DOCUMENTATION AND INTERPRETATION OF SELECTED WILDLIFE HABITAT RELATIONSHIPS AT ROCKY MOUNTAIN ARSENAL

Task Three: Lagomorphs

By

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The results presented in this report are preliminary and may not be cited or otherwise published without the written consent of the authors.

Abstract: Black-tailed jackrabbits (Lepus californicus) and one or two species of cottontails (Sylvilagus audubonii, S. floridanus) were studied at Rocky Mountain Arsenal to determine habitat preferences. Four different techniques, two diurnal and two nocturnal, were evaluated for effectiveness: headlight counts, spotlight counts, flush counts, and walk counts. Spotlight counts and flush counts proved the most effective and will be retained. In terms of habitat type, flush counts revealed that jackrabbits were most abundant on native perennial grassland and yucca grassland, whereas cottontails were more widely distributed over native perennial grassland, yucca grassland, western wheatgrass, and mowed grass. Spotlight transects showed a dip in lagomorph abundance in mid-summer, and a strong similarity between jackrabbits and cottontails in their preference of vegetation types.

INTRODUCTION

Lagomorphs and prairie dogs constitute a significant component of the food resource base for predators at Rocky Mountain Arsenal. These predators, various raptors and eagles, coyotes, and badgers, are maintained by healthy prey populations. The decimation of prairie dog populations as a result of sylvatic plague on RMA in the fall of 1988 (Ebasco Service, In. 1989) placed a particular emphasis on the significance of lagomorphs. The ability of the various habitats to support a diverse and abundant prey base of lagomorphs is a key element in the

diversity and potential stability of the RMA ecosystem.

The purpose of this study is to determine the habitat preferences of the lagomorphs (black-tailed jackrabbits, and either one or both of the two species of cottontails that may occur there, the desert cottontail and eastern cottontail). This knowledge then can be applied as management decisions and cleanup mitigation activities are carried out. This report covers the first field season of lagomorph work by DMNH staff at RMA, from 15 May through 31 December 1991. This first year was instrumental in developing techniques and determining which ones were effective, and in gathering some preliminary data.

METHODS

Four different techniques were used to generate counts of animals and to determine habitat associations: headlight counts, spotlight counts, flush transects, and walk transects. The first two are nocturnal and the latter two are diurnal. At this point, the goal was to assess the effectiveness of these different sampling techniques to select one diurnal and one nocturnal sampling method that would be continued in subsequent years. Sampling techniques were also developed for data collection of the vegetation.

Headlight Counts

Headlight counts involved driving 31 km (19 miles) along section roads and counting lagomorphs seen in the headlights of

the vehicle (see Figure 1 for route used). Two people were involved, the driver and the counter. These counts were carried out between one hour after sundown until midnight, once in June and once in July.

Spotlight Counts

Spotlight counts (Smith and Nydegger 1985) were used to document lagomorph abundance at night in different vegetation types. They involved three people, one driver and two spotters standing in the bed of a pickup truck, driving 36 km on dirt roads. Spotters each held a spotlight (Brinkmann Q-Beam spotlight, 200,000 candlepower) and counted animals seen in the spotlight. The driver was responsible for noting any animals seen in the road. Spotlights were continuously swept from the road ahead out to the side, 90 degrees from the direction of travel. When an animal was sighted, one of the spotters paced out the distance perpendicular from the road and placed a flag at the position where the animal was first seen. The next day, the flag was used as the center point of a vegetation plot. Figure 2 shows the roads used. Virtually all available dirt roads were used except where a general vegetation type was already well-represented.

Flush Counts

Eight transects were established for flush counts, measuring 1.6 km by 200 m. The transects were described in terms of the

following dominant vegetation types: Native perennial (transects 1 and 2), sandsage prairie (transect 3), yucca grassland (transect 4), western wheatgrass (transect 5), crested wheatgrass (transect 6), mowed site (transect 7), and weedy forbs (transect 8). Ten people and 6 dogs were employed. Eight people were spread evenly across one end, 28 m apart; 6 of these held dogs on 4.6 m leashes. The outside edge people, called side points, did not have dogs but did record data. Additionally, two lead point people walked about 40 m in front of the side points, and counted any lagomorphs that flushed in front. All animals on the plot were counted as they were flushed.

Walk Counts

Walk counts were carried out two weeks after the flush counts, in July and October 1991. These involved one person walking along the midline of the flush transects and counting any lagomorphs flushed.

Vegetation Measures

Each flag placed during spotlight transects was the center of a sample plot. Four types of vegetation measurements were taken at each sample plot: plant cover, height diversity profile, vegetation height, and distance to woody vegetation. Plant cover was determined using forty randomly placed points within a 10 m circle of the flag. The points were located using knots on string and a random numbers table. At each knot the vegetation

was classified as bare, litter, or one of 25 plant species; plant species were subsequently lumped into annual grass, perennial grass, annual forb, and perennial forb.

The height diversity profile is a measure of the physical plant community structure. It was measured by placing a 2.4 cm diameter PVC pipe in four random locations at each plot. The number of plant parts that touched the pipe at predetermined height intervals (0-5 cm, 5-10 cm, 10-20 cm, 20-30 cm, 30-50 cm, and greater than 50 cm) was recorded. Vegetation height was measured as the tallest plant in each of the 90 degree arcs of the 10 m radius circle surrounding the flag. Distance to woody vegetation was measured by pacing off the distance to trees or shrubs from four randomly placed points in each plot. Only plant cover is examined in this report.

RESULTS

Headlight Counts

June headlight counts had a total of 45 lagomorphs (24 jackrabbits, 17 cottontails, and 4 undetermined). July headlight counts had a total of 25 lagomorphs (14 jackrabbits, 10 cottontails, and 1 undetermined). Relative proportions were 54% jackrabbits, 39% cottontails, and 7% undetermined.

Spotlight Counts

Figure 4 shows the number of jackrabbits and cottontails seen on spotlight transects in June, August, September, and

November. Jackrabbit numbers were highest in June and September. Cottontails start out in June with a relative high number, but peak in November. Both species show a mid-season decline, jackrabbits in August, and cottontails in September, as is more clearly reflected in the combined total for all lagomorphs (top line).

Figure 5 shows the number of jackrabbits and cottontails pooled over months, in each of six plant categories: litter, bare ground, annual grass, perennial grass, annual forb, and perennial forb. Most notable is the similarity between jackrabbits and cottontails in the different plant categories. Both species were most frequently seen in perennial grasses and annual forbs.

Flush Counts

During the flush counts 66 animals were seen: 22 animals in June (11 jackrabbits and 11 cottontails), and 44 animals in October (30 jackrabbits and 14 cottontails). Except for transects 1 and 5, the number of lagomorphs sighted in each transect was similarly high or low regardless of month. Table 3 shows the data pooled over the two sample periods and broken down by vegetation type. Transect 2, perennial grassland, contained the greatest number of animals (25, 38% of all animals seen), and transect 4, yucca grassland, contained the second highest number of animals (14, 21%). The percentages for each species separately show that jackrabbits were most abundant in two transects (2, native perennial and 4, yucca grassland), whereas

cottontails were relatively abundant in four different transects (1, 4, 5, and 7, native perennial, yucca grassland, western wheatgrass, and mowed grass, respectively).

Walk Counts

No lagomorphs were flushed on 6 of 8 transects during walk counts in both July and October. One cottontail was flushed on transects 2 and 8 in July, and 1 cottontail and one jackrabbit were flushed on transects 1 and 6, respectively, in October.

DISCUSSION

Both the headlight counts and the spotlight counts showed a dip in animal numbers during the summer. Headlight counts were lower by almost half in July (25 lagomorphs) compared to June (45 lagomorphs). Spotlight counts revealed a similar pattern in that jackrabbit numbers were lowest in August, and cottontail numbers were lowest in September (Figure 4). Reproduction begins in mid-March for desert cottontails, February for eastern cottontails, and probably around January for black-tailed jackrabbits. Thus June counts reflect a minimum of two litters for each species. The decline is less easily explained, and may be affected by vegetation growth that blocks visibility at the later times in the summer season. The quality of data and amount of information from the spotlight counts is far greater than for the headlight counts, and the two are sufficiently redundant that the headlight counts will no longer be conducted.

The percentage dominant ground cover (Figure 5) reveals the surprising similarity between the jackrabbits and cottontails in the ground cover type in which they are most frequently found. The height diversity profiles are not evaluated at this point, and may reveal differences that the ground cover type do not pinpoint. The relationship between lagomorph habitat use and habitat availability remains unclear. Both of these issues will be covered in 1993.

The flush counts, also extremely labor-intensive, proved fruitful in evaluating broad categories of habitat preferences. The jackrabbits were concentrated in only two different habitat types, one of the native perennial transects (the one closest to the airport that also houses prairie dogs) and the yucca grassland. In contrast, they are represented in other habitat types by substantially lower frequencies of occurrence. In contrast, the cottontails were more broadly distributed over four different habitat types, including a native perennial transect not adjacent to the airport. This may reflect the presence of two different species of cottontails. Unfortunately, the species are almost impossible to distinguish in the field and that clarification awaits the collection of specimens.

Walk counts proved extremely unproductive and will be abandoned as a useful technique at RMA. They have been useful in areas where much greater distances are walked (Gross et al. 1974).

OTHER ACTIVITIES THIS PERIOD

1. Experimentation with camera units.
2. Established transects.
3. Mapped vegetation on spotlight transects.

PLANS FOR 1992

1. Analyze vegetation data for spotlight transects.
2. Develop comparison of vegetation used with vegetation present on spotlight transects.
3. Continue experimentation with camera units and develop experimental approach.
4. Attempt to resolve whether both species of cottontails occur at RMA, and if so, to address habitat partitioning.
5. Evaluate responses to disturbance on existing plots as such disturbances arise.

LITERATURE CITED

Ebasco Services, Inc. 1989. Black-tailed prairie dog activity survey. Interim report (June). Prepared for the Office of Program Manager, Rocky Mountain Arsenal.

Gross, J.E., L.C. Stoddart, and F.H. Wagner. 1974. Demographic analysis of a northern Utah jackrabbit population. Wildlife Monographs, 40:5-68.

Smith, G.W., and N.C. Nydegger. 1985. A spotlight, line-transect method for surveying jack rabbits. Journal of Wildlife Management, 49:699-702.

HEADLIGHT COUNTS

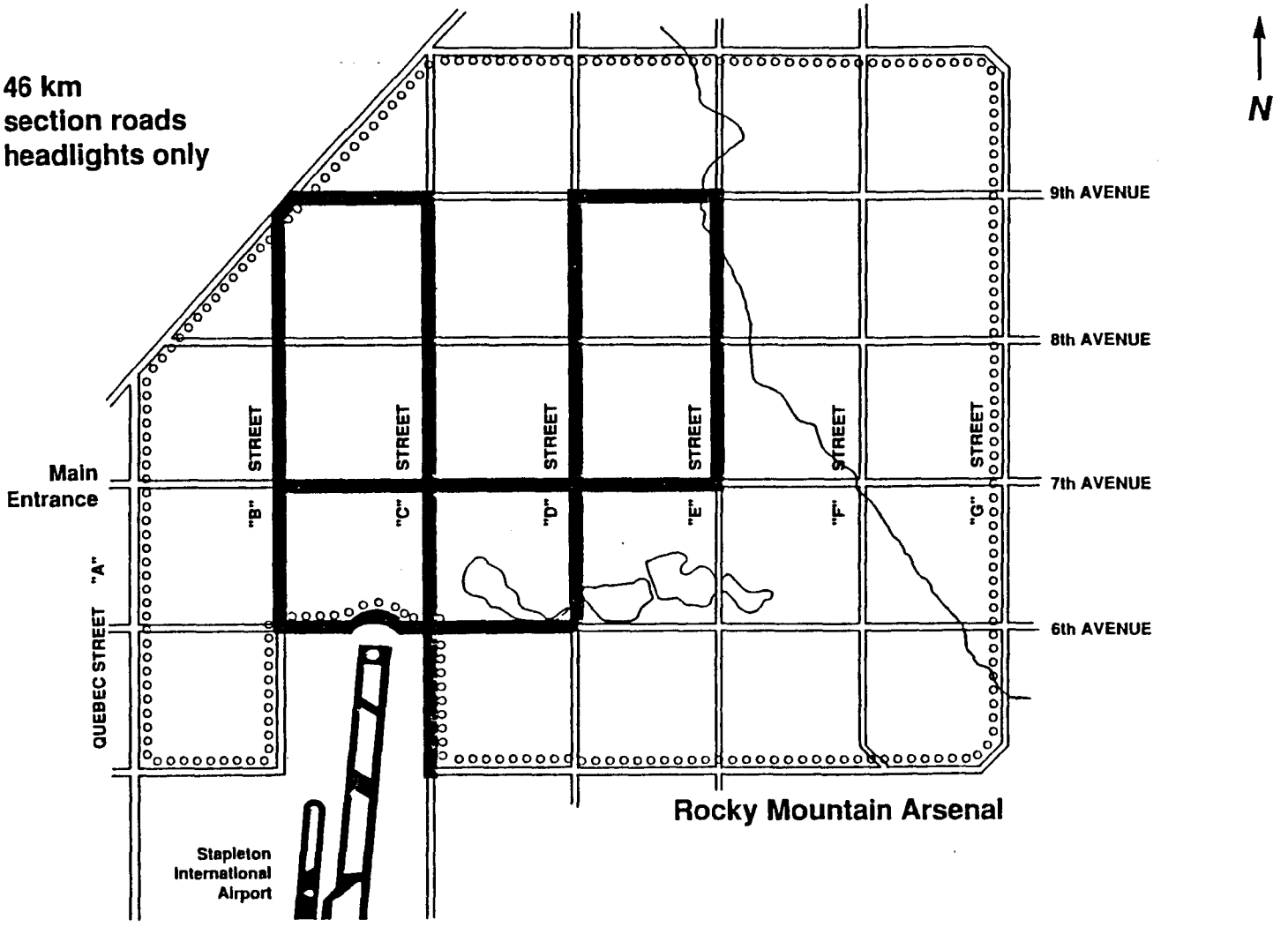

Figure 1. Headlight Count Transects for Lagomorphs at RMA.

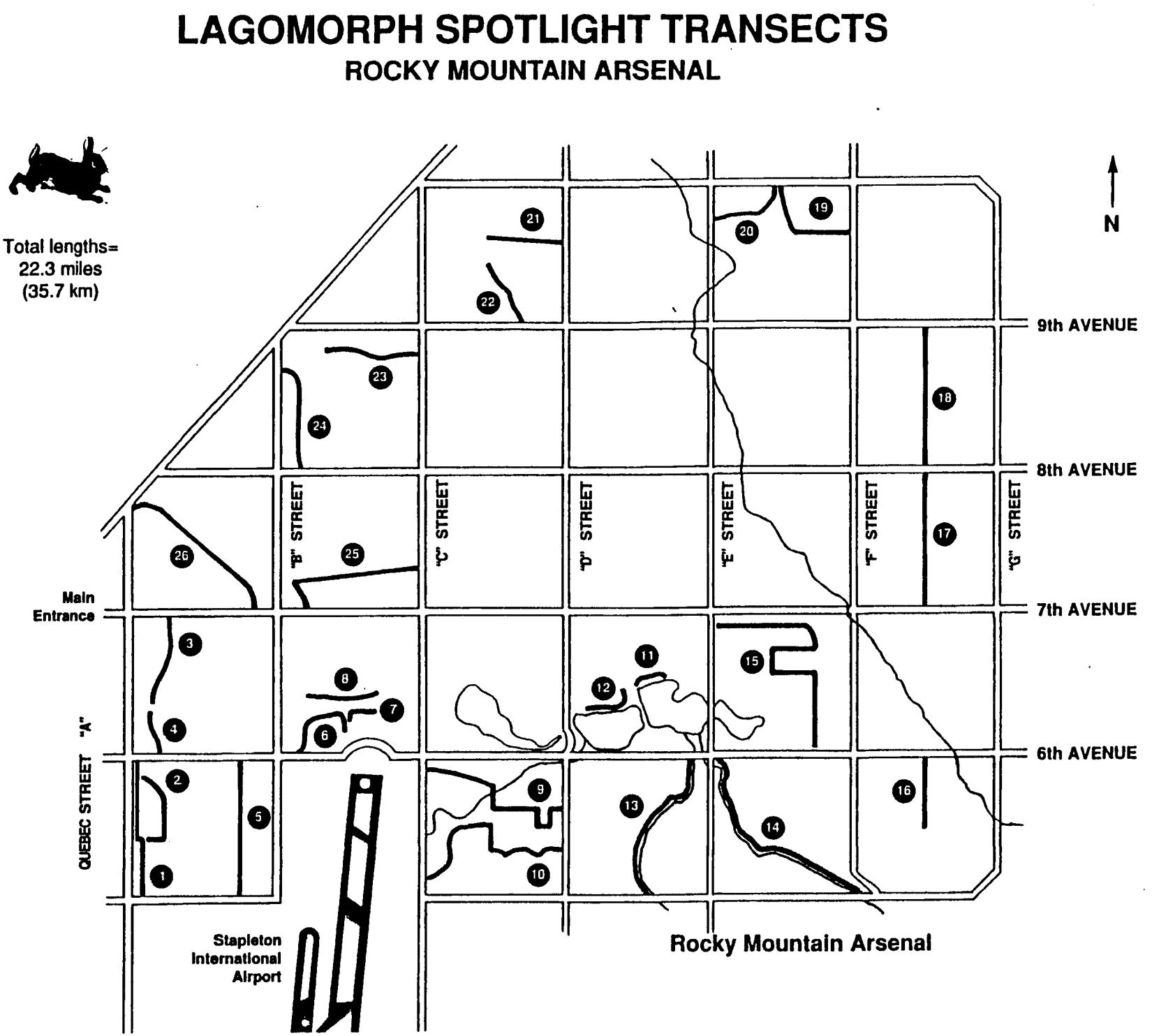

Figure 2. Spotlight Transects for Lagomorphs at RMA.

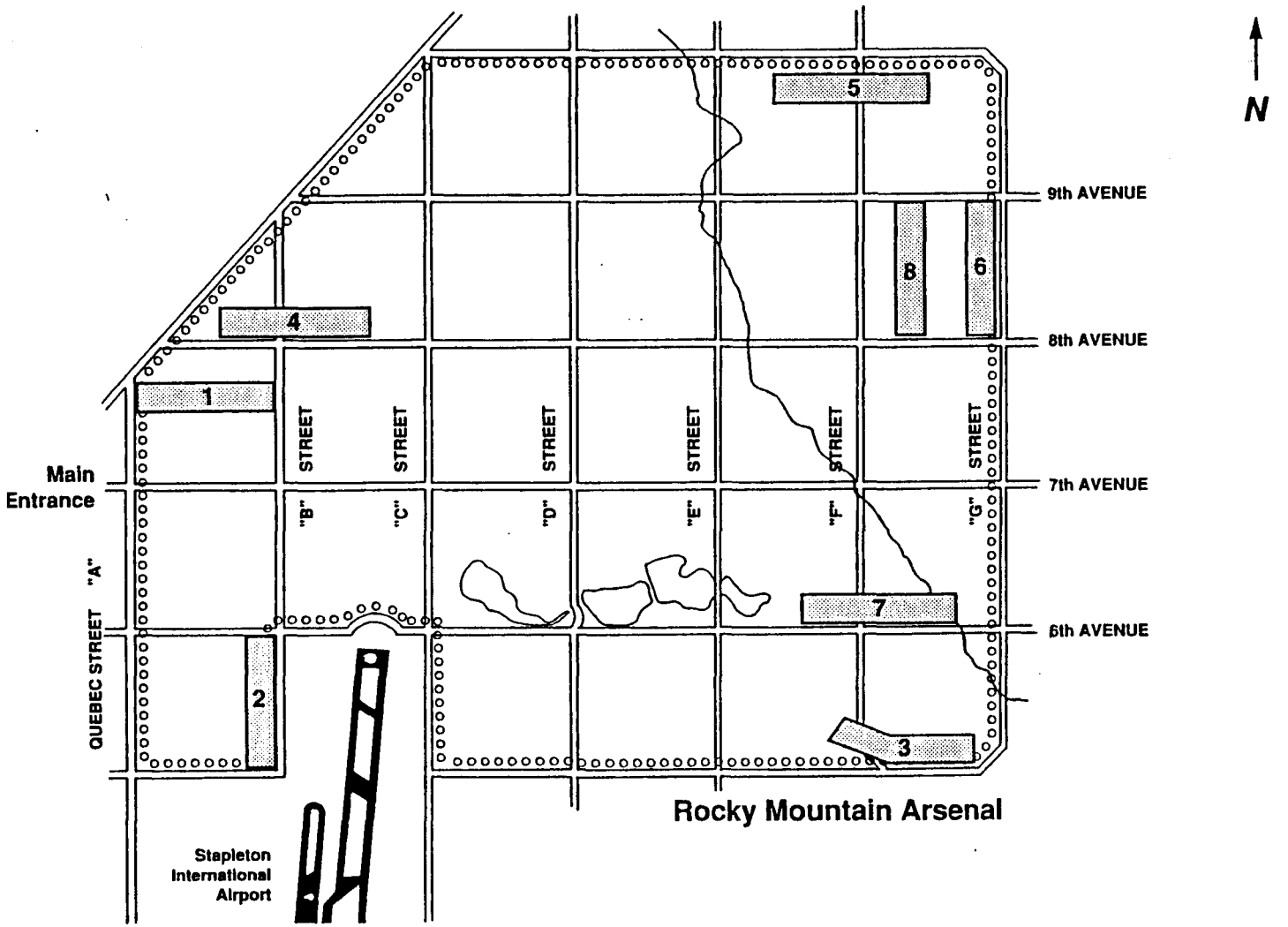

Figure 3. Flush Count Transects for Lagomorphs at RMA.

Figure 4. Spotlight Counts by Month

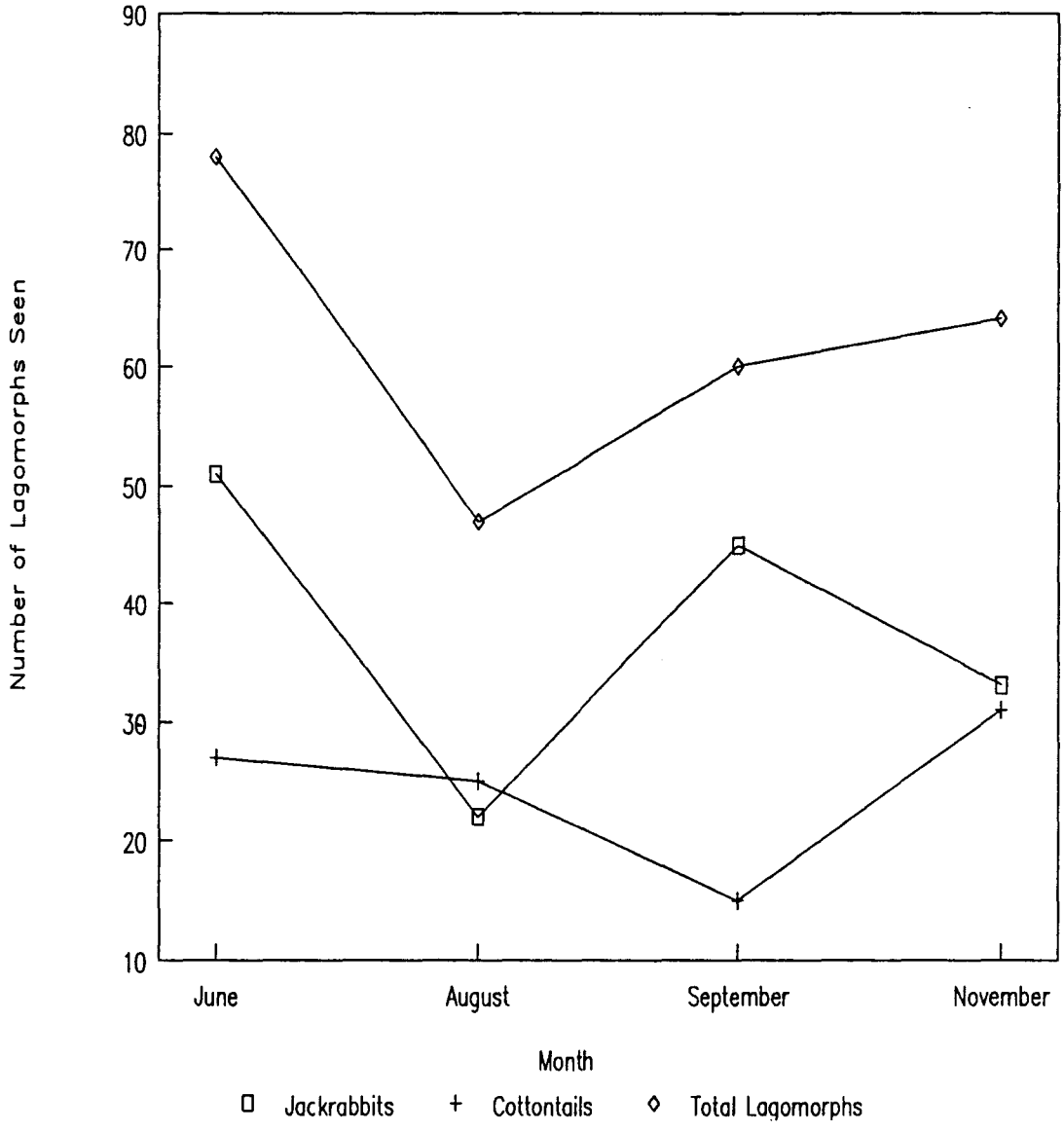

Figure 5. Percentage Dominant Ground Cover at Points where Jackrabbits and Cottontails were Sighted during Spotlight Counts.

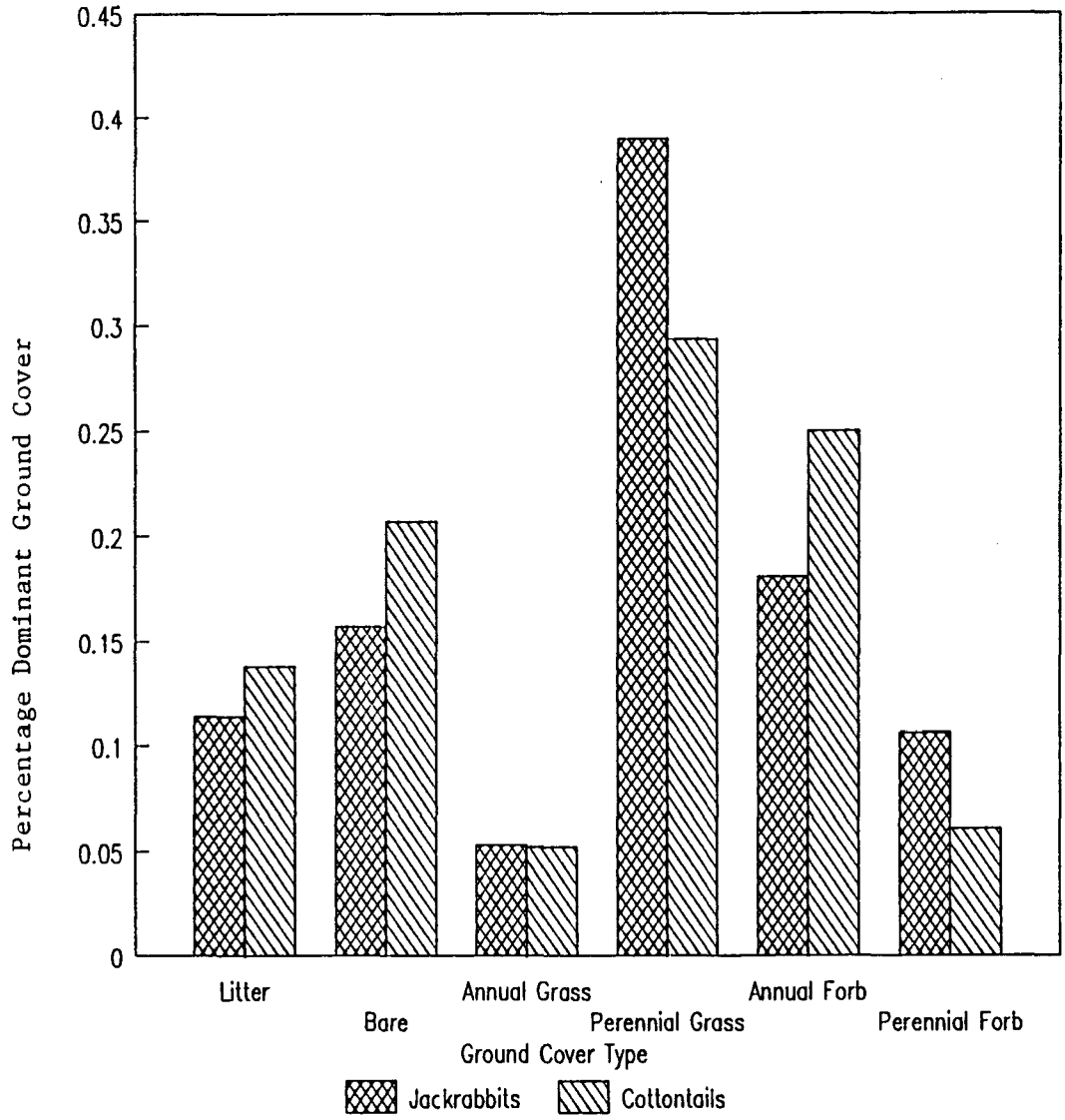

TABLE 1. Flush counts of black-tailed jackrabbits and cottontails on 8 transects pooled over June and October 1991. Percentages for jackrabbits and cottontails, respectively, in parentheses.

TRANSECT	HABITAT	JACK-RABBITS	COTTON-TAILS	TOTALS
1	Native perennial	3 (7%)	4 (16%)	7
2	Native perennial	22 (54%)	3 (12%)	25
3	Sandsage prairie	1 (2%)	0 (0%)	1
4	Yucca grassland	9 (22%)	5 (20%)	14
5	Western wheatgrass	2 (5%)	5 (20%)	7
6	Crested wheatgrass	0 (0%)	1 (4%)	1
7	Mowed grass	1 (2%)	4 (16%)	5
8	Weedy forbs	3 (7%)	3 (12%)	6
	TOTALS	41	25	66