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**A SURVEY OF THE BATS OF THE  
TOWNSEND RANGER DISTRICT  
HELENA NATIONAL FOREST, MONTANA**

**Final Report  
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*by*

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## INTRODUCTION

The Endangered Species Act of 1973, Section 7 (a)(2) mandates that any federal agency assure that any of its actions "(are) not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of (its) habitat" (Finch 1992). In addition, the National Forest Management Act of 1976 and United States Forest Service (USFS) policy require that the Forest Service must maintain viable populations of native vertebrates in national forests (Sec. 219 (12)(g) and "where appropriate and to the extent practicable, ...preserve and enhance the diversity of plant and animal communities" (Finch 1992).

There are presently 14 species of bats in Montana (Thompson 1982). Five species are listed by the Montana Natural Heritage Program as species of special concern. These are the Pallid bat (*Antrozous pallidus*), the Spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Plecotus townsendii*), the Fringed myotis (*Myotis thysanodes*), and the Northern long-eared bat (*Myotis septentrionalis*) (Genter 1993). The first three are listed as sensitive by the Northern Region (R 1) of the USFS (Mumma 1991). Sensitive species are "those plant and animal species identified by the Regional Forester for which population viability is a concern as evidenced by:

- a) Significant current or predicted downward trends in



population numbers and density;  
2) Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (Reel et al. 1989).

In 1992, Jean LaVelle, the biologist for the Townsend District of the Helena National Forest contacted me about conducting several nights of bat surveys on the Townsend Ranger District near Townsend, Montana, to document species occurrence and relative densities for use in Forest management decisions. The results of these studies are presented here.

#### ACKNOWLEDGEMENTS

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## METHODS

### Equipment

Mist nets: Braided nylon mist nets, in 18, 30, and 36 foot lengths, (50 dernier/2 ply; 1 1/2 inch mesh) were used to capture bats (Kunz and Kurta 1988). Mist nets were strung on sectional aluminum poles made from electrical conduit, cut to 5 foot lengths, each with a connector at one end, so a net pole could be fashioned to any desired height. Poles used for this study were two or three lengths high (10 to 15 feet). Poles were held in place with ropes tied to trees, rocks, or branches. Mist nets were deployed across the narrower stretches of slow moving streams and smaller pools, where bats were likely to come for water (Kunz and Kurta 1988).

Bat detectors: Tunable broadband ultra-sonic bat detectors (QMC Mini-2) were used to detect night-time bat activity. If a single detector was being used it was tuned to 40 kHz when walking a transect. If two detectors were available, one was tuned to 40 kHz and the other to 25 kHz. When a bat was detected, the dial of the detector could be manipulated to find the high and low range of the detected bat (if there was time, which there generally was not). With experience the activity of the bat (cruising, searching, or feeding) and the genus of the bat could be determined by the sound, duration, and intensity of the detected bat



echolocations (Fenton 1988, Fenton and Bell 1981).

Detections were recorded on field forms by time, frequency monitored, and species (if known or suspected).

#### Bat identification

Once captured in a mist net or harp trap, bats were carefully removed. Species of the bat, sex, age (juvenile or adult)(Anthony 1988), reproductive condition (females: lactating or non-lactating; males: scrotal or non-scrotal)(Racey 1988), and select measurements (forearm length) and other identifying characteristics and measurements such as ear length, pelage coloration, etc., were recorded on field forms. Weight was taken using a Pesola spring scale (50g X 0.5g) and measurements were taken using a vernier caliper and recorded to the nearest tenth millimeter. Bats were identified using one of several dichotomous keys. The most useful were:

Bats of America Barbour and Davis 1969

The Mammals of Montana Hoffman and Pattie 1968

Handbook of Canadian Mammals van Zyll de Jong 1985

Most bats were released after data was recorded, though if there was a question of identification, or if the bat was considered unusual for that locality or habitat, the bat was collected to be verified later by a competent authority.



### Site Selection

As funding was only available for a few nights of surveys, sites were selected that appeared to have the greatest chance of finding good bat concentrations. These were all located near watering sources adjacent to habitat that had riparian areas, mature hardwoods, older age-class Douglas fir, and limestone outcrops, all habitat components found to be associated with high bat activity during studies on the adjacent Deerlodge National Forest (Butts 1993a, Butts 1993b.).

Once a general area was selected, the specific site was chosen that appeared to have potential roosting sites nearby, such as older trees, fractured rock, old buildings, or known caves or adits. If water was nearby, specific sites to set up mist nets were generally selected that crossed the slowest moving stretches of streams or pools.

When a specific site was selected, from two to six mist nets were set up in the evening across trails, or across and adjacent to streams or ponds. Nets were not raised into final position until about one-half hour after sunset to avoid catching birds. Depending on the site, the height of the bottom of the net above ground or water varied from less than a foot to 6 feet. Nets were checked at least every hour until after midnight, then again between one hour, and



one-half hour before sunrise. Nets were taken down one-half hour before sunrise to avoid catching birds.

One or two walking transects were conducted at each site, depending upon available personnel. Beginning approximately one-half hour after sunset, and lasting for one hour, a transect was walked through habitat representative of the area, using an "ultra-sonic bat detector." All bats heard were recorded as "cruising, searching, or feeding," depending on activity, by species if identifiable, and by time period.

As information collected in 1991 on the Deerlodge National Forest suggested that little bat activity occurred after midnight, walking transects were run no later than that time.

#### RESULTS

A total of five nights were spent surveying bats at four different sites on the Townsend Ranger District in 1992 (July 14, 15, 18, 27, and 28). Three of these sites, Avalanche, Hellgate, White's Gulches are located at the mouths of canyons cutting through a large limestone outcrop on the western flank of the Big Belt Mountains east of Canyon Ferry Lake. The fourth site was located on Indian Creek on the east flanks of the Elkhorn Mountains west of



Townsend, Montana.

Intense bat activity was encountered at a small pool in the canyon of Avalanche Gulch just after dusk on the evening of July 14, 1992. A total of 37 bats were captured. Among these were 27 Little brown bats (*Myotis lucifugus*), six Big brown bats (*Eptesicus fuscus*), one Fringed myotis (*Myotis thysanodes*), one Long-eared myotis (*Myotis evotis*), one Small-footed bat (*Myotis ciliolabrum*), and one Townsend's big-eared bat (*Plecotus townsendii*). All but the last bat were males, and most were adults. The Townsend's big-eared bat was a non-lactating adult female. Biological information on these bats is presented in Table 1.

Three bats, all of different species, were captured on White's Gulch the night of July 15. These were an adult male Little brown bat, an adult female non-lactating Long-legged myotis (*Myotis volans*), and an adult female lactating Small-footed myotis. Biological information on these bats is shown in Table 1. Only one *Myotis* was recorded during a one hour walking transect (21:35 to 22:35) through the canyon using an ultra-sonic bat detector.

Two nights were spent mist-netting over small pools in Hellgate Canyon (July 18 and July 28). Numerous bats were observed approaching and avoiding the mist-nets, which were



Table 1. Biological data of bats captured on the Townsend  
Ranger District, Helena National Forest, 1992.

Site	Species	Sex	Age	FA*	WT**
<b>Avalanche Gulch</b>					
	M. lucifugus	M	Ad	35mm	7.0g
	"	M	Ad	38mm	6.5g
	"	M	Ad	35mm	6.0g
	"	M	Ad	35mm	7.0g
	"	M	juv.	36mm	6.0g
	"	M	Ad	35mm	6.0g
	"	M	Ad	37mm	6.5g
	"	M	Ad	38mm	6.5g
	"	M	Ad	36mm	6.0g
	"	M	juv	37mm	6.0g
	"	M	Ad		6.5g
	"	M	Ad		5.75g
	"	M	Ad		6.0g
	"	M	Ad		6.0g
	"	M	Ad		6.5g
	"	M	juv		6.0g
	"	M	Ad		6.0g
	"	M	Ad		6.5g
	"	M	Ad		



Table 1 (continued).

Site	Species	Sex	Age	FA*	WT**
	<i>M. lucifugus</i>	M	Ad		
	"	M	Ad		
	"	M	Ad		
	"	M	Ad		
	"	M	Ad		
	"	M	Ad		
	"	M	Ad		
	"	M	Ad		
	<i>M. ciliolabrum</i>	M	Ad	34mm	4.3g
	<i>M. evotis</i>	M	Ad	37mm	6.5g
	<i>M. thysanodes</i>	M	Ad	40mm	8.0g
	<i>Plecotus t.</i>	F	Ad	non-lac	12.0g
	<i>Eptesicus f.</i>	M	Ad	scrotal	18.5g
	"	M	Ad	scrotal	17.5g
	"	M	Ad	48mm	19.5g
	"	M	Ad	46mm	18.5g
	"	M	Ad	47mm	17.5g
White's Gulch					
	<i>M. lucifugus</i>	M	Ad	35mm	6.6g
	<i>M. ciliolabrum</i>	F	Ad	lac. 31mm	5.7g
	<i>M. volans</i>	F	Ad	non-lac 38mm	9.0g



Table 1 (continued).

Site	Species	Sex	Age	FA*	WT**
<b>Hellgate</b>					
	<i>M. lucifugus</i>	M	Ad	35mm	6.2g
	"	M	Ad	36mm	5.5g
	"	M	Ad	37mm	7.0g
	"	M	Ad	37mm	6.5g
	"	F	juv	37mm	6.0g
	"	M	Ad	35mm	7.0g
	"	M	Ad	35mm	5.75g
	"	M	Ad	36mm	6.5g
	"	M	Ad	37mm	6.75g
	"	M	Ad	34mm	6.0g
	"	M	Ad	37mm	5.5g
	<i>M. ciliolabrum</i>	M	Ad	34mm	4.0g
	"	F	Ad non-lac	36mm	4.5g

**Indian Creek**

<i>Eptesicus f.</i>	M	Ad scrotal	44mm	11.5g
<i>M. volans</i>	F	Ad lac	39mm	10.0g
<i>Lasiurus c.</i>	M	Ad scrotal		

\*FA=Forearm length

\*\*WT=Weight



ballooned slightly from a steady breeze on both nights of trapping. The bat detector found almost constant activity for about 45 minutes after dusk on July 18 (21:30-22:15), followed by sporadic and generally low levels of activity for about one hour (22:15-23:15).

On the first evening of mist-netting one adult male Little brown bat was captured. On the second night, nine bats were captured. Among these were six adult male Little brown bats, one juvenile female Little brown bat, one adult male Small-footed myotis, and one adult female non-lactating Small-footed myotis. Data from these bats are presented in Table 1.

The night of July 27, 1992, was spent mist-netting bats over Indian Creek about 2 miles upstream of the canyon in riparian habitat. Three bats were captured, including an adult male Hoary bat (*Lasiurus cinereus*), an adult male Big brown bat, and adult female lactating Long-legged myotis (Table 1). A bat detector transect was run in the Indian Creek limestone canyon between 21:30 and 22:30 that found low bat activity (3 bat passes per hour were recorded). There was no water in the canyon at the time of the survey.

A total of 53 bats was captured during five nights of mist-netting surveys on the Townsend Ranger District of the



Helena National Forest during the summer of 1992. Among these were eight species of bats, representing four genera.

#### DISCUSSION

There appears to be an unusually rich representation of bats on the Townsend Ranger District of the Helena National Forest. Studies on the nearby Deerlodge National Forest during the summers of 1991 and 1992 resulted in the capture of only 36 bats during more than 40 trap nights (Butts 1993a, Butts 1993b), compared to 53 bats during 5 trap nights on the Townsend Ranger District. Most of the bats captured on the Deerlodge were taken at three locations. It is important to note, however, that the sites surveyed on the Townsend Ranger District were selected because they had habitat components that were associated with high bat activity on the Deerlodge National Forest. Sites on the Deerlodge, on the other hand, were selected to be representative of the Forest as a whole.

One of the species captured in Avalanche Gulch, the Townsend's big-eared bat, is on the U.S. Forest Service Northern Region sensitive species list (Mumma 1991) and two of the eight species documented on the District are on the Montana Natural Heritage Program's sensitive species list (Townsend's big-eared bat and Fringed myotis).



The majority of bats captured during this study were adult males. Adult males of many insectivorous species of bats roost singly in cool locations where they can reduce their body temperature to reduce metabolism (Barbour and Davis 1969, Hill and Smith 1984). Deep caves in limestone outcrops could provide this habitat in the Townsend District. Numerous caves can be seen in the cliffs at the mouths of the canyons that were surveyed, but none of these have been entered to survey for bat use because of the difficulty of access.

The presence of females of several species, such as the Townsend's big-eared bat, the Long-legged myotis, and the Small-footed myotis, documented on the Townsend Ranger District during this study suggest the likelihood of maternity roosts in the vicinity, especially where the bat is lactating. Maternity roosts are often in warmer parts of caves or shelters where the females do not become torpid, in order to maintain a high metabolism and promote rapid growth in the young bats (Barbour and Davis 1969). Maternity colonies of Townsend's big-eared bats are found fairly near the entrances of caves and adits, often within the sight of light (Barbour and Davis 1969). The maternity roosts of the Long-legged myotis, on the other hand, are usually found in cracks and crevices in fractured rock or under the bark of trees (Barbour and Davis 1969). Little is known of the



maternity roosting requirements of the Small-footed myotis.

#### SUMMARY

Eight species of bats were documented on the Townsend Ranger District during five nights of mist-netting during the summer of 1992. Two of these species, the Townsend's big-eared bat, and the Fringed myotis are on the Montana Natural Heritage Program's sensitive species list. The Townsend's big-eared bat is also listed by the U.S. Forest Service Northern Region as a sensitive species. Females of the Townsend's big-eared bat, the Small-footed myotis, and the Long-legged myotis suggest that maternity colonies probably exist in the vicinity.

The species diversity and the presence of rare and sensitive bat species indicates that portions of the Townsend Ranger District of the Helena National Forest are excellent habitat for bats. Management activities to maintain this habitat will need to protect and preserve caves, ensure that old mine adits are un-occupied in summer, autumn, and winter before blocking entrances, maintain water sources, and maintain a diversity of habitats that include, where applicable, mature hardwoods, older stands of Douglas fir, and healthy riparian areas.



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