

SURVEY OF THE BAT SPECIES AND THEIR HABITAT USE IN GRAND TETON NATIONAL PARK

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Objectives

Until recently, little attention has been directed to the bat fauna of GTNP. The role of bats in ecosystems is more significant than previously thought. Also, the public's awareness of bats is growing and as part of routine interpretive needs, the NPS must have factual information on all animals in the Park.

A baseline survey was conducted to determine species composition, distribution, abundance, and habitat use of bats in Grand Teton National Park, Wyoming. The principal objectives are:

1. Obtain information on species occurrence and distribution within the Park;
2. Assess the population status for bat species present;
3. Identify rare species in the Park and identify management needs to ensure the viability of these species in GTNP; and
4. Evaluate potential conflicts with human activities.

Methods

Field studies were conducted from 20 May to 14 September 1985 in GTNP. Bats were surveyed primarily with ultrasonic monitoring equipment capable of detecting and recording high frequency echolocation calls. Flying bats were monitored along transects with a batmonitor and a broadband capacitance microphone (Simmons et al. 1979). Recordings were later analyzed with a zero-crossing period meter and a Nicola digital oscilloscope. For further details on field or laboratory procedures on the use of echolocation calls, see Fenton and Bell (1981).

Transects were run in all habitat types throughout GTNP. They were typically 2-4 km long, depending upon terrain and vegetative cover. Each sampled site was characterized by habitat (lacustrine, riparian, forest, meadow, sagebrush-grassland), vegetation, and structure. Temperature, wind speed, cloud cover, and precipitation were recorded each night. Heavy wind and rain limited the effectiveness of the monitoring equipment and estimates of activity under

these conditions may be low.

Mist nets were used to capture bats to determine age, sex, reproductive status and to obtain study specimens. A .410 shotgun was used at two locations unsuitable for use of nets. Numerous buildings and other man-made structures were surveyed for bat roosts. Park personnel and concessionaires were contacted to evaluate conflicts with human activities. I was interested in how these people viewed the bats and what control methods, if any, were used.

Results

Seven species of bats were detected during the study. The most common species was Myotis lucifugus, the little brown bat. This species was found in all habitats surveyed. Lasionycteris noctivagans, the silver-haired bat, was second but was more restricted in its habitat use. Other species detected in order of abundance are: Eptesicus fuscus, the big brown bat; M. volans, the long-legged myotis; Lasiurus cinereus, the hoary bat; M. evotis, the long-eared myotis; and one detection of Plecotus townsendii, Townsend's big-eared bat. Figure 1 lists the species detected and their relative abundance in each of the habitat types surveyed.

A comparison of time spent by bats in each of the sampled habitats showed that M. lucifugus was found foraging more frequently over lakes than over the other habitats (Chi Square = 47.20, $p < .005$). L. noctivagans preferred foraging above the forests more than the other habitat types (Chi Square = 18.43, $p < .01$). Lasiurus and M. volans were detected in the lacustrine and riparian habitats only. E. fuscus was found over lakes, open fields, and forest.

Preliminary analyses indicate that the highest level of bat activity is over the lacustrine habitat. Foraging over the water and beaches accounted for an average of 68 bat passes per hour of monitoring time. Riparian and forest habitats averaged 26 and 18 passes per hour, respectively. This compares with an average of less than 6 passes per hour in the coastal forests of Oregon (D. Thomas, pers. comm.). Sagebrush-grassland habitat averaged less than 4 passes per hour (see Figure 1).

M. lucifugus used buildings throughout GTNP as maternity roosts. Most were small groups of 10-20 bats but some of the older buildings with well established colonies had up to several hundred females and young. Several dozen male Eptesicus were also found in these roosts. M. evotis was found in one abandoned building at Antelope Flats. The other bats in GTNP are either saxicolous or arboreal.

Conclusions

This inventory reveals a comparatively diverse bat fauna in GTNP. Numerous old buildings provide abundant roosting habitat for the little brown bat, which reaches its highest densities in developed areas. The big brown bat was found only in developed areas, roosting in low densities along with the little brown

	LACUSTRINE	RIPARIAN	SAGEBRUSH-GRASSLAND	MIXED FOREST	WET FOREST - WILLOW
M. LUCIFUGUS	A	O	R	O	O
L. NOCTIVAGANS	O	R	N	A	O
E. FUSCUS	O	R	N	R	R
M. VOLANS	R	O	N	N	R
M. EVOTIS	R	R	R	N	N
L. CINEREUS	R	O	N	R	R
P. TOWNSENDII	N	N	R	N	N

A -- Abundant
 O -- Occasional
 R -- Rare
 N -- Not Detected

Figure 1. Bat species and their relative abundance in habitats surveyed.

bat. Dead snags throughout the Park provide unlimited roosting habitat for silver-haired, long-legged, and male little brown bats. However, rocky substrate with the proper exposure is not evenly distributed and may limit the distribution of saxicolous species such as the long-eared myotis and Townsend's big-eared bat in GTNP. The hoary bat is closely associated with the cottonwood riparian habitat and is most abundant in the south end of the Park.

The problem of bats roosting in buildings is an old one and likely will never be solved. Bat-proofing is the only safe and effective way to exclude bats from buildings. In some cases this may be costly and unnecessary. A well informed public, aware of the role of bats in nature and their beneficial insectivorous habits, will be more tolerant of these shy creatures. The use of toxicants should be prohibited in all situations as they have been proven to be more harmful to human occupants than to the bats (see Greenhall 1982 for a discussion). A reasonable and cost-effective approach to bat management is the construction of bat houses. These structures allow bats to inhabit developed areas and provide insect control without the problems of them occupying buildings.

Literature Cited

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