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BAT SPECIES OVERWINTERING IN LAVA-TUBE CAVES
IN LINCOLN, GOODING, BLAINE, BINGHAM, AND
BUTTE COUNTIES, IDAHO
WITH SPECIAL REFERENCE TO ANNUAL RETURN OF
BANDED PLECOTUS TOWNSENDII

by
Martha C. Wackenhut

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE

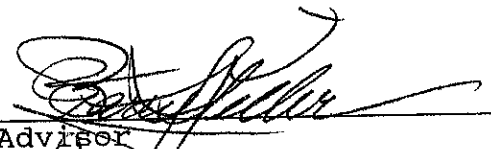
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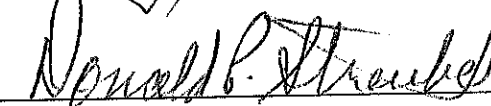
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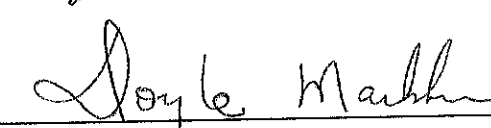
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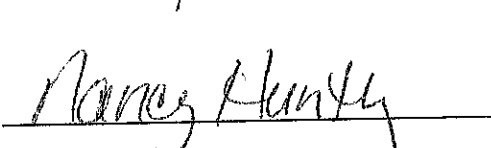
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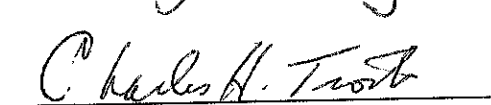


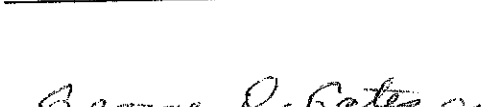
Advisor











Graduate Faculty Representative

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Bat Species overwintering in lava-tube caves
in Lincoln, Gooding, Blaine, Bingham, and
Butte Counties, Idaho
with special reference to annual return of
banded Plecotus townsendii

Martha C. Wackenhut

Thesis Abstract, Idaho State University, 1990

The objectives of this study were to increase the knowledge of bat species composition and local distribution in southcentral and southeastern Idaho, to determine the population status of winter resident bat species, and to document movements of banded bats. Plecotus townsendii was a summer resident of the Idaho National Engineering Laboratory (INEL) and of the Lincoln-Gooding County study area (LGC). This species also hibernated in lava-tube caves in both areas in numbers ranging from 3 to 406 per cave in the mid-winter. Myotis leibii was a summer resident of the LGC and hibernated in both areas in numbers ranging from 1 to 28 per cave in the mid-winter. Other summer residents of the LGC included: Myotis evotis, Myotis lucifugus, Antrozous pallidus, Pipistrellus hesperus. Lasionycteris noctivagans were found in the late summer and Myotis yumanensis were found using a cave in early spring as either a hibernaculum or a day roost.

Band returns of 514 P. townsendii from 11 caves ranged from 11.1 % to 60.9 % the year following banding. Movement of individuals of this species during hibernation was limited to adjacent caves and was likely induced by banding disturbance. The longest movement documented was 8.3 km between hibernation periods rather than during a hibernation period. P. townsendii was found hibernating from 0.6 C to 11 C and from 44 % to 90 % relative humidity. Female P. townsendii lost an average of 3.0 gm (n=43), 21.9 %, of their fall body weight over the winter. Males lost an average of 2.4 gm (n=10), 21.5 %, of their fall weight over the winter. Females of this species enter caves to hibernate earlier in the fall than do males. A ratio of 1:3.4, male:female was found in the fall in caves. A ratio of 1:1.2, male:female was found in caves during spring.

INTRODUCTION

As bat populations decline globally the need for more intensive management of their populations and essential habitats is increasing (Stebbings 1980). Baseline data on population, ecological, and behavioral aspects of Idaho bats are necessary in order to insure that they are protected and managed properly.

Two species of bats found in Idaho, Euderma maculatum and Plecotus townsendii are of special concern. Little is known of the distribution, population status, and habits of E. maculatum in Idaho. The eastern subspecies of P. townsendii, P. t. virginianus and P. t. ingens, are listed as endangered species (Federal Register 1989) and the subspecies found in the Pacific Northwest, P. t. townsendii, is currently a candidate for listing as threatened (U.S. Fish and Wildlife Service 1990). Although the subspecies found in Idaho, P. t. pallescens (Hall 1981), is not a candidate for threatened status, there are limited data which suggest that some historical hibernacula in southern Idaho are no longer occupied.

Fourteen species of bats are known to occur in Idaho: Myotis lucifugus (little brown myotis), Myotis yumanensis (Yuma myotis), Myotis evotis (long-eared myotis), Myotis thysanodes (fringed myotis), Myotis volans (long-legged myotis), Myotis californicus (California myotis), Myotis leibii (small-footed myotis), Lasionycteris noctivagans

(silver-haired bat), Pipistrellus hesperus (western pipistrelle), Eptesicus fuscus (big brown bat), Lasiurus cinereus (hoary bat), Euderma maculatum (spotted bat), Plecotus townsendii (Townsend's big-eared bat), Antrozous pallidus (pallid bat) (Keller 1985).

Groves and Marks (1985) developed a distributional checklist of mammals found in Idaho based upon Idaho Department of Fish and Game Regions. According to this listing P. hesperus and E. maculatum are not found in southeastern Idaho and M. yumanensis, E. maculatum, and A. pallidus are not known to occur in south central Idaho. Keller (1981) has documented A. pallidus in this region, however.

Reynolds et al. (1986), who compiled a list of species and estimated relative abundances of vertebrates of the Idaho National Engineering Laboratory (INEL) in southeastern Idaho, found M. leibii and P. townsendii abundant, M. lucifugus and M. evotis common, and E. fuscus and L. cinereus uncommon. Genter (1986) documented M. leibii and P. townsendii hibernating in lava-tube caves at the INEL. He also found M. lucifugus, M. evotis, E. fuscus, L. noctivagans, and L. cinereus to be migratory to this area.

Behavioral and ecological data for Idaho bats is essentially non existent. The need to understand movements, seasonal activity, and habitat requirements is of particular importance to protect roost sites, hibernacula, and foraging

areas.

The objectives of this study were to 1) verify species composition for two areas in southern Idaho, determine local distributions, and obtain a measure of population status of resident species, 2) identify summer roosts and hibernacula, 3) document movements of individuals, between or within the study areas.

METHODS

Study Area

This study was conducted in Bingham and Butte counties on the southeastern end of the INEL, and in Lincoln, Blaine, and Gooding counties (LGC), located in southcentral Idaho. The study areas are approximately 60 km apart at the closest point. These areas were chosen because of their concentration of lava-tube caves and their proximity to each other.

Caves in both study areas were formed as tubes from molten rivers of basaltic lava or as blisters, from pockets of trapped gases. No solution caves are found in the study area. The youngest lava flows are probably no more than a few thousand years old (Ross and Forrester 1958). LGC contain more known caves than the INEL and most of these caves are more extensive. Cave size ranges from less than 30 m in length to over 1.5 km; ceiling heights range from less than 2 m to over 12 m. The caves on the INEL vary in elevation from 1500 m to 1700 m. Those found in LGC range from 1100 m to 1400 m in elevation.

Sagebrush-grass communities predominate the INEL, with Artemesia tridentata covering 80 % of the area, especially in areas of good soil cover (Harniss and West 1973). The understory is predominated by grasses, such as Agropyron spp., Oryzopsis hymenoides, and Sitanion hystrix. Juniperus osteosperma is found mixed with the sage-grass vegetation on low ridges and high buttes. Vegetation of the LGC area is

similar to that of the INEL. Sagebrush-grass communities predominate, with similar understory components, but J. osteosperma is absent as a vegetation component (Bureau of Land Management 1979).

The Big Lost River and its Sinks, the main surface water sources on the INEL, were completely dry during the years of this study. Open water could be found in holding ponds near nuclear facilities, however. Open water in the LGC is generally limited to reservoirs, livestock watering ponds, and small intermittent streams.

Cold winters and hot dry summers predominate throughout southern Idaho. Most of the annual precipitation occurs in the form of winter snows and spring rains. During the period of this study, average annual precipitation was below normal for southern Idaho; in 1987 it was 15.5 cm and 23.6 cm and in 1988 it was 13.8 cm and 27.0 cm for the INEL and the LGC area, respectively. The average temperatures, in January, while I was conducting my mid-winter census were -9.3 C (1988) and -12.9 C (1989) and -5.5 C (1988) and -3.2 C (1989) for the INEL and LGC, respectively.

Field Methods

To obtain data on bat populations, caves were censused and reservoirs and ponds were mist netted. Limited banding was completed to permit study of potential movement by individuals among hibernacula.

Bands were attached on the forearm of bats (Choate et al. 1987). Individually numbered size #3 aluminum bands (National Band and Tag Co., Newport KY, USA) and size #XF (2.3 mm) split ring plastic bands (A.C. Hughes, Middlesex, TW121NA, England) were used. To reduce the chance of injury to the wing membrane and the forearm, the sharp edges and corners of each band were smoothed and rounded with a small metal fingernail file (Hitchcock 1957). Different colored bands were used at each banding location.

Locations of caves were obtained from topographic maps, by personal communication with BLM and INEL personnel, and from members of the Gem State Grotto. No attempt was made to do an extensive search for unknown caves in either area. Caves were surveyed for bats in the summer and fall of 1987, in the winter, spring, summer and fall of 1988, and in the winter of 1989. Locations of caves surveyed are listed in Appendix A. A limited census was done in the fall of 1989 and winter of 1990. The spring, fall, and winter censuses were generally performed in March, October, and January, respectively. Summer censuses of caves were conducted from May through August. Bats were censused by visually counting individuals present in each cave. Clusters of bats were not disturbed in order to count individuals. Therefore numbers occasionally may have been underestimated. But in the 1989 mid-winter, census only 15 % of the clusters encountered contained more than 20 individuals and 28 % of the clusters

contained over 10 individuals, thus adequate assessment of the number of individuals was permitted in all but a few circumstances. Temperature was taken in each cave at several locations where bats were found, and relative humidity was measured using a psychrometer (Bendix Corporation, Friez Instrument Division, model ML-450 A/UM).

Bats were captured in caves while in a state of torpor. Accessible bats were collected by hand or with a long-handled net from the wall or ceiling. Only a sample of bats were banded in all caves. Bats found in caves in the summer, fall, or spring were identified to species, sexed, and weighed, using a pesola spring scale, then banded, and released at the site of capture. Bats were not banded or handled during the mid-winter in an attempt to decrease disturbance during this most sensitive period of hibernation, as suggested by Tuttle (1979).

From May through August 1987 and 1988, bats were captured with mist nets at reservoirs and ponds. Locations of areas netted are included in Appendix A. Some cave entrances were also netted. A 4 tier, 12.8 m long, 50d/2 ply, 3.8 cm mesh, black nylon mist net was used. Nets were usually tended for at least 2 hours after sunset, but sometimes throughout the night. Captured bats were removed to determine species and sex. Bats were weighed, banded, and released at the site of capture.

Voucher specimens of all hibernating species are

deposited in collections at the Radiological and Environmental Sciences Laboratory (RESL) at the INEL and at the Idaho Museum of Natural History, Idaho State University. Catalog numbers for the state museum specimens are: M. yumanensis, IMNH1181; M. lucifugus, IMNH1182; M. leibii, IMNH1183, IMNH1184; P. townsendii, IMNH1185, IMNH1186, IMNH1187.

Statistical Treatments

Departures of sex ratios from expected values were tested with chi square. T-tests were utilized to compare differences in male and female mass during the fall and spring and to test for significant differences in weight loss over the winter. The intensity of the relationship between hibernating bat populations and cave temperature or absolute humidity was described with a Pearson's correlation analysis. An alpha level of 0.05 was defined as the criterion of significance. All statistical tests were performed following procedures outlined in Zar (1984).

RESULTS AND DISCUSSION

Species Composition, Distribution, and Population Status

Of 11 caves surveyed on the INEL (Fig. 1), seven contained hibernating P. townsendii, three contained hibernating M. leibii, and two were used in the summer as day roosts by P. townsendii. Of 18 caves surveyed in the LGC (Fig. 2), eight contained hibernating P. townsendii and three contained hibernating M. leibii. Two caves were found to be used as day roosts by P. townsendii, and M. yumanensis was using a cave as either a day roost or hibernaculum.

The number of P. townsendii hibernating in caves at the INEL in mid-winter ranged from three to 138 (Table 1). West Rattlesnake Cave was the only cave at the INEL which had a population of greater than 100 hibernating P. townsendii. This cave also had a relative large population of hibernating M. leibii. In March 1988, 28 individuals of this species were using the cave, while other caves of both areas contained only three or fewer individuals. LGC area caves had mid-winter populations of P. townsendii ranging from four to 406 (Table 2). Three caves in this area had hibernating populations of this species of over 200 individuals.

Four sites were netted on the INEL over 2 years. No bats were captured or seen flying in the areas netted. In the LGC, seven sites were netted over the 2

Figure 1. Locations of INEL caves, in Bingham and Butte Counties, Idaho, which were used as hibernacula or day roosts. 1, East Aviator Cave. 2, EBRII Cave III. 3, West Rattlesnake Cave. 4, East Rattlesnake Cave. 5, North Tower Cave. 6, Moonshiners Cave. 7, Middle Butte Cave. 8. West Aviator Cave.

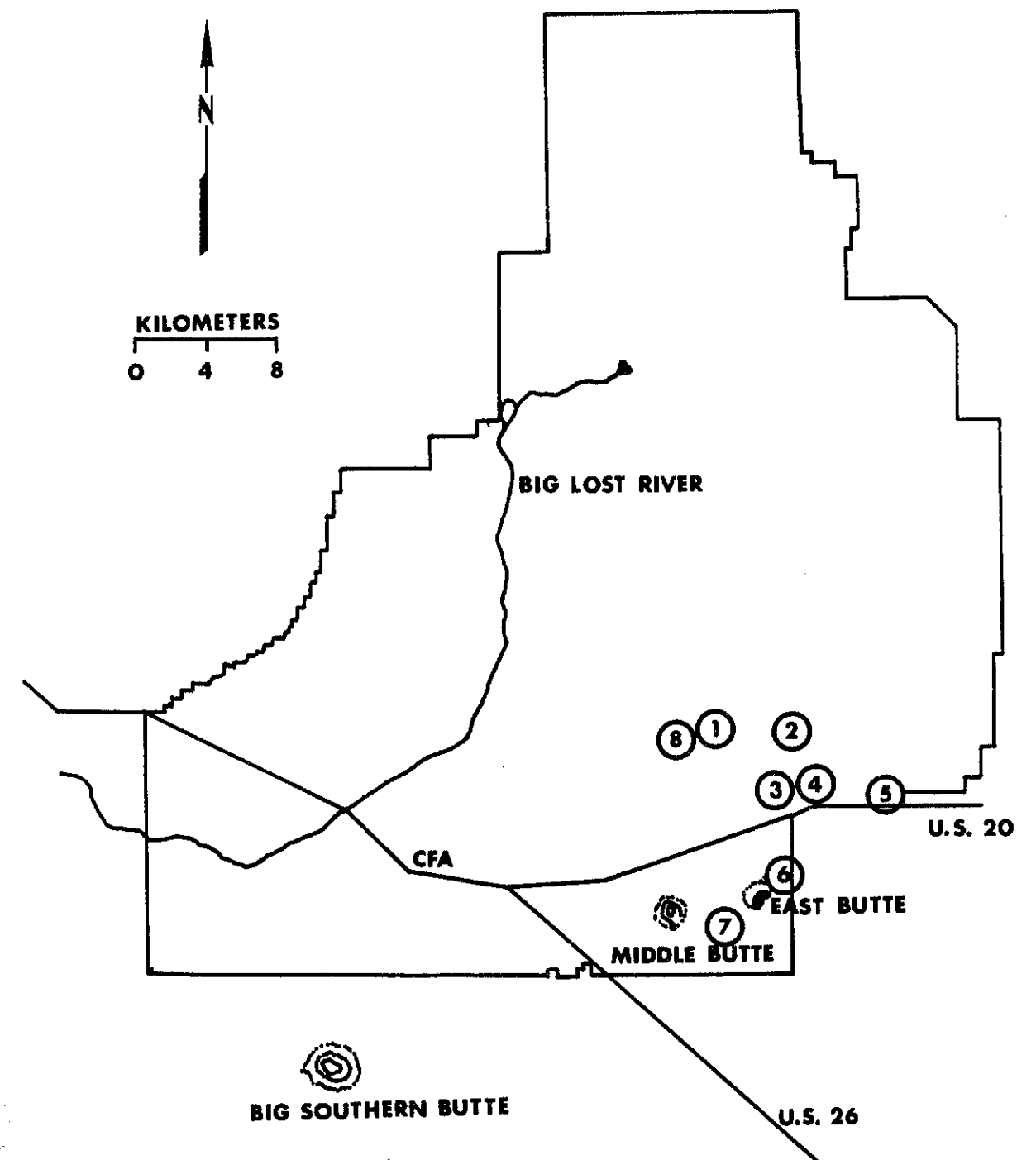


Figure 2. Location of caves in Lincoln-Gooding County which were used as hibernacula or day roosts. 1, Owl Cave. 2, Octopus Cave. 3, Gypsum Cave. 4, Maze Cave. 5, Pot-of-Gold. 6, Big Arch Cave. 7, West Wedge Butte Cave. 8, East Wedge Butte Cave.

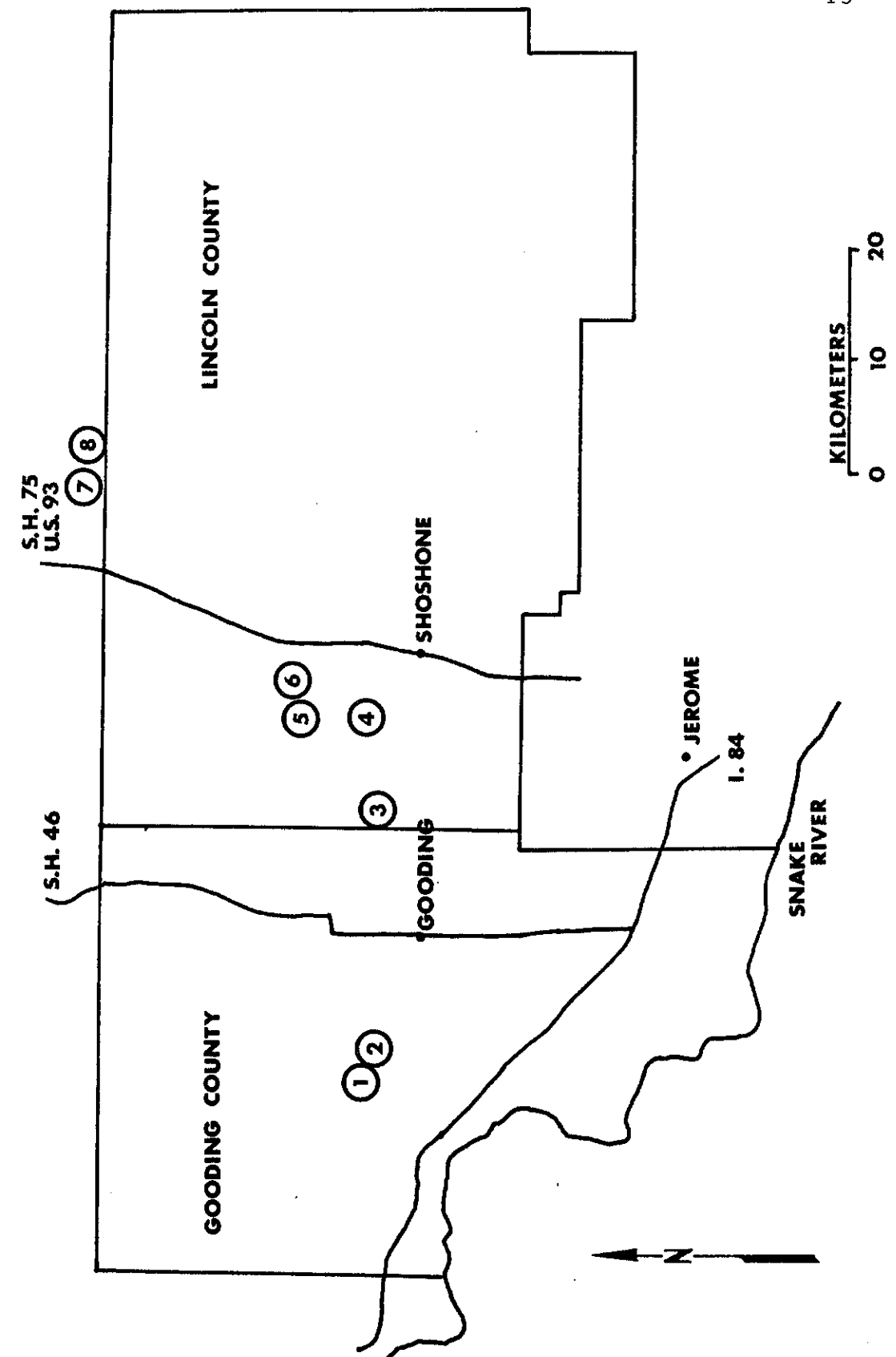


Table 1. Number, by species, of bats found in caves on the INEL during censuses.

CAVE	DATE	<u>P. townsendii</u>	<u>M. leibii</u>
W. Rattlesnake	10/17/87	78	0
	1/7/88	127	14
	3/26/88	111	28
	10/20/88	87	3
	1/19/89	138	21
	10/23/89	112	1
E. Rattlesnake	3/26/88	7	0
	8/15/88	1	0
	1/19/89	6	0
Middle Butte	10/17/87	16	0
	1/7/88	21	1
	4/11/88	17	2
	10/14/88	20	1
	1/26/89	38	1
North Tower	10/22/87	3	0
	1/7/88	10	0
	4/11/88	6	0
	10/14/88	3	0
EBRII Cave III	4/26/88	3	0
	1/24/89	3	0
Moonshiners	6/1/87	1	0
W. Aviator	2/15/90	44	1
E. Aviator	2/15/90	10	0

Table 2. Number, by species, of bats found in caves in the Lincoln-Gooding County study area during censuses.

CAVE	DATE	<u>P. townsendii</u>	<u>M. leibii</u>
Big Arch	10/24/87	195	0
	1/2/88	324	0
	3/12/88	477	0
	1/21/89	406	0
Gypsum	10/8/87	24	0
	1/30/88	268	0
	3/18/88	177	1
	8/11/88	1	0
	11/5/88	126	0
	2/11/89	248	1
Owl	6/12/87	1	0
	10/12/87	35	0
	1/10/88	241	0
	3/6/88	234	0
	6/30/88	1	0
	11/6/88	145	0
	1/29/89	302	0
E. Wedge Butte ¹	10/18/87	10	0
	1/22/88	4	0
	3/20/88	3	0
	2/8/89	9	0
W. Wedge Butte	10/18/87	12	2
	1/22/88	67	2
	3/20/88	49	3
	2/8/89	53	3
Pot-of-Gold	1/16/88	48	0
	3/28/88	30	0
Octopus	1/10/88	1	0
	1/29/89	15 ²	0
Maze	1/2/88	4	1

¹Two M. yumanensis were found on 3/20/88.

²New chamber was found and censused.

years. Figure 3 illustrates the locations of bat species found as summer residents in the LGC. Township, range, and section are listed in Appendix A for all locations at which bats were found. Bats were captured in three of LGC (Table 3). P. hesperus and A. pallidus used a high-walled box canyon, with a spring fed pool, as a roosting area. M. lucifigus, M. evotis, and M. leibii were netted at desert reservoirs. L. noctavagans was found using a house as a day roost during the fall, 1987. A M. lucifigus maternity roost was found in an abandoned house in the summer, 1987. This roost consisted of no more than a dozen individuals at the time it was discovered. This house was removed from the area the fall after the roost site was discovered preventing further investigation.

Although M. yumanensis was not included on Groves and Marks (1985) list, Hall (1981) includes south central Idaho on the edge of the species range. Whether M. yumanensis are year-around residents to the area is unknown, because no individuals were captured during the summer, and the two individuals found in East Wedge Butte Cave during the spring (Table 2) could have been using the cave as a day roost. The individuals were not in torpor when captured, and were not detected in a mid-winter census. M. yumanensis arrive at nursery colonies in April (Barbour and Davis 1969); this might indicate that the two found in March were simply moving through the area.

Figure 3. Locations of bats found as summer residents of the Lincoln-Gooding County study area. Star = A. pallidus. Open Triangle = P. hesperus. Open Circle = M. leibii. Open Square = M. evotis. Solid Triangle = L. noctivagans. Solid circle = M. lucifigus. Solid Square = P. townsendii.

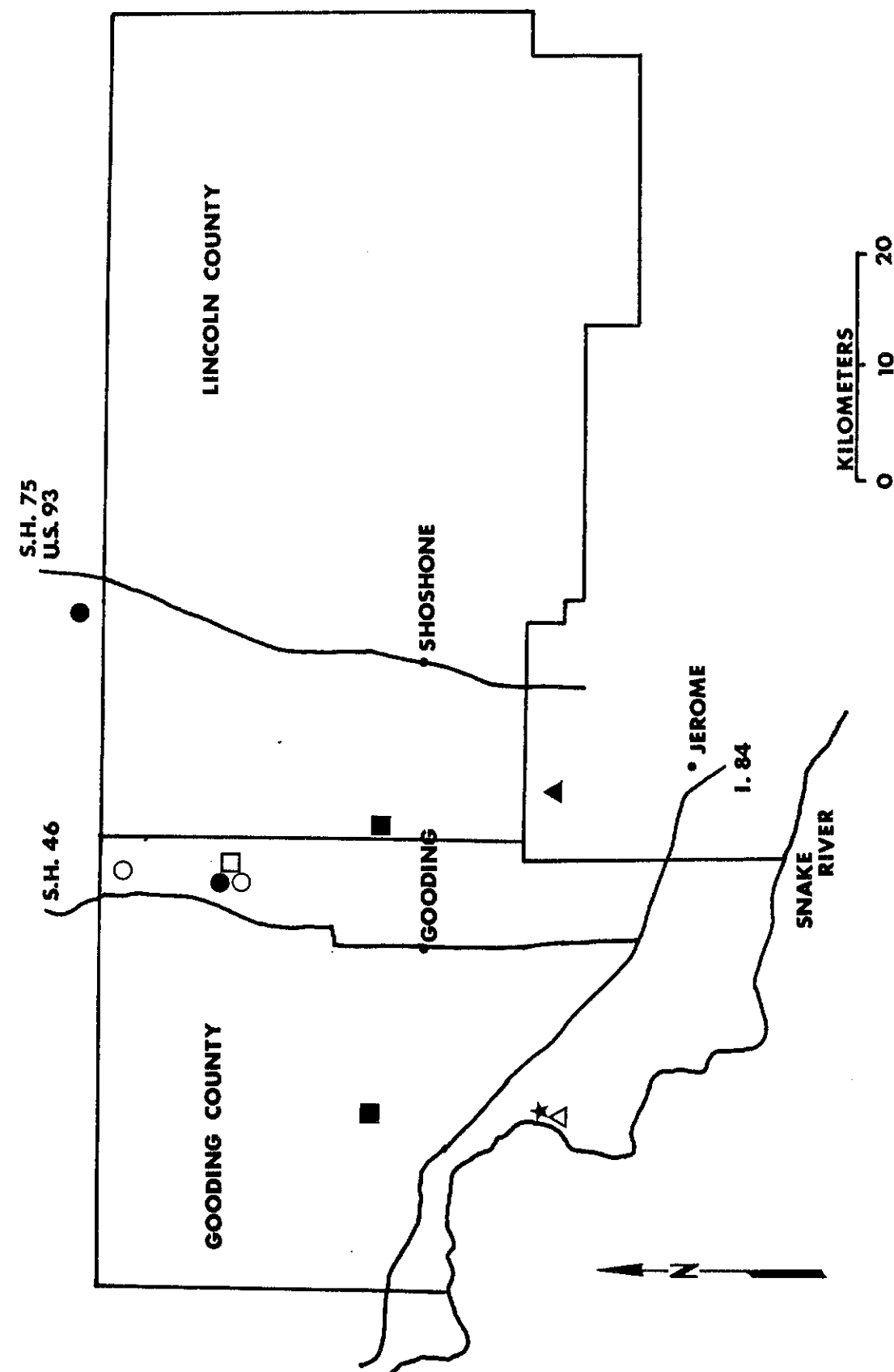


Table 3. Bats captured with mist netting efforts in LGC, 1987-1988.

DATE	LOCATION	SPECIES	NUMBER/SEX
6/4/87	Thorn Crk. Res.	<u>M. lucifigus</u>	1 female
6/18/87	Malad Gorge	<u>A. pallidus</u> <u>P. hesperus</u>	3 males 1 male
7/14/87	McHann Res.	<u>M. leibii</u>	1 female
6/3/88	Thorn Crk. Res.	<u>M. leibii</u> <u>M. evotis</u>	1 male 1 female

Hall (1981) and Hermanson and O'Shea (1983) show the range of A. pallidus to extend north into central Utah and East into eastern Oregon, but both authors apparently overlooked a report by Fichter (1964) of records of A. pallidus from three locations in Idaho. Fichter suggested that since these records were in the fall of the year, during extremely hot, dry years that they were the result of transient movements rather than resident bats. Thus he discounted the idea that the species range should be expanded to include southern Idaho.

Keller (1980;1981) documented that this species occurs in southcentral Idaho and specimens from Ada County, in southwestern Idaho, are on deposit at Boise State University. Catalog numbers for the Boise state specimens are: BSUM945, BSUM946, BSUM946A, BSUM947, BSUM948, BSUM345, BSUM351. The species appears to be widespread across southern Idaho in canyons (Keller, unpublished). The three individuals that I captured in mid-June 1987, were in an area of high cliff walls, which is typical roosting habitat for A. pallidus. This indicates that they were probably summer residents, rather than transients.

Several species known to range into southern Idaho (Hall 1981, Groves and Marks 1985) were not found. This was probably the result of limited success mist netting. The drought conditions that occurred during 1987-1988 might have affected bat behavior such that rather than

concentrating near reservoirs, they moved to other localities along the Snake River or to higher elevations.

Caves were censused to obtain baseline data on populations of hibernating species to develop information on abundance. Upon comparing census data from the winter 1988 and 1989, it is apparent that most caves contained an increasing number of hibernating P. townsendii. Because the winter of 1988 was milder than 1989, it is probable that this increase resulted from weather conditions that forced bats into caves from alternate winter roosts.

P. townsendii populations were comparable, with a possible trend toward increase in Middle Butte Cave, with populations documented by Genter (1986) during his 1985 study on the INEL where he observed 15 individuals of this species during the winter. I observed 21 in 1988 and 38 in 1989. Long-term censusing would need to be employed to determine if a trend toward population stability was the result of other factors, such as weather and the timing of the censusing.

In 1989, Aviator Cave was discovered on the INEL by a security helicopter pilot. This cave appears not to have been entered by humans since last used by Native Americans. It was censused for hibernating bats with the expectation of finding larger numbers using the cave because of its isolation. This was not the case; a relatively small population was found using the cave in mid-winter, 1990. By

contrast, the LGC caves frequently are used for recreation. Big Arch Cave had the largest population of hibernating bats, yet this cave has some recreational use throughout the year. This seems to illustrate two points: first that P. townsendii will tolerate some disturbance during hibernation; secondly, it appears that while a wide range of environmental and physical cave factors are adequate for hibernacula, there are caves that are preferred even though human disturbance would make them seem less than ideal. A research program to investigate why these sites seem ideal may provide new management strategies and should be undertaken.

Hibernating populations of P. townsendii in LGC, appear to be relatively large compared to those documented on the INEL or at study sites in other states. Humphreys and Kunz (1976) found cave populations in Kansas ranging up to 62 individuals during hibernation. Pearson et al. (1952) found hibernating populations in California to range up to 201 individuals in one cave, but most caves and mines contained far fewer individuals. Twente (1960) surveyed over 500 caves and mines in Utah and found this species to be a frequent hibernator but in low numbers. The highest number of individuals he found in one hibernaculum was 13. A study in the eastern counties of Oregon (Perkins 1987) indicates populations approaching those in southern Idaho. Four caves in this region of Oregon contained hibernating

P. townsendii, with only one of these having over 200 bats present.

M. leibii occurred in large numbers in only one cave. Although it is probable that some individuals were missed during censusing because of this species' habit of using holes and cracks for roosting, it is doubtful that caves containing large numbers of hibernating individuals occur in southern Idaho. The absence of other hibernating species may result because the lava-tube caves of southern Idaho are unsuitable to them.

Band Returns

Five hundred and fourteen P. townsendii were banded in 11 caves at both study sites. A complete set of data for banded individuals is presented in Appendix B. The fall following banding, 212 individuals (41 %) returned to the same cave as used the previous year. Twelve individuals (2 %) returned to caves other than the one in which they were banded.

One hundred and one P. townsendii were banded in five caves on the INEL. From 14.3 % to 60.9 % of the bats banded in the fall of 1987 and the spring of 1988 were present in caves during the mid-winter 1988/89 census (Table 4). West Rattlesnake Cave had a band return frequency of 37.7 % of these individuals in the fall of 1988 and the same band return frequency (37.7 %) of these individuals in the fall

Table 4. Band return data for P. townsendii.

CAVE	# BANDED FALL 1987 AND SPRING 1988	% RETURN MID-WINTER 1989
W. Rattlesnake	69	60.9
E. Rattlesnake	7	14.3
Middle Butte	22	45.5
Big Arch	146	44.5
Gypsum	106	38.7
Owl	74	36.0
W. Wedge Butte	48	52.1
E. Wedge Butte	11	9.1

of 1989.

Four hundred and thirteen P. townsendii were banded in six caves in the LGC. From 11.1 % to 52.1 % of the bats banded in the fall of 1987 and the spring of 1988 were present in the mid-winter 1988/1989 census (Table 4).

Movements

Movements over relatively long distances between hibernacula and summer roosting and foraging areas have been noted for M. lucifugus in New England (Griffin 1945, Davis and Hitchcock 1965), M. grisescens in southeastern U.S. (Tuttle 1976), E. fuscus in northeastern U.S. (Beer 1955), and for L. noctivagans throughout its range (Kunz 1982). Humphreys and Kunz (1976) note that P. townsendii in Kansas have localized seasonal movements. However this species has been found to move between caves during the hibernation period (Twente 1955a, Humphreys and Kunz 1976).

No movements were noted for P. townsendii between the INEL and the LGC for the 2-year period of this study. The 16 documented movements within the study areas were generally limited to short movements between adjacent caves. Exchanges between caves on the LGC was documented for two caves. In one instance 6 of 12 recaptures in West Wedge Butte Cave in the spring of 1988 had been banded in East Wedge Butte Cave in the

Fall of 1987, 400 m away. In another instance, three individuals had moved from Pot-Of-Gold Cave approximately 90 m, to Big Arch Cave. On the INEL instances of cave exchange occurred between East Rattlesnake Cave and West Rattlesnake Cave, which are approximately 75 m apart. The movements in the latter two instance both were noted during banding in the spring 1988, upon returning to the caves a few days later. The mean distance between caves which had exchange during a hibernation period was $188.33 \text{ m} \pm 105.92$ (S.E.).

The longest exchange documented was an individual banded in West Rattlesnake Cave in fall 1988, which was found in Aviator Cave in mid-winter 1990. These two caves are approximately 8.3 km apart.

In most cases, marked *P. townsendii* found in caves during the 1988 and 1989 censuses had been banded there the previous season. Of the 224 individuals which were relocated, 95 % had returned to the cave in which they were banded. This indicates a high degree of cave fidelity, a condition noted by Humphreys and Kunz (1976) for this species in Kansas, where 80 % of the individuals banded returned to the same cave. In contrast to the high cave fidelity and lack of exchange found between caves, actual band returns were relatively low. Only a 44 % band return was documented. Bats are relatively long-lived animals. Pearson et al. (1952) reported that the average age of

females in populations in California was 5 years, so it seems unlikely that natural mortality is the cause of the low band returns. Mortality resulting from the banding effort is possible, but not likely because of efforts to limit disturbance, the lack of direct evidence of mortality, and no incidences of wing damage suggesting conditions that might lead to death.

This species appears to be localized in seasonal behavior. This is illustrated by the fact that no exchange was noted between study areas, there was little exchange between caves at each area, and marked individuals in both areas were found at or near the site of banding during both the summer and winter. Humphreys and Kunz (1976) and Pearson et al. (1952) note that P. townsendii are localized in their seasonal behavior. Both found that this species is frequently active during the winter and that there is constant turnover of individuals in caves throughout the hibernation period.

A movement of 8.3 km was observed between hibernacula from one year to another. The other 11 movements documented were between adjacent caves and were probably the result of the banding disturbance. Humphreys and Kunz (1976) reported a movement of 2.4 km as the furthest distance moved between hibernacula from one year to another.

Cave Selection

P. townsendii were found hibernating under a wide range of cave temperatures and relative humidities, from 0.6 C to 13.7 C and from 44 % to 90 % relative humidity (Table 5). Fall cave temperatures ranged from 6 C to 11 C on the INEL and from 5.7 C to 13.7 C in the LGC. Mid-winter cave temperatures ranged from 0.8 C to 4 C on the INEL and 0.7 C to 6 C in the LGC. Spring cave temperatures ranged from 2 C to 5 C at the INEL and from 0.6 C to 6.5 C at the LGC. Cave humidities ranged from 58 % to 90 % in the fall. Mid-winter relative humidity ranged from 44 % to 75% in the INEL caves and from 72 % to 87 % in LGC caves. Absolute humidity ranged from 3.5 to 7.3 gm/m³ in the fall and from 1.7 to 6.0 gm/m³ in the winter.

No significant relationship exists between the number of bats present in the fall census and cave temperature at the time, $r=0.24$, $p>0.20$ (Fig. 4). The number of bats present during the mid-winter census was not found to dependent on the cave temperature during the census, $r=0.10$, $p>0.30$ (Fig. 5). A tendency is evident toward the number of bats present in the spring census being dependent on the cave temperature at the time, $r=0.52$, $p=0.074$ (Fig. 6). No relationship exists between the number of bats present and the fall absolute humidity of caves, $r=0.39$, $p>0.20$ (Fig. 7). No relationship was found between the number of bats using caves for hibernacula and the

Table 5. Temperature and relative humidity of caves which contained hibernating bats.

CAVE	DATE	TEMP. (°C)	% R.H.
<u>INEL</u>			
W. Rattlesnake	10/17/87	8.0	58%
	1/7/88	2.0	50%
	3/26/88	2.0	72%
	10/20/88	11.0	
	1/19/89	2.8	44%
E. Rattlesnake	1/19/89	4.0	
Middle Butte	10/17/87	6.0	
	1/7/88	4.0	75%
	4/11/88	4.0	
	10/14/88	2.3	73%
	1/26/89	0.0	53%
North Tower	10/22/87	8.0	75%
	1/7/88	0.8	63%
	4/11/88	5.0	
	10/14/88	9.0	75%
EBRII Cave III	1/24/89	4.0	75%
<u>LGC</u>			
Big Arch	10/24/87	5.7	90%
	1/2/88	0.7	80%
	3/12/88	0.6	
	1/21/89	3.2	82%
Gypsum	10/8/87	10.5	60%
	1/30/88	4.5	
	3/18/88	4.5	
	11/5/88	13.7	67%
	2/11/89	5.3	85%
Owl	10/12/87	7.4	80%
	1/10/88	2.6	84%
	3/6/88	11.0	83%
	1/29/89	2.5	72%
E. Wedge Butte	10/18/87	8.8	81%
	1/22/88	4.8	
	3/20/88	4.5	
	2/8/89	3.0	72%

Table 5 continued.

W. Wedge Butte	10/18/87	9.0	81%
	1/22/88	0.9	
	3/20/88	5.5	
	2/8/89	2.0	87%
Pot-of-Gold	1/16/88	5.5	86%
	3/28/88	4.0	
Octopus	1/29/89	3.0	84%
Maze	1/2/88	6.0	72%

Figure 4. Relationship between bat numbers and cave temperature during the fall census.

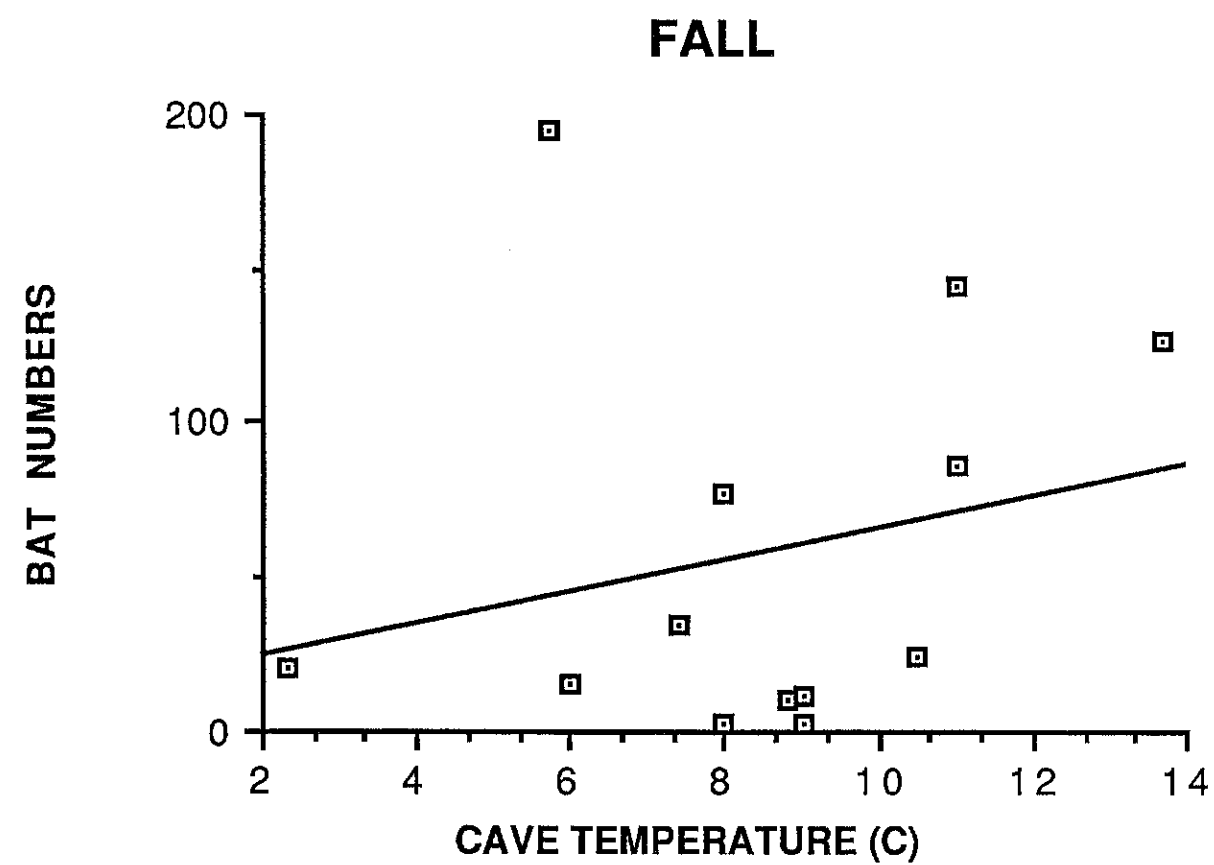


Figure 5. Relationship between bat numbers and cave temperature during the mid-winter census.

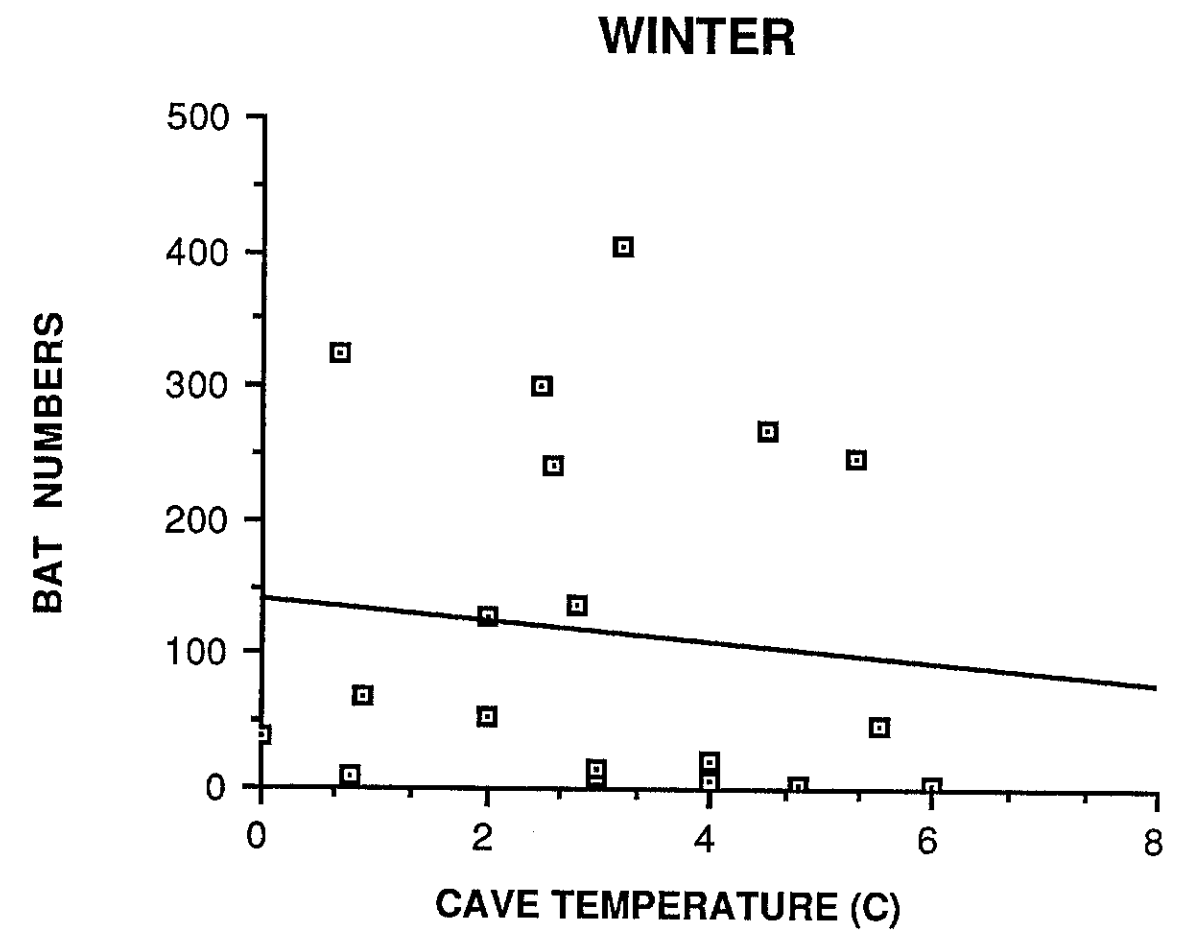


Figure 6. Relationship between bat numbers and cave temperature during the spring census.

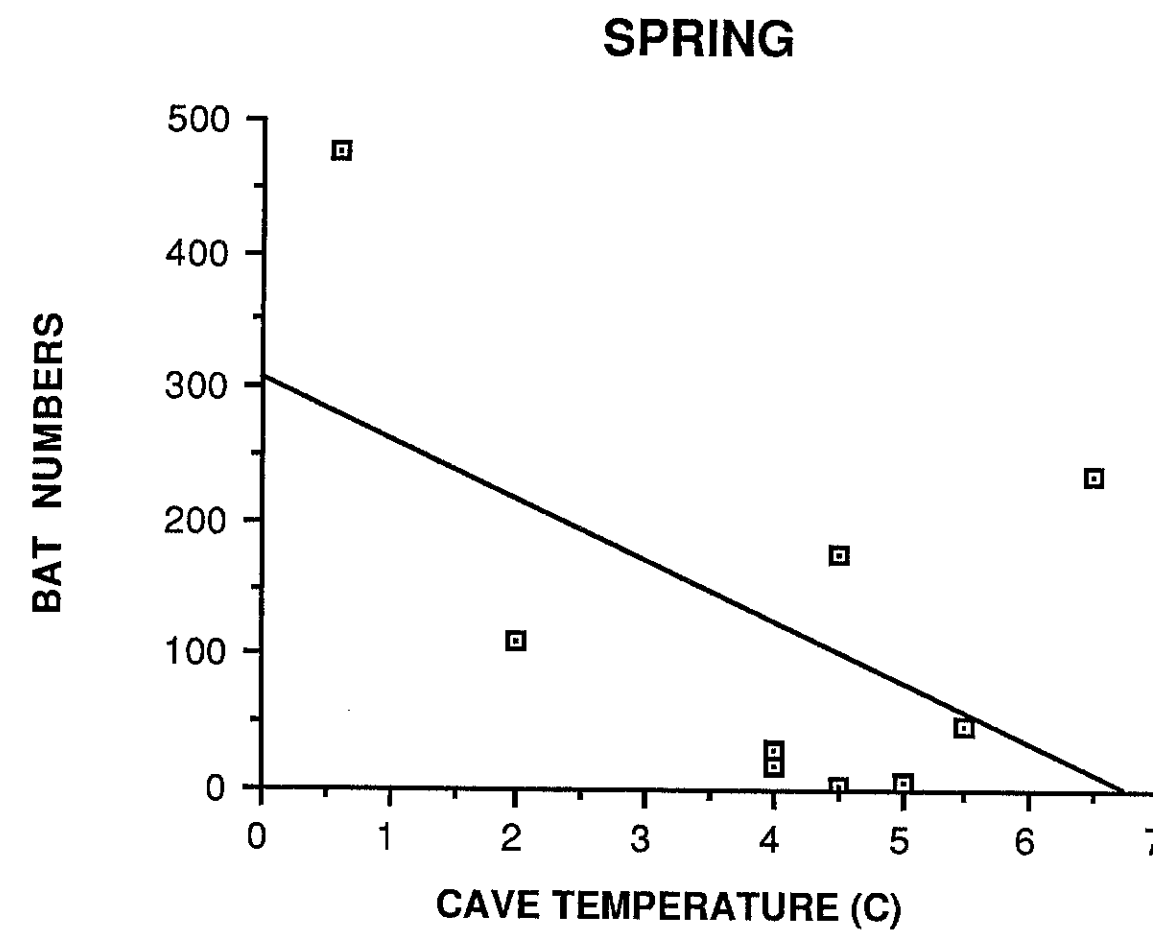
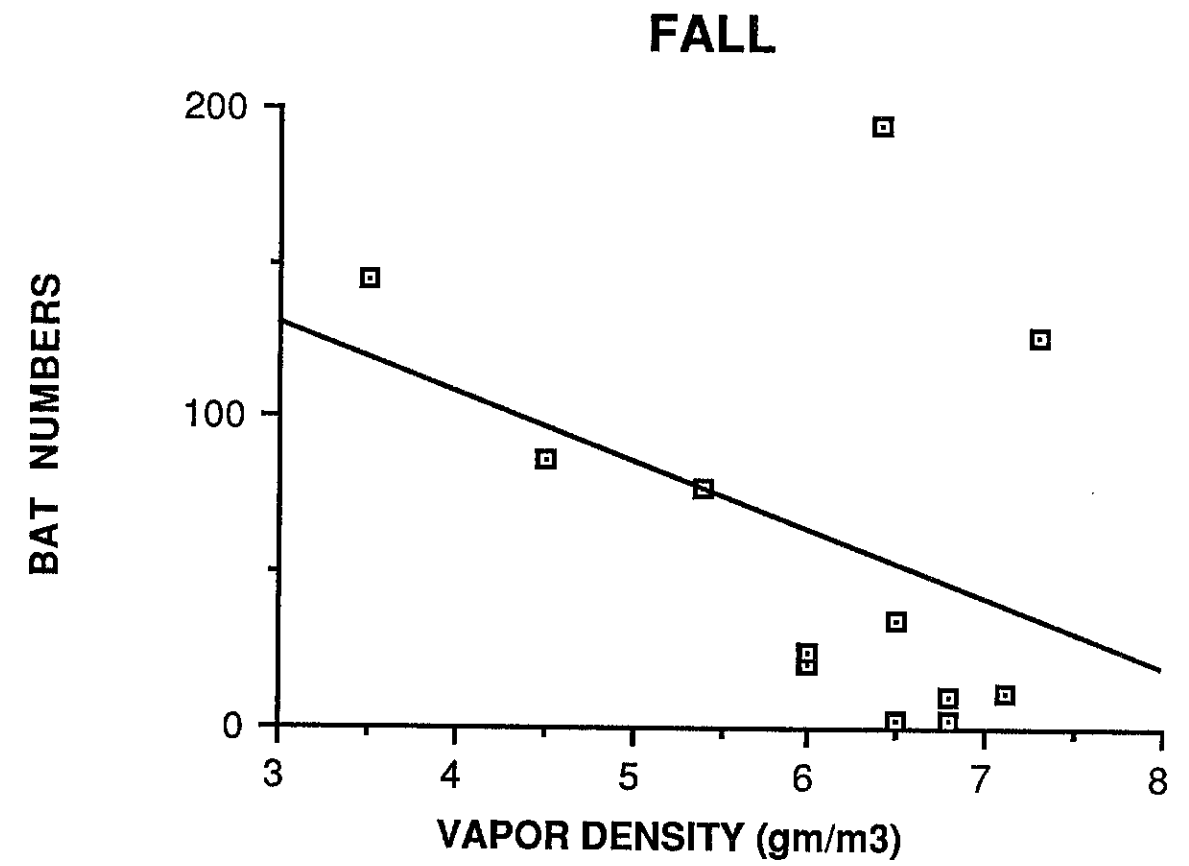


Figure 7. Relationship between bat numbers and cave absolute humidity (vapor density) during the fall census.



mid-winter absolute humidity, $r=0.24$, $p>0.20$ (Fig. 8).

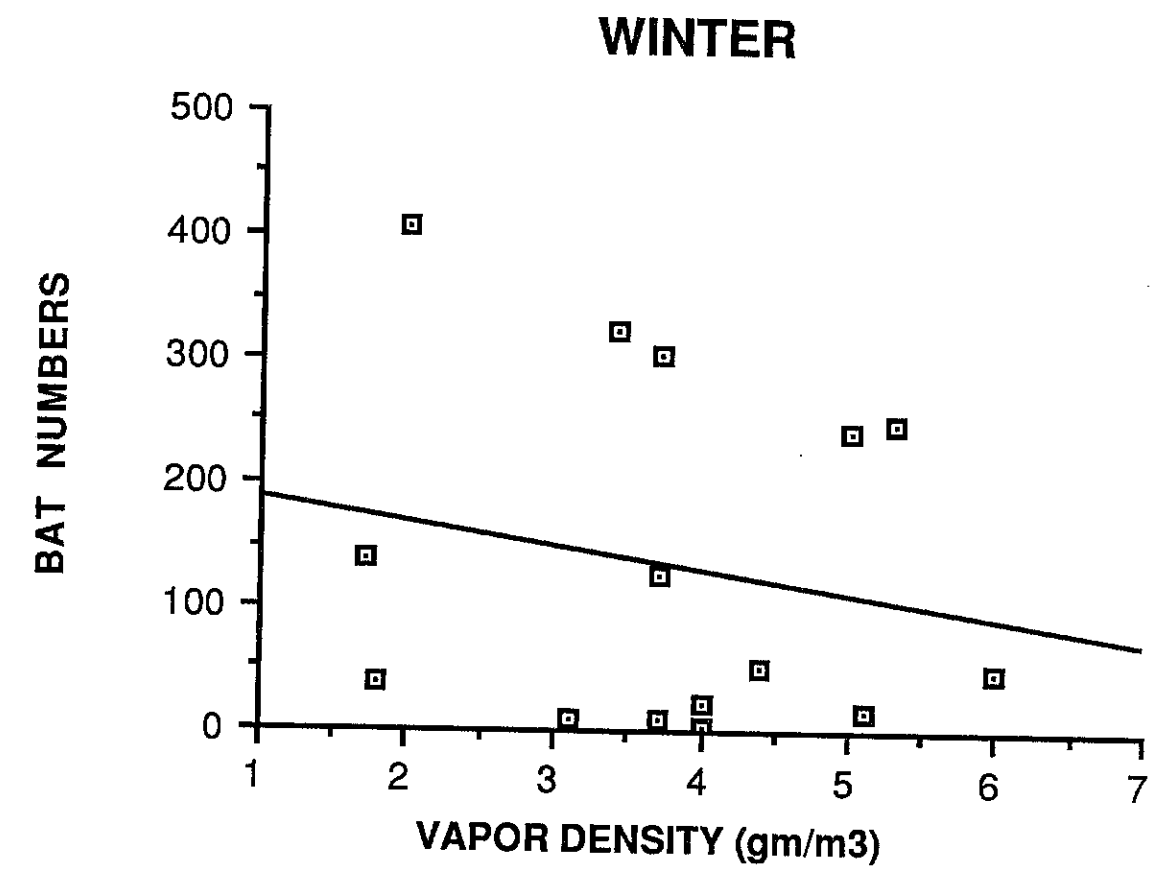
Although bats are suggested to select specific microclimates within caves as roost sites during hibernation (Twente 1955b), they did not appear to roost in higher numbers in caves of specific temperatures or relative humidities. The cave temperature and absolute humidity in fall does not seem to influence the number of bats occupying it, nor does the cave winter temperature and absolute humidity. There does appear to be a tendency for cave temperature in the spring to affect bat numbers, with colder caves having more bats. Perhaps cave temperature is one cue for the exit of bats from their hibernacula. Another possibility is that bats hibernating in colder caves use less of their fat reserves, thus can afford to stay in torpor later into the spring.

Weight Dynamics

The mean weight of female *P. townsendii* in southern Idaho in the fall was $13.6 \text{ gm} \pm 0.09 \text{ (SE)}$ ($n=103$). The mean male weight was $11.1 \text{ gm} \pm 0.09 \text{ (SE)}$ ($n=30$). This is a highly significant difference ($p=0.0001$) in weight between sexes going into the hibernation period. The mean weight of females in the spring was $10.4 \text{ gm} \pm 0.06 \text{ (SE)}$ ($n=240$) and for males it was $8.8 \text{ gm} \pm 0.04 \text{ (SE)}$ ($n=200$). The difference in weight between the sexes is also significant ($p=0.0001$).

The amount of weight lost over the winter was

Figure 8. Relationship between bat numbers and cave absolute humidity (vapor density) during the mid-winter census.



significantly different ($p=0.0008$) for the two sexes. Females lost an average of $3.0 \text{ gm} \pm 0.08 \text{ (SE)}$ ($n=43$). Males lost an average of $2.4 \text{ gm} \pm 0.18 \text{ (SE)}$ ($n=10$). Females lost an average of $21.9 \% \pm 0.52 \text{ (SE)}$ ($n=43$) of their fall body weight by spring. Males lost $21.5 \% \pm 1.58 \text{ (SE)}$ ($n=10$) of their fall body weight by spring. The percent body weight lost was not significantly different ($p=0.35$) for females and males.

Williams and Findley (1979) note that there are reports of sexual dimorphism in bats but few statistical comparisons of these differences exist. They investigated sexual dimorphism in bats by measuring 4 body length parameters. Male and female *P. townsendii* were significantly different from each other in their forearm length. In this study, southern Idaho male and female *P. townsendii* appear to be sexually dimorphic in body weight with females significantly heavier than males. Males and females do not lose a significantly different percent of body weight over winter. The difference in weight of males and females cannot be attributed to pregnancy of females because this species exhibits delayed fertilization of the egg until spring (Pearson et al. 1952).

Humphreys and Kunz (1976) report a weight loss of 55 % and 57 % of prehibernation body weight for male and female *P. townsendii*, respectively. They explain this as a result of the high energetic cost of frequent movements during the

hibernation period. The results of this study show a considerably lower percent weight loss of 21.5 and 21.9 for males and females respectively. This difference in weight loss for the two studies may be explained by the fact that the above investigators measured weight at regular intervals through the winter, while bats in my study were left undisturbed through the winter. In my study frequent movements were not observed and bats did not suffer the high cost of going in and out of torpor because of disturbance, therefore, mass loss was low.

Sex Ratios

Thirty males and 103 females were banded in caves during fall 1987 (Table 6). The proportion of males in caves ranged from 0 to 36 % and that of females from 64 % to 100 %. A ratio of 1:3.4 (male:female) was found in the fall among the bats examined. This ratio is significantly different ($p = 0.0001$) from an expected 50:50 ratio. Two hundred males and 240 females were banded or recaptured in the spring, 1988 (Table 6). The proportion of males in the caves ranged from 17 % to 67 % and that of females ranged from 33 % to 83 %. Most cave populations were approaching a 1:1 sex ratio and an overall ratio of 1:1.2 (males:females) was found in the bats examined.

The sex ratio of P. townsendii is equal at birth (Pearson et al. 1952). Pearson et al. (1952) point out

Table 6. Proportion of male and female *P. townsendii* captured in caves in fall 1987 and 1988 and spring 1988. Value in parenthesis is the number of individuals captured.

CAVE	DATE	TOTAL	% MALES	% FEMALES
<u>FALL</u>				
West Rattlesnake	10/17/87	30	27 (8)	73 (22)
	10/20/88	18	11 (2)	89 (16)
Middle Butte	10/17/87	7	29 (2)	71 (5)
North Tower	10/22/87	3	0 (0)	100 (3)
Big Arch	10/24/87	50	36 (18)	64 (32)
Gypsum	10/8/87	8	12.5 (1)	87.5 (7)
Owl	10/12/87	12	0 (0)	100 (12)
East Wedge Butte	10/18/87	9	0 (0)	100 (9)
West Wedge Butte	10/18/87	12	0 (0)	100 (12)
<u>SPRING</u>				
West Rattlesnake	3/26/88	40	47.5 (19)	52.5 (21)
East Rattlesnake	3/26/88	7	29 (2)	71 (5)
Middle Butte	4/11/88	16	44 (7)	56 (9)
North Tower	4/11/88	6	17 (1)	83 (5)
Big Arch	3/12/88	114	60.5 (69)	39.5 (45)
Gypsum	3/18/88	102	40 (41)	60 (61)
Owl	3/6/88	66	38 (25)	62 (41)
East Wedge Butte	3/20/88	3	67 (2)	33 (1)
West Wedge Butte	3/20/88	48	29 (14)	71 (34)
Pot-of-Gold	3/28/88	30	57 (17)	43 (13)

that because of differences in behavior of the sexes, adult sex ratios cannot be accurately measured. Contrasting data however, have been reported on the sex ratios of hibernating bats. Phillips (1966) found that, in Kansas in the fall, male E. fuscus outnumber females in caves. Davis (1959) reports eastern pipestrelles hibernating in West Virginia at a 4:1 ratio of males to females. By contrast Humphreys and Kunz (1976) found that female P. townsendii outnumbered males more than 2:1 all winter except in January, when they approached equal proportions. In southern Idaho female P. townsendii outnumbered males over 3:1 in the fall as bats were entering hibernation, but the ratio was nearly 1:1 in the spring just before bats emerged from their hibernacula. It is possible that in Idaho the sexes differentially occupy roosts outside of caves in the fall, as suggested by Humphreys and Kunz (1976) for this species in Kansas. However, by spring both sexes are using caves in near equal proportions, possibly because the harsher winters of southern Idaho make roosting outside of caves detrimental to this species.

RECOMMENDATIONS

Now that some baseline data are available for hibernating populations of P. townsendii, it would be advisable to proceed with annual censusing of caves to determine population trends. This should be done in December or January when cave populations are generally at their peak. Additionally the recreational use of caves on public lands should be monitored by sign-in registers. The bat population and public use data can then be used to determine the need of more intensive management of the species and the caves they use as hibernacula. While P. townsendii populations appear stable in southern Idaho, the status of the populations should be monitored carefully and measures to limit disturbance should be taken. This would prevent population losses in Idaho such as those which have led to the species being listed as endangered in the east and its possible threatened status in the northwest.

Because several caves did not contain bats or had small numbers of bats, further research should be undertaken to determine what factors make lava-caves suitable hibernacula. Possibilities might include an intensive analysis of environmental and physical variability within the cave, as well as geological and environmental features of the area in proximity to the cave.

Because P. townsendii appear localized seasonally and

do not readily exchange caves in this area, a catastrophic event in one cave could affect the population of that area. Probably the most detrimental affect on hibernating bats is human disturbance, particularly malicious vandalism intended to destroy bats. Further research comparing populations exposed to the impacts of human disturbance with populations which have limited disturbance is warranted. The INEL has been closed to the public for many years making it an ideal location for long-term studies of bat populations. Human entrance into most INEL caves is limited, the exception being those caves south of Highway 20, which are patrolled less intensively by INEL Security. Additionally the INEL would be an appropriate area to test differing gating systems which would be effective as well as safe for P. townsendii. Tuttle (1977) recommends gates with horizontal bars at least 6 inches apart and vertical bars no less than 2 feet apart. Additionally, gates should be constructed so they do not obstruct air flow into the cave. The INEL could also serve as an area to implement management practices such as the trapping and transplanting bats, as this may prove necessary in the future if populations decline dramatically.

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Caves surveyed and locations mist netted.

LOCATION	SPECIES
<u>INEL</u>	
West Rattlesnake Cave T3N,R32E,S25,NE1/4,NE1/4	<u>Plecotus townsendii</u> <u>Myotis leibii</u>
East Rattlesnake Cave T3N,R32E,S25,NE1/4,NE1/4	<u>P. townsendii</u>
Middle Butte Cave ¹	<u>P. townsendii</u> <u>M. leibii</u>
North Tower Cave T3N,R33E,S28,SE1/4,SE1/4	<u>P. townsendii</u>
EBRII Cave III T3N,R33E,S18,SW1/4,SW1/4	<u>P. townsendii</u>
Moonshiners Cave T2N,R32E,S28,SE1/4,SE1/4	<u>P. townsendii</u>
West Aviator Cave ¹	<u>P. townsendii</u> <u>M. leibii</u>
East Aviator Cave ¹	<u>P. townsendii</u>
College Cave ¹	
EBRII Cave I T3N,R32E,S24,NE1/4,NE1/4	
EBRII Cave II T3N,R32E,S19,NE1/4,NW1/4	
NRF pond T4N,R30E,S20,SW1/4,SW1/4	
EBRII pond T3N,R32E,S11,SE1/4SE1/4	
Frenchman's Cabin pond T1N,R29E,S9,SE1/4,SE1/4	

Appendix A continued

LGC

Big Arch Cave T4S,R17E,S1,SW1/4,SW1/4	<u>P. townsendii</u>
Gypsum Cave T4S,R16E,S10,NE1/4,SW1/4	<u>P. townsendii</u> <u>M. leibii</u>
Owl Cave T5S,R14E,S6,NW1/4,SE1/4	<u>P. townsendii</u>
East Wedge Butte Cave T2S,R18E,S13,SW1/4,SW1/4	<u>P. townsendii</u> <u>M. yumanensis</u>
West Wedge Butte Cave T2S,R18E,S13,SW1/4,SW1/4	<u>P. townsendii</u> <u>M. leibii</u>
Pot-of-Gold Cave T4S,R17E,S1,SW1/4,SW1/4	<u>P. townsendii</u>
Octopus Cave T5S,R14E,S6,NW1/4,SE1/4	<u>P. townsendii</u>
Maze Cave T4S,R17E,S14,NW1/4,NW1/4	<u>P. townsendii</u> <u>M. leibii</u>
Thorn Creek Reservoir T3S,R16E,S6,NE1/4,SE1/4	<u>M. lucifugus</u> <u>M. leibii</u> <u>M. evotis</u>
McHann Reservoir T2S,R15E,S22,NW1/4,SE1/4	<u>M. leibii</u>
Malad Gorge T6S,R13E,S26,SW1/4,SW1/4	<u>Antrozous pallidus</u> <u>Pipistrellus hesperus</u>
House Richfield Canal T2S,R18E,S29,NW1/4,SW1/4	<u>M. lucifugus</u>
House North Jerome T8S,R17E,S9	<u>Lasionycteris noctivagans</u>
unnamed caves (2) T3S,R18E,S16,NE1/4,SW1/4	
Little Arch Cave T4S,R17E,S11,SE1/4,SW1/4	

T-Cave

T4S,R17E,S14,NW1/4,NW1/4

Dead Horse Cave

T5S,R14E,S6,SE1/4,SW1/4

Wagon Butte Cave

T2S,R22E,S26,SW1/4,NE1/4

Black Ridge Caves (4)

T5S,R21E,S4,NE1/4; T4S,R21E,S33,SE1/4

Niagara Springs ponds

T8S,R15E,S4,SW1/4,SW1/4

Homestead Reservoir

T4S,R15E,S22,SE1/4,SW1/4

Summit Reservoir

T2S,R17E,S18,SW1/4

Restricted information. Contact the Research Ecologist at
the Radiological and Environmental Science Laboratory, INEL.

APPENDIX B

CAPTURE AND BANDING RECORD OF PLECOTUS TOWNSENSII

DATE CAPT.	CAVE LOCATION	DATE RECAPT.	LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT	RECAPT. WEIGHT
060187	MOONSHINERS			RED	115	M	9.2	
061287	OWL			BLUE	183	M	9.5	
100887	GYPSUM	031888	GYPSUM	YELLOW	9	F	14.9	11.0
100887	GYPSUM			YELLOW	10	F	13.1	
100887	GYPSUM	031888	GYPSUM	YELLOW	11	F	14.0	10.2
100887	GYPSUM			YELLOW	12	F	13.1	
100887	GYPSUM	031888	GYPSUM	YELLOW	13	F	13.4	10.1
100887	GYPSUM			YELLOW	14	F	11.5	
100887	GYPSUM	031888	GYPSUM	YELLOW	15	F	12.1	9.1
100887	GYPSUM					F	15.2	
100987	OWL			YELLOW	16	M	11.0	
100987	OWL			YELLOW	17	F	14.7	
100987	OWL			YELLOW	18	F	14.6	
100987	OWL	030688	OWL	YELLOW	19	F	13.4	10.9
100987	OWL			YELLOW	20	F	14.3	
100987	OWL	030688	OWL	YELLOW	21	F	14.4	
100987	OWL			YELLOW	22	F	14.1	11.5
100987	OWL			YELLOW	23	F	13.9	
100987	OWL			YELLOW	24	F	13.8	
100987	OWL	030688	OWL	YELLOW	25	F	14.9	11.5
100987	OWL	030688	OWL	YELLOW	26	F	14.1	11.4
100987	OWL	030688	OWL	YELLOW	27	F	13.0	10.0
100687	OWL			YELLOW	28	F	13.8	
101787	W.RATTLESNAKE			RED	1	M	10.7	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	2	F	13.5	10.3
101787	W.RATTLESNAKE			RED	3	F	13.4	
101787	W.RATTLESNAKE			RED	4	M	10.3	
101787	W.RATTLESNAKE			RED	5	F	13.0	
101787	W.RATTLESNAKE			RED	6	M	10.9	
101787	W.RATTLESNAKE			RED	7	M	10.9	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	8	F	13.6	9.8
101787	W.RATTLESNAKE			RED	9	M	11.0	
101787	W.RATTLESNAKE			RED	10	M	11.5	
101787	W.RATTLESNAKE			RED	11	F	13.0	
101787	W.RATTLESNAKE			RED	12	F	12.3	
101787	W.RATTLESNAKE			RED	13	F	13.6	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	14	F	11.4	9.3
101787	W.RATTLESNAKE			RED	15	F	12.1	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	16	F	12.9	10.3
101787	W.RATTLESNAKE			RED	17	F	12.3	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	18	M	11.2	8.0
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	19	F	12.1	10.0
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	20	F	14.0	11.4
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	21	F	12.5	9.3
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	22	M	12.6	8.8
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	23	F	13.4	9.6
101787	W.RATTLESNAKE			RED	24	F	13.2	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	25	F	12.9	10.5
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	26	F	13.4	11.0
101787	W.RATTLESNAKE			RED	27	F	12.8	9.5
101787	W.RATTLESNAKE			RED	28	F	11.7	
101787	W.RATTLESNAKE	032688	W.RATTLESNAKE	RED	29	F	13.9	10.4
101787	W.RATTLESNAKE					M	11.5	
101787	W.RATTLESNAKE			RED	30	F	13.1	
101787	MIDDLE BUTTE			RED	31	M	10.8	
101787	MIDDLE BUTTE			RED	32	F	13.6	
101787	MIDDLE BUTTE			RED	33	F	12.2	

DATE CAPT.	CAVE LOCATION	DATE RECAPT.	LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT	RECAPT. WEIGHT
101787	MIDDLE BUTTE	041188	MIDDLE BUTTE	RED	34	F	13.6	10.6
101787	MIDDLE BUTTE			RED	35	F	13.0	
101787	MIDDLE BUTTE			RED	36	M	10.7	
101787	MIDDLE BUTTE			RED	37	F	12.7	
101887	E.WEDGE BUTTE			YELLOW	29	F	14.2	
101887	E.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	30	F	14.0	10.4
101887	E.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	31	F	13.1	10.0
101887	E.WEDGE BUTTE			YELLOW	32	F	15.3	
101887	E.WEDGE BUTTE			YELLOW	33	F	14.2	
101887	E.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	34	F	14.6	10.9
101887	E.WEDGE BUTTE	032088	E.WEDGE BUTTE	YELLOW	35	F	12.8	10.3
101887	E.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	36	F	14.5	11.0
101887	E.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	37	F	14.6	11.1
101887	W.WEDGE BUTTE			YELLOW	38	F	13.6	
101887	W.WEDGE BUTTE			YELLOW	39	F	15.4	
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	40	F	14.8	11.6
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	41	F	13.7	10.1
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	42	F	15.6	12.8
101887	W.WEDGE BUTTE			YELLOW	43	F	13.6	
101887	W.WEDGE BUTTE			YELLOW	44	F	14.5	
101887	W.WEDGE BUTTE			YELLOW	45	F	12.6	
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	47	F	13.3	10.5
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	48	F	15.3	12.0
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	49	F	14.4	11.4
101887	W.WEDGE BUTTE	032088	W.WEDGE BUTTE	YELLOW	50	F	14.1	10.7
102287	NORTH TOWER			RED	38	F	11.0	
102287	NORTH TOWER	041188	NORTH TOWER	RED	39	F	14.7	11.4
102287	NORTH TOWER	041188	NORTH TOWER	RED	40	F	13.7	11.4
102387	BIG ARCH			YELLOW	51	M	11.4	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	52	M	10.4	8.6
102387	BIG ARCH			YELLOW	53	F	13.2	
102387	BIG ARCH			YELLOW	54	M	10.5	
102387	BIG ARCH			YELLOW	55	F	14.9	
102387	BIG ARCH			YELLOW	56	F	13.1	
102387	BIG ARCH			YELLOW	57	F	14.5	
102387	BIG ARCH			YELLOW	58	F	14.1	
102387	BIG ARCH			YELLOW	59	F	13.0	
102387	BIG ARCH			YELLOW	60	F	14.3	
102387	BIG ARCH			YELLOW	61	F	14.0	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	62	F	12.7	10.6
102387	BIG ARCH	031288	BIG ARCH	YELLOW	63	F	13.4	11.0
102387	BIG ARCH	031288	BIG ARCH	YELLOW	64	F	15.0	11.5
102387	BIG ARCH			YELLOW	65	F	13.1	
102387	BIG ARCH			YELLOW	66	F	13.1	
102387	BIG ARCH			YELLOW	67	M	11.4	
102387	BIG ARCH			YELLOW	68	F	13.6	
102387	BIG ARCH			YELLOW	69	F	12.1	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	70	F	14.1	11.0
102387	BIG ARCH			YELLOW	71	F	14.6	
102387	BIG ARCH			YELLOW	72	F	14.1	
102387	BIG ARCH			YELLOW	73	F	14.7	
102387	BIG ARCH			YELLOW	74	F	13.2	
102387	BIG ARCH			YELLOW	75	F	15.1	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	76	F	13.4	11.0
102387	BIG ARCH			YELLOW	77	M	10.3	
102387	BIG ARCH			YELLOW	78	F	13.0	
102387	BIG ARCH			YELLOW	79	M	10.4	
102387	BIG ARCH			YELLOW	80	M	11.0	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	81	M	11.3	9.6
102387	BIG ARCH	031288	BIG ARCH	YELLOW	82	M	11.1	9.0
102387	BIG ARCH	031288	BIG ARCH	YELLOW	83	M	10.4	8.4
102387	BIG ARCH			YELLOW	84	F	12.2	
102387	BIG ARCH			YELLOW	85	F	14.0	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	86	F	12.9	10.7
102387	BIG ARCH	031288	BIG ARCH	YELLOW	87	M	11.2	8.6
102387	BIG ARCH			YELLOW	88	F	14.6	
102387	BIG ARCH			YELLOW	89	M	11.7	
102387	BIG ARCH			YELLOW	90	F	14.5	

DATE CAPT.	CAVE LOCATION	DATE RECAPT.	LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT	RECAPT. WEIGHT
102387	BIG ARCH			YELLOW	91	F	13.2	
102387	BIG ARCH			YELLOW	92	F	13.3	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	93	M	11.4	8.7
102387	BIG ARCH			YELLOW	94	F	14.0	
102387	BIG ARCH			YELLOW	95	M	11.1	
102387	BIG ARCH			YELLOW	96	F	13.5	
102387	BIG ARCH			YELLOW	97	M	11.4	
102387	BIG ARCH	031288	BIG ARCH	YELLOW	98	M	11.0	9.1
102387	BIG ARCH	031288	BIG ARCH	YELLOW	99	M	11.5	9.0
102387	BIG ARCH			YELLOW	100	M	10.8	
030688	OWL			WHITE	1	F	10.5	
030688	OWL			WHITE	2	F	11.7	
030688	OWL			WHITE	3	M	9.1	
030688	OWL			WHITE	4	M	9.0	
030688	OWL			WHITE	5	M	9.1	
030688	OWL			WHITE	7	F	13.1	
030688	OWL			WHITE	8	F	11.4	
030688	OWL			WHITE	10	F	11.0	
030688	OWL			WHITE	11	F	10.4	
030688	OWL			WHITE	12	F	10.5	
030688	OWL			WHITE	13	M	9.3	
030688	OWL			WHITE	14	M	8.9	
030688	OWL			WHITE	15	F	11.3	
030688	OWL			WHITE	16	M	9.0	
030688	OWL			WHITE	17	F	10.2	
030688	OWL			WHITE	18	F	10.6	
030688	OWL			WHITE	19	M	8.9	
030688	OWL			WHITE	20	F	9.2	
030688	OWL			WHITE	21	M	9.1	
030688	OWL			WHITE	22	F	10.6	
030688	OWL			WHITE	23	M	9.0	
030688	OWL			WHITE	24	M	9.1	
030688	OWL			WHITE	25	F	10.5	
030688	OWL			WHITE	26	F	11.0	
030688	OWL			WHITE	27	M	9.3	
030688	OWL			WHITE	28	M	9.5	
030688	OWL			WHITE	29	F	11.3	
030688	OWL			WHITE	31	F	12.0	
030688	OWL			WHITE	32	F	10.3	
030688	OWL			WHITE	33	F	9.4	
030688	OWL			WHITE	34	F	9.6	
030688	OWL			WHITE	35	F	10.7	
030688	OWL			WHITE	36	M	10.3	
030688	OWL			WHITE	37	F	9.5	
030688	OWL			WHITE	38	F	9.7	
030688	OWL			WHITE	41	F	10.3	
030688	OWL			WHITE	42	M	9.7	
030688	OWL			WHITE	43	M	9.5	
030688	OWL			WHITE	44	F	11.4	
030688	OWL			WHITE	45	F	11.2	
030688	OWL			WHITE	47	M	9.2	
030688	OWL			WHITE	48	F	10.4	
030688	OWL			WHITE	49	F	10.5	
030688	OWL			WHITE	50	F	9.4	
030688	OWL			WHITE	51	M	9.3	
030688	OWL			WHITE	52	M	8.7	
030688	OWL			WHITE	53	M	9.0	
030688	OWL			WHITE	54	M	8.7	
030688	OWL			WHITE	55	M	9.1	
030688	OWL			WHITE	56	M	8.6	
030688	OWL			WHITE	57	F	10.0	
030688	OWL			WHITE	58	F	11.1	
030688	OWL			WHITE	59	F	10.4	
030688	OWL			WHITE	60	F	10.2	
030688	OWL			WHITE	61	M	8.1	
030688	OWL			WHITE	63	M	9.1	
030688	OWL			WHITE	64	F	11.0	

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
030688	OWL	WHITE	65	M	9.1
030688	OWL	WHITE	67	F	11.7
030688	OWL	WHITE	68	F	10.2
030688	OWL	WHITE	69	F	12.0
031288	BIG ARCH	YELLOW	101	M	9.6
031288	BIG ARCH	YELLOW	102	M	8.6
031288	BIG ARCH	YELLOW	103	F	11.3
031288	BIG ARCH	YELLOW	104	F	10.1
031288	BIG ARCH	YELLOW	105	M	10.0
031288	BIG ARCH	YELLOW	106	M	9.4
031288	BIG ARCH	YELLOW	107	M	8.8
031288	BIG ARCH	YELLOW	108	F	11.5
031288	BIG ARCH	YELLOW	109	F	8.6
031288	BIG ARCH	YELLOW	110	F	11.0
031288	BIG ARCH	YELLOW	111	F	11.2
031288	BIG ARCH	YELLOW	112	M	8.7
031288	BIG ARCH	YELLOW	113	M	9.6
031288	BIG ARCH	YELLOW	114	M	9.0
031288	BIG ARCH	YELLOW	115	F	11.1
031288	BIG ARCH	YELLOW	116	M	9.3
031288	BIG ARCH	YELLOW	117	F	
031288	BIG ARCH	YELLOW	118	M	9.1
031288	BIG ARCH	YELLOW	119	M	9.7
031288	BIG ARCH	YELLOW	120	F	11.4
031288	BIG ARCH	YELLOW	121	M	8.4
031288	BIG ARCH	YELLOW	122	M	8.5
031288	BIG ARCH	YELLOW	123	F	10.7
031288	BIG ARCH	YELLOW	124	F	11.1
031288	BIG ARCH	YELLOW	125	F	11.3
031288	BIG ARCH	YELLOW	126	M	8.5
031288	BIG ARCH	YELLOW	127	M	9.0
031288	BIG ARCH	YELLOW	128	M	8.7
031288	BIG ARCH	YELLOW	129	M	8.4
031288	BIG ARCH	YELLOW	130	F	11.4
031288	BIG ARCH	YELLOW	131	M	9.4
031288	BIG ARCH	YELLOW	132	M	9.2
031288	BIG ARCH	YELLOW	133	F	12.0
031288	BIG ARCH	YELLOW	134	M	8.0
031288	BIG ARCH	YELLOW	135	F	9.5
031288	BIG ARCH	YELLOW	136	M	9.3
031288	BIG ARCH	YELLOW	137	F	12.0
031288	BIG ARCH	YELLOW	138	M	9.8
031288	BIG ARCH	YELLOW	139	F	11.3
031288	BIG ARCH	YELLOW	140	M	9.5
031288	BIG ARCH	YELLOW	141	F	11.3
031288	BIG ARCH	YELLOW	142	M	9.7
031288	BIG ARCH	YELLOW	143	M	9.2
031288	BIG ARCH	YELLOW	144	F	10.8
031288	BIG ARCH	YELLOW	145	F	11.0
031288	BIG ARCH	YELLOW	146	F	11.4
031288	BIG ARCH	YELLOW	147	F	11.1
031288	BIG ARCH	YELLOW	148	M	9.1
031288	BIG ARCH	YELLOW	149	F	9.8
031288	BIG ARCH	YELLOW	150	F	11.6
031288	BIG ARCH	YELLOW	151	F	11.9
031288	BIG ARCH	YELLOW	152	F	12.0
031288	BIG ARCH	YELLOW	153	M	8.9
031288	BIG ARCH	YELLOW	154	M	9.5
031288	BIG ARCH	YELLOW	155	F	12.3
031288	BIG ARCH	YELLOW	156	F	10.2
031288	BIG ARCH	YELLOW	157	M	9.4
031288	BIG ARCH	YELLOW	158	M	9.3
031288	BIG ARCH	YELLOW	159	M	9.1
031288	BIG ARCH	YELLOW	160	M	9.5
031288	BIG ARCH	YELLOW	161	M	9.4
031288	BIG ARCH	YELLOW	162	F	11.6
031288	BIG ARCH	YELLOW	163	F	12.2

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
031288	BIG ARCH	YELLOW	164	M	8.7
031288	BIG ARCH	YELLOW	165	F	11.5
031288	BIG ARCH	YELLOW	166	F	11.4
031288	BIG ARCH	YELLOW	167	M	9.1
031288	BIG ARCH	YELLOW	168	F	11.2
031288	BIG ARCH	YELLOW	169	F	11.8
031288	BIG ARCH	YELLOW	170	M	9.2
031288	BIG ARCH	YELLOW	171	M	8.9
031288	BIG ARCH	YELLOW	172	M	8.9
031288	BIG ARCH	YELLOW	173	M	8.4
031288	BIG ARCH	YELLOW	174	M	9.8
031288	BIG ARCH	YELLOW	175	M	8.9
031288	BIG ARCH	YELLOW	176	M	8.7
031288	BIG ARCH	YELLOW	177	M	8.4
031288	BIG ARCH	YELLOW	178	F	10.9
031288	BIG ARCH	YELLOW	179	M	8.8
031288	BIG ARCH	YELLOW	180	M	9.2
031288	BIG ARCH	YELLOW	181	M	8.4
031288	BIG ARCH	YELLOW	182	M	10.0
031288	BIG ARCH	YELLOW	183	M	8.7
031288	BIG ARCH	YELLOW	184	M	9.0
031288	BIG ARCH	YELLOW	185	M	8.9
031288	BIG ARCH	YELLOW	186	M	8.4
031288	BIG ARCH	YELLOW	187	F	8.7
031288	BIG ARCH	YELLOW	188	F	11.2
031288	BIG ARCH	YELLOW	189	M	8.0
031288	BIG ARCH	YELLOW	190	M	9.0
031288	BIG ARCH	YELLOW	191	F	13.3
031288	BIG ARCH	YELLOW	192	M	9.3
031288	BIG ARCH	YELLOW	193	M	8.6
031288	BIG ARCH	YELLOW	194	M	8.7
031288	BIG ARCH	YELLOW	195	M	9.0
031288	BIG ARCH	YELLOW	196	M	8.5
031288	BIG ARCH	YELLOW	197	M	7.9
031288	BIG ARCH	YELLOW	198	M	8.8
031288	BIG ARCH	YELLOW	199	M	9.4
031288	BIG ARCH	YELLOW	200	F	11.3
031888	GYPSUM	ORANGE	2	F	9.2
031888	GYPSUM	ORANGE	4	M	8.0
031888	GYPSUM	ORANGE	5	M	9.1
031888	GYPSUM	ORANGE	7	M	8.6
031888	GYPSUM	ORANGE	8	F	8.9
031888	GYPSUM	ORANGE	10	M	9.4
031888	GYPSUM	ORANGE	11	F	10.1
031888	GYPSUM	ORANGE	12	F	10.4
031888	GYPSUM	ORANGE	13	M	8.5
031888	GYPSUM	ORANGE	14	M	8.6
031888	GYPSUM	ORANGE	15	F	10.4
031888	GYPSUM	ORANGE	16	M	8.9
031888	GYPSUM	ORANGE	17	F	10.0
031888	GYPSUM	ORANGE	18	F	10.7
031888	GYPSUM	ORANGE	19	F	9.1
031888	GYPSUM	ORANGE	20	F	9.9
031888	GYPSUM	ORANGE	21	F	10.3
031888	GYPSUM	ORANGE	22	M	8.5
031888	GYPSUM	ORANGE	23	F	10.2
031888	GYPSUM	ORANGE	25	M	8.8
031888	GYPSUM	ORANGE	26	F	9.4
031888	GYPSUM	ORANGE	27	F	10.3
031888	GYPSUM	ORANGE	28	F	10.3
031888	GYPSUM	ORANGE	29	F	10.4
031888	GYPSUM	ORANGE	30	M	8.6
031888	GYPSUM	ORANGE	31	M	8.5
031888	GYPSUM	ORANGE	32	M	7.9
031888	GYPSUM	ORANGE	33	F	9.9
031888	GYPSUM	ORANGE	34	F	10.5
031888	GYPSUM	ORANGE	35	F	9.4

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
031888	GYPSUM	ORANGE	36	F	10.4
031888	GYPSUM	ORANGE	37	F	10.0
031888	GYPSUM	ORANGE	38	M	8.8
031888	GYPSUM	ORANGE	39	F	10.2
031888	GYPSUM	ORANGE	40	M	8.1
031888	GYPSUM	ORANGE	41	M	8.0
031888	GYPSUM	ORANGE	42	F	9.6
031888	GYPSUM	ORANGE	43	F	9.5
031888	GYPSUM	ORANGE	44	F	10.0
031888	GYPSUM	ORANGE	45	F	9.3
031888	GYPSUM	ORANGE	46	M	8.1
031888	GYPSUM	ORANGE	47	F	9.6
031888	GYPSUM	ORANGE	48	M	8.5
031888	GYPSUM	ORANGE	49	F	9.5
031888	GYPSUM	ORANGE	50	F	9.4
031888	GYPSUM	ORANGE	51	F	9.8
031888	GYPSUM	ORANGE	53	F	10.7
031888	GYPSUM	ORANGE	54	F	9.6
031888	GYPSUM	ORANGE	55	F	10.5
031888	GYPSUM	ORANGE	56	F	9.9
031888	GYPSUM	ORANGE	52	F	10.5
031888	GYPSUM	ORANGE	57	M	8.0
031888	GYPSUM	ORANGE	58	F	11.2
031888	GYPSUM	ORANGE	60	F	9.1
031888	GYPSUM	ORANGE	61	F	10.0
031888	GYPSUM	ORANGE	62	M	8.9
031888	GYPSUM	ORANGE	63	F	11.0
031888	GYPSUM	ORANGE	64	M	9.2
031888	GYPSUM	ORANGE	65	F	10.1
031888	GYPSUM	ORANGE	66	F	10.0
031888	GYPSUM	ORANGE	67	M	8.2
031888	GYPSUM	ORANGE	68	M	8.3
031888	GYPSUM	ORANGE	70	M	9.9
031888	GYPSUM	ORANGE	71	F	10.8
031888	GYPSUM	ORANGE	72	M	8.4
031888	GYPSUM	ORANGE	73	M	9.0
031888	GYPSUM	ORANGE	74	M	9.4
031888	GYPSUM	ORANGE	76	F	9.7
031888	GYPSUM	ORANGE	77	F	10.1
031888	GYPSUM	ORANGE	78	M	8.4
031888	GYPSUM	ORANGE	79	M	8.3
031888	GYPSUM	ORANGE	80	F	9.1
031888	GYPSUM	ORANGE	81	F	11.1
031888	GYPSUM	ORANGE	82	M	8.5
031888	GYPSUM	ORANGE	83	F	9.9
031888	GYPSUM	ORANGE	84	M	8.4
031888	GYPSUM	ORANGE	85	F	9.5
031888	GYPSUM	ORANGE	86	F	10.0
031888	GYPSUM	ORANGE	87	M	8.1
031888	GYPSUM	ORANGE	88	M	8.3
031888	GYPSUM	ORANGE	89	M	8.5
031888	GYPSUM	ORANGE	90	F	9.2
031888	GYPSUM	ORANGE	91	M	7.5
031888	GYPSUM	ORANGE	92	M	8.0
031888	GYPSUM	ORANGE	93	M	8.4
031888	GYPSUM	ORANGE	94	F	11.3
031888	GYPSUM	ORANGE	95	F	9.9
031888	GYPSUM	ORANGE	96	F	9.6
031888	GYPSUM	ORANGE	97	M	8.5
031888	GYPSUM	ORANGE	98	F	10.3
031888	GYPSUM	ORANGE	100	F	8.9
031888	GYPSUM	ORANGE	101	M	8.4
031888	GYPSUM	ORANGE	102	F	9.3
031888	GYPSUM	ORANGE	103	F	11.1
031888	GYPSUM	ORANGE	104	F	9.8
031888	GYPSUM	ORANGE	105	M	8.4
031888	GYPSUM	ORANGE	106	M	8.5

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
031888	GYPSUM	ORANGE	107	M	8.2
032088	W.WEDGE BUTTE	LTGREEN	2	M	8.6
032088	W.WEDGE BUTTE	LTGREEN	3	F	11.4
032088	W.WEDGE BUTTE	LTGREEN	5	M	10.0
032088	W.WEDGE BUTTE	LTGREEN	7	F	10.5
032088	W.WEDGE BUTTE	LTGREEN	10	M	8.3
032088	W.WEDGE BUTTE	LTGREEN	12	F	11.1
032088	W.WEDGE BUTTE	LTGREEN	13	F	11.4
032088	W.WEDGE BUTTE	LTGREEN	14	M	8.4
032088	W.WEDGE BUTTE	LTGREEN	15	F	10.8
032088	W.WEDGE BUTTE	LTGREEN	17	M	8.4
032088	W.WEDGE BUTTE	LTGREEN	19	M	8.8
032088	W.WEDGE BUTTE	LTGREEN	21	F	10.2
032088	W.WEDGE BUTTE	LTGREEN	22	F	10.6
032088	W.WEDGE BUTTE	LTGREEN	23	F	10.9
032088	W.WEDGE BUTTE	LTGREEN	25	F	10.0
032088	W.WEDGE BUTTE	LTGREEN	26	F	9.2
032088	W.WEDGE BUTTE	LTGREEN	27	M	8.4
032088	W.WEDGE BUTTE	LTGREEN	28	F	9.8
032088	W.WEDGE BUTTE	LTGREEN	30	F	11.3
032088	W.WEDGE BUTTE	LTGREEN	31	M	8.8
032088	W.WEDGE BUTTE	LTGREEN	32	F	9.0
032088	W.WEDGE BUTTE	LTGREEN	34	F	9.7
032088	W.WEDGE BUTTE	LTGREEN	35	F	10.3
032088	W.WEDGE BUTTE	LTGREEN	36	F	10.8
032088	W.WEDGE BUTTE	LTGREEN	38	F	10.1
032088	W.WEDGE BUTTE	LTGREEN	40	M	9.0
032088	W.WEDGE BUTTE	LTGREEN	41	M	9.0
032088	W.WEDGE BUTTE	LTGREEN	42	F	9.5
032088	W.WEDGE BUTTE	LTGREEN	43	M	9.4
032088	W.WEDGE BUTTE	LTGREEN	44	M	8.4
032088	W.WEDGE BUTTE	LTGREEN	45	M	8.0
032088	W.WEDGE BUTTE	LTGREEN	49	M	10.1
032088	W.WEDGE BUTTE	LTGREEN	46	F	10.4
032088	W.WEDGE BUTTE	LTGREEN	47	F	10.0
032088	W.WEDGE BUTTE	LTGREEN	50	F	11.3
032088	W.WEDGE BUTTE	LTGREEN	52	F	10.4
032088	E.WEDGE BUTTE	REDWHIT		F	10.9
032088	E.WEDGE BUTTE	REDWHIT		M	8.6
032688	W.RATTLESNAKE	RED	41	M	8.6
032688	W.RATTLESNAKE	RED	42	M	8.6
032688	W.RATTLESNAKE	RED	43	F	9.0
032688	W.RATTLESNAKE	RED	44	F	10.5
032688	W.RATTLESNAKE	RED	45	F	10.4
032688	W.RATTLESNAKE	RED	46	F	11.4
032688	W.RATTLESNAKE	RED	47	M	8.5
032688	W.RATTLESNAKE	RED	48	F	11.2
032688	W.RATTLESNAKE	RED	49	F	10.9
032688	W.RATTLESNAKE	RED	50	F	9.7
032688	W.RATTLESNAKE	RED	51	M	8.6
032688	W.RATTLESNAKE	RED	52	M	9.7
032688	W.RATTLESNAKE	RED	53	M	
032688	W.RATTLESNAKE	RED	54	M	8.1
032688	W.RATTLESNAKE	RED	55	M	8.1
032688	W.RATTLESNAKE	RED	56	M	8.4
032688	W.RATTLESNAKE	RED	57	F	11.0
032688	W.RATTLESNAKE	RED	58	M	9.3
032688	W.RATTLESNAKE	RED	59	M	9.3
032688	W.RATTLESNAKE	RED	60	F	10.1
032688	W.RATTLESNAKE	RED	61	M	8.0
032688	W.RATTLESNAKE	RED	62	M	8.4
032688	W.RATTLESNAKE	RED	63	M	9.0
032688	W.RATTLESNAKE	RED	64	M	8.0
032688	W.RATTLESNAKE	RED	65	M	8.1
032688	W.RATTLESNAKE	RED	66	M	8.1
032688	E.RATTLESNAKE	PINK	11	F	7.2
032688	E.RATTLESNAKE	PINK	12	F	9.6

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
032688	E. RATTLESNAKE	PINK	13	F	7.6
032688	E. RATTLESNAKE	PINK	14	F	10.6
032688	E. RATTLESNAKE	PINK	15	F	7.4
032688	E. RATTLESNAKE	PINK	16	M	8.6
032688	E. RATTLESNAKE	PINK	17	M	7.9
032888	POT-OF-GOLD	DKYELL	2	M	8.4
032888	POT-OF-GOLD	DKYELL	3	F	9.8
032888	POT-OF-GOLD	DKYELL	4	M	8.5
032888	POT-OF-GOLD	DKYELL	7	F	10.3
032888	POT-OF-GOLD	DKYELL	8	F	11.4
032888	POT-OF-GOLD	DKYELL	10	M	8.6
032888	POT-OF-GOLD	DKYELL	11	M	8.7
032888	POT-OF-GOLD	DKYELL	12	F	10.4
032888	POT-OF-GOLD	DKYELL	13	F	10.0
032888	POT-OF-GOLD	DKYELL	14	F	9.6
032888	POT-OF-GOLD	DKYELL	15	F	10.4
032888	POT-OF-GOLD	DKYELL	16	M	9.3
032888	POT-OF-GOLD	DKYELL	17	F	10.8
032888	POT-OF-GOLD	DKYELL	18	M	8.0
032888	POT-OF-GOLD	DKYELL	19	M	8.1
032888	POT-OF-GOLD	DKYELL	21	M	8.7
032888	POT-OF-GOLD	DKYELL	22	F	10.2
032888	POT-OF-GOLD	DKYELL	23	F	9.0
032888	POT-OF-GOLD	DKYELL	24	F	10.4
032888	POT-OF-GOLD	DKYELL	25	F	10.4
032888	POT-OF-GOLD	DKYELL	26	F	10.0
032888	POT-OF-GOLD	DKYELL	27	M	8.1
032888	POT-OF-GOLD	DKYELL	28	M	8.3
032888	POT-OF-GOLD	DKYELL	29	M	8.5
032888	POT-OF-GOLD	DKYELL	30	M	8.3
032888	POT-OF-GOLD	DKYELL	31	M	9.2
032888	POT-OF-GOLD	DKYELL	32	M	7.8
041188	MIDDLE BUTTE	PURPLE	2	M	8.5
041188	MIDDLE BUTTE	PURPLE	3	F	10.4
041188	MIDDLE BUTTE	PURPLE	4	F	10.6
041188	MIDDLE BUTTE	PURPLE	5	F	9.4
041188	MIDDLE BUTTE	PURPLE	7	M	8.6
041188	MIDDLE BUTTE	PURPLE	8	M	9.1
041188	MIDDLE BUTTE	PURPLE	10	F	8.9
041188	MIDDLE BUTTE	PURPLE	11	F	9.0
041188	MIDDLE BUTTE	PURPLE	12	F	9.0
041188	MIDDLE BUTTE	PURPLE	13	F	9.8
041188	MIDDLE BUTTE	PURPLE	15	F	12.1
041188	MIDDLE BUTTE	PURPLE	16	M	8.4
041188	MIDDLE BUTTE	PURPLE	17	M	8.9
041188	MIDDLE BUTTE	PURPLE	18	M	7.6
041188	MIDDLE BUTTE	PURPLE	19	M	8.7
041188	NORTH TOWER	BLUE	1	M	9.0
041188	NORTH TOWER	BLUE	2	F	10.6
041188	NORTH TOWER	BLUE	4	F	10.4
041188	NORTH TOWER	BLUE	5	F	8.3
041188	W. RATTLESNAKE	RED	67	F	8.2
041188	W. RATTLESNAKE	RED	68	M	9.2
041188	W. RATTLESNAKE	RED	69	M	8.7
041188	W. RATTLESNAKE	RED	70	F	9.4
041188	W. RATTLESNAKE	RED	71	M	8.1
041188	W. RATTLESNAKE	RED	72	M	8.7
041188	W. RATTLESNAKE	RED	73	M	8.0
041188	W. RATTLESNAKE	RED	74	M	7.6
041188	W. RATTLESNAKE	RED	75	M	8.3
041188	W. RATTLESNAKE	RED	76	M	9.2
041188	W. RATTLESNAKE	RED	77	F	10.1
041188	W. RATTLESNAKE	RED	78	F	10.3
041188	W. RATTLESNAKE	RED	79	F	10.1
063088	OWL CAVE	WHITE	71	M	9.5
102088	W. RATTLESNAKE	DKGREEN	1	F	12.7
102088	W. RATTLESNAKE	DKGREEN	2	F	12.4

DATE CAPT.	CAVE LOCATION	BAND COLOR	BAND NUMBER	SEX	CAPTURE WEIGHT
102088	W.RATTLESNAKE	DKGREEN	3	M	10.3
102088	W.RATTLESNAKE	DKGREEN	4	F	11.9
102088	W.RATTLESNAKE	DKGREEN	5	F	11.4
102088	W.RATTLESNAKE	DKGREEN	7	F	14.4
102088	W.RATTLESNAKE	DKGREEN	8	F	13.6
102088	W.RATTLESNAKE	DKGREEN	10	F	13.4
102088	W.RATTLESNAKE	DKGREEN	11	F	13.3
102088	W.RATTLESNAKE	DKGREEN	12	F	12.1
102088	W.RATTLESNAKE	DKGREEN	13	F	15.4
102088	W.RATTLESNAKE	DKGREEN	14	F	14.4
102088	W.RATTLESNAKE	DKGREEN	15	F	11.7
102088	W.RATTLESNAKE	DKGREEN	16	M	13.6
102088	W.RATTLESNAKE	DKGREEN	17	F	13.0
102088	W.RATTLESNAKE	DKGREEN	18	F	13.4
102088	W.RATTLESNAKE	DKGREEN	19	F	14.3
102088	W.RATTLESNAKE	DKGREEN	20	F	11.4
011989	W.RATTLESNAKE	DKBLUE	1	F	11.5
011989	W.RATTLESNAKE	DKBLUE	2	F	11.1
011889	W.RATTLESNAKE	DKBLUE	3	F	14.3
011989	W.RATTLESNAKE	DKBLUE	4	F	11.1