

Technical Report No. 16
JACKRABBIT DEMOGRAPHIC AND LIFE
HISTORY STUDIES, PAWNEE SITE

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GRASSLANDS BIOME
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INTRODUCTION

This report includes: (1) a brief description of field installations, designs, and procedures, (2) a partial analysis of black-tailed jackrabbit (*Lepus californicus*) and white-tailed jackrabbit (*Lepus townsendi*) population dynamics and life history data collected to date in the vicinity of the Central Plains Experimental Range, and (3) a brief description of objectives to be completed in FY 1970.

DEMOGRAPHY

Population Density

Jackrabbit densities are being indexed once in the spring and once in the fall. Index values are the average numbers of each species flushed per mile of paced transect on 36 miles of permanently located transects (Fig. 1). The spring index is obtained at the beginning of the littering season and is intended to provide initial density-condition information for the small herbivorous mammal simulation model. The basic function of the model is to generate weekly biomass standing crop and biomass turnover estimates. The fall index is intended to provide final density-condition information for checking the model's output. The fall index can be timed only to coincide approximately with the fall peak density, since the secretive nature of young jackrabbits prohibits the measurement of total density when the masses of very young cause the highest densities. Thus, the index follows the peak density when all rabbits are subject to being counted and provides a measure (along with age and sex structure) to reconstruct peak density.

Four indices have been completed (Fig. 2). Several population factors may be tentatively described from the appearance of these data. First, the range of variation and the maximum values in absolute population size appear

to be several magnitudes greater in blacktails than in whitetails. This analysis perhaps confirms suggestions in the literature that population-density fluctuations are greater in blacktails than in whitetails. Second, both populations suffered density declines of comparable magnitudes during the 1968-69 winter (black-tail population declined 66%; white-tail population declined 46%).

Mean flushing distances for each species for each of the indices are shown in Table 1. The flushing-distance disparity between species and between sampling periods probably indicates a non-linear function between rabbits present and rabbits flushed. The main source of variation is perhaps a behavioral variable caused by density dependent social interactions, season, weather, and other factors. The exact nature of the variation, and thus the nature and magnitude of implied corrections in the density indices, cannot be determined until the density indices are calibrated against absolute densities. Absolute-density measurements will be obtained beginning in March, 1970.

Age Structure

Monthly age structures for both populations are determined from the age structure of rabbits collected the first week of each month along 87 miles of permanent collecting routes. Rabbits are collected at night with spotlight and shotgun. Animals are classified as adults or juveniles on the bases of absence or presence, respectively, of the epiphyseal cartilage on the proximal end of the humerus. The epiphyseal cartilage technique provides absolute age discrimination until the rabbits are six or seven months old. This technique provides jackrabbit ages until about October for jackrabbit breeding chronology thus far encountered on the Pawnee National Grasslands.

Percentages of juveniles in the blacktail and whitetail populations for 1968 and 1969 are shown in Fig. 3. Several population features are apparent. First, the age structures of blacktails and whitetails follow comparable curves each year. Second, the 1969 chronology of juvenile buildup in both populations was about one month earlier than in 1968. Third, the blacktails and whitetails reached maximum values of about 80% and 70% juveniles, respectively. Both values are below the 90-95% values which have been observed to be characteristic for maintenance of densities from year to year. Thus, the 1968-69 over-winter population decline in blacktails and whitetails could have resulted partially from a heavier than normal complement of adults in the population which reached their life expectancy during the winter.

DISPERSION

The distribution of blacktails and whitetails has been outlined tentatively on the basis of observations on flush transects and collection routes (Fig. 4). Although the dispersion patterns are shown as species specific, there are considerable areas of overlap, particularly during the winter months. Likewise there are extensive areas that are occupied by one or the other species throughout the year. Additional information on the nature of intra- and interspecific dispersion patterns will be obtained in FY 1970 through the aid of telemetry studies. All equipment for the telemetry system has been purchased, transmitters and receivers are operational, and the program will be operational by late February.

Table 1. Mean distances in yards between observer and flushing point of jackrabbits on 36 miles of transects. Sample size in parentheses.

	<u>BLACK-TAILED JACKRABBITS</u>	<u>WHITE-TAILED JACKRABBITS</u>
March, 1968	29 (15)	*5 (2)
October, 1968	20 (24)	25 (7)
April, 1969	33 (10)	16 (5)
November, 1969	28 (11)	17 (4)

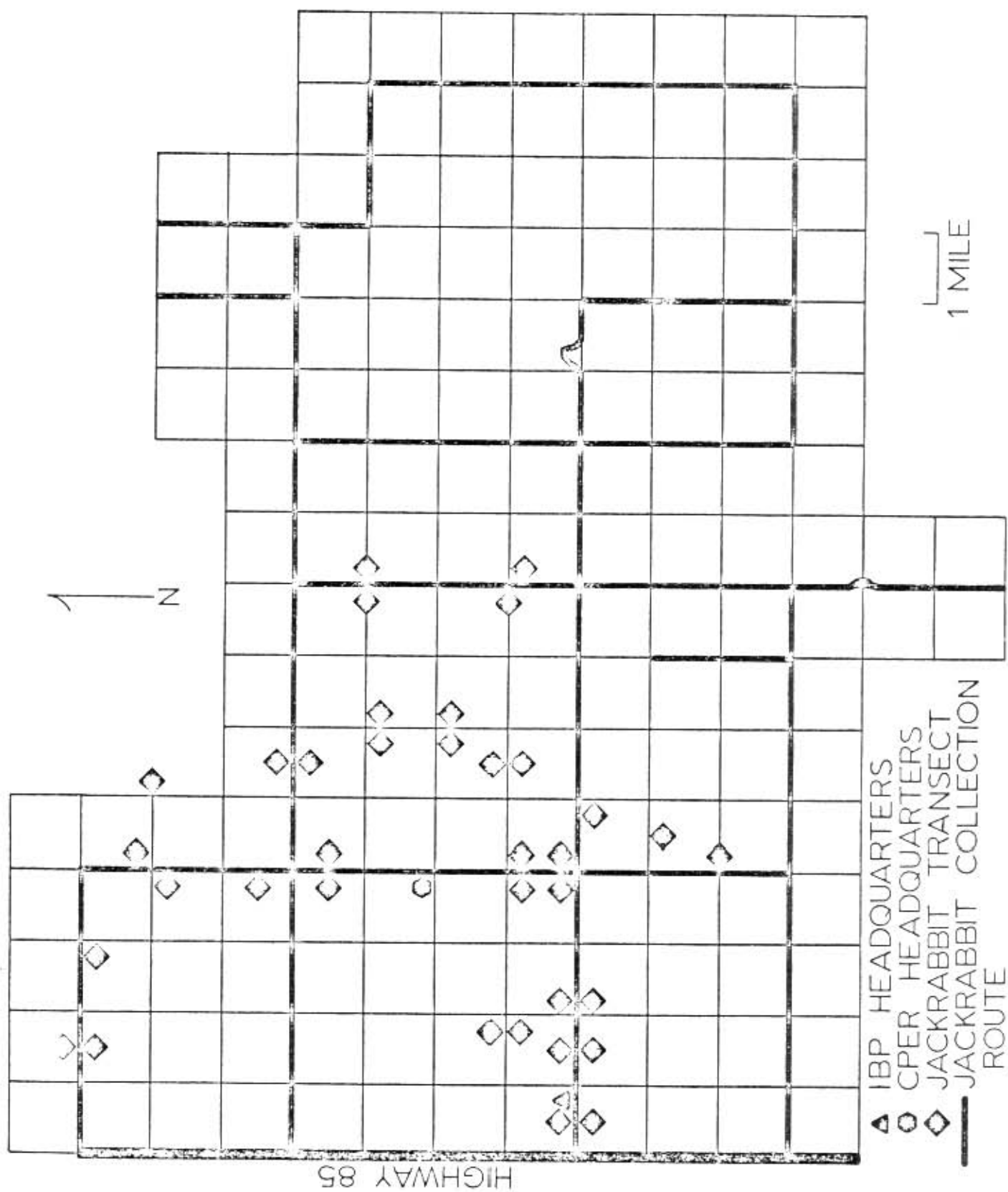


Fig. 1. Map of Pawnee National Grasslands showing design of jackrabbit flush transects and jackrabbit collecting routes.

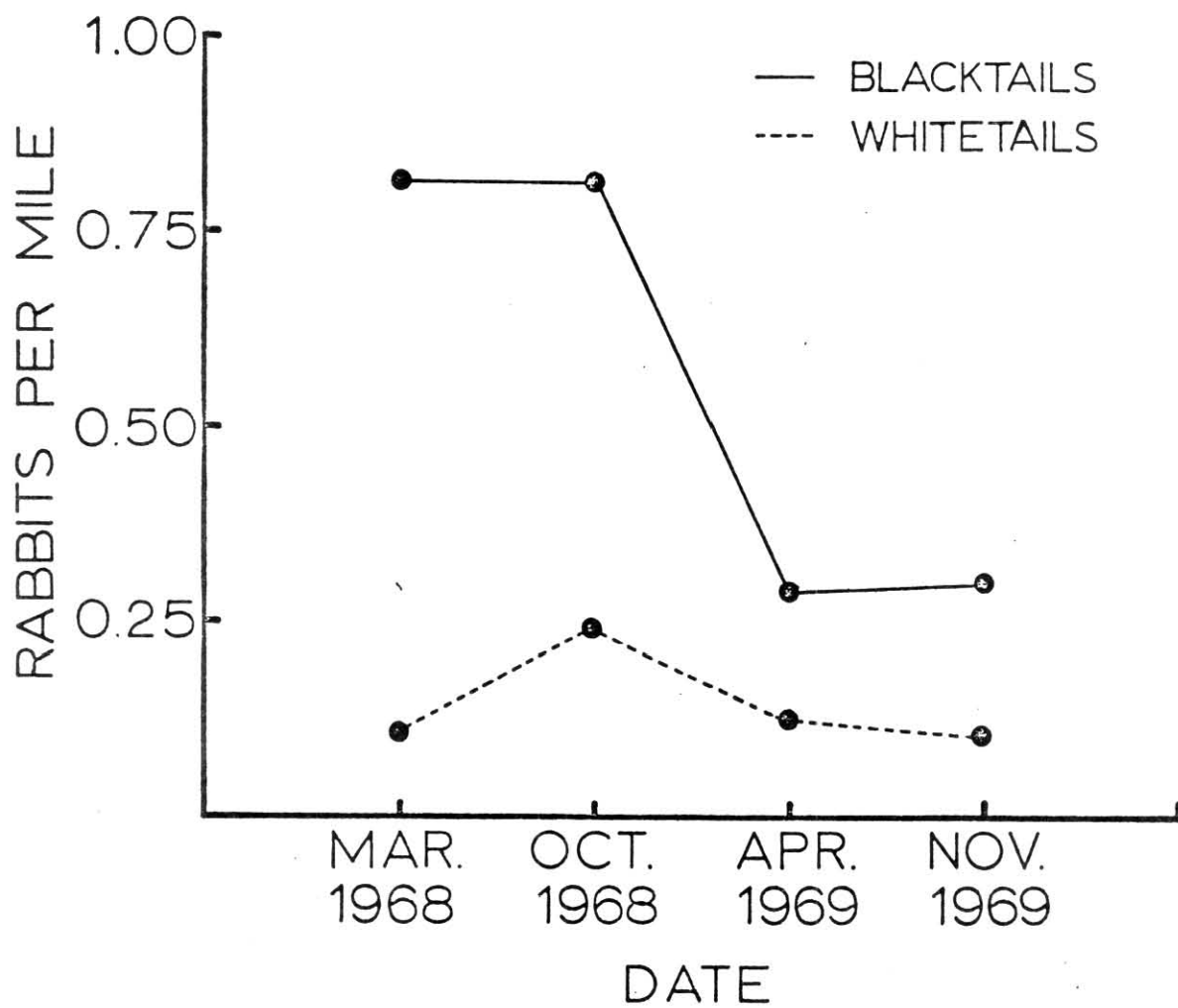


Fig. 2. Mean number of jackrabbits flushed per mile of transect on 36 miles of transects.

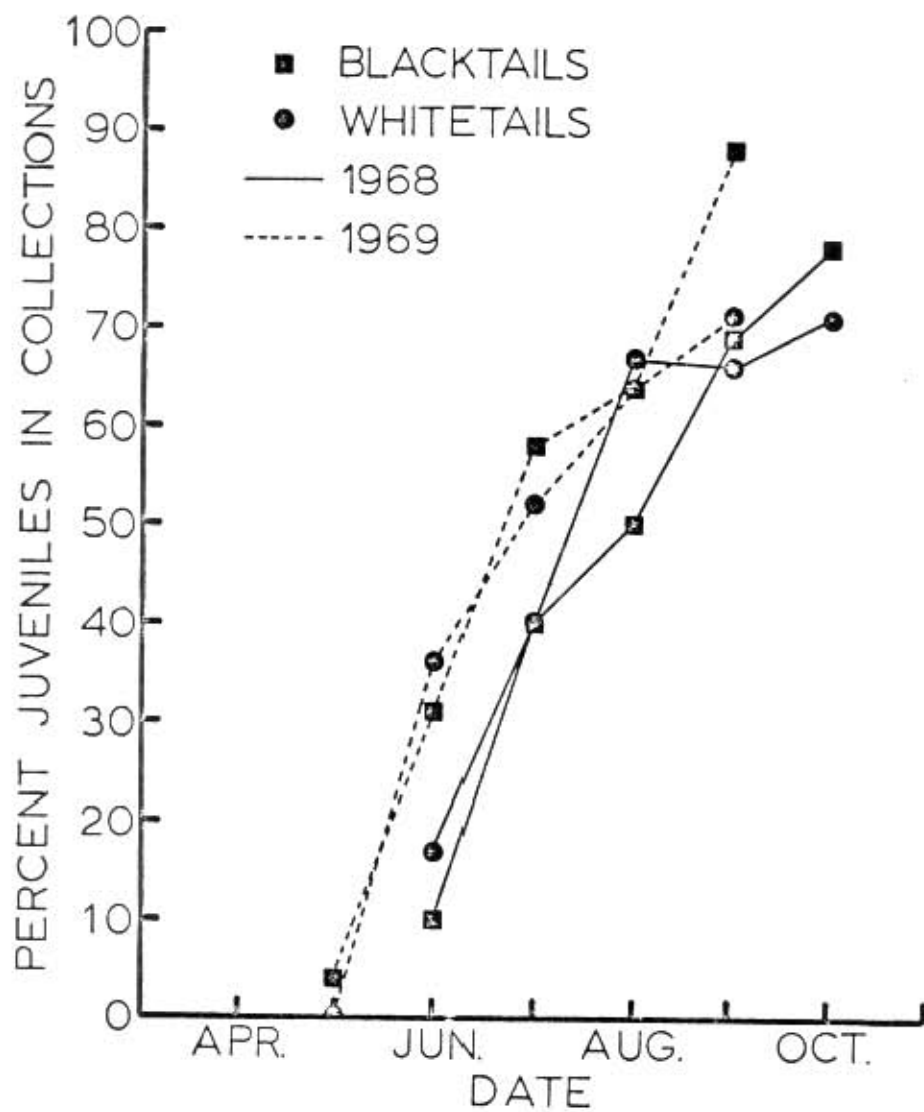


Fig. 3. Percentages of juvenile jackrabbits in summer and fall rabbit collections.

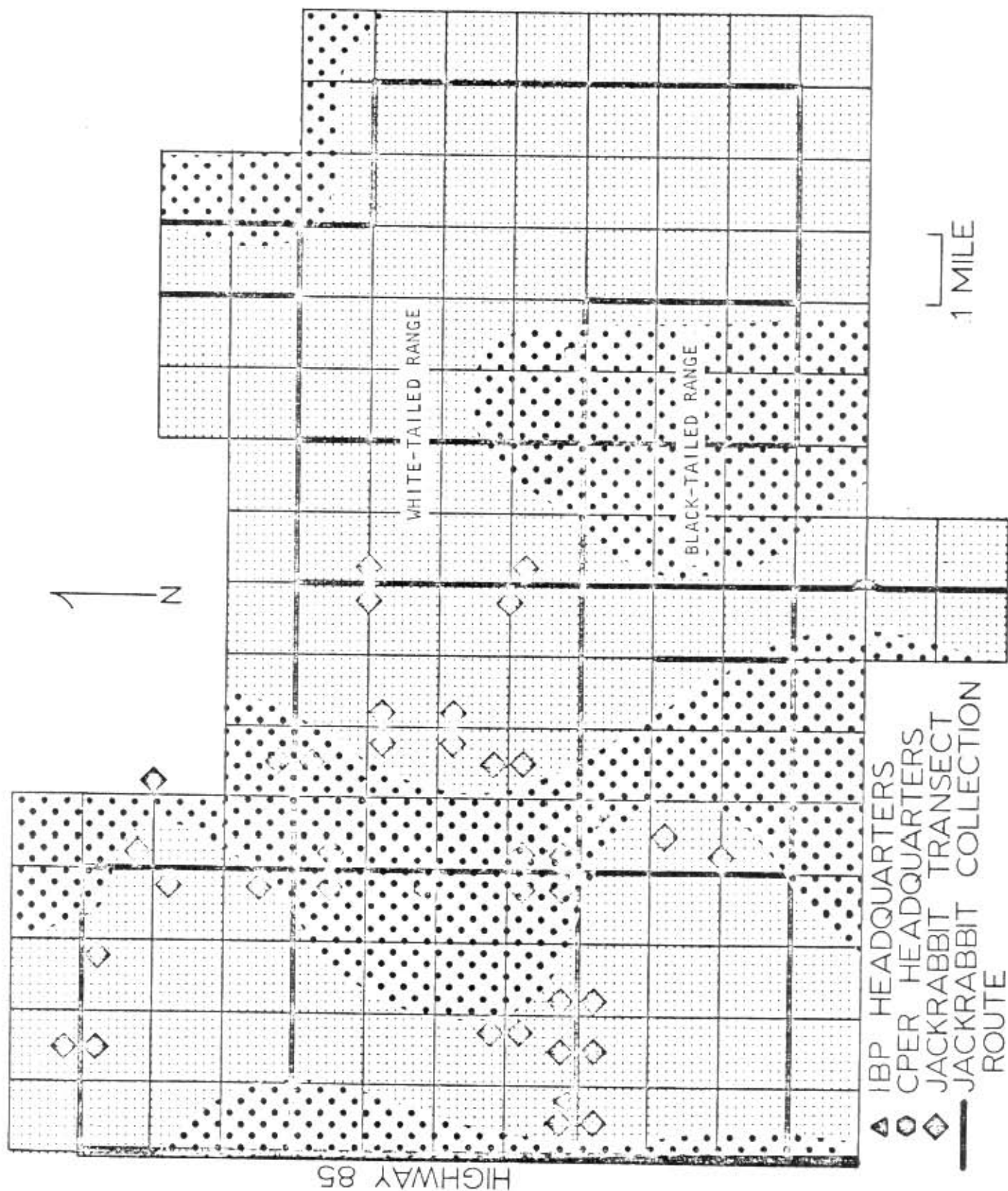


Fig. 4. Distribution patterns of black-tailed and white-tailed jackrabbits on Pawnee National Grassland study area.