 21 June 1968, at the left end of the first passage perpendicular to the entrance passage. The sample taken contained 74 (83%) females and 15 males. All bats were volant as anticipated from the previous year's experience. Fifteen days later on 24 July 1969, the colony was smaller and the bats were very alert; they were flying before their number could be estimated. The sample taken contained 44 (70%) females and 19 males.

This maternity colony still contained approximately 2000 gray bats on 27 June 1972, when 140 (77%) females and 43 males were captured. The colony was over the big guano pile, the same location as 9 June 1968, at the entrance of the back room of the cave. Approximately 350 young were too small to fly and remained on the ceiling. The colony was found at this same location 5 June 1975, 11 June 1976, and 14 June 1977. The cavern in which the colony was located was not entered, and no direct light was directed toward the colony during these three visits because of a moratorium placed on the banding of gray bats in 1976.

No maternity colony was discovered at Cave 5 during this study, but on 8 June 1968, 30-40 dead or dying gray bats were discovered hanging from the ceiling in the dark zone 20 meters from the entrance and over an old guano pile.

A colony of undetermined size was discovered in Cave 4 in early June 1978. A female with a young bat attached flew from a small passage

midway in this 1000 meter long cave. A large number of bats was heard, but the small passage leading to the presumed maternity colony was not entered.

Cave 6 is another good *M. grisescens* maternity colony cave. By 5 May 1968 a maternity colony of more than 5400 *M. grisescens* inhabited this cave. The sex ratio was 95% (1135) females and only 5% (59) males, including all of the banded and non-banded bats sampled.

The maternity colony in Cave 6 was established by 5 May 1968, when the total sample contained 1135 (95%) females and 59 (5%) males, located within 30 meters of the entrance in the zone of total darkness. The colony was still in existence on 8 June 1968, when 103 (92%) females and 9 (8%) males were taken from a colony of a few thousand gray bats at the very back of the large passage just before a low water crawl, nearly 100 meters from the entrance. The following year on 28 June 1969 the maternity colony was again found at the same location as 5 May 1968. Three sweeps of the sampling net recovered 220 gray bats of which 138 (63%) were females.

Cave 7 was entered only once during the maternity period on 28 June 1969. The sample taken in the dome room yielded 70 (93%) females and 5 males.

Discussion. The size of the maternity colonies in the southwestern Ozarks of northeastern Oklahoma appear smaller than those reported in the Missouri Ozarks by Myers (1964). Myers (1964) reported 26 maternity colonies that contained from 1,000 to 10,000 gray bats. The average maternity colony consisted of a little over 4,000. He also indicated a rather stable population from 1954-1962. During that period Myers (1964), visited Cave 2 and estimated the maternity colony contained 1,000 gray bats.

In Kentucky and Illinois, Hall and Wilson (1966) estimated that the maternity colonies in four caves ranged in size from 1,000 to 10,000 *M. grisescens*. During the summer of 1970, the estimated mean sizes of five maternity colonies in Tennessee and Alabama ranged from 3,600 to 100,000 (Tuttle, 1976a).

The adult male *M. grisescens* is absent from the maternity colonies (Grigsby, 1965; Guthrie, 1933; Myers, 1964; Elder and Gunier, 1978; and Tuttle, 1976a). This reduces the intraspecific competition for food resources. Hamilton, *et al* (1967) and Kunz (1974) found that larger colonies necessitated a longer foraging period.

Tuttle (1976b) found summer colonies to prefer caves within 1 km of a major river or lake and that they were rarely found farther than 4 km from such places. Maternity colony Caves 4, 6 and 7 are within 1 km of a large stream or reservoir. Cave 2 is 1.5 km from the Illinois River. These caves are within the optimum distance from foraging areas as found by Tuttle (1976b).

Tuttle (1976b) found that the capacity of a roost site of a maternity colony to trap heat has a major impact on the growth rates of pre-flight young. Maternity colonies in Caves 2, 6 and 7 were found in cave domes during this study, where the heat produced by the bats could be trapped. Caves 5 and 7 have large guano deposits beneath these domes, suggesting previous maternity colonies.

I found that the young *M. grisescens* at Cave 2 were volant by 9 July 1969. Tuttle (1976a) found that the young gray bats in Alabama and Tennessee were flying by 15 July. Using this information, I refrained from banding young *M. grisescens* until 15 July to reduce mortality rates and increase recovery rates.

Chapter VII

HIBERNACULA

The gray bat, *Myotis grisescens*, of the southwest portion of the Ozark Plateau utilize two hibernacula (Caves 15 and 16).

Two visits were made to the only known hibernaculum for Oklahoma *M. grisescens* on 20 December 1969 and on 28 February 1970 to determine if there was a strong connection between the northeastern Oklahoma colonies and those in the Central Ozarks. The confirmation of this connection was definitely established, as shown in Tables 12, 13, 17, 18, 19 and Figure 7.

The visits to Cave 15 were made under the direction of Dr. Richard Myers, who had studied this hibernaculum from 1954-1962. As Myers suggested, there were only 20 minutes to make estimates and collect samples prior to the aroused bats' dispersal. The first visit was devoted to collecting banded bats from northeastern Oklahoma (93) and to banding (658). Estimation of the size of the hibernating colony was the object of the second visit.

A map received from Dr. Myers, based on Bretz's (1956) Map of Cave 15, was utilized as a guide in finding the hibernating bats and in

estimating the number in this hibernaculum. An estimated 70,053 specimens of *M. grisescens* covered 810.25 sq. ft. and ranged in density from 82 bats per sq. ft. on the walls to 94.8 bats per sq. ft. on the ceiling and the underside of the larger elements of breakdown on 28 February 1970. Wilbur Gunier and Michael Harvey reported to the Bat Banding Office a large number of the band recoveries from Hibernacula 15 and 16, respectively.

Table 17. The number of male and female *Myotis grisescens* banded in Northeastern Oklahoma and subsequently recovered in hibernacula 15 and 16 within one year after banding and more than one year after banding.

CAVE 15									
Banding Site	Within one year after banding			More than one year after banding			Total		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
2	8	3	11	13	4	17	21	7	28
4	13	2	15	12	8	20	25	10	35
5	29	12	41	47	24	71	76	36	112
6	27	10	37	58	28	86	85	38	123
7	22	2	24	30	8	38	52	10	62
10	0	1	1	0	0	0	0	1	1
TOTAL	99	30	129	160	72	232	259	102	361

CAVE 16									
Banding Site	Within one year after banding			More than one year after banding			Total		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
2	2	0	2	5	2	7	7	2	9
4	0	0	0	4	2	6	4	2	6
5	0	0	0	7	5	12	7	5	12
6	8	1	9	14	3	17	22	4	26
TOTAL	10	1	11	30	12	42	40	13	53

TABLE 18. The total number and percentage of recoveries of Myotis grisescens at their hibernacula from each Oklahoma banding site.

Banding Site	Number Banded			Recoveries at Hibernacula			Percent Recoveries at Hibernacula		
	Female	Male	TOTAL	Female	Male	TOTAL	Female	Male	TOTAL
1	0	2	2	0	0	0	0	0	0
2	436	158	594	28	9	37	6	6	6
4	531	145	676	29	12	41	5	8	6
5	1214	619	1833	83	41	124	7	7	7
6	1629	664	2293	107	42	149	7	6	6
7	626	175	801	52	10	62	8	6	8
10	0	1	1	0	1	1	0	100	100
TOTALS	4436	1764	6200	299	115	414	(7)	(7)	(7)

TABLE 19. The number of Myotis grisescens that have made round trips from their summer territory to Hibernaculum 15 and back to their summer territory.

Interim Recovery Site	Banding Site									
	4		5		6		7		Total	
	F	M	F	M	F	M	F	M	F	M
15	4	0	4	0	4	0	1	0	13	0

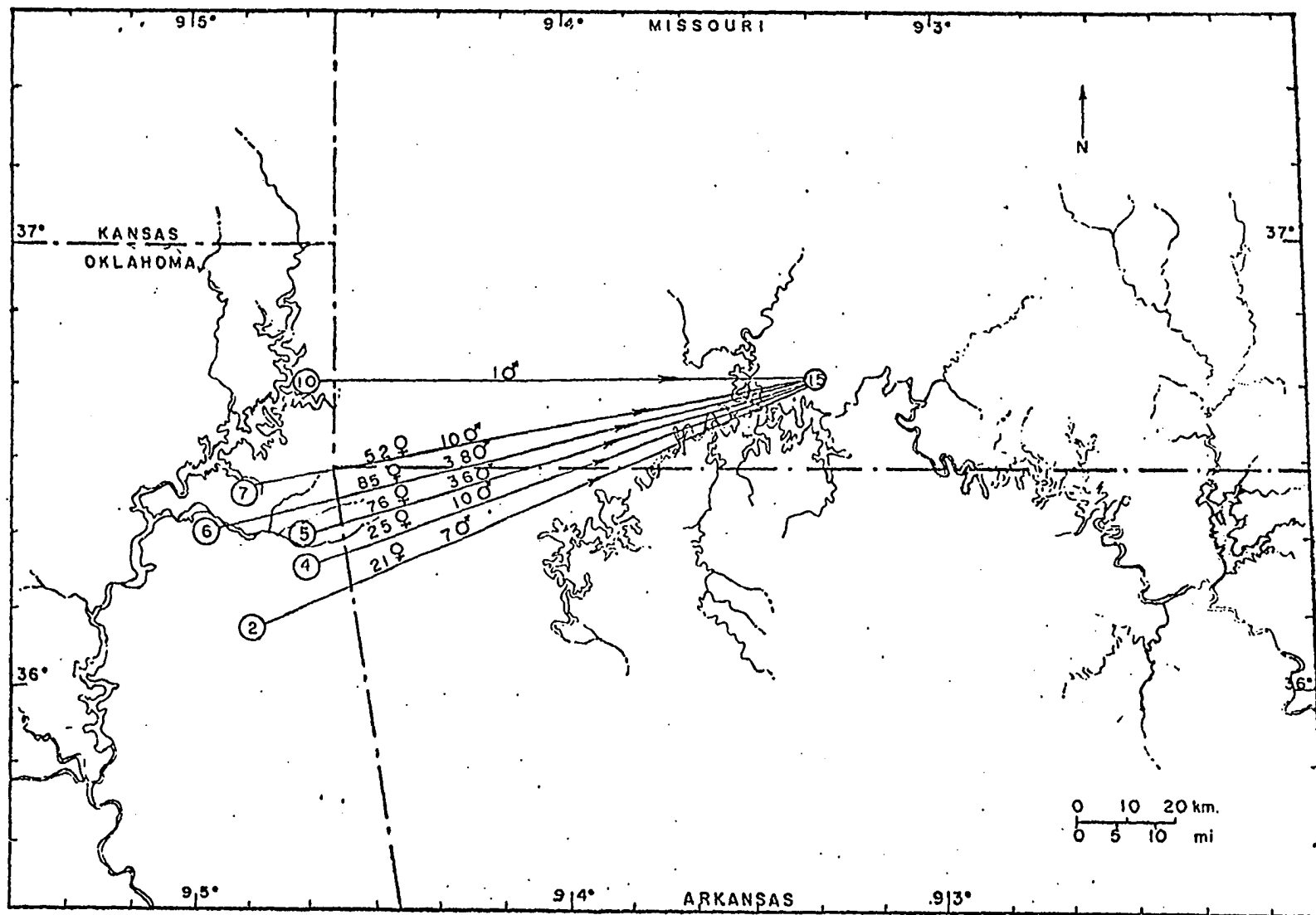


FIGURE 7. The number of male and female *Myotis grisescens* banded in Northeastern Oklahoma and recovered in Hibernaculum 15.

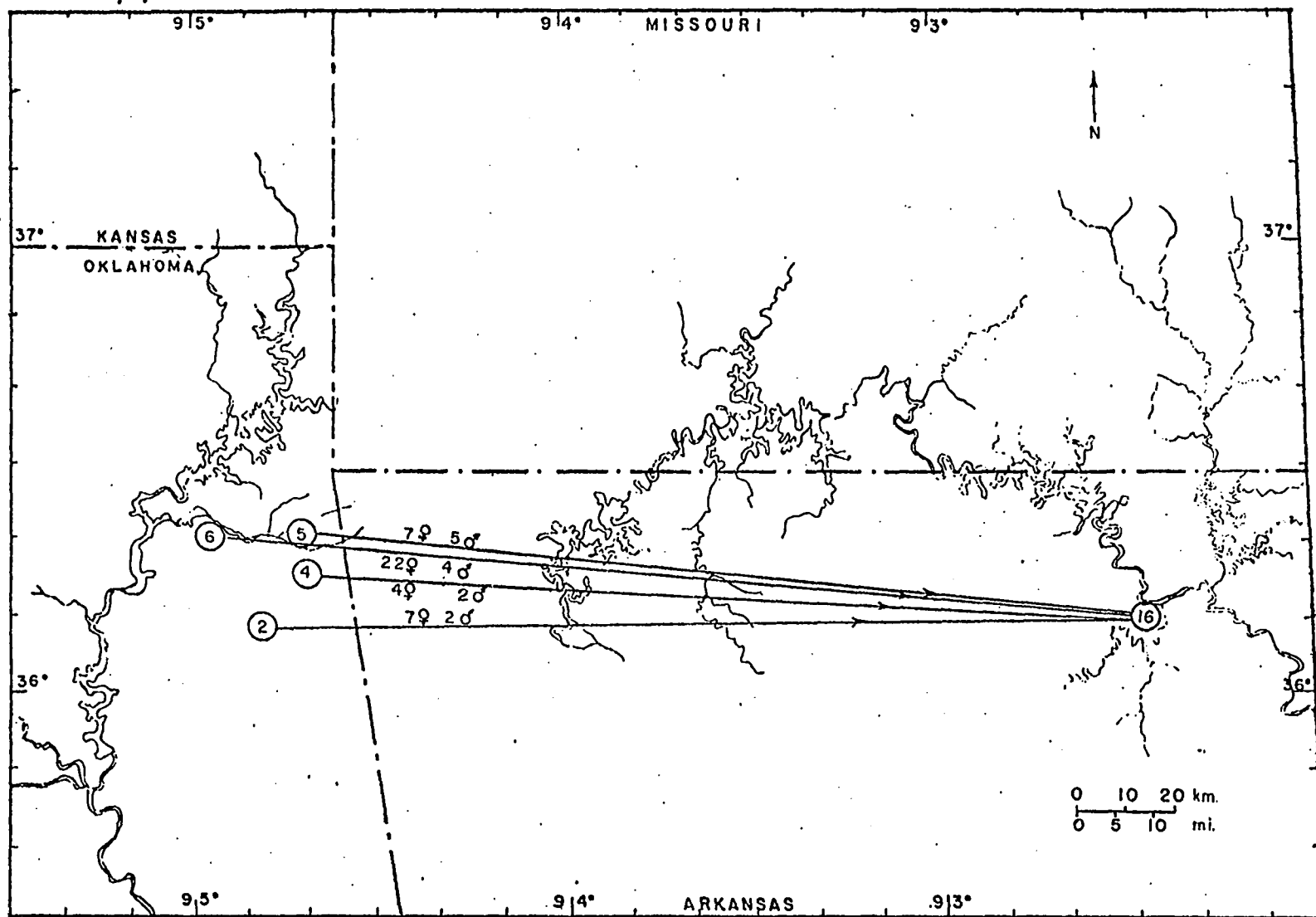


FIGURE 8. The number of male and female *Myotis grisescens* banded in Northeastern Oklahoma and recovered in Hibernaculum 16.

Chapter VIII

PHILOPATRY

The gray bat, *Myotis grisescens*, of the southwest portion of the Ozark Plateau demonstrated site fidelity, or philopatry, to their respective hibernacula.

The 658 *M. grisescens* banded at Cave 15, a hibernaculum, never were reported from another hibernaculum. Fifteen females and twelve males demonstrated loyalty to that wintering site, as they were captured there in the ensuing years but at no other hibernaculum. Also, none of the 6858 bats in this study frequented more than one of the hibernacula, further indicating loyalty to wintering sites. There were 361 gray bats from the Oklahoma caves recovered in Hibernaculum 15. Thirteen of these bats made at least one round trip from the study area to hibernal Cave 15. The largest number of movements of gray bats from an Oklahoma Cave (6) to hibernal Cave 15 was 123 with 37 recorded making the migratory flight within one year of banding. Of those banded in Cave 5, 112 were recovered at hibernal Cave 15 with 41 making the flight the fall after banding.

Fifty-three of the 414 gray bats banded in Oklahoma were captured in hibernal Cave 16. Eleven of these recoveries were made within the first

winter after banding. Cave 7 was the only major banding site in Oklahoma from which gray bats were not found wintering in both hibernacal Caves 15 and 16. The greatest number of gray bats from Oklahoma found in hibernacal Cave 16 was 26 from Cave 6.

Discussion. No disloyalty was demonstrated by the bats involved in this study. All 414 bats from summer caves in Oklahoma were loyal to their respective wintering caves in Arkansas and Missouri as discussed earlier. Multiple round trips further strengthened this loyalty concept. Also, all of those banded during the winter in hibernacal Cave 15 were recovered in place which is another indication of the fidelity to their hibernaculum.

In a 9 year study in the south-central Ozarks of Missouri, Myer (1964) found only 1% of the females and 2% of the males demonstrating winter disloyalty. His work involved three major hibernacula of *Myotis grisescens* in the Missouri Ozarks. This intensive banding activity in the hibernacula might account for the discovery of this apparent disloyalty to their wintering cave.

A later study of one of the hibernacula in the Ozarks by Elder and Gunier (1978) revealed loyalty to the wintering caves for all but less than one percent of those recovered.

The most extensive evaluation of hibernating sites of *M. grisescens* was the 14 year study by Tuttle (1976a) which involved gray bat colonies in Florida, Georgia, North Carolina, Virginia, Alabama, Tennessee and Kentucky. He reported 100% winter loyalty for three hibernacula, except for one juvenile male that was recovered in two hibernacula.

The gray bats of the southwest portion of the Ozark Plateau exhibited winter philopatry by their strict loyalty to their respective hibernacula.

Chapter IX

SUMMARY

The purpose of this study was to determine the seasonal movements, maternity sites, hibernacula and philopatry of the gray bat, *Myotis grisescens*, in the southwestern portion of the Ozark Plateau. There were 6858 gray bats banded at seven caves (2, 4, 5, 6, 7, 10 and 15) in Missouri and Oklahoma and 894 (13%) gray bats were recovered at 14 locations in Arkansas, Missouri and Oklahoma, from 1968 through 1978.

The gray bats move into their summer feeding grounds in northeastern Oklahoma in late March and early April with the large colonies building up by mid-April. They move into the maternity caves (2, 4, 6 and 7) in May, where parturition occurs in early June. The adult males were not encountered during the maternity period. Movement between caves begins again after the young become volant by mid-July and begin appearing in the hibernacula by 20 September 1968, with the last fall record in Oklahoma being 30 November 1972.

Maternity colonies were observed in four Oklahoma caves (2, 4, 6, and 7). The size of the maternity colonies ranged from 2,000 in Cave 2 to 5,800 in Cave 6. Caves 4, 6 and 7 are within 1 km of a large body of water and Cave 2 is only 1.5 km from the Illinois River, an optimum distance from foraging areas, according to Tuttle (1976b). The gray bat maternity colonies in Caves 2, 6 and 7 were observed in the cave domes which are capable of trapping heat essential for optimum pre-flight growth rate as reported by Tuttle (1976b).

Gray bats that raise their young in northeastern Oklahoma were found to use two caves (15 and 16) in Missouri and Arkansas as their hibernacula. Hibernaculum Cave 15, located in Stone County, Missouri, is 130 km from Cave 6, a maternity colony cave. The other hibernaculum (Cave 16), in Baxter County, Arkansas, is 194 km from Cave 6. Recoveries of bats banded in Oklahoma were made on 21 different dates in these hibernacula. In Cave 15, 361 migrants were recovered from Oklahoma, while 53 were recovered in Cave 16. They began arriving in the hibernacula as early as 29 September in 1968 and were last found there 3 April in 1970. The estimated number of hibernating gray bats in Cave 15 on 28 February 1970, was approximately 70,000.

The gray bat of the southwest portion of the Ozark Plateau demonstrated site fidelity, or philopatry, to their respective hibernacula. None of the 6858 banded gray bats were found to frequent more than one hibernaculum. There were 361 gray bats from Oklahoma caves loyal to Cave 15, while 53 were faithful to Cave 16. Of the 658 specimens banded in Cave 15, none was found wintering elsewhere. This was further evidence of winter philopatry.

The gray bat population in the southwestern portion of the Ozark Plateau can be maintained and possibly increased by the proper gating of caves that provide critical habitat for this species, thereby preventing disturbances to the maternity colonies.

Maternity colony Caves 5 and 6 are already gated. Cave 7 needs an improved gate to enhance access of gravid females. Caves 2, 4, 6, and 7 need to be closely monitored during each maternity period to insure that the gates remain locked, and no access is allowed into these maternity colonies.

Hibernal Caves 15 and 16, must be properly gated, preventing human disturbance of the hibernating bats.

From the studies of Tuttle (1976a), Elder and Gunier (1978), and Myers (1964), it is evident that the gray bat also uses alternate roost sites at various times of the year. Adding protection at caves occupied while traveling between the summer roosts in northeastern Oklahoma, northwestern Arkansas, and southwestern Missouri and their hibernacula, would be of great help where human disturbance has been a problem.

In conclusion it seems imperative that a minimum of the aforementioned steps be taken immediately in cooperation with the Office of Endangered Species, Fish and Wildlife Service in Kansas City, Missouri, Austin, Texas, and Jackson, Mississippi, to maintain the population of the gray bat, *M. grisescens*, in the southwestern portion of the Ozark Plateau.

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APPENDICES

APPENDIX I

THE NAME OR LOCATION OF BANDING AND RECOVERY SITES

<u>SITE NUMBER</u>	<u>BANDING AND/OR RECOVERY SITES</u>
1.	Etta Cave
2.	Adair Bat Cave
3.	Logan Spring Cave
4.	Stansbury Cave
5.	Roberts (Anticline Cave)
6.	Spavinaw Creek Cave
7.	Twin Cave
8.	Grand Lake near Ketchum
9.	N.E. of Grove
10.	Boy Scout Cave
11.	Near Wyandotte, Oklahoma
12.	War Eagle Cave
13.	Roaring River State Park
14.	Saltpeter Cave
15.	Marvel Cave
16.	Bonanza Cave

APPENDIX II

A listing of all Foreign Recoveries, including banding and recovery sites,
band number, sex, banding and recovery dates for bats captured at:

CAVE	Page
2	61
4	63
5	66
6	72
7	78
10	81

FOREIGN RECOVERIES FROM CAVE 2

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 2				
Recovery: Cave 3				
	6-81282	F	15 July 68	26 Sept. 68
Site of:				
Banding: Cave 2				
Recovery: Cave 4				
	6-81207	F	9 June 68	11 Aug. 68
	6-81228	F	21 June 68	11 Aug. 68
	7-52606	F	27 June 72	18 Aug. 73
Site of:				
Banding: Cave 2				
Recovery: Cave 5				
	6-81020	M	15 July 68	22 July 68
	6-81239	F	21 June 68	22 July 68
	6-81246	F	21 June 68	22 July 68
	6-81293	F	15 July 68	22 July 68
	6-81349	F	15 July 68	24 July 68
	6-81359	F	15 July 68	24 July 68
	7-06615	M	24 July 69	1 April 70
Site of:				
Banding: Cave 2				
Recovery: Cave 6				
	6-81207	F	9 June 68	29 Sept. 68
	6-81336	F	15 July 68	29 Sept. 68
	6-81340	F	15 July 68	29 Sept. 68
	7-52554	F	27 June 72	22 Sept. 72
Site of:				
Banding: Cave 2				
Recovery: Cave 13				
	7-06615	M	24 July 69	--April 70

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 2				
Recovery: Cave 14				
	7-06938	M	27 June 72	23 Feb. 73
Site of:				
Banding: Cave 2				
Recovery: Cave 15				
	6-81018	M	15 July 68	20 Dec. 69
	6-81085	M	21 July 68	14 Nov. 71
	6-81211	F	21 June 68	20 Dec. 69
	6-81224	F	21 June 68	20 Feb. 69
	6-81229	F	21 June 68	20 Dec. 69
	6-81230	F	21 June 68	14 Nov. 71
	6-81245	F	21 June 68	20 Dec. 69
	6-81248	F	21 June 68	14 Nov. 71
	6-81275	F	15 July 68	20 Dec. 69
	6-81275	F	15 July 68	27 March 70
	6-81300	F	15 July 68	20 Dec. 69
	6-81311	F	15 July 68	27 March 70
	6-81358	F	15 July 68	27 March 70
	6-81388	F	21 July 68	18 Jan. 69
	6-81392	F	21 July 68	20 Feb. 69
	7-05732	M	28 Sept. 68	20 Dec. 69
	7-06494	F	9 July 69	20 Dec. 69
	7-06518	F	9 July 69	3 April 70
	7-06523	F	9 July 69	20 Dec. 69
	7-06601	M	9 July 69	14 Nov. 71
	7-06609	M	24 July 69	20 Dec. 69
	7-06617	M	24 July 69	27 March 70
	7-06618	M	24 July 69	20 Dec. 69
	7-06644	F	24 July 69	20 Dec. 69
	7-06649	F	24 July 69	20 Dec. 69
	7-06515	F	9 July 69	10 March 73
	7-06515	F	9 July 69	5 March 72
	7-06521	F	9 July 69	5 March 72
Site of:				
Banding: Cave 2				
Recovery: Cave 16				
	6-81021	M	15 July 68	27 Jan. 73
	6-81277	F	15 July 68	30 Jan. 70
	6-81394	F	21 July 68	27 Jan. 73

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding:	Cave 2			
Recovery:	Cave 16			
	7-52539	F	27 June 72	27 Jan. 73
	7-52575	F	27 June 72	27 Jan. 73
	6-81014	M	15 July 68	16 Feb. 75
	7-52612	F	27 June 72	16 Feb. 75
	7-06475	F	9 July 69	20 March 78
	7-06662	F	24 July 69	27 Jan. 73

FOREIGN RECOVERIES FROM CAVE 4

Site of:				
Banding:	Cave 4			
Recovery:	Cave 2			
	6-82600	F	11 Aug. 68	9 July 69
	6-82747	F	11 Aug. 68	27 June 72
	6-82845	F	11 Aug. 68	9 July 69
	6-82867	F	11 Aug. 68	6 Aug. 70
	6-82891	F	11 Aug. 68	24 July 69
	6-82969	F	11 Aug. 68	27 June 72

Site of:				
Banding:	Cave 4			
Recovery:	Cave 5			
	6-82512	M	11 Aug. 68	25 July 70
	6-82531	M	11 Aug. 68	28 Sept. 68
	6-82769	F	11 Aug. 68	25 July 70
	6-82800	F	11 Aug. 68	9 April 71
	6-82938	F	11 Aug. 68	29 March 69
	6-82940	F	11 Aug. 68	25 July 70
	7-50398	F	24 March 71	9 April 71
	7-50660	M	24 March 71	9 April 71
	7-52402	F	24 March 71	9 April 71
	7-52403	F	24 March 71	9 April 71
	7-52404	F	24 March 71	9 April 71

Site of:				
Banding:	Cave 4			
Recovery:	Cave 6			
	6-82462	M	11 Aug. 68	13 Sept. 70
	6-82475	M	11 Aug. 68	15 April 72

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding:	Cave 4			
Recovery:	Cave 6			
	6-82618	F	11 Aug. 68	1 Sept. 68
	6-82622	F	11 Aug. 68	22 Aug. 69
	6-82675	F	11 Aug. 68	25 Oct. 74
	6-82679	F	11 Aug. 68	29 Sept. 68
	6-82725	F	11 Aug. 68	1 Sept. 68
	6-82733	F	11 Aug. 68	22 Sept. 72
	6-82756	F	11 Aug. 68	29 Sept. 68
	6-82770	F	11 Aug. 68	13 Sept. 70
	6-82826	F	11 Aug. 68	8 Aug. 70
	6-82859	F	11 Aug. 68	8 Aug. 70
	6-82892	F	11 Aug. 68	22 Aug. 69
	6-82927	F	11 Aug. 68	28 June 69
	6-82940	F	11 Aug. 68	15 April 72
	6-82960	F	11 Aug. 68	1 Sept. 68
	6-82960	F	11 Aug. 68	22 Aug. 69
	6-82964	F	11 Aug. 68	22 Aug. 69
	7-50410	F	10 Aug. 70	13 Sept. 70
	7-50423	F	10 Aug. 70	15 April 72
	7-50751	M	15 Oct. 71	22 Sept. 72
	7-50757	M	15 Oct. 71	22 Sept. 72
	6-82515	M	11 Aug. 68	25 Oct. 74

Site of:

Banding: Cave 4
Recovery: Cave 7

6-82668	F	11 Aug. 68	31 Aug. 68
6-82681	F	11 Aug. 68	28 June 69
6-82688	F	11 Aug. 68	5 Oct. 68
6-82785	F	11 Aug. 68	31 Aug. 68
6-82871	F	11 Aug. 68	31 Aug. 68
6-82896	F	11 Aug. 68	31 Aug. 68
6-82956	F	11 Aug. 68	31 Aug. 68

Site of:

Banding: Cave 4
Recovery: Cave 15

6-82462	M	11 Aug. 68	20 Dec. 69
6-82474	M	11 Aug. 68	20 Feb. 69
6-82478	M	11 Aug. 68	28 Feb. 70
6-82518	M	11 Aug. 68	3 April 70

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 4				
Recovery: Cave 15				
	6-82589	F	11 Aug. 68	20 Dec. 69
	6-82605	F	11 Aug. 68	13 Dec. 68
	6-82632	F	11 Aug. 68	20 Dec. 69
	6-82642	F	11 Aug. 68	29 Dec. 68
	6-82660	F	11 Aug. 68	27 March 70
	6-82663	F	11 Aug. 68	20 Dec. 69
	6-82675	F	11 Aug. 68	20 Feb. 69
	6-82689	F	11 Aug. 68	18 Jan. 69
	6-82685	M	11 Aug. 68	8 March 75
	6-82698	M	11 Aug. 68	5 March 72
	6-82701	F	11 Aug. 68	27 March 70
	6-82703	F	11 Aug. 68	27 March 70
	6-82703	F	11 Aug. 68	20 Feb. 69
	6-82723	F	11 Aug. 68	5 March 72
	6-82734	F	11 Aug. 68	20 Dec. 69
	6-82819	F	11 Aug. 68	29 Dec. 68
	6-82884	F	11 Aug. 68	20 Dec. 69
	6-82897	F	11 Aug. 68	20 Feb. 69
	6-82938	F	11 Aug. 68	20 Feb. 69
	6-82946	F	11 Aug. 68	20 Dec. 69
	6-82995	F	11 Aug. 68	20 Dec. 69
	6-82997	F	11 Aug. 68	20 Feb. 69
	7-50338	M	10 Aug. 70	14 Nov. 71
	7-50354	M	20 Aug. 70	13 Nov. 71
	7-50395	F	24 March 71	5 March 72
	7-50407	F	10 Aug. 70	14 Nov. 71
	7-50748	M	15 Oct. 71	10 March 73
	7-50406	F	10 Aug. 70	5 March 72
	7-50745	M	15 Oct. 71	5 March 72
Site of:	6-82849	F	11 Aug. 68	20 Feb. 69
	6-82903	F	11 Aug. 68	20 Feb. 69
Banding: Cave 4				
Recovery: Cave 16				
	6-82507	M	11 Aug. 68	27 Jan. 73
	6-82598	F	11 Aug. 68	27 Jan. 73
	6-82998	F	11 Aug. 68	27 Jan. 73
	7-50404	F	10 Aug. 70	16 Feb. 75
	7-50746	M	15 Oct. 71	16 Feb. 75
	6-82939	F	11 Aug. 68	20 March 78

FOREIGN RECOVERIES FROM CAVE 5

Site of:	<u>Band</u>	<u>Sex</u>	<u>Date of</u>	
	<u>Number</u>		<u>Banding</u>	<u>Recovery</u>
Banding: Cave 5				
Recovery: Cave 2				
	6-58050	F	4 May 68	27 June 72
	6-58090	F	4 May 68	9 July 69
	6-58098	F	4 May 68	21 June 68
	6-58446	F	4 May 68	27 June 72
	6-58447	F	4 May 68	21 June 68
	6-58457	F	4 May 68	6 Aug. 70
	6-58460	F	4 May 68	15 July 68
	6-58466	F	4 May 68	21 July 68
	6-58495	F	4 May 68	27 June 72
	6-58522	F	4 May 68	21 June 68
	6-58523	F	4 May 68	24 July 69
	6-81515	F	22 July 68	27 June 72
	6-81661	F	22 July 68	27 June 72
	6-82191	M	24 July 68	22 Sept. 72
	6-82387	F	24 July 68	6 Aug. 70
	7-50831	F	9 April 71	27 June 72
	7-06729	F	9 April 71	17 July 73

Site of:

Banding: Cave 5
Recovery: Cave 4

6-58045	F	4 May 68	18 July 73
6-58119	M	4 May 68	11 Aug. 68
6-58133	M	4 May 68	11 Aug. 68
6-58149	M	4 May 68	11 Aug. 68
6-58165	M	4 May 68	11 Aug. 68
6-58229	M	4 May 68	11 Aug. 68
6-58232	M	4 May 68	15 Oct. 71
6-58237	M	4 May 68	11 Aug. 68
6-58253	M	4 May 68	11 Aug. 68
6-58280	M	4 May 68	11 Aug. 68
6-58365	M	4 May 68	11 Aug. 68
6-58410	F	4 May 68	11 Aug. 68
6-58432	F	4 May 68	15 Oct. 71
6-58434	F	4 May 68	11 Aug. 68
6-58436	F	4 May 68	11 Aug. 68
6-58461	F	4 May 68	11 Aug. 68
6-58499	F	4 May 68	11 Aug. 68
6-58508	F	4 May 68	11 Aug. 68
6-81415	F	22 July 68	11 Aug. 68
6-81517	F	22 July 68	11 Aug. 68

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 5				
Recovery: Cave 4				
	6-81925	F	22 July 68	11 Aug. 68
	7-50271	M	25 July 70	18 July 73
Site of:				
Banding: Cave 5				
Recovery: Cave 6				
	6-58030	F	4 May 68	29 Sept. 68
	6-58051	F	4 May 68	5 May 68
	6-58076	F	4 May 68	28 June 69
	6-58100	F	4 May 68	5 May 68
	6-58162	M	4 May 68	29 Sept. 68
	6-58167	M	4 May 68	5 May 68
	6-58185	M	4 May 68	29 Sept. 68
	6-58188	M	4 May 68	5 May 68
	6-58192	M	4 May 68	25 Oct. 74
	6-58229	M	4 May 68	29 Sept. 68
	6-58247	M	4 May 68	25 Oct. 74
	6-58253	M	4 May 68	1 Sept. 68
	6-58258	M	4 May 68	29 Sept. 68
	6-58270	M	4 May 68	5 May 68
	6-58314	M	4 May 68	5 May 68
	6-58413	F	4 May 68	22 Sept. 72
	6-58421	F	4 May 68	5 May 68
	6-58435	F	4 May 68	13 Sept. 70
	6-58444	F	4 May 68	5 May 68
	6-58452	F	4 May 68	5 May 68
	6-81459	F	22 July 68	28 June 69
	6-81534	F	22 July 68	28 June 69
	6-81558	F	22 July 68	13 Sept. 70
	6-81588	F	22 July 68	22 Sept. 72
	6-81562	F	22 July 68	1 Sept. 68
	6-81643	F	22 July 68	15 April 72
	6-81725	M	22 July 68	22 Sept. 72
	6-81754	M	22 July 68	29 Sept. 68
	6-81794	M	22 July 68	29 Sept. 68
	6-81833	F	22 July 68	8 Aug. 70
	6-81838	F	22 July 68	22 Aug. 69
	6-81926	F	22 July 68	1 Sept. 68
	6-81952	F	22 July 68	22 Sept. 72
	6-81969	F	22 July 68	22 Sept. 72

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 5				
Recovery: Cave 6				
	6-82021	M	24 July 68	25 Oct. 74
	6-82115	M	24 July 68	1 Sept. 68
	6-82118	M	24 July 68	8 Aug. 70
	6-82150	M	24 July 68	22 Sept. 72
	6-82316	F	24 July 68	8 Aug. 70
	6-82328	F	24 July 68	1 Sept. 68
	6-82349	F	24 July 68	25 July 68
	6-82368	F	24 July 68	15 April 72
	6-82369	F	24 July 68	1 Sept. 68
	7-06241	M	29 March 69	9 Sept. 69
	7-06737	F	9 April 71	15 April 72
	7-06757	F	9 April 71	22 Sept. 72
	7-06789	F	9 April 71	15 April 72
	7-50270	M	25 July 70	8 Aug. 70
	7-50298	M	25 July 70	22 Sept. 72
	7-50690	M	9 April 71	25 Oct. 74
	7-50719	M	9 April 71	25 Oct. 74
	7-50741	M	9 April 71	29 Oct. 71
	7-50741	M	9 April 71	22 Sept. 72
	7-52407	F	9 April 71	15 April 72
	7-52413	F	9 April 71	15 April 72
	7-52477	F	9 April 71	22 Sept. 72
	6-82118	M	24 July 68	8 Aug. 70

Site of:				
Banding: Cave 5				
Recovery: Cave 7				
	6-58455	F	4 May 68	31 Aug. 68
	6-81433	F	22 July 68	31 Aug. 68
	6-81449	F	22 July 68	31 Aug. 68
	6-81527	F	22 July 68	31 Aug. 68
	6-81542	F	22 July 68	31 Aug. 68
	6-81551	F	22 July 68	31 Aug. 68
	6-81664	F	22 July 68	31 Aug. 68
	6-82377	F	22 July 68	29 Nov. 70
	6-82427	F	22 July 68	31 Aug. 68

Site of:				
Banding: Cave 5				
Recovery: Site 8				
	6-81668	F	22 July 68	27 July 68

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 5				
Recovery: Site 9				
	6-81940	F	22 July 68	28 Aug. 68
Site of				
Banding: Cave 5				
Recovery: Cave 14				
	6-58166	M	4 May 68	23 Feb. 73
Site of:				
Banding Cave 5				
Recovery: Cave 15				
	6-58034	F	4 May 68	7 Feb. 70
	6-58037	F	4 May 68	20 Feb. 69
	6-58038	F	4 May 68	20 Dec. 69
	6-58066	F	4 May 68	20 Dec. 69
	6-58074	F	4 May 68	20 Dec. 69
	6-58074	F	4 May 68	27 March 70
	6-58126	M	4 May 68	20 Dec. 69
	6-58134	M	4 May 68	29 Dec. 68
	6-58141	M	4 May 68	27 March 70
	6-58146	M	4 May 68	28 Feb. 70
	6-58151	M	4 May 68	20 Dec. 69
	6-58158	M	4 May 68	5 March 72
	6-58164	M	4 May 68	7 Feb. 70
	6-58171	M	4 May 68	27 March 70
	6-58173	M	4 May 68	7 Feb. 70
	6-58196	M	4 May 68	27 March 70
	6-58205	M	4 May 68	20 Dec. 69
	6-58214	M	4 May 68	18 Jan. 69
	6-58225	M	9 April 71	8 March 75
	6-58230	M	4 May 68	29 Dec. 68
	6-58237	M	4 May 68	20 Dec. 69
	6-58241	M	4 May 68	5 March 72
	6-58247	M	4 May 68	29 Dec. 68
	6-58248	M	4 May 68	14 Nov. 71
	6-58286	M	4 May 68	29 Dec. 68
	6-58296	M	4 May 68	20 Dec. 69
	6-58298	M.	4 May 68	29 Dec. 68

Site of:	<u>Band</u>	<u>Sex</u>	<u>Date of</u>		<u>Recovery</u>
	<u>Number</u>		<u>Banding</u>		
Banding: Cave 5					
Recovery: Cave 15					
	6-58308	M	4 May 68		27 March 70
	6-58324	M	4 May 68		29 Dec. 68
	6-58434	F	4 May 68		20 Dec. 69
	6-58453	F	4 May 68		5 March 72
	6-58469	F	4 May 68		20 Dec. 69
	6-58516	F	22 July 68		8 March 75
	6-58518	F	4 May 68		5 March 72
	6-81397	F	22 July 68		29 Dec. 68
	6-81397	F	22 July 68		20 Dec. 69
	6-81412	F	22 July 68		10 March 73
	6-81415	F	22 July 68		10 March 73
	6-81436	F	22 July 68		18 Jan. 69
	6-81438	F	22 July 68		20 Dec. 69
	6-81445	F	22 July 68		14 Nov. 71
	6-81498	F	22 July 68		24 Oct. 70
	6-81503	F	22 July 68		20 Dec. 69
	6-81531	F	22 July 68		20 Feb. 69
	6-81533	F	22 July 68		27 March 70
	6-81543	F	22 July 68		18 Jan. 69
	6-81577	F	22 July 68		20 Feb. 69
	6-81610	F	22 July 68		20 Feb. 69
	6-81630	F	22 July 68		8 March 75
	6-81630	F	22 July 68		20 Dec. 69
	6-81631	F	22 July 68		5 March 72
	6-81651	F	22 July 68		20 Feb. 69
	6-81681	F	22 July 68		20 Feb. 69
	6-81684	F	22 July 68		20 Dec. 69
	6-81690	F	22 July 68		20 Dec. 69
	6-81714	M	22 July 68		14 Nov. 71
	6-81741	M	22 July 68		20 Feb. 69
	6-81742	M	22 July 68		20 Dec. 69
	6-81746	M	22 July 68		3 April 70
	6-81821	F	22 July 68		3 April 70
	6-81825	F	22 July 68		20 Feb. 69
	6-81854	F	22 July 68		20 Feb. 69
	6-81868	F	22 July 68		29 Dec. 68
	6-81884	F	22 July 68		20 Feb. 69
	6-81905	F	22 July 68		20 Dec. 69
	6-81909	F	22 July 68		20 Dec. 69
	6-81915	F	22 July 68		14 Feb. 71

Site of:	<u>Band Number</u>	<u>Sex</u>	<u>Date of</u>	
			<u>Banding</u>	<u>Recovery</u>
Banding: Cave 5				
Recovery: Cave 15				
	6-81916	F	22 July 68	20 Dec. 69
	6-81929	F	22 July 68	14 Nov. 71
	6-81941	F	22 July 68	14 Nov. 71
	6-81994	F	22 July 68	13 Dec. 68
	6-82134	M	24 July 68	20 Dec. 69
	6-82165	M	24 July 68	20 Feb. 69
	6-82170	M	24 July 68	28 Feb. 70
	6-82280	F	24 July 68	20 Dec. 69
	6-82281	F	24 July 68	14 Nov. 71
	6-82298	F	24 July 68	29 Dec. 68
	6-82299	F	22 July 68	5 March 72
	6-82307	F	24 July 68	3 April 70
	6-82338	F	24 July 68	18 Jan. 69
	6-82344	F	24 July 68	27 March 70
	6-82350	F	24 July 68	20 Feb. 69
	6-82407	F	24 July 68	20 Dec. 69
	6-82418	F	24 July 68	18 Jan. 69
	7-06350	F	29 March 69	20 Dec. 69
	7-06711	F	9 April 71	8 March 75
	7-06714	F	9 April 71	5 March 72
	7-06718	F	9 April 71	10 March 73
	7-06721	F	9 April 71	10 March 73
	7-06756	F	9 April 71	5 March 72
	7-06757	F	9 April 71	8 March 75
	7-06763	F	9 April 71	5 March 72
	7-06775	F	9 April 71	5 March 72
	7-06778	F	9 April 71	5 March 72
	7-06780	F	9 April 71	5 March 72
	7-06786	F	9 April 71	5 March 72
	7-06795	F	9 April 71	8 March 75
	7-06796	F	9 April 71	8 March 75
	7-06797	F	9 April 71	5 March 72
	7-50294	M	25 July 70	5 March 72
	7-50703	M	9 April 71	5 March 72
	7-50703	M	9 April 71	10 March 73
	7-50704	M	9 April 71	5 March 72
	7-50705	M	9 April 71	5 March 72
	7-50742	M	9 April 71	5 March 72
	7-50830	F	9 April 71	5 March 72
	7-52384	F	25 July 70	14 Nov. 71
	7-52407	F	9 April 71	10 March 73
	7-52444	F	9 April 71	8 March 75
	7-52451	F	9 April 71	5 March 72
	7-52474	F	9 April 71	5 March 72

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 5				
Recovery: Cave 16				
	6-58277	M	4 May 68	27 Jan. 73
	6-58424	F	4 May 68	27 Jan. 73
	6-58498	F	4 May 68	27 Jan. 73
	6-81419	F	22 July 68	27 Jan. 73
	6-81529	F	22 July 68	27 Jan. 73
	6-81977	F	22 July 68	27 Jan. 73
	6-82111	M	24 July 68	16 Feb. 75
	6-82135	M	24 July 68	20 March 78
	7-50845	F	9 April 71	16 Feb. 75
	7-52390	F	25 July 70	27 Jan. 73
	6-82136	M	24 July 68	16 Feb. 75
	6-82159	M	24 July 68	30 Jan. 70

FOREIGN RECOVERIES FROM CAVE 6

Site of:				
Banding: Cave 6				
Recovery: Cave 2				
	7-52712	F	22 Sept. 72	17 July 73
	7-52786	F	22 Sept. 72	30 March 74

Site of:				
Banding: Cave 6				
Recovery: Cave 4				
	6-58543	F	5 May 68	11 Aug. 68
	6-58566	F	5 May 68	11 Aug. 68
	6-58663	F	5 May 68	11 Aug. 68
	6-58786	F	5 May 68	11 Aug. 68
	7-52753	F	22 Sept. 72	18 July 73
	7-52829	F	22 Sept. 72	18 July 73

Site of:				
Banding: Cave 6				
Recovery: Cave 5				
	6-58007	F	28 March 68	4 May 68
	6-58017	F	28 March 68	4 May 68
	6-58018	F	5 May 68	9 April 71
	6-58103	M	28 March 68	29 March 69
	6-58551	F	5 May 68	22 July 68
	6-58599	F	5 May 68	22 July 68
	6-58641	F	5 May 68	22 July 68

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding:	Cave 6			
Recovery:	Cave 5			
	6-58646	F	5 May 68	9 April 71
	6-58667	F	5 May 68	22 July 68
	6-58673	F	5 May 68	22 July 68
	6-58682	F	5 May 68	22 July 68
	6-58683	F	5 May 68	22 July 68
	6-58686	F	5 May 68	22 July 68
	6-58830	F	5 May 68	22 July 68
	6-58841	M	29 Sept. 68	9 April 71
	6-58842	F	5 May 68	24 July 68
	6-58871	F	5 May 68	22 July 68
	6-58917	F	5 May 68	24 July 68
	6-58927	F	5 May 68	22 July 68
	6-58969	F	5 May 68	24 July 68
	6-58985	F	5 May 68	22 July 68
	6-81103	F	8 June 68	9 April 71
	6-81116	F	8 June 68	22 July 68
	6-81141	F	8 June 68	22 July 68
	6-81142	F	8 June 68	22 July 68
	6-81146	F	8 June 68	25 July 70
	6-81152	F	8 June 68	22 July 68
	6-81190	F	8 June 68	22 July 68
	6-82316	F	8 Aug. 70	9 April 71
	6-82578	M	1 Sept. 68	9 April 71
	6-82580	M	1 Sept. 68	9 April 71
	7-05337	M	1 Sept. 68	9 April 71
	7-05771	M	29 Sept. 68	25 July 70
	7-05772	M	29 Sept. 68	25 July 70
	7-05819	M	29 Sept. 68	29 March 69
	7-05889	M	29 Sept. 68	6 Nov. 70
	7-05915	M	29 Sept. 68	25 July 70
	7-05933	M	29 Sept. 68	9 April 71
	7-05965	M	29 Sept. 68	9 April 71
	7-05975	M	29 Sept. 68	29 March 69
	7-05986	M	29 Sept. 68	25 July 70
	7-06030	M	29 Sept. 68	29 March 69
	7-06078	M	29 Sept. 68	9 April 71
	7-06540	M	9 Sept. 69	25 July 70

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 6				
Recovery: Cave 7				
	6-58022	F	28 March 68	31 Aug. 68
	6-58607	F	5 May 68	31 Aug. 68
	6-58841	M	5 May 68	31 Aug. 68
	6-58915	F	5 May 68	28 June 69
	7-05394	M	1 Sept. 68	5 Oct. 68
	7-05815	M	29 Sept. 68	5 Oct. 68
	7-06050	M	29 Sept. 68	5 Oct. 68
Site of:				
Banding: Cave 6				
Recovery: Cave 12				
	6-58751	F	5 May 68	20 Feb. 71
Site of:				
Banding: Cave 6				
Recovery: Cave 15				
	6-58019	F	22 Sept. 72	20 Feb. 69
	6-58103	M	28 March 68	20 Dec. 69
	6-58560	F	5 May 68	20 Dec. 69
	6-58583	F	5 May 68	20 Dec. 69
	6-58594	F	5 May 68	24 Oct. 70
	6-58604	F	5 May 68	20 Dec. 69
	6-58607	F	5 May 68	20 Dec. 69
	6-58622	F	5 May 68	20 Dec. 69
	6-58627	F	5 May 68	10 March 73
	6-58633	F	5 May 68	18 Jan. 69
	6-58640	F	5 May 68	20 Feb. 69
	6-58643	F	5 May 68	14 Nov. 71
	6-58669	F	5 May 68	27 March 70
	6-58713	F	5 May 68	14 Nov. 71
	6-58727	F	5 May 68	14 Nov. 71
	6-58742	F	5 May 68	20 Dec. 69
	6-58744	F	5 May 68	3 April 70
	6-58773	F	5 May 68	29 Dec. 68
	6-58801	M	5 May 68	14 Nov. 71
	6-58826	M	5 May 68	14 Nov. 71
	6-58837	F	5 May 68	27 March 70
	6-58847	F	5 May 68	27 March 70
	6-58888	F	5 May 68	27 March 70
	6-58891	F	5 May 68	14 Nov. 71

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding:	Cave 6			
Recovery:	Cave 15			
	6-58917	F	5 May 68	20 Dec. 69
	6-58921	F	5 May 68	20 Feb. 69
	6-58936	F	5 May 68	18 Jan. 69
	6-58942	F	5 May 68	20 Feb. 69
	6-58962	F	5 May 68	29 Sept. 68
	6-58964	F	5 May 68	14 Nov. 71
	6-58987	F	5 May 68	27 March 70
	6-58990	F	5 May 68	7 Feb. 70
	6-58996	F	5 May 68	5 March 72
	6-59000	F	5 May 68	24 Oct. 70
	6-59000	F	5 May 68	10 March 73
	6-81004	M	8 June 68	20 Feb. 69
	6-81107	F	8 June 68	18 Jan. 69
	6-81111	F	8 June 68	20 Dec. 69
	6-81127	F	8 June 68	20 Dec. 69
	6-81136	F	8 June 68	3 April 70
	6-81142	F	8 June 68	20 Feb. 69
	6-81146	F	8 June 68	29 Dec. 68
	6-81152	F	8 June 68	27 March 70
	6-81161	F	8 June 68	20 Feb. 69
	6-81171	F	8 June 68	20 Dec. 69
	6-81176	F	8 June 68	20 Dec. 69
	6-81198	F	8 June 68	14 Nov. 71
	6-82544	M	1 Sept. 68	20 Dec. 69
	7-05343	M	1 Sept. 68	29 Dec. 68
	7-05352	M	1 Sept. 68	20 Dec. 69
	7-05516	F	1 Sept. 68	18 Jan. 69
	7-05535	F	1 Sept. 68	18 Jan. 69
	7-05546	F	1 Sept. 68	18 Jan. 69
	7-05574	F	1 Sept. 68	29 Dec. 68
	7-05579	F	1 Sept. 68	14 Nov. 71
	7-05595	F	1 Sept. 68	27 March 70
	7-05612	F	1 Sept. 68	29 Dec. 68
	7-05619	F	1 Sept. 68	20 Dec. 69
	7-05621	F	1 Sept. 68	8 March 75
	7-05648	F	29 Sept. 68	14 Nov. 71
	7-05657	F	29 Sept. 68	20 Dec. 69
	7-05671	F	29 Sept. 68	20 Dec. 69
	7-05672	F	29 Sept. 68	24 Oct. 70
	7-05686	F	29 Sept. 68	20 Dec. 69

Site of:	<u>Band</u>	<u>Sex</u>	<u>Date of</u>	
	<u>Number</u>		<u>Banding</u>	<u>Recovery</u>
Banding: Cave 6				
Recovery: Cave 15				
	7-05687	F	29 Sept. 68	29 Dec. 68
	7-05719	M	1 Sept. 68	20 Dec. 69
	7-05720	M	1 Sept. 68	20 Dec. 69
	7-05748	M	29 Sept. 68	29 Dec. 68
	7-05754	M	29 Sept. 68	20 Dec. 69
	7-05522	F	1 Sept. 68	20 Feb. 69
	7-05764	M	29 Sept. 68	8 March 75
	7-05767	M	29 Sept. 68	7 Feb. 70
	7-05793	M	29 Sept. 68	20 Dec. 69
	7-05827	M	29 Sept. 68	13 Dec. 68
	7-05836	M	29 Sept. 68	3 April 70
	7-05860	M	29 Sept. 68	18 Jan. 69
	7-05873	M	29 Sept. 68	27 March 70
	7-05885	M	29 Sept. 68	7 Feb. 70
	7-05902	M	29 Sept. 68	5 March 72
	7-05923	M	29 Sept. 68	20 Dec. 69
	7-05928	M	29 Sept. 68	20 Dec. 69
	7-05932	M	29 Sept. 68	20 Dec. 69
	7-05948	M	29 Sept. 68	20 Dec. 69
	7-05952	M	29 Sept. 68	7 Feb. 70
	7-05953	M	29 Sept. 68	20 Dec. 69
	7-05962	M	29 Sept. 68	18 Jan. 69
	7-05967	M	29 Sept. 68	7 Feb. 70
	7-06009	M	29 Sept. 68	20 Dec. 69
	7-06014	M	29 Sept. 68	20 Feb. 69
	7-06044	M	29 Sept. 68	20 Dec. 69
	7-06073	M	29 Sept. 68	0 March 69
	7-06078	M	29 Sept. 68	5 March 72
	7-06095	M	29 Sept. 68	20 Dec. 69
	7-06099	M	29 Sept. 68	20 Dec. 69
	7-06104	F	29 Sept. 68	20 Dec. 69
	7-06122	F	29 Sept. 68	18 Jan. 69
	7-06145	F	29 Sept. 68	20 Feb. 69
	7-06259	M	29 Sept. 68	20 Dec. 69
	7-06274	M	29 Sept. 68	3 April 70
	7-06393	F	29 Sept. 68	27 March 70
	7-06675	F	9 Sept. 69	14 Nov. 71
	7-06680	F	9 Sept. 69	20 Dec. 69
	7-06683	F	9 Sept. 69	5 March 72
	7-06865	F	15 April 72	8 March 75
	7-06896	F	15 April 72	10 March 73

	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of Recovery</u>
Site of:				
Banding:	Cave 6			
Recovery:	Cave 15			
	7-50470	F	13 Sept. 70	14 Nov. 71
	7-50509	F	13 Sept. 70	14 Nov. 71
	7-50550	F	13 Sept. 70	14 Nov. 71
	7-50554	F	13 Sept. 70	10 March 73
	7-50560	F	13 Sept. 70	14 Nov. 71
	7-50568	F	13 Sept. 70	24 Oct. 70
	7-50626	F	13 Sept. 70	8 March 75
	7-50916	F	15 April 72	10 March 73
	7-50937	F	15 April 72	8 March 75
	7-50563	F	13 Sept. 70	14 Nov. 71
	7-52826	F	22 Sept. 72	10 March 73
	7-52842	F	22 Sept. 72	8 March 75
	7-52907	F	22 Sept. 72	8 March 75
	7-52921	F	22 Sept. 72	8 March 75
	7-52957	F	22 Sept. 72	10 March 73
	7-52975	F	22 Sept. 72	25 Oct. 74
	7-52978	F	22 Sept. 72	10 March 73

Site of:

Banding: Cave 6
Recovery: Cave 16

	6-58716	F	5 May 68	20 March 78
	7-05877	M	29 Sept. 68	30 Jan. 70
	7-05951	M	29 Sept. 68	27 Jan. 73
	7-06277	M	28 June 69	27 Jan. 73
	7-06374	F	28 June 69	27 Jan. 73
	7-06812	F	15 April 72	27 Jan. 73
	7-06831	F	15 April 72	16 Feb. 75
	7-06971	F	22 Sept. 72	27 Jan. 73
	7-50460	F	13 Sept. 70	27 Jan. 73
	7-50461	F	13 Sept. 70	27 Jan. 73
	7-50490	F	13 Sept. 70	16 Feb. 75
	7-50494	F	13 Sept. 70	16 Feb. 75
	7-50546	F	13 Sept. 70	27 Jan. 73
	7-50901	F	15 April 72	16 Feb. 75
	7-50948	F	15 April 72	16 Feb. 75
	7-50952	F	15 April 72	27 Jan. 73
	7-52632	M	22 Sept. 72	27 Jan. 73
	7-52701	F	22 Sept. 72	27 Jan. 73

	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of</u>	<u>Recovery</u>
Site of:					
Banding:	Cave 6				
Recovery:	Cave 16				
	7-52751	F	22 Sept. 72		27 Jan. 73
	7-52752	F	22 Sept. 72		16 Feb. 75
	7-52762	F	22 Sept. 72		16 Feb. 75
	7-52768	F	22 Sept. 72		27 Jan. 73
	7-52898	F	22 Sept. 72		16 Feb. 75
	7-52966	F	22 Sept. 72		27 Jan. 73
	7-52973	F	22 Sept. 72		27 Jan. 73
	7-52987	F	22 Sept. 72		16 Feb. 75

FOREIGN RECOVERIES FROM CAVE 7

Site of:					
Banding:	Cave 7				
Recovery:	Cave 2				
	7-05300	F	31 Aug. 68		6 Aug. 70
	7-05408	F	31 Aug. 68		27 June 72
Banding:	Cave 7				
Recovery:	Cave 5				
	6-82076	M	24 July 68		27 July 68
	6-82248	F	24 July 68		24 Sept. 68
	7-05118	F	24 July 68		25 July 70
	7-05124	F	31 Aug. 68		9 April 71
	7-06233	M	5 Oct. 68		9 April 71
	7-50680	F	25 March 71		9 April 71
	7-50686	F	25 March 71		9 April 71
Site of:					
Banding:	Cave 7				
Recovery:	Cave 6				
	6-82021	M	24 July 68		25 Oct. 74
	6-82091	M	24 July 68		29 Sept. 68
	6-82239	F	24 July 68		1 Sept. 68
	7-05103	F	31 Aug. 68		28 June 69
	7-05222	F	31 Aug. 68		15 April 72
	7-05232	F	31 Aug. 68		8 Aug. 70
	7-05244	F	31 Aug. 68		1 Sept. 68
	7-05246	F	31 Aug. 68		1 Sept. 68
	7-05259	F	31 Aug. 68		1 Sept. 68
	7-05312	M	31 Aug. 68		25 Oct. 74

	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of Recovery</u>
Site of:				
Banding: Cave 7				
Recovery: Cave 6				
	7-05326	M	31 Aug. 68	22 Aug. 68
	7-5328	M	31 Aug. 68	29 Oct. 70
	7-05450	F	31 Aug. 68	1 Sept. 69
	7-06002	M	5 Oct. 68	28 June 69
Site of:				
Banding: Cave 7				
Recovery: Site 8				
	6-82076	M	24 July 68	27 July 68
Site of:				
Banding: Cave 7				
Recovery: Site 11				
	6-82027	M	24 July 68	9 Sept. 70
Site of:				
Banding: Cave 7				
Recovery: Cave 12				
	7-05187	F	31 Aug. 68	9 June 69
Site of:				
Banding: Cave 7				
Recovery: Cave 15				
	6-82005	M	24 July 68	20 Dec. 69
	6-82038	M	24 July 68	28 Feb. 70
	6-82095	M	24 July 68	29 Dec. 68
	6-82096	M	24 July 68	20 Dec. 69
	6-82098	M	24 July 68	8 March 70
	6-82098	M	24 July 68	10 March 70
	6-82105	M	24 July 68	20 Dec. 69
	6-82105	M	24 July 68	5 March 70
	6-82235	F	24 July 68	20 Dec. 69
	6-82239	F	24 July 68	29 Dec. 69
	6-82272	F	24 July 68	3 April 70
	7-05007	F	31 Aug. 68	20 Dec. 69
	7-05014	F	31 Aug. 68	14 Nov. 70
	7-05016	F	31 Aug. 68	18 Jan. 69
	7-05017	F	31 Aug. 68	20 Dec. 69
	7-05039	F	31 Aug. 68	29 Dec. 69
	7-05045	F	31 Aug. 68	20 Feb. 69

Site of:	<u>Band</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of</u>	<u>Recovery</u>
	<u>Number</u>				
Banding: Cave 7					
Recovery: Cave 15					
	7-05047	F	31 Aug. 68		20 Feb.
	7-05050	F	31 Aug. 68		27 March
	7-05071	F	31 Aug. 68		20 Dec.
	7-05079	F	31 Aug. 68		20 Dec.
	7-05088	F	31 Aug. 68		14 Nov.
	7-05105	F	31 Aug. 68		29 Dec.
	7-05122	F	31 Aug. 68		27 March
	7-05122	F	31 Aug. 68		14 Nov.
	7-05124	F	31 Aug. 68		18 Jan.
	7-05142	F	31 Aug. 68		24 Oct.
	7-05163	F	31 Aug. 68		0 March
	7-05165	F	31 Aug. 68		20 Feb.
	7-05172	F	31 Aug. 68		14 Nov.
	7-05173	F	31 Aug. 68		20 Dec.
	7-05204	F	31 Aug. 68		20 Feb.
	7-05213	F	31 Aug. 68		14 Nov. 7
	7-05217	F	31 Aug. 68		29 Dec. 6
	7-05233	F	31 Aug. 68		18 Jan. 6
	7-05250	F	31 Aug. 68		27 March 7
	7-05253	F	31 Aug. 68		7 Feb. 7
	7-05256	F	31 Aug. 68		3 April 7
	7-05274	F	31 Aug. 68		20 Dec. 6
	7-05275	F	31 Aug. 68		20 Feb. 6
	7-05305	F	31 Aug. 68		3 April 7
	7-05305	F	31 Aug. 68		8 March 7
	7-05432	F	31 Aug. 68		20 Feb. 6
	7-05437	F	31 Aug. 68		20 Feb. 6
	7-05456	F	31 Aug. 68		27 March 7
	7-05475	F	31 Aug. 68		29 Dec. 6
	7-05475	F	31 Aug. 68		18 Jan. 6
	7-05487	F	31 Aug. 68		14 Nov. 7
	7-06177	F	5 Oct. 68		27 March 7
	7-06198	F	5 Oct. 68		20 Feb. 6
	7-06212	M	5 Oct. 68		18 Jan. 6
	7-06212	M	5 Oct. 68		20 Dec. 7
	7-06232	M	5 Oct. 68		20 Feb. 7
	7-06328	F	5 Oct. 68		20 Dec. 7
	7-06329	F	5 Oct. 68		20 Dec. 7
	7-06404	F	28 June 69		20 Dec. 7
	7-06408	F	28 June 69		3 April 7
	7-06455	F	28 June 69		20 Dec. 7
	7-06460	F	28 June 69		20 Dec. 7
	7-05449	F	31 Aug. 68		5 March 7
	7-05480	F	31 Aug. 68		5 March 7
	7-06458	F	28 June 69		10 March 7
	7-50663	F	25 March 71		14 Nov. 7

FOREIGN RECOVERIES FROM CAVE 10

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 10				
Recovery: Cave 15				
	6-81011	M	22 June 68	18 Jan. 69

APPENDIX III

A listing of all Inplace Recoveries, including the banding and recovery site, band number, sex, and banding and recovery dates for gray bats captured and recovered at:

CAVE	Page
2	83
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6	85
7	88
15	88

INPLACE RECOVERIES FROM CAVE 2

Site of:	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of Recovery</u>
Banding: Cave 2				
Recovery: Cave 2				
	6-81229	F	21 June 68	9 July 69
	6-81236	F	21 June 68	9 July 69
	6-81268	F	15 July 68	17 July 73
	6-81285	F	15 July 68	27 June 72
	6-81314	F	15 July 68	9 July 69
	6-81341	F	15 July 68	21 July 68
	6-81355	F	15 July 68	21 July 68
	6-81363	F	15 July 68	5 Aug. 70
	6-81372	F	21 July 68	24 July 69
	6-81381	F	21 July 68	24 July 69
	7-05642	F	28 Sept. 68	17 July 73
	7-06473	F	9 July 69	17 July 73
	7-06480	F	9 July 69	27 June 72
	7-52582	F	27 June 72	5 June 75
	7-52626	F	27 June 72	5 June 75

INPLACE RECOVERIES FOR CAVE 5

Site of:	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of Recovery</u>
Banding: Cave 5				
Recovery: Cave 5				
	6-81718	M	22 July 68	25 July 70
	6-82130	M	24 July 68	28 Sept. 68
	6-82316	F	24 July 68	9 April 71
	6-58109	M	4 May 68	22 July 68
	6-58116	M	4 May 68	3 Oct. 68
	6-58127	M	4 May 68	25 July 70
	6-58131	M	4 May 68	28 Sept. 68
	6-58148	M	4 May 68	22 July 68
	6-58151	M	4 May 68	9 April 71
	6-58158	M	4 May 68	22 July 68
	6-58160	M	4 May 68	29 March 69
	6-58168	M	4 May 68	25 July 70
	6-58170	M	4 May 68	24 July 68
	6-58194	M	4 May 68	3 Oct. 68
	6-58197	M	4 May 68	28 Sept. 68
	6-58205	M	4 May 68	28 Sept. 68
	6-58225	M	4 May 68	9 April 71
	6-58237	M	4 May 68	28 Sept. 68
	6-58247	M	4 May 68	3 Oct. 68

Site of:	<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of Recovery</u>
Banding: Cave 5				
Recovery: Cave 5				
	6-58265	M	4 May 68	29 March 69
	6-58281	M	4 May 68	9 April 71
	6-58282	M	4 May 68	28 Sept. 68
	6-58286	M	4 May 68	25 July 70
	6-58288	M	4 May 68	28 Sept. 68
	6-58288	M	4 May 68	3 Oct. 68
	6-58300	M	4 May 68	22 July 68
	6-58301	M	4 May 68	22 July 68
	6-58309	M	4 May 68	22 July 68
	6-58327	M	4 May 68	28 Sept. 68
	6-58338	M	4 May 68	22 July 68
	6-58375	M	4 May 68	9 April 71
	6-58400	M	4 May 68	22 July 68
	6-58409	F	4 May 68	9 April 71
	6-58432	F	4 May 68	9 April 71
	6-58439	F	4 May 68	22 July 68
	6-58455	F	4 May 68	9 April 71
	6-58508	F	4 May 68	22 July 68
	6-58516	F	4 May 68	22 July 68

INPLACE RECOVERIES FROM CAVE 6

Site of:	<u>Band</u>	<u>Sex</u>	<u>Date of</u>	
	<u>Number</u>		<u>Banding</u>	<u>Recovery</u>
Banding: Cave 6				
Recovery: Cave 6				
	6-58005	F	28 March 68	5 May 68
	6-58017	F	28 March 68	8 Aug. 70
	6-58018	F	28 March 68	5 May 68
	6-58105	M	28 March 68	8 June 68
	6-58107	M	28 March 68	25 Oct. 74
	6-58561	F	5 May 68	8 June 68
	6-58581	F	5 May 68	13 Sept. 70
	6-58587	F	5 May 68	22 Sept. 72
	6-58587	F	5 May 68	15 April 72
	6-58602	F	5 May 68	22 Aug. 69
	6-58609	F	5 May 68	29 Sept. 68
	6-58610	F	5 May 68	9 Sept. 69
	6-58664	F	5 May 68	9 Sept. 69
	6-58687	F	5 May 68	9 Sept. 69
	6-58713	F	5 May 68	13 Sept. 70
	6-58717	F	5 May 68	13 Sept. 70
	6-58775	F	5 May 68	22 Aug. 69
	6-58782	F	5 May 68	8 Aug. 70
	6-58783	F	5 May 68	22 Sept. 72
	6-58787	F	5 May 68	9 Sept. 69
	6-58796	F	5 May 68	28 June 69
	6-58824	M	5 May 68	29 Sept. 68
	6-58829	F	5 May 68	22 Aug. 69
	6-58841	M	5 May 68	29 Sept. 68
	6-58845	M	5 May 68	29 Oct. 71
	6-58845	M	5 May 68	29 Sept. 68
	6-58849	M	5 May 68	29 Sept. 68
	6-58879	F	5 May 68	29 Sept. 68
	6-58881	F	5 May 68	28 June 69
	6-58926	F	5 May 68	22 Aug. 69
	6-58967	F	5 May 68	1 Sept. 68
	6-58984	F	5 May 68	22 Aug. 69
	6-81003	M	8 June 68	29 Sept. 68
	6-81008	M	8 June 68	29 Sept. 68
	6-81009	M	8 June 68	29 Sept. 68
	6-81131	F	8 June 68	1 Sept. 68
	6-81132	F	8 June 68	25 July 68
	6-81176	F	8 June 68	9 Sept. 69

Site of:

Banding: Cave 6
Recovery: Cave 6

<u>Band Number</u>	<u>Sex</u>	<u>Banding</u>	<u>Date of</u>	<u>Recovery</u>
6-82541	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82543	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82544	M	1 Sept. 68	1 Sept. 68	29 Oct. 71
6-82545	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82547	M	1 Sept. 68	1 Sept. 68	22 Sept. 72
6-82548	M	1 Sept. 68	1 Sept. 68	22 Sept. 72
6-82564	M	1 Sept. 68	1 Sept. 68	29 Oct. 71
6-82564	M	1 Sept. 68	1 Sept. 68	25 Oct. 74
6-82567	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82573	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82575	M	1 Sept. 68	1 Sept. 68	28 June 69
6-82575	M	1 Sept. 68	1 Sept. 68	25 Oct. 74
6-82576	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
6-82578	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05334	M	1 Sept. 68	1 Sept. 68	22 Sept. 72
7-05336	M	1 Sept. 68	1 Sept. 68	5 March 72
7-05337	M	1 Sept. 68	1 Sept. 68	15 April 72
7-05338	M	1 Sept. 68	1 Sept. 68	22 Sept. 72
7-05339	M	1 Sept. 68	1 Sept. 68	25 Oct. 74
7-05349	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05360	M	1 Sept. 68	1 Sept. 68	8 Aug. 70
7-05366	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05368	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05370	M	1 Sept. 68	1 Sept. 68	22 Aug. 69
7-05372	M	1 Sept. 68	1 Sept. 68	22 Aug. 69
7-05372	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05385	M	1 Sept. 68	1 Sept. 68	22 Sept. 72
7-05385	M	1 Sept. 68	1 Sept. 68	13 Sept. 70
7-05386	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05392	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05400	M	1 Sept. 68	1 Sept. 68	8 Aug. 70
7-05504	F	1 Sept. 68	1 Sept. 68	8 Aug. 70
7-05531	F	1 Sept. 68	1 Sept. 68	9 Sept. 69
7-05553	F	1 Sept. 68	1 Sept. 68	28 June 69
7-05559	F	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05572	F	1 Sept. 68	1 Sept. 68	9 Sept. 69
7-05608	F	1 Sept. 68	1 Sept. 68	28 June 69
7-05616	F	1 Sept. 68	1 Sept. 68	13 Sept. 70
7-05672	F	29 Sept. 68	29 Sept. 68	9 Sept. 69
7-05692	F	29 Sept. 68	29 Sept. 68	22 Sept. 72
7-05707	M	1 Sept. 68	1 Sept. 68	29 Sept. 68
7-05710	M	1 Sept. 68	1 Sept. 68	22 Sept. 72

Site of:	<u>Band</u>	<u>Sex</u>	<u>Date of</u>	
	<u>Number</u>		<u>Banding</u>	<u>Recovery</u>
Banding: Cave 6				
Recovery: Cave 6				
	7-05713	M	1 Sept. 68	29 Sept. 68
	7-05723	M	1 Sept. 68	8 Aug. 70
	7-05723	M	1 Sept. 68	22 Sept. 72
	7-05729	M	1 Sept. 68	29 Sept. 68
	7-05730	M	1 Sept. 68	29 Sept. 68
	7-05751	M	29 Sept. 68	8 Aug. 70
	7-05754	M	29 Sept. 68	29 Oct. 71
	7-05769	M	29 Sept. 68	25 Oct. 74
	7-05774	M	29 Sept. 68	13 Sept. 70
	7-05780	M	29 Sept. 68	9 Sept. 69
	7-05789	M	29 Sept. 68	15 April 72
	7-05809	M	29 Sept. 68	13 Sept. 70
	7-05815	M	29 Sept. 68	13 Sept. 70
	7-05831	M	29 Sept. 68	28 June 69
	7-05849	M	29 Sept. 68	28 June 69
	7-05849	M	29 Sept. 68	22 Aug. 69
	7-05852	M	29 Sept. 68	25 Oct. 74
	7-05854	M	29 Sept. 68	22 Sept. 72
	7-05854	M	29 Sept. 68	13 Sept. 70
	7-05878	M	29 Sept. 68	22 Sept. 72
	7-05880	M	29 Sept. 68	22 Aug. 69
	7-05906	M	29 Sept. 68	13 Sept. 70
	7-05914	M	29 Sept. 68	13 Sept. 70
	7-05929	M	29 Sept. 68	9 Sept. 69
	7-05938	M	29 Sept. 68	13 Sept. 70
	7-05945	M	29 Sept. 68	13 Sept. 70
	7-05952	M	29 Sept. 68	25 Oct. 74
	7-05986	M	29 Sept. 68	25 Oct. 74
	7-05999	M	29 Sept. 68	25 Oct. 74
	7-06008	M	29 Sept. 68	22 Sept. 72
	7-06031	M	29 Sept. 68	25 Oct. 74
	7-06051	M	29 Sept. 68	22 Sept. 72
	7-06052	M	29 Sept. 68	22 Sept. 72
	7-06058	M	29 Sept. 68	29 Oct. 71
	7-06073	M	29 Sept. 68	8 Aug. 70
	7-06254	M	28 June 69	22 Aug. 69
	7-06262	M	28 June 69	22 Sept. 72
	7-06263	M	28 June 69	8 Aug. 70
	7-06369	F	28 June 69	22 Sept. 72
	7-06371	F	28 June 69	13 Sept. 70
	7-06392	F	28 June 69	8 Aug. 70

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 6				
Recovery: Cave 6				
	7-06396	F	28 June 69	8 Aug. 70
	7-50019	F	9 Sept. 69	15 April 72
	7-50546	F	13 Sept. 70	22 Sept. 72
	7-50570	F	13 Sept. 70	22 Sept. 72
	7-50592	F	13 Sept. 70	22 Sept. 72
	7-50617	F	13 Sept. 70	15 April 72
	7-50654	F	13 Sept. 70	29 Oct. 71
	7-50907	F	15 April 72	22 Sept. 72
	7-50960	F	15 April 72	22 Sept. 72
	7-52643	M	22 Sept. 70	25 Oct. 74
	7-06904	F	15 Apr. 72	22 Sept. 72
	7-06905	F	15 Apr. 72	25 Oct. 74

INPLACE RECOVERIES FROM CAVE 7

Site of:				
Banding: Cave 7				
Recovery: Cave 7				
	6-82058	M	24 July 68	31 Aug. 68
	6-82244	F	24 July 68	31 Aug. 68
	6-82272	F	24 July 68	28 June 69
	6-82274	F	24 July 68	5 Oct. 68
	7-05306	M	31 Aug. 68	5 Oct. 68

INPLACE RECOVERIES FROM CAVE 15

Site of:				
Banding: Cave 15				
Recovery: Cave 15				
	7-06558	F	20 Dec. 69	5 March 72
	7-06585	F	20 Dec. 69	7 Feb. 70
	7-06592	F	20 Dec. 69	7 Feb. 70
	7-50029	M	20 Dec. 69	14 Nov. 71
	7-50084	M	20 Dec. 69	28 Feb. 70
	7-50096	M	20 Dec. 69	7 Feb. 70
	7-50131	M	20 Dec. 69	14 Nov. 71
	7-50157	M	20 Dec. 69	28 Feb. 70
	7-50189	M	20 Dec. 69	28 Feb. 70
	7-50237	M	20 Dec. 69	8 March 75
	7-50239	M	20 Dec. 69	7 Feb. 70
	7-50254	M	20 Dec. 69	7 Feb. 70
	7-50260	M	20 Dec. 69	7 Feb. 70

	<u>Band Number</u>	<u>Sex</u>	<u>Date of Banding</u>	<u>Recovery</u>
Site of:				
Banding: Cave 15				
Recovery: Cave 15				
	7-52040	F	20 Dec. 69	5 March 72
	7-52046	F	20 Dec. 69	24 Oct. 70
	7-52053	F	20 Dec. 69	28 Feb. 70
	7-52054	F	20 Dec. 69	14 Nov. 71
	7-52102	F	20 Dec. 69	7 Feb. 70
	7-52106	F	20 Dec. 69	14 Nov. 71
	7-52145	F	20 Dec. 69	7 Feb. 70
	7-52160	F	20 Dec. 69	7 Feb. 70
	7-52190	F	20 Dec. 69	7 Feb. 70
	7-52198	F	20 Dec. 69	28 Feb. 70
	7-52210	M	20 Dec. 69	8 March 71
	7-52265	M	20 Dec. 69	10 March 71
	7-52303	F	20 Dec. 69	28 Feb. 70
	7-52347	F	20 Dec. 69	7 Feb. 71

APPENDIX IV

Summary Tables	Page
I	91
II	92

A summary of the number and ratio of male and female *Myotis grisescens* recovered in place and elsewhere for each band site.

Banding Site	Inplace Recoveries ¹					Recovered Elsewhere ²					Total Recoveries				
	Number			Ratio		Number			Ratio		Number			Ratio	
	Female	Male	Total	Female	Male	Female	Male	Total	Female	Male	Female	Male	Total	Female	Male
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	15	0	15	100	0	41	13	54	76	24	56	13	69	81	19
4	0	0	0	0	0	68	20	88	77	23	68	20	88	77	23
5	14	25	39	26	64	153	80	233	66	34	167	105	272	61	33
6	51	82	133	38	62	146	64	210	70	30	197	146	343	57	43
7	3	2	5	60	40	68	21	89	76	24	71	23	94	76	24
10	0	0	0	0	0	0	1	1	0	100	0	1	1	0	100
15	15	12	27	56	44	0	0	0	0	0	15	12	27	56	44
TOTALS	98	121	219	(45)	(55)	476	199	675	(71)	(29)	574	320	894	64	36

1. Derived from Tables: 1, 3, 5, 7, 9 and 11.

2. See next page.

The number and location of recoveries of *Myotis grisescens* from each banding site. Inplace recoveries excluded.

Recovery Site	Banding Site														
	2		4		5		6		7		10				
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Total
2	-	-	6	0	16	1	2	0	2	0	0	0	26	1	27
3	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
4	3	0	-	-	11	11	6	0	0	0	0	0	20	11	31
5	5	2	8	3	-	-	27	18	5	2	0	0	45	25	70
6	4	0	18	5	32	26	-	-	8	7	0	0	62	38	100
7	0	0	7	0	9	0	3	4	-	-	0	0	19	4	23
8	0	0	0	0	1	0	0	0	0	1	0	0	1	1	2
9	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
11	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
12	0	0	0	0	0	0	1	0	1	0	0	0	2	0	2
13	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
14	0	1	0	0	0	1	0	0	0	0	0	0	0	2	2
15	21	7	25	10	76	36	85	38	52	10	0	1	259	102	361
16	7	2	4	2	7	5	22	4	0	0	0	0	40	13	53
TOTAL	41	13	68	20	153	80	146	64	68	21	0	1	476	199	675

Derived from Tables: 2, 4, 6, 8, 10, 12 and 14.

APPENDIX V

Multiple Recoveries Pages 94-96

Multiple recoveries of Myotis grisescens in the southwestern portion of the Ozark Plateau between 1968 and 1975: The band numbers (in numerical order); sex; banding site and date, first, second and third recovery sites and dates.

Band Number	Sex	Banding Site	Banding Date	1st Recovery Site	1st Recovery Date	2nd Recovery Site	2nd Recovery Date	3rd Recovery Site	3rd Recovery Date
6-58017	F	6	28 March	68	5 4 May	68	6 8 Aug.	70	
6-58018	F	6	28 March	68	6 5 May	68	5 9 April	71	
6-58074	F	5	4 May	68	15 20 Dec.	69	15 27 March	70	
6-58103	M	6	28 March	68	5 29 March	69	15 20 Dec.	69	
6-58151	M	5	4 May	68	15 20 Dec.	69	5 9 April	71	
6-58158	M	5	4 May	68	5 22 July	68	15 5 March	72	
6-58205	M	5	4 May	68	5 28 Sept.	68	15 20 Dec.	69	
6-58225	M	5	4 May	68	5 9 April	71	15 8 March	75	
6-58229	M	5	4 May	68	4 11 Aug.	68	6 29 Sept.	68	
6-58237	M	5	4 May	68	4 11 Aug.	68	5 28 Sept.	68	15 20 Dec. 69
6-58247	M	5	4 May	68	5 3 Oct.	68	15 29 Dec.	68	6 25 Oct. 74
6-58253	M	5	4 May	68	4 11 Aug.	68	6 1 Sept.	68	
6-58286	M	5	4 May	68	15 29 Dec.	68	5 25 July	70	
6-58288	M	5	4 May	68	5 28 Sept.	68	5 3 Oct.	68	
6-58432	F	5	4 May	68	5 9 April	71	4 15 Oct.	71	
6-58434	F	5	4 May	68	4 11 Aug.	68	15 20 Feb.	69	
6-58455	F	5	4 May	68	7 31 Aug.	68	5 9 April	71	
6-58508	F	5	4 May	68	5 22 July	68	4 11 Aug.	68	
6-58516	F	5	4 May	68	5 22 July	68	15 8 March	75	
6-58587	F	6	5 May	68	6 15 April	72	6 22 Sept.	72	
6-58604	F	6	5 May	68	15 29 Dec.	69	15 7 Feb.	70	
6-58607	F	6	5 May	68	7 31 Aug.	68	15 20 Dec.	69	
6-58633	F	6	5 May	68	15 18 Jan.	69	15 20 Dec.	69	
6-58713	F	6	5 May	68	6 13 Sept.	70	15 14 Nov.	71	

Band Number	Sex	Banding		1st Recovery		2nd Recovery		3rd Recovery	
		Site	Date	Site	Date	Site	Date	Site	Date
6-58837	F	6	5 May	68	15	27 March	70	15	24 Oct. 70
6-58841	M	6	5 May	68	7	31 Aug.	68	6	29 Sept. 68
6-58845	M	6	5 May	68	6	29 Sept.	68	6	29 Oct. 71
6-58917	F	6	5 May	68	5	24 July	68	15	20 Dec. 69
6-59000	F	6	5 May	68	15	24 Oct.	70	15	10 March 73
6-81107	F	6	8 June	68	15	18 Jan.	69	15	20 Feb. 69
6-81111	F	6	8 June	68	15	20 Dec.	69	15	7 Feb. 70
6-81142	F	6	8 June	68	5	22 July	68	15	20 Feb. 69
6-81146	F	6	8 June	68	15	29 Dec.	68	5	25 July 70
6-81152	F	6	8 June	68	5	22 July	68	15	27 March 70
6-81176	F	6	8 June	68	6	9 Sept.	69	15	20 Dec. 69
6-81207	F	2	9 June	68	4	11 Aug.	68	6	29 Sept. 68
6-81229	F	2	29 June	68	2	9 July	69	15	20 Dec. 69
6-81275	F	2	15 July	68	15	20 Dec.	69	15	27 March 70
6-81397	F	5	22 July	68	15	29 Dec.	68	15	20 Dec. 69
6-81415	F	5	22 July	68	4	11 Aug.	68	15	10 March 73
6-81558	F	5	22 July	68	6	13 Sept.	70	6	22 Sept. 72
6-81630	F	5	22 July	68	15	20 Dec.	69	15	8 March 75
6-81905	F	5	22 July	68	15	20 Dec.	69	15	24 Oct. 70
6-82098	M	7	24 July	68	15	10 March	73	15	8 March 75
6-82105	M	7	24 July	68	15	20 Dec.	69	15	5 March 72
6-82150	M	5	24 July	68	5	9 April	71	6	22 Sept. 72
6-82239	F	7	24 July	68	6	1 Sept.	68	15	29 Dec. 68
6-82272	F	7	24 July	68	7	28 June	69	15	3 April 70
6-82316	F	5	24 July	68	6	8 Aug.	70	5	9 April 71
6-82462	M	4	11 Aug.	68	15	20 Dec.	69	6	13 Sept. 70
6-82544	M	6	1 Sept.	68	15	20 Dec.	69	6	29 Oct. 71
6-82564	M	6	1 Sept.	68	6	29 Oct.	71	6	25 Oct. 74
6-82575	M	6	1 Sept.	68	6	28 June	69	6	25 Oct. 74
6-82675	F	4	11 Aug.	68	15	20 Feb.	69	6	25 Oct. 74
6-82703	F	4	11 Aug.	68	15	20 Feb.	69	15	27 March 70
6-82938	F	4	11 Aug.	68	15	20 Feb.	69	5	29 March 69

5 9 April 71

Band Number	Sex	Banding		1st Recovery		2nd Recovery		3rd Recovery	
		Site	Date	Site	Date	Site	Date	Site	Date
6-82940	F	4	11 Aug. 68	5	25 July 70	6	15 April 72		
6-82960	F	4	11 Aug. 68	6	1 Sept. 68	6	22 Aug. 69		
7-05122	F	7	31 Aug. 68	15	27 March 70	15	14 Nov. 71		
7-05124	F	7	31 Aug. 68	15	18 Jan. 69	5	9 April 71		
7-05305	M	7	31 Aug. 68	15	3 April 70	15	8 March 75		
7-05337	M	6	1 Sept. 68	5	9 April 71	6	15 April 72		
7-05372	M	6	1 Sept. 68	6	22 Aug. 68	6	29 Sept. 68		
7-05385	M	6	1 Sept. 68	6	13 Sept. 70	6	22 Sept. 72		
7-05475	F	7	31 Aug. 68	15	29 Dec. 68	15	18 Jan. 69		
7-05535	F	6	1 Sept. 68	15	18 Jan. 69	15	24 Oct. 70		
7-05672	F	6	29 Sept. 68	6	9 Sept. 69	15	24 Oct. 70		
7-05723	M	6	1 Sept. 68	6	8 Aug. 70	6	22 Sept. 72		
7-05754	M	6	29 Sept. 68	15	20 Dec. 69	6	29 Oct. 71	15	10 March 73
7-05815	M	6	29 Sept. 68	7	5 Oct. 68	6	13 Sept. 70		
7-05819	M	6	29 Sept. 68	5	29 March 69	5	25 July 70		
7-05849	M	6	29 Sept. 68	6	29 June 69	6	22 Aug. 69		
7-05854	M	6	29 Sept. 68	6	13 Sept. 70	6	29 Sept. 72		
7-05952	M	6	29 Sept. 68	15	7 Feb. 70	6	25 Oct. 74		
7-05986	M	6	29 Sept. 68	5	25 July 70	6	25 Oct. 74		
7-06073	M	6	29 Sept. 68	15	0 March 69	6	8 Aug. 70		
7-06078	M	6	29 Sept. 68	5	9 April 71	15	5 March 72		
7-06212	M	7	5 Oct. 68	15	18 Jan. 69	15	20 Dec. 69		
7-06515	F	2	9 July 69	15	5 March 72	15	10 March 73		
7-06757	F	5	9 April 71	6	22 Sept. 72	15	8 March 75		
7-50546	F	6	13 Sept. 70	6	22 Sept. 72	16	27 Jan. 73		
7-50703	M	5	9 April 71	15	5 March 72	15	10 March 73		
7-50741	M	5	9 April 71	6	29 Oct. 71	6	22 Sept. 72		
7-52407	F	5	9 April 71	15	10 March 72	6	15 April 72		