HIEBERT

DISCUSSION OF BAT POPULATIONS FOR BOULDER COUNTY AND SUGGESTIONS FOR MANAGEMENT

Jeffrey W. Hiebert

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ABSTRACT

Bats play an important role in insect predation, seed dispersal and plant pollination. The destruction of roosting and foraging habitat has prompted studies that indicate a downward trend in populations of the little brown bat (Myotis lucifugus). While more studies on other populations of bats are necessary it is apparent that this is only part of a larger trend resulting in the loss of diversity. The City of Boulder Mountain Parks has initiated a bat habitat improvement program. Bat boxes were made by the specifications set forth by Bat Conservation International and distributed throughout the park. A bat box was placed at the ranger cottage with a informational placard to help increase awareness of and reduce misinformation about bats.

INTRODUCTION

Bats are one of the most successful and widely distributed of mammals second only to rodents. Bats are found on every continent and inhabit every type of ecosystem. The majority of bats are distributed in the tropics but many inhabit temperate and subarctic regions. Bats have been incorporated into the psyche and folklore of many cultures throughout time. They have been the messengers of demons and still today they are characterized as rabid vermin.

In truth bats play a crucial part in the environment and only less than 1% of bats have been found to carry rabies. Bats are the primary nocturnal predator

of night flying insects. Frugivorous bats act as a major seed dispersal vector and may be the primary dispersal agent of some tropical species of plants. Many bats act as pollinators with examples of symbiotic relationships between nectivorous bats and flowering plants. Surprisingly, little is known about bats and their specific natural histories. However, populations of certain species have been shown to be declining. This is speculated to be due to the destruction of roosting, foraging and hibernating habitats as well as the effects of pesticides such as DDT.

Fifteen species of bats are found to inhabit Colorado with eight identified in Boulder County (Armstrong, 1984.) The following is a brief description of each species. A more complete description can be found in David Armstrong's Ecological Survey of the City of Boulder, Colorado Mountain Parks.

SPECIES ACCOUNT FOR BOULDER COUNTY

Little Brown Bat (Myotis lucifugus)

Distribution- Found throughout most of North America; Specimens found on South Boulder Creek.

Description- A dark brown metallic coloration and characterized by an erratic flight pattern.

Size- small; 89-102 mm.

Natural History- The Little Brown Bat is found roosting in attics, buildings and trees in large gregarious aggregations. These aggregations may facilitate thermoregulation. The diet consists of mostly midges, mosquitoes and beetles. Female produces one offspring in early summer. Populations of the Little Brown Bat may be seriously declining (Armstrong, 1989.) The preservation of roost sites may increase populations combined with preserving foraging habitats, protecting hibernation sites and reducing the use of heavy pesticides.

Long-eared Myotis (Myotis evotis)

Distribution- Found only in Western North America occurring in middle elevations of foothills and plateaus. Documented in the City of Boulder Mountain Parks.

Description- A medium brown coloration with the largest ears of any Myotis.

Size- Small; 89 - 94 mm

Natural History- The long eared Myotis is primarily a tree roosting species. They have not been observed to form colonies. They feed over ponds and throughout the canopy of the forest. Long-eared myotis are entirely insectivorous feeding entirely on beetles. The female produces one young between May and July. Their winter range is not yet known.

Fringed Bat (Myotis thysanodes)

Distribution- The fringed bat is suspected to inhabit Boulder County, but none have been observed and little is know about this species.

Long-Legged Bat (Myotis Volans)

Distribution- Found throughout Western North America and has been documented in Boulder County.

Description- A smoke brown to chocolate brown body above with a yellow brown body below.

Size- Medium; 96 - 99 mm

Natural history- The long-legged bat inhabits open forests and woodlands from 4000 - 9000 feet in elevation. It roosts mainly in trees and has been observed feeding at 3 meters above lakes and throughout the forest canopy. The reproduction development has not yet been studied.

Small Footed Myotis (Myotis leibii)

Distribution- This relatively uncommon species is found mostly in foothill areas and has been documented in Boulder Canyon.

Description- A yellowish brown coat is contrasted by black membrane and ears.

Size- small: 76-86 mm.

Natural History- The small footed myotis inhabits rocky shrub land of the plains and foothills. Summer roosts are located in trees under rocks and in pockets of sandstone. This is the only genus of Myotis that hibernates in Colorado. Its winter hibernaculum is usually located in relatively exposed areas of caves, mines, rock crevices and possibly buildings. It is insectivorous with a diet mostly composed of beetles, flies, true bugs and ants. The only colonies formed are nursery colonies which occur after the first young are born in June or July.

Silver-Haired Bat (Lasionycteris noctivagans)

Distribution- Found throughout North America and occurs state wide in Colorado and has been documented in Boulder County.

Description- The silver-haired bat can be confused with no other North American bat due to its black fur interspersed with white hairs giving a silvery appearance.

Size- medium; 95-105 mm.

Natural History- This tree roosting species migrates from its wintering grounds in southwestern U.S. and northern Mexico to Canada in the summer. The broad migration corridor passes through Boulder County where only males will stop to roost. Silver-haired bats are opportunistic feeders of insects but concentrating mostly on moths and beetles. These bats differ from other species by producing twins, usually in June, instead of single young. However, much is yet to be understood about the breeding behavior of these bats.

Big Brown Bat (Eptesicus fuscus)

Distribution- Found throughout North and Central America. Common in Boulder County.

Description- A dark brown metallic coloration.

Size- large; 108-123 mm.

Natural History- A common bat that appears to live in Boulder County year around taking roost in buildings, attics, trees, caves and sewers. Their diet consists mainly of beetles, ants, flies and moths. Females give birth to single young in late June.

Hoary Bat (Lasiurus cinereus)

Distribution- Found throughout the U.S. in wooded habitats and recorded in Boulder County.

Description- Brown hairs tipped with white give a frosted appearance.

Size- large; 125-140 mm. (One of the largest in Colorado.)

Natural History- These bats are found a variety of habitats and will roost in trees or buildings. The hoary bat is a open-air forager and consumes mostly moths but will also eat smaller bats and other insects. Females produce twins in June. The young cling to the mothers back while on foraging runs until they are a week old. It has been observed that the hoary bat makes a large migration with a division in the sexes occurring in the summer but little else is known about its biology.

Townsend's Big-Eared Bat (Plecotus townsendii)

Distribution- Occurs in western North America with records occurring in the foothills of Boulder County.

Description- Huge ears make confusion with any other North American bat impossible. Fur coloration ranges from black to a light brown or grey.

Size- medium; 82-100 mm.
Natural History- Townsend's big-eared bats occur in woodlands mainly in the foothills of Colorado. It may also hibernate within the Boulder Mountain Parks or it may use man-made structures as hibernacula. This species of bats are thought to be insectivorous but the details of diet are not known. Females give birth to a single young from mid-April to mid-July. These bats are found in low densities and are non-migratory thus making them susceptible to disturbance.

DISCUSSION

The urban-wildlife interface for Boulder, Colorado provides a dichotomy of effects on bat populations. Historically the Boulder Valley was almost void of trees up to the base of the foothills. As development began, fire was suppressed and buffalo were destroyed the Ponderosa Pine-Douglas Fir forest slowly invaded the plains. Also trees were planted and the riparian corridor around Boulder Creek flourished. More trees were made available for roosting thus improving the habitat for bats. More buildings were also made available for roosting but according to local pest control companies when people think bats are inhabiting their belfries

they have them, subsequently removed. Conversely, a historical decrease of foraging habitats coincided with urbanization. Wetlands were converted into farmland and parking lots and Boulder Creek was channelized which took out approximately 12 miles of stream corridor. These factors would appear to have a direct impact, reducing local bat populations.

The goal of many environmental conservationists and resource mangers is often to try to estimate and mimic or at least approximate a pre-disturbance era when managing wildlife. Many problems are inherent in these approximations let alone understanding the complex interactions of the historic populations within their environment. Also little is known of the consequences of the modifications of current populations and the modifications role in the current ecosystem. It is not clear if historic populations of bats were increased or decreased due to urbanization. Only now is there enough data becoming available that implies any trends, in this case downward, in local population sizes.

Weed, pest and insect control has consequently dumped tons of chemicals onto our lands and into our streams. Only now are we understanding the effects of pesticides and herbicides on the environment. Managers are starting to see the benefits of using natural controlling agents such as goats for weed control, barn owls for rodent control and the use predator insects on crops to stop insect pests. Bats could be used in a similar way to control mosquitoes and other night flying insects. Bats could be coaxed into neighborhoods with artificial roosting sites thus reducing the need for chemical insecticides.

It is becoming apparent by observing other species that the destruction of habitat and pollution have jeopardized entire communities and the consequences of assuming that the same is not true with bats may be insurmountable. The first step in managing bat populations is first to stop the destruction of their roosting, foraging and hibernating habitats. Second, to reduce the usage of heavy pesticides and reduce the non-point source and point source pollutants. Thirdly, to increase the diversity of the roosting habitat with bat boxes, foraging habitats by stream rehabilitation, and protecting hibernaculum from recreational and commercial users. These steps combined with more research and a public education program, perhaps incorporating bat boxes, may provide a buffer for the local populations of bats in Boulder County.

REFRENCES

Armstrong, D. 1972. Distribution of mammals in Colorado. University of Kansas Printing Service, Lawerence, KS.

----. 1984. Ecological survey of the City of Boulder, Colorado Mountain Parks.