ECOLOGY OF THE BEAVER IN GRAND TETON NATIONAL PARK, WYOMING

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This is a report of continued investigations of population characteristics and habitat relationships of beavers in Grand Teton National Park. This study was supported by the New York Zoological Soceity and the Northern Rocky Mountain Cooperative Park Study Project. I wish to acknowledge the valuable assistance of personnel of Grand Teton National Park and the Wyoming Game and Fish Department, Dr. Oscar H. Paris, former Director of the Jackson Hole Biological Research Station from which this study was conducted, Dr. Jack C. Turner, and numerous friends and associates who aided in field investigations.

Study Objectives

A. Enumeration and evaluation of population characteristics including abundance, distribution, territoriality, age structure, natality, mortality, dispersal, and behavior.

B. Estimation of habitat relationships including use patterns, food habits and selectivity, beaver-moose food resource overlap, limiting factors, and faunal relationships.

Methods

Beavers were live trapped and ear tagged for recognition of individuals in behavioral observations, for analysis of movements, and for estimations of colony size, age structure, natality, and mortality. A starlight night scope facilitated behavioral observations at night.

Annual cutting rates of woody vegetation were correlated with availability, distance from water, and diameter size classes by quadrat sampling and measurements of cut and uncut stems of woody vegetation. Food availability at three sites was determined in a similar manner but also using canopy coverage techniques. Beaver-moose food resource overlap was measured by a modified closest-neighbor sampling technique. Food habits were estimated by microanalysis of fecal contents.

Results and Discussion

A total of 103 beaver colonies were located in Grand Teton National Park representing over 500 beavers. The Snake River Floodplain provides the largest habitat source for beavers in the Park and supported 51 colonies between 1974 and 1976. An estimated 2000 to 3000 beavers occupy the Park. The average colony size was found to be 5.2 beavers and the abundance of beavers on the major streams in the Park was 0.9 colonies/km.

Eighty-three beaver carcasses from around the State were examined to generate age/weight correlation curves. Growth is rapid from birth to three years of age, after which time growth rate declines. Ninety-one beavers were live trapped and tagged between 1974-76, 88 of which were in Grand Teton National Park (Figure 1). A sex ratio of 126:100 (males to females) was found for the live trapped population. Forty-nine percent of these were adults (beavers two years or older), 29 percent yearlings (one to two years old), and 22 percent kits (to one year). Usually, colony offspring leave the family group at two years of age but there was evidence that some three year olds were with parent colonies. This possibly relates to the unexploited nature of these populations and the lack of available habitat for dispersing beavers. An average of 2.1 kits per colony was observed for those colonies with offspring. This may not reflect natality rate since considerable mortality could occur between birth and weaning. An average of 2.0 yearlings per colony indicates possible low mortality between one and two years of age. Major causes of mortality were observed to be disease, drowning of newborn at high water, road kill, damage control on private lands within the Park, and predation by coyotes.

Beaver populations on most of the streams in the Park appear at carrying capacity resulting in territorial packing. That is, the colony boundaries butt against those of neighboring colonies and home range is thus synonymous with the territory. When there is unoccupied space between colonies, territorial boundaries remain stationary but home ranges expand resulting in an area of home range overlap between two or more colonies.

Use patterns studies demonstrated that beavers select or prefer to cut certain plant species and certain size classes of each species. Distance of movement to cut a preferred plant is associated with the size class of the plant. For example, beavers will travel greater distances to cut a four to ten cm aspen than to cut smaller size classes. There is evidence to indicate that beavers enhance succession to climax vegetation by the removal of subclimax trees and shrubs.

Figure 2 shows the relative frequency of forage classes in the diet of beavers between May and October. There is a definite seasonal shift in food habits associated with availability of forbs and graminoids (grasses and grass-like plants). Linear correlation of utilization of forbs and graminoids (% frequency in deit) with availability (% cover) is statistically significant.

The major limiting factor for beaver populations on the major streams in the Park is the availability of winter dwelling sites. At low stream flows, over 60 percent of the beaver population on the Snake River, Buffalo River, and Pacific Creek are forced to abandon summer dwellings. At low stream volumes winter dwelling sites are scarce and most colonies are forced to re-establish in precariously eroding bank dens. These dens are then abandoned the following spring when stream volume increases.

Recommendations

It is probable that the Park beaver population is a source for filling vacant habitat of exploited populations outside the Park. The ramifications of this situation for management of both or either of these populations are numerous. Several population characteristics of the Park beavers appear unique to this population and are undoubtedly associated with unexploited conditions. Three years of data are insufficient to judge the significance of some of these unique characteristics. Since 88 beavers in the study area are presently ear tagged, a minimum of effort in future years of study would provide relatively greater data than obtained in the first few years of this study. Therefore, it is suggested that this study be continued over the next two years on a much reduced time schedule but sufficient to obtain pertinent data that could not be obtained in three years of study.

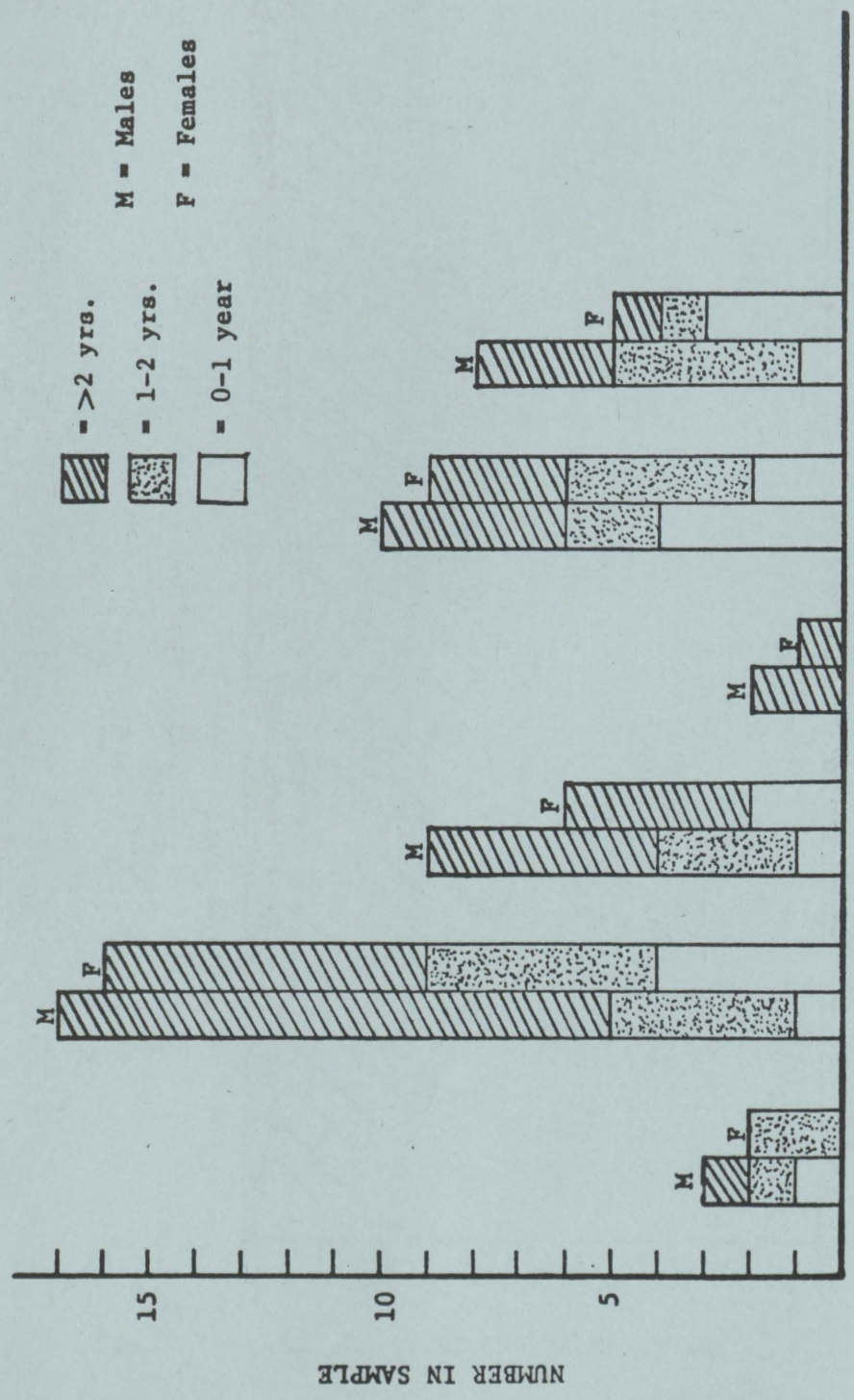

Figure 1. Sex and age class of live-trapped beavers in Grand Teton National Park, 1974-76.

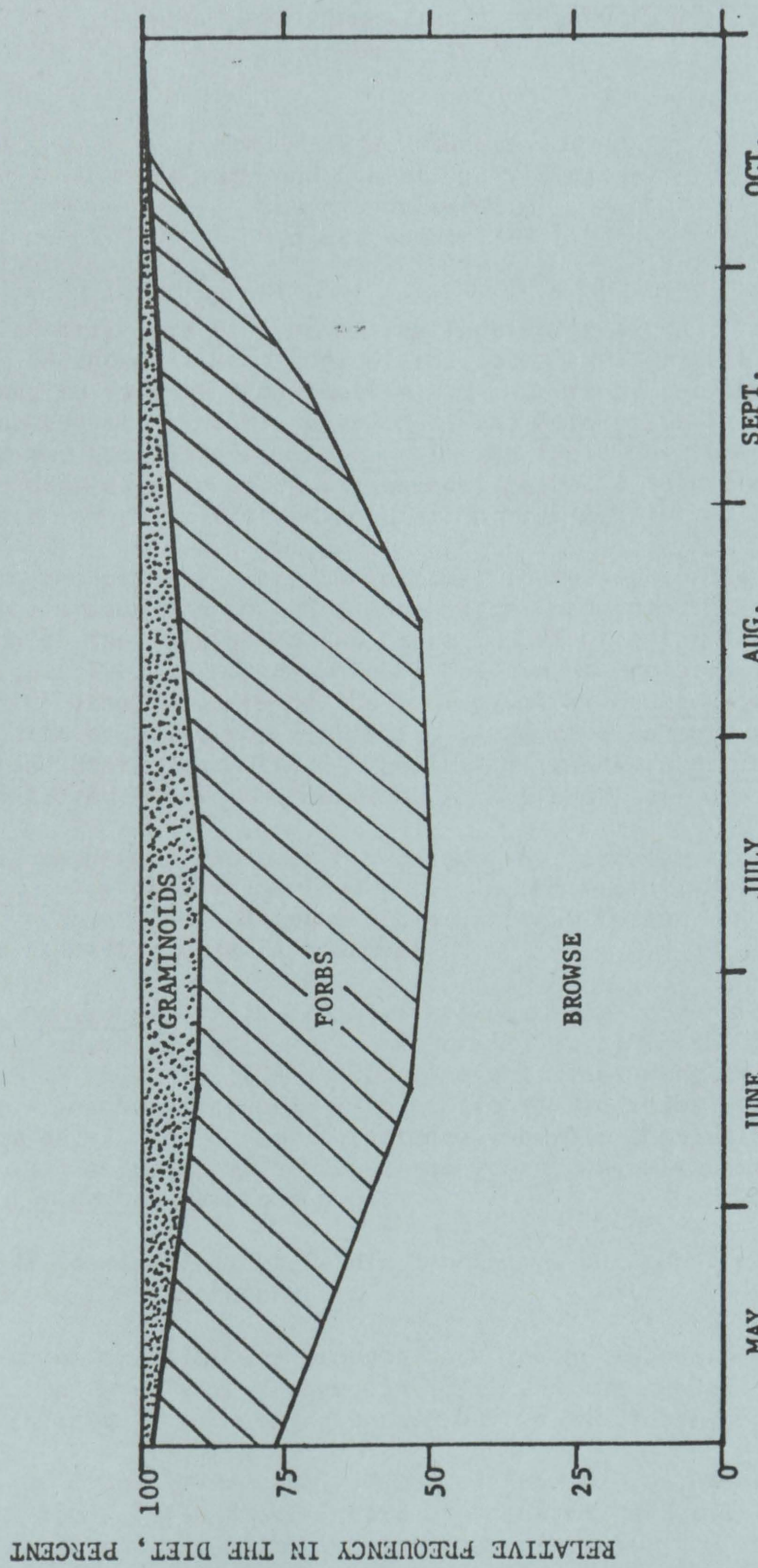

Fig. 2. Seasonal changes in the relative frequency of different forage classes in the diet of beavers in Grand Teton National Park as determined by fecal analysis microtechniques.