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Some Coyote Food Habitat Patterns in the Shrub-Steppe of South-central Washington

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AN ABSTRACT OF THE THESIS OF Peter Frederick Stoel for the
Master of Science in Biology presented 3 November 1976.

Title: Some Coyote Food Habit Patterns in the Shrub-
Steppe of South-central Washington

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

Richard B. Forbes, Chairman

Dennis W. Boddy /

David T. Clark

Richard Thoms

Coyote food habits were ascertained by identifying the undigested material in 1143 scats collected at monthly intervals from specific road transects on the USERDA Hanford Reservation in Washington from 1974 to 1976. Tracks at artificially established scent posts along the principal

transect provided evidence that the scats were left by coyotes and not bobcats or badgers. On the basin plain (150m elevation) where the *Artemisia tridentata*/*Poa sandbergii* Association predominates, the average monthly percent occurrences in the 491 scats collected in 1975 were pocket mouse 60, leporid 39, pocket gopher 12, grasshopper 12, fruit 10, cricetine mice 7, darkling beetle 6, bird 5, reptile 4, ground squirrel 4, microtine mice 3, and livestock 1.8. Pocket mice and leporids both occurred in every monthly sample of 1974-76. During the summer of 1974 grasshoppers were eaten in large quantities (85 percent occurrence), but the next year they were eaten less than half as frequently (37 percent) during the same period. Monthly numbers of pocket mice and cricetines live-trapped on a grid on the plain correlated significantly with the monthly percent occurrence in scats ($r = .80$, $p < .001$; and $r = .62$, $p < .02$ respectively).

At 500m elevation in the more mesic nearby Rattlesnake Hills, covered mostly by an *Artemisia tridentata*/*Agropyron spicatum* Association, microtines dominated the diet during all seasons for an average seasonal occurrence of 83 percent. The average seasonal percent occurrence of the principal foods in 1975 were *Lagurus curtatus* 68, *Microtus montanus* 30, gopher 24, pocket mouse 14, birds 12, leporid 8, grasshopper 7, grass 3 and darkling beetles 2.

Other studies have shown that leporids predominate

in the coyote's diet in the plains and intermountain areas while rodents predominate in mountain and coastal areas. Coyote food habits on the Hanford plain in 1975 are unusual in that a rodent, the pocket mouse, *Perognathus parvus*, is the dominant item in this arid, intermountain basin instead of leporids. However, the estimated biomass of *Perognathus* at Hanford (8.5 - 134 kg per km²) in 1975 was comparable to the biomass of leporids in Utah (8.2 - 137 kg per km²) where the coyote's diet is about 80 percent leporid. *Perognathus parvus* is exceptionally numerous in the habitat type found at Hanford, and the coyote's diet reflects this abundance.

Coyote scats were significantly non-random in their distribution on the three collection transects (Chi square goodness-of-fit test $P < .001$). Reasons discussed to explain the clustered pattern include a territorial marking function for the droppings, preference for elevated places for marking, previous droppings as stimulus, and juxtaposition of the scat concentrations to important areas such as rendezvous sites.

SOME COYOTE FOOD HABIT PATTERNS IN THE
SHRUB-STEPPE OF SOUTH-CENTRAL
WASHINGTON

by
PETER FREDERICK STOEL

A thesis submitted in partial fulfillment of the
requirements for the degree of

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in
BIOLOGY

Portland State University
1976

TO THE OFFICE OF GRADUATE STUDIES AND RESEARCH:

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CHAPTER I

INTRODUCTION

Purpose Of This Study

The populations of many large predatory mammals such as the wolf, cougar, and grizzly bear have been much reduced in the contiguous United States largely because of loss of wildlife habitat and conflict with man's pastoral activities. However, one medium sized carnivore, the coyote (*Canis latrans*), has adapted remarkably well to man's encroachment on its habitat. Because of the coyote's relative abundance compared to large carnivores, and the continuing coyote-livestock controversy, research interest in this animal has greatly increased in recent years.

More than thirty coyote food studies have been published in the past fifty years. Though these studies have become more detailed, there is still a vacuum in our knowledge of the coyote's diet in many specific habitats. A review of the literature shows that coyotes eat practically all available animal and vegetable materials, but there is great variation in the relative proportions of the different food types. This variation means that coyote food habits in each habitat type generally must be ascertained by a specific food habits study. Previous coyote food studies have not included monthly quantitative data on the abundance

of prey species to compare with the quantitative data on the coyote's diet.

The United States Energy Research and Development Administration's (ERDA) Hanford Reservation in the Columbia basin of south-central Washington offers a unique site for the study of coyote ecology in relatively undisturbed habitat because of its large area and protected coyote population. In addition, studies of small mammal and insect populations by other scientists at Hanford provides data that can be used to better understand the relationship between coyote food habits and prey abundance.

The specific objectives of this research project were to 1) describe seasonal variation in the diet of the Hanford coyote population, 2) compare the frequency of occurrence of small mammals in coyote scats with the frequency of capture of small mammals in live traps in the same area throughout the period of scat collection, and 3) examine the distributional pattern of coyote scats on the roads where they were collected.

Description Of The Study Area

The Hanford Reservation lies in the rain shadow of the Cascade Mountains in one of the most arid regions of the Pacific Northwest. Average annual precipitation at the Hanford Weather Station in the middle of the Reservation is only 170 mm (60 year average), falling mostly between October and April. Summers are hot and dry (mean July maximum

33.3°C); winters are cool (mean January minimum -10.2°C) (Rickard 1972). Precipitation in the Rattlesnake Hills above 365 meters elevation is appreciably higher (approximately 230 mm) than it is on the plain (170 mm) (Hinds and Thorp 1974).

The 1300 km² Reservation is mostly a plain crossed by rolling hills and ridges varying in elevation from 150 to 229 meters. This plain is broken only by Gable Mountain (335 meters elevation) in the northeast area and by the Columbia River. The Reservation is bordered by the Columbia River on the north and east, and the Rattlesnake Hills on the west which rise steeply to 1,067 meters. Across the river on the east are the White Bluffs (274 m). The Reservation surrounded by the river and these hills is thus a well defined topographic unit. Lands adjacent to the river on the north and northeast are administered by state and federal wildlife agencies and are not agricultural.

The Reservation is entirely within the *Artemisia tridentata*/*Agropyron spicatum* (Sagebrush/bunchgrass) Zone (Daubenmire, 1970). Most of the Reservation, which is on the plain below 300 m elevation, consists of *Artemisia tridentata*/*Poa sandbergii* (Sagebrush/Sandberg's bluegrass) Association where it has not been severely disturbed by past agricultural activity. In disturbed areas *Bromus tectorum* (cheatgrass brome) is prevalent (Rickard 1972). The study area on the plain was limited to the *Artemisia tridentata*/

Poa sandbergii Association. Areas along the river were not surveyed.

Above 360 m in the more mesic Rattlesnake Hills, the vegetation is dominated by the *Artemisia/Agropyron* Association. This area of the Rattlesnake Hills covers about 88 km² of the 1300 km² Reservation (Figure 1). The flora along Snively Road (Figure 1) consists primarily of the *Artemisia/Agropyron* Association with deciduous shrubs such as black cottonwood, chokecherry, smooth sumac, Lewis mock-orange bordering a spring-fed brook. This riparian vegetation provides a habitat for many birds, including California quail and chukar. In Snively Basin there are abandoned wheat-fields which are now dominated by cheatgrass brome and tumble mustard (*Sisymbrium altissimum*). For a more detailed description of the Rattlesnake Hills habitat see Rickard (1972).

Figure 1. Map of coyote scat collection areas and areas where prey populations were surveyed 1974-76.

CHAPTER II

METHODS

Coyote food habits were determined by identifying the undigested items found in 1152 scats collected from specific roads on the Hanford Reservation between March 1974 and February 1976.

Location Of Sampling Areas

Coyote scats were collected from the lower elevation plain and the Rattlesnake Hills. On the plain, scats were collected along a single transect consisting of 17.7 km section of the Army Loop Road (ALR) between Route 4 south and the Gate 118 Road (Figure 1). The ALR is a paved road 4 meters wide. It is within the fenced and locked enclosure of the Reservation, not accessible to the general public and not a main thoroughfare; it is probably traveled by two or three cars per day on the average. The pavement made the scats clearly visible; collection was easier than from the other collection roads, which were all dirt. Collections from this road during four months of 1974 (May, June, July, and November) and every month between February 1975 and February 1976 produced 694 scats.

Scats were also collected from three other areas on the plain to see if the distribution of scats on ALR was

representative of that on the Reservation plain in general (see Appendix). A carnivore scent post survey conducted on the ALR provided evidence that the scats analyzed were in fact from coyote and not from bobcats or badgers.

In the Rattlesnake Hills 113 scats were collected from the Snively Canyon Road between March 1975 and February 1976. This transect consisted of the 4.5 km section of the road between the 1200 Foot Road and the bottom of the switchback at 579 meters elevation (Figure 1).

Method Of Analysis

A few scats were broken apart and analyzed in the field when it could be seen that they consisted totally of a single easily-identifiable item, *e.g.*, darkling beetles or apples. Most scats were analyzed in the laboratory by a procedure derived from Burrows (1968) and Korschgen (1969).

- 1) Each scat was placed in a five quart plastic pail of warm water with some detergent and allowed to soak ten minutes or more. Five pails were processed at a time. The scat number was written on the container each time the scat was transferred to a new container.

- 2) The scat was broken manually in the soaking solution. Rubber gloves were worn.

- 3) The bucket contents were then poured into a sieve with a mesh of 0.351 mm and rinsed thoroughly

with warm water.

4) The scat material remaining on the screen was washed into a pan which was filled with water. This separated the hair, chitinous insect parts and other light material, which floated on the surface from the bones and seeds which sank to the bottom. The light weight material, usually hair, was poured back into the sieve; the heavy material (teeth and bones) were examined in one inch of water.

5) Teeth and hair were identified to genus by using keys to skulls and hair (Glass 1951, Mayer 1952, and Moore 1974) and by comparison to known specimens in the Portland State University Collection of Vertebrates.

6) Guard hairs were selected from the hair in the sieve and examined under a compound microscope. Each scat was checked especially for the presence of leporid hair if leporid teeth or toenails had not already been found.

The frequency of occurrence method of reporting food habits does not accurately reflect the relative volume of foods eaten because items occurring in small amounts (*e.g.*, grass) will be counted equally with those occurring in large amounts, ignoring their respective volumes. Some step to compensate for this bias does seem necessary. A number of approaches have been taken. Meinzer *et al* (1975) identified

the items in each of one hundred point samples taken from each scat. This gave a frequency of occurrence in the scat that more accurately reflected the volume occupied by each item. However, the fact that the volume of some foods (*e.g.*, meat) are digested and absorbed far more than other items (*e.g.*, chitinous insects) introduces inherent bias in the scat sample that makes such lengthy procedures, or tedious separation and measurement, of questionable value.

Knowlton (1964), analyzing dry scats, visually estimated the volume of items in each scat. He distinguished three volume categories, "major" (40-100% of the scat), "minor" (5-39%), and "trace" (<5%). In this study washing the scats made finding and identifying items in the scats easier and more pleasant. However, it also made the volume occupied by the various items difficult to estimate visually since the material is thoroughly mixed. Therefore, only the two volume categories, "trace" (<10% of the scat) and "major" (10-100%), were used in this study.

In tabulating the results (Appendix A through G) two figures are given for each food category - the percent "major" occurrence, *i.e.*, the percentage of scats that contained a "major" portion of the item, and a percent "total" occurrence, *i.e.*, the percentage of scats that contained any amount of the item even trace amounts. If these two figures are the same it means the item is eaten in substantial quantities whenever it is eaten. If the percent

total occurrence is much larger then it means the coyote eats that item frequently in small quantities (*e.g.*, grass). Total occurrences are listed in the appendices, but in the text all percent occurrences discussed are occurrences of major amounts.

Scent Post Survey

In order to see if carnivores other than coyotes (*e.g.*, bobcats and badgers) were using the ALR and thus possibly depositing scats there also, fifty scent posts were set along 14.7 miles of the Army Loop Road. Each post consisted of a perforated plastic capsule containing one gram of fermented egg scent powder provided by the U. S. Fish and Wildlife Service. The capsule was one-half inch above the ground on a stick and surrounded by sifted soil that provided a soft substrate to retain footprints of any animal approaching the capsule. The scent posts were constructed on alternating sides of ALR at 0.3 mile intervals adjacent to the road where scats were collected. The posts were monitored for five days in the fall of 1974 and 1975.

CHAPTER III

RESULTS AND DISCUSSION--COYOTE FOOD HABITS ON THE HANFORD PLAIN

Fichter, *et al* (1955) described the coyote's diet in terms of four principle food categories - mammals, birds, insects and fruit.¹ These categories are applicable in most places the coyote lives, including the Columbia Basin country where this study was done. The relative importance of these categories varies seasonally, annually and by location. At Hanford during 1974-1975 the order of importance for these categories was mammal, insect, fruit and bird on the plains, with birds becoming second in importance in the Rattlesnake Hills (Figure 2).

MAMMALS

Mammals were consistently the most important food source over an annual period (Figures 2, 3). Of the 42 species of mammals found on or near the Hanford Reservation, 19 species were found in the 1152 scats analyzed (Table I).

The mammal remains found in coyote scats varied with the altitude at which the scats were found. Approximately

¹ A fifth category might be grass, which is found all year in small amounts. A few scats consist almost entirely of grass. This suggests the grass is eaten deliberately and thus should be considered a food item.

Figure 2. Percentage of coyote scats containing major food categories, Army Loop Road and Snively Road, 1975.

Figure 3. Important foods of coyotes in *Artemisia/Poa* habitat on the Hanford Reservation, Washington, as determined by analysis of scats collected from the Army Loop Road between May 1974 and February 1976.

TABLE I

MAMMALS RECORDED ON OR NEAR THE HANFORD RESERVATION
(ITEMS FOUND IN COYOTE SCATS ARE MARKED AS FOLLOWS:

- SNIVELY CANYON; * ARMY LOOP ROAD
- * BOTH SNIVELY AND ARMY LOOP ROAD)

Order Insectivora

Soricidae

<i>Sorex vagrans</i>	Vagrant Shrew
<i>Sorex merriami</i>	Merriam's Shrew

Order Chiroptera

Vespertilionidae

<i>Myotis lucifugus</i>	Little Brown Myotis
<i>Lasionycteris noctivagans</i>	Silver-haired Bat
<i>Lasiurus cinereus</i>	Hoary Bat

Order Lagomorpha

-* Leporidae

<i>Sylvilagus nuttallii</i>	Nuttall's Cottontail
<i>Lepus californicus</i>	Black-tailed Jack Rabbit

Order Rodentia

Sciuridae

<i>Eutamias minimus</i>	Least Chipmunk
- <i>Marmota flaviventris</i>	Yellow-bellied Marmot
-* <i>Spermophilus townsendii</i>	Townsend's Ground Squirrel

Geomyidae

-* <i>Thomomys talpoides</i>	Northern Pocket Gopher
------------------------------	------------------------

Heteromyidae

- * *Perognathus parvus* Great Basin Pocket Mouse

Castoridae

- Castor canadensis* Beaver

Cricetidae

Cricetinae

- * *Reithrodontomys megalotis* Western Harvest Mouse
 -* *Peromyscus maniculatus* Deer Mouse
 * *Onychomys leucogaster* Northern Grasshopper Mouse
 - *Neotoma cinereus* Bushy-tailed Wood Rat

Microtinae

- *Microtus montanus* Montane Vole
 -* *Lagurus curtatus* Sagebrush Vole
 . *Ondatra zibethicus* Muskrat

Muridae

- Rattus norvegicus* Norway Rat
 - *Mus musculus* House Mouse

Erethizontidae

- * *Erethizon dorsatum* Porcupine

Order Carnivora

Canidae

- * *Canis latrans* Coyote
Canis familiaris Domestic Dog

Procyonidae

- Procyon lotor* Raccoon

Mustelidae

<i>Mustela frenata</i>	Long-tailed Weasel
<i>Mustela vison</i>	Mink
<i>Taxidea taxus</i>	Badger
<i>Spilogale gracilis</i>	Western Spotted Skunk
<i>Mephitis mephitis</i>	Striped Skunk
<i>Lutra canadensis</i>	River Otter

Felidae

<i>Felis rufus</i>	Bobcat
<i>Felis catus</i>	Domestic Cat

Order Perissodactyla

Equidae

* <i>Equus caballus</i>	Horse
-------------------------	-------

Order Artiodactyla

Suidae

<i>Sus scrofa</i>	Pig
-------------------	-----

Cervidae

<i>Cervus elaphus</i>	Wapiti
-* <i>Odocoileus hemionus</i>	Mule Deer
<i>Odocoileus virginianus</i>	White-tailed Deer

Bovidae

* <i>Bos taurus</i>	Cattle
* <i>Ovis aries</i>	Domestic Sheep

88 km² of the land along the western boundary of the Hanford Reservation is above 365 meters elevation. There the predominant mammals found in scats differ from those found on the rest of the Reservation (Table II). These mammals are discussed more fully in Chapter IV. On the rest of the Reservation, consisting of plains about 1300 km² in extent, *Perognathus parvus* is the predominant item found in scats.

Comparison of scats collected along the ALR and those collected in other areas on the plain indicates that the coyote's food habits are similar over most of this lowland area. A possible exception might be areas immediately adjacent to the Columbia River. No sampling was done there.

Great Basin Pocket Mice

Great Basin Pocket Mice (*Perognathus parvus*) were the most frequently occurring item in coyote scats on the Hanford Reservation plain. Their occurrence exceeded 40 per cent in every month of this study except during the winter, and every monthly sample collected from the Army Loop Road contained some *P. parvus* remains (Fig. 3).

Live-trapping of small mammals near the Army Loop Road from 1974 to 1976 (Hedlund and Rodger 1976) provided a picture of the monthly availability of *Perognathus* to the coyote. Pocket mice were trapped at very low levels from two to three months each winter (Appendix H). During this period they are believed to be underground in a torpid state, periodically waking to eat from stored caches of

TABLE II

COMPARISON OF THE PERCENT OCCURRENCE OF SEVERAL
 IMPORTANT MAMMALS FOUND IN COYOTE SCATS FROM
 THE RATTLESNAKE HILLS AND ON THE LOW
 ELEVATION PLAIN MARCH 1975 -
 FEBRUARY 1976

	Rattlesnake Hills (Snively Road)	Army Loop Road
Pocket mouse <i>Perognathus parvus</i>	15.0	60.4
Rabbit	8.7	38.7
Pocket gopher <i>Thomomys talpoides</i>	25.0	12.2
Cricetine mice	0.0	7.0
Ground squirrel <i>Spermophilus townsendii</i>	2.2	4.5
Voles <i>Microtus, Lagurus</i>	82.5	2.7
Birds	13.0	4.3
Livestock	1.0	1.8

seeds (O'Farrell *et al* 1975). Occurrence of pocket mouse remains in scats follows this pattern, dropping off sharply in early winter (Fig. 4). The pocket mice emerge in February; they are again trappable and also resume an important place in the coyote's diet.

There is a peak in occurrence of pocket mice in scats in the late summer and fall of 1974 and 1975. There is also clear evidence of a peak in occurrence in April 1975 (Fig. 3). The trapping data show peaks in the same months (Fig. 4).

O'Farrell *et al*'s (1975) data indicate that adult female pocket mice emerge later than males, and both are most active and breeding at the end of April. This explains the peak occurrence of pocket mice in scats collected in April. Adult pocket mice bear one to three litters per year, depending on food resources, store food underground, and cease above ground activity by July after only 60 to 90 days of above ground activity. The next peak in pocket mouse trappability and occurrence in scats represents the activity of the offspring of the litters born in the spring. These are subadults gathering seeds to store in their underground food caches; they seemingly provide the summer peak in occurrence in coyote scats. The correlation between the percent occurrence of pocket mice remains in scats and the number of individuals caught in traps each month is high (Fig. 5). Overall, the coyotes' food habits closely follow

Figure 4. Comparison of monthly occurrence of pocket mice in coyote scats collected from the ALR with numbers of individual pocket mice trapped monthly near the ALR (Hedlund and Rodgers, 1976).

Figure 5. Regression of the percentage of ALR coyote scats containing pocket mice against the number of individual pocket mice live-trapped monthly near the ALR 1974-76 (Hedlund and Rodgers, 1976).

the availability of the most numerous rodent species in this area.

An unexpected finding was the occurrence of pocket mice in some scats through the winter months when pocket mice are virtually untrappable. Winter 1974-75 was unusual with a few pocket mice caught each month. Though no trapping was done in December of January 1975-76 it appears from the pattern in previous years that none would have been trapped (Appendix H). Yet in three scat collections in December and January pocket mice were always present in about 20 percent of the scats. This suggests that coyotes were either hunting harder for the mice in winter, or there were more active pocket mice around than the trapping suggests, or both. There were clearly some pocket mice available to the coyotes during December and January 1975-76.

Leporids

Remains of Nuttall's cottontail (*Sylvilagus nuttallii*) and the black-tailed jackrabbit (*Lepus californicus*) were found in 42 percent of the scats collected on the ALR (average of twelve months sampled between February 1975 and February 1976). These two rabbit species are not readily distinguishable on the basis of hair and teeth found in scats according to Moore (1974) and Mayer (1952), so they are lumped together in this study.

Occurrence of leporids in coyote scats collected during 1974 and 1975 was lowest in the late summer and early

fall and high during winter and spring. There is no clear explanation for the decline in leporid occurrence at the end of the summer in both 1974 and 1975. No quantitative information has been gathered on leporid population dynamics at Hanford. Therefore it is not possible to say whether this decline in leporid consumption is related to a decline in the leporid population or possibly a diversion in coyote interest caused by the high pocket mouse population.

The occurrence of leporids and the occurrence of rodents in coyote scats were inversely related during the fall and winter months but not during the spring and summer (Fig. 6). The correlations for the months September through February were $r = -.80$ ($N = 8$, $P < .02$) for *Perognathus* versus leporids (Fig. 7) and $r = -.92$ ($N = 8$, $P < .01$) for all rodents versus leporids. During the spring and summer months the correlations were not significant for *Perognathus* versus leporids, or for all rodents versus leporids. Instead both rodents and leporids occurred at high frequencies during most spring and summer months, except when grasshoppers were very abundant in July 1974 (Fig. 6).

Leporid occurrence was highest in a sample of 15 scats collected December 23, 1975 when snow covered the ground; 75 percent of the scats contained leporid remains (Fig. 3). This was the only sample collected when the

Figure 6. Negative correlation between the percent occurrence of leporids and the percent occurrence of rodents in ALR coyote scats during the months of September-February 1974-76 ($r = -.92$, $N = 8$, $P < .01$). Data from the other months is presented but not included in the correlation.

Figure 7. Negative correlation between the percent occurrence of leporids and the percent occurrence of pocket mice (*Perognathus parvus*) in ALR coyote scats during the months of September-February 1974-76 ($r = -.80$, $N = 8$, $P < .02$). Data from other months is presented but not included in the correlation.

ground was snow covered. This high occurrence of leporids, along with the lowest occurrence of rodents during 1975 (40 percent), suggests that winter leporid consumption in this area is greatly increased by snow accumulation on the ground. This is similar to Gier's observation concerning coyote food habits in Kansas that "...during January and February, particularly when there is snow protecting the rodents and covering most other food materials, rabbit remains occurred in 60 to 80% of the stomachs and made up considerably over half the contents." (Gier 1968).

Since 1962 a population of black-tailed jackrabbits in the Great Basin has been monitored in the Curlew Valley of northern Utah 725 km SE of Hanford (Gross *et al*, 1974; Wagner and Stoddart, 1972). In most years, the Curlew Valley jackrabbits produce four litters, the first in mid-February and the last in early July. Thus jackrabbit populations in Utah, and probably at Hanford, would be high in late summer. However, data from coyote food habits at Hanford do not confirm this. Instead of eating leporids, Hanford coyotes were eating grasshoppers, darkling beetles and especially pocket mice.

Pocket Gophers

Northern pocket gophers (*Thomomys talpoides*) were found in coyote scats along the Army Loop Road every month of the year, for an average monthly occurrence during 1975

of 12.2 percent. Though their remains were never very abundant, pocket gopher was the item that occurred with the most consistent frequency in the scats (Fig. 3). Pocket gophers do not hibernate or become inactive any time of the year (Ingles 1965) and thus are always available to coyotes in varying amounts. The peak occurrence was in March.

Townsend's Ground Squirrel

Townsend's ground squirrels (*Spermophilus townsendii*) were eaten only in the spring. Therefore the average monthly occurrence for 1975 was only 4.5 percent, but a peak of 23 percent occurrence was reached during May-June 1975.

Ground squirrels on the ALE Reserve feed above ground during the day from late January to June then enter estivation and are in hypothermic torpor for the next seven months (O'Farrell 1975b). Therefore they are available as food for coyotes only in the spring. On the low elevation grid near Rattlesnake Springs no *Spermophilus townsendii* have been caught. In past years (1968-71) at other trapping locations in all habitat types on the Arid Lands Ecology Reserve only 2 out of 14 *Spermophilus* were trapped in the *Artemisia/Poa* association, the habitat where the ALR scat collection transect is located. *Spermophilus* were trapped mostly in the *Artemisia/Agropyron* association above 360 meters elevation (O'Farrell 1975a, b; O'Farrell *et al* 1972, 1974;

Hedlund *et al* 1976b). There ground squirrels find the green vegetation necessary for growth during their active period in the spring (O'Farrell 1975b). However, ground squirrels are found at low elevations where green vegetation exists, such as around riparian habitat along the Columbia River (O'Farrell 1975b).

Besides their limited annual activity period and their need for fresh herbage a third factor affecting their distribution, and thus having a big impact on their availability to coyotes, is their habit of living in colonies (MacClintock and Ferguson 1970) which are widely scattered at Hanford. *Spermophilus* may be a substantial part of the diet of those local coyotes that visit these colonies in the spring.

Cricetine Mice

Altogether, cricetines were found in coyote scats on the ALR at an average monthly occurrence of 7.0 percent in 1975. Deer mice (*Peromyscus maniculatus*) were the most common cricetine, but since it was usually difficult to distinguish them from harvest mice (*Reithrodontomys megalotis*) based on scat material these two species are treated as one category, Cricetinae. Bushy-tailed wood rats (*Neotoma cinerea*) occurred in one scat collected in Snively Canyon. The Northern grasshopper mouse (*Onychomys leucogaster*) occurred in one scat collected on the ALR in August 1975.

Remains of deer mice and harvest mice were found frequently in scats during the winter and only rarely in the summer (Fig. 3). This reflects the capture pattern on the small mammal trapping grid (Plot #24) near the ALR. Eleven of the 13 cricetines trapped were captured during the months December through March (Table III); these were the same months when cricetines were found most frequently in scats (Fig. 3).

Microtines

The sagebrush vole (*Lagurus curtatus*) and montane vole (*Microtus montanus*) occurred at low frequencies on the Army Loop Road together averaging only 2.7 percent occurrence. They occurred in scats collected between February and April 1975 and between November 1975 and February 1976. Peak occurrence was 19 percent, in January 1976 when *Peromyscus* was also at peak occurrence and *Perognathus* activity was low. The two microtines occurred at about the same frequency. Along with their occurrence in ALR winter scats, microtines were also trapped for the first time in three years at the low elevation grid (two *Lagurus curtatus* February 11-12, 1976. Hedlund and Rodgers 1976, see Table III).

Livestock

The average monthly occurrence of cow, sheep and horse hair in scats on the Army Loop Road was 1.8 percent. Of the

TABLE III

SMALL MAMMALS LIVE-TRAPPED MONTHLY ON A TRAPPING GRID NEAR THE
ARMY LOOP ROAD MAY 1974 - FEBRUARY 1976
(FROM HEDLUND AND RODGERS 1976)

	1974												1975												1976	
	M	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F			
	1-3	21-25																								
<i>Perognathus parvus</i>	37	35	26	35	49	60	72	69	16	5	9	50	79	52	50	62	69	72	-	33	-	-	0			
<i>Peromyscus maniculatus</i>	1	0	0	0	0	0	0	0	2	2	3	2	0	0	0	0	0	1	-	0	-	-	2			
<i>Onychomys leucogaster</i>	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	-	0	-	-	0			
<i>Lagurus curtatus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	-	2			

694 scats analyzed from the ALR, one collected in February 1975 contained wool. Cattle hair was found more frequently, but only in winter and early spring. Horse hair was found in five scats in May 1974 collected on the Gate 111 Road and in two scats collected on the ALR in January 1976.

Livestock grazing is prohibited on the Hanford Reservation except for limited experimental purposes. However, domestic animals occasionally break in from surrounding areas. I observed and photographed free-running horses on the Reservation July 4, 1974, 18 km NE of Gate 111. The occurrences of livestock in scats probably resulted from coyotes scavenging a few carcasses. One carcass, a calf, was found near Highway 240 at Gate 118. It may be the source of cattle hair found on the ALR scats in early 1975. Besides this carcass I have no specific information on sources of the livestock hair in scats.

BIRDS

Bird remains were found in a few scats sporadically throughout the year, for an average monthly percent occurrence of 5 percent. Most remains (feathers) were not identified beyond the class Aves. In a few cases parts of bills and feet were found; these were from the most common passeriform species found on the Reservation, horned larks (*Eremophilus alpestris*) and meadowlarks (*Sturnella neglecta*). There was an increase in birds in the coyote's diet in

winter.

REPTILES

Lizards and snakes were found in coyote scats at an average occurrence of 4 percent. They occurred in scats found in August 1974, February 1975, and every month from June 1975 to February 1976. The remains were all of snakes except for a few lizards found in February 1975 and January 1976. The lizards were probably side-blotched (*Uta stansburiana*) the most common lizard on the Reservation (Fitzner 1976). No short-horned lizard remains were found though I have seen them on the Army Loop Road. Snakes identified were the gopher snake (*Pituophis melanoleucus*), yellow-bellied racer (*Coluber constrictor*) and one rattlesnake (*Crotalus viridis*) occurrence, identified by the presence of a rattle segment in a scat. Rattlesnakes have previously been recorded in coyote diets (Sperry 1941, Ferrel *et al* 1953).

INSECTS

Insects are seasonally important in the coyote's diet at Hanford. The average monthly occurrence for 1975 was 15 percent. Three families were principally involved in 1974 and 1975 -- Tenebrionidae (darkling beetles, Coleoptera), Acrididae (Short-horned grasshoppers, Orthoptera), and Tettigoniidae (long-horned grasshoppers, Orthoptera).

Orthoptera

Orthoptera were particularly prevalent in the ALR scats during the summer of 1974, occurring in 87 percent of the scats in "major" amounts in both the June 21 sample of 16 scats and in the 38 scats collected between July 30 and August 6 (Fig. 3). Specific types of Orthoptera were not identified in the scat samples. I collected one specimen, a dectid (*Apote notabilus*) on June 21, 1974, in the vicinity. These animals were very numerous on the road at that time. Many legs and ovipositors observed in analyzed scats resembled those of this specimen. In an unrelated study at a site near the B-C Crib (Fig. 1) five kilometers north of the ALR in similar habitat Sheldon and Rodgers (1976) identified 14 species of grasshoppers, including both vegetation and ground dwelling species. Grasshopper density on the ground in 1974 peaked in late June and July according to their ocular estimates. Coyote consumption of grasshoppers, as determined by analysis of ALR scats, peaked during the same period (Fig. 8).

An interesting question is whether the high consumption of grasshoppers in the summer of 1974 depressed the consumption of other food items, particularly rabbits and pocket mice. Figure 3 shows that rabbits were at high occurrence in scats through June when grasshoppers were also heavily eaten. After all scats were cleared from the road July 5 the fresh scats deposited in July showed a sharp

Figure 8. Comparison between ocular estimates of grasshopper density per m² (B-C Crib area, Sheldon and Rodgers, 1976) and percentage of coyote scats on the ALR containing grasshoppers, 1974.

reduction in rabbit consumption while grasshopper occurrence was maximal. Pocket mouse consumption also continued a downward trend in July when small mammal trapping showed rapidly increasing pocket mouse activity (Fig. 4). This data suggests a coaction resulting in depressed consumption of mammals during periods of very high insect abundance.

In 1975 dectids were not observed in coyote scats, but acridid grasshoppers occurred from July through November. The November peaks in 1974 and 1975 are consistent, about 20 percent both years. Several investigators of coyote food habits have noted significant summer or fall occurrences of acridids in coyote scats (O. Murie 1935; A. Murie 1940; Meinzer *et al* 1975; Ellis 1959; Knowlton 1964). Fichter, *et al* (1955), for example, reported high summer occurrences of grasshoppers - 72, 85, and 95 percent for the summers of 1947-49 respectively - in coyote scats from an area in Nebraska. Other writers (A. Murie 1940; Ryden 1975) suggest that grasshoppers may be particularly important in the diet of young coyotes in late summer.

Tenebrionidae

Darkling beetles (*Tenebrionidae*) appeared in two distinct peaks in 1975 and occurred in smaller amounts during the same period in 1974 (Fig. 3). *Tenebrionidae* occurred at an average rate of six percent occurrence for all of 1975. The two distinct peaks were in June 1975 (27 percent occurrence) and November 1975 (24 percent). Three samples

collected in the summer and fall 1975 had zero occurrence (Fig. 3).

Table IV compares monthly pitfall trap data (Rodgers *et al* 1976) for 1974 and 1975 from two areas north of where the ALR scats were collected (Fig. 1). The reason for the lack of a fit between the occurrence of darkling beetles in scats and pitfall traps is not clear ($r = + .05$, $N = 9$). However darkling beetle occurrence in pitfall traps at two similar areas 8 km apart (Redox Pond and B-C Crib) were also not significantly correlated ($r = + .48$, $N = 11$, $.20 < P < .10$). Likewise, occurrence in scats was variable in the same month at different places on the lower plain; for example, 24 percent versus 47 percent on the ALR and Gate 111 Road respectively in November 1975. This suggests that darkling beetle activity and abundance was scattered and variable over this area so that pitfall trapping and scat collection would have to be more closely coordinated in time and distance in order to show a correlation. Pitfall trap data from 1974-1975 (Rodgers, *et al* 1976), and from previous years (Rickard 1970, 1971) suggests that the June peak in occurrence of darkling beetles in scats was due largely to *Eleodes hispilabris* and the October-November peak to *Philolithus densicollis* (Horn) (formerly *Pelecyporus*).

FRUIT

Fruits from naturally occurring plants at Hanford were

TABLE IV

COMPARISON OF PERCENT OCCURRENCE OF DARKLING BEETLES IN COYOTE SCATS
ON THE ARMY LOOP ROAD WITH THE NUMBER OF PITFALL-TRAPPED AT REDOX
POND AND B-C CRIB (DARKLING BEETLE DATE FROM RODGERS *et al* 1976)

	1974										1975									
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Number of Darkling Beetles Pitfall-trapped																				
Redox Pond	49	6	1	3	4	4	-	-	-	-	-	0	8	8	6	-	5	12	-	-
B-C Crib	59	33	14	1	2	72	-	-	-	-	0	-	6	2	3	-	1	5	-	-
Percent Occurrence of Darkling Beetles In Scats	5	0	0	0	-	-	10	-	-	0	2	0	2	27	0	0	0	10	24	0

not found in coyote scats. However, apples and cherries are common in coyote scats, especially in the winter, averaging 10 percent occurrence during 1975 (Fig. 3). Three possible sources for the apples and cherries are garbage from the Central Dump (landfill) located on the ALR, spillage from trucks along Highway 240 (report from John Hedlund, personal communication), abandoned orchards along the Columbia River, and orchards more than twelve miles south of the ALR on the other side of Rattlesnake Mountain.

Fruit occurred most frequently in the winter, with a peak of 35 percent occurrence in January. Sperry (1941) reported frozen fruit in the winter diet of coyotes in Washington; this is confirmed by this study. Ozaga and Harger (1966) also reported that frozen apples were an important item (31 percent occurrence) in the coyote's winter diet on Beaver Island in Lake Michigan.

CARNIVORE RESPONSE TO SCENT POSTS

No other carnivores besides coyotes were recorded at the scent posts in 1974 or 1975. During 250 scent post nights each year there were 28 coyote visits in 1974 and 23 in 1975 along the ALR. It is concluded from the lack of response by other wild carnivores that the scats on the ALR were from coyotes.

Dog tracks are usually indistinguishable from coyote tracks. However, since coyotes were seen along the ALR,

and I neither saw nor received any reports of dogs there, it is concluded that the scent post tracks are from coyotes.

Dogs were seen only once on the Reservation. On February 24, 1974 I saw two free-running dogs unaccompanied by any people near the junction of the 1200 Foot Road and Snively Road. The nearest human residence is 7.7 km away on the other side of Rattlesnake Mountain.

DISCUSSION

Pocket mice and leporids were the major items in the coyote's diet in the *Artemisia tridentata*/*Poa sandbergii* habitat type which covers most of the basin plain. This habitat is characterized by low mammal diversity (O'Farrell *et al* 1975). *Perognathus parvus* far out-numbers the other mouse species present with a population an order of magnitude greater than that of *Peromyscus maniculatus*, the next most abundant species (O'Farrell *et al* 1975).

Pocket mice occurred more frequently than leporids in scats (60 percent *versus* 40 percent occurrence). However, frequency of occurrence data tends to overestimate the volume of small items in the diet, such as mice, since they occur more frequently in small quantities (less than 40 percent of the scat) than do large items such as leporids (Clark 1972). Not counting small quantities (items occupying less than 10 percent of the scat) when calculating the percent occurrence removes some of this bias, since mice

occur more often at such low volumes than do leporids. Yet, since mice also appear in 10 to 50 percent of the scat more often than do leporids, it might be suspected that the volume of mice in the diet is still over-estimated. Leporids may approach pocket mice in volume in the coyote's diet rather than be considerably less, as indicated by the average frequency of leporid occurrence in scats.

Most other coyote food habit studies also show rodents and leporids as the major dietary items. Leporids usually predominate on the plains and in arid intermountain areas (Fichter *et al* 1955; Gier 1968; Clark 1972); rodents predominate in mountain and coastal areas (Ferrel *et al* 1953; A. Murie 1940) due to greater abundance of microtines there. Coyote food habits in the *Artemisia/Poa* habitat of Washington deviate from this pattern. It is an arid intermountain area where the results of this study show a rodent rivals rabbits as the major prey species in the coyote's diet. Sperry (1941) reports finding a similar pattern in Washington 40 years ago. He found, in 8,263 stomachs collected from 1931 to 1936 from 17 western states, that stomachs from Washington coyotes had the lowest percentage of rabbit occurrence (27 percent) and the highest occurrence of *Perognathus* (27 percent in his April samples).

In another arid intermountain area, the Curlew Valley on the Idaho-Utah border, jackrabbits were by far the predominant coyote food [77 percent occurrence in scats and

72 to 95 percent occurrence in stomachs (Clark 1972). Fall jackrabbit densities varies in the Curlew Valley from 1963 through 1969 from a low of 11.7 per km² to 68.0 per km² (Gross *et al* 1974). At a mean adult jackrabbit weight of 2.0 kg (Stoddart 1972) this jackrabbit density converts to a jackrabbit biomass range of 23.4 to 137 kg per km².

At Hanford the above ground biomass of *Perognathus* (the biomass available to coyotes) can be calculated directly from the numbers of individuals trapped on the one hectare live-trapping grid (plot #24). Since live-trapping was conducted each month for three consecutive nights, and all individuals were marked and released, it is likely that nearly all *Perognathus* active each month were counted. Thus, the number of individuals captured can be used as a conservative estimate of the above ground population.

Using this estimate of population and a mean weight for *Perognathus* of 17.4 grams (Hedlund *et al* 1976b; O'Farrell 1975b), above ground *Perognathus* biomass varied during the period of this study from 8.5 kg per km² in January 1975 to 134 kg per km² in April 1975. This estimate of *Perognathus* biomass compares well with Gross (1974) estimate of rabbit biomass which provided about 80 percent of the Curlew Valley coyotes' food and supported a coyote population there of approximately 0.7 per km² (Clark 1972).

It would be interesting to have as accurate an estimate of leporid density at Hanford as we have of *Perognathus* density so we could see how well the percent occurrence in scats correlates with the biomass of these species in the Hanford environment. However, the above calculations suggest that *Perognathus* biomass density at Hanford is adequate to supply the major portion of the coyote's diet for the ten months out of the year when pocket mice are active above ground, just as the scat analysis data suggests.

CHAPTER IV

COYOTE FOOD HABITS IN THE RATTLESNAKE HILLS

Eleven collections of coyote scats (130 scats total) from Snively Road (366 m to 580 m elevation) covering the period of March 1975 to February 1976 shows a diet which differs markedly from that which occurred at lower elevations only 10 km away. These data are arranged according to season for analysis and discussion. The sagebrush vole, (*Lagurus curtatus*) and the montane vole (*Microtus montanus*) together occurred in 85 percent of the scats on the average across all seasons. These two species of voles completely dominated the coyote's diet during the year (Figure 9).

Six trapping sessions were conducted in Snively Basin in the Rattlesnake Hills between January 1975 and March 1976 (J. D. Hedlund, D. T. McCullugh, and K. A. Gano, unpublished data). Traps were set at two grids about one kilometer apart in Snively Basin both at 533 m elevation. The results from the two trapping grids have been combined in the following discussion.

Lagurus consistently occurred in a high percentage of coyote scats throughout 1975, averaging 66 percent occurrence (Fig. 9). Conversely, the trapping rate for *Lagurus* fluctuated widely, from one individual in August to twenty

Figure 9. Seasonal food habits of coyotes in the Rattlesnake Hills as determined by analysis of scats from Snively Road.

in September. There is a tendency for the percent occurrence in the scats to rise and fall slightly with corresponding changes in numbers of individuals trapped. However, the occurrence rate in scats is consistent compared to the sharp twenty-fold fluctuations in trapping rates during 1975 (Figure 10).

The explanation for this divergence between trapping and scat results may be simply that the coyotes are hunting over a large range of habitats in the Rattlesnake Hills differing in faunal abundance from the trap grid areas, and may find a dependable source of voles throughout the year elsewhere than on the trapping grids. Specifically, many *Lagurus* eaten by coyotes may have been caught above the 533 meter grids. O'Farrell (1972, 1975a) found, during small mammal surveys from 1968 to 1971, that *Lagurus* were trapped most frequently above 910 meters and rarely below 300 meter meters. In contrast, the lower plain (Chapter III) is more monotonous and thus, though coyotes range over a wide area there also, wherever they go they are sampling prey populations which are fluctuating like those on the trapping grid near Rattlesnake Springs.

Perognathus parvus occurred in at least a small number of scats every month from April through November 1975. There were no occurrences in the samples collected in winter or early spring. Average occurrence was 15 percent throughout 1975. Trapping results on the two Snively

Figure 10. Comparison of numbers of small mammals live-trapped with small mammals in coyote scats - Rattlesnake Hills, Snively Road 1975. (Trapping data J. D. Hedlund, K. A. Gano, D. T. McCulloch, unpublished).

Basin grids showed the expected pattern of pocket mouse activity -- active during the spring, summer and fall but none in winter. However, fluctuations in trapping rates showed no relationship to changes in scat occurrence during the active period (Fig. 10).

Microtus montanus occurred frequently in coyote scats for an average seasonal occurrence of 32 percent, second only to *Lagurus*. In contrast to its abundance in scats, *Microtus* was only trapped during the winter (February 1976) at the 533 meter level. Cricetines (*Peromyscus maniculatus*) were trapped in small numbers during all seasons of the year but occurred in only three out of 130 scats (two of these in trace amounts only).

Table V shows that *Lagurus* is the most frequently trapped and the most frequently occurring mammal in the coyote's diet in the Rattlesnake Hills. *Microtus*, which was trapped only one month, must also have been plentiful somewhere in the Snively Canyon. *Perognathus* and *Peromyscus* were both frequently trapped, but only *Perognathus* occurred frequently in coyote scats. Other authors (Fichter, *et al* 1955; A. Murie, 1940; Scott 1947) have also reported that *Peromyscus* does not appear in canid diets as frequently as their numbers in the environment would lead one to expect. The explanation given is that *Peromyscus* is both nocturnal and secretive while voles are active at all hours (Ambrose 1973, Pearson 1960) and consistently follow

TABLE V

COMPARISON OF THE TOTAL NUMBER OF EACH SPECIES
TRAPPED AND THE AVERAGE 1975 SEASONAL PERCENT
OCCURRENCE IN THE RATTLESNAKE HILLS

	<i>Lagurus</i>	<i>Microtus</i>	<i>Perognathus</i>	<i>Peromyscus</i>
Number of Individuals Trapped	56	5	29	21
Percent Occurrence in Scats	66	32	15	1

poorly hidden runways (Pearson 1960). Thus, coyotes would more rarely encounter *Peromyscus* than voles. *Perognathus* is also strictly nocturnal (Kritzman 1974) but is eaten very frequently by coyotes. How the behavior of pocket mice make them more susceptible to coyote predation is not clear.

There is also evidence that *Peromyscus* is rejected by canids on the basis of taste. Steve Hoffman (Utah State University, unpublished data) reports that in captive feeding experiments coyotes did not eat *Peromyscus* as readily as other species including *Perognathus*, *Spermophilus*, and voles. Scott (1947) reports that he found *Peromyscus* killed by red foxes and left uneaten along trails and at dens.

Rabbits occurred in only a few scats in the Rattlesnake Hills with an average for the year of 9 percent occurrence. Pocket gophers were the third most common mammal food, occurring in 25 percent of the scats. Other food items, all found at low occurrence, were ground squirrels (2 percent), a bushy-tailed wood rat (*Neotoma cinerea*, one scat), canid (trace), deer (2 percent), cattle (1 percent), birds (13 percent occurrence for the year, largely galliforms), darkling beetles, acridids, fruit (1 percent), and grass (see Appendix C).

CHAPTER V

DISTRIBUTION OF SCATS ON THE COLLECTION TRANSECTS

Scats collected along the three principal collection routes do not appear to be distributed evenly but instead are clustered in some areas of the transect. Figures 11, 12, and 13 chart the number of scats collected in each 0.1 mile interval on the Army Loop Road, the Gate 111 Road, and Snively Road. Each 0.5 mile interval on the ALR transect and each 0.2 mile interval on the Snively and Gate 111 Roads were treated as sample quadrats for statistical analysis of the scat distribution patterns. Using the X^2 goodness of fit test (Sokal and Rohlf 1969) the distribution of the numbers of scats collected in these quadrats differed significantly from randomness on all three transects ($P \leq .001$). Each monthly sample on the ALR also differed significantly from a random distribution ($P \leq .005$) except for the months of July 1974, and April, October, and November 1975.

The non-random distribution is not only statistically significant for most months but the consistent clustering of scats on certain sections of the transect can be clearly seen in Figure 11. The coyotes use a "latrine" area on the ALR marked by a much higher concentration of scats between

Figure 11. Monthly distribution of coyote scats on the Army Loop Road, 1974-76, and coyote visits to scent posts 1974 and 1975.

Figure 12. Distribution of coyote scats on Snively Road, 1975.

Figure 13. Distribution of coyote scats on Gate 111 Road, 1975.

2.2 and 3.6 miles. This area was consistently used through 1975.

A partial explanation for these concentrations is offered by the observation of Ozoga and Harger (1966), who found that coyote droppings were concentrated on elevated spots such as small knolls, ridges, and beaver lodges. The ALR is built up above the surrounding terrain in many places, and this elevation may be part of the reason scats accumulate on this road. Other authors do not note any observations of clustering along roads, though many other coyote food habit studies also use droppings collected from roads. Thompson (1952) writes that "...my field experience with coyotes in Wisconsin indicates that they do not concentrate their droppings on favored stretches of trail or road, at least not to the extent observed on...wolf runs."

Since the heavy clustering is only in a few, not unusually elevated places on the ALR, the elevation is only part of the explanation. Mech and Frenzel (1971) and Peters (1975) note that a high proportion of sign on road and trails are found at junctions. However, scat clusters on the ALR are not well aligned with road junctions. Animal trail junctions with the ALR were not detected.

Peters (1975), in his extensive study of scent-marking in wolves, found that raised-leg urinations (RLUs) in the snow were significantly more dense around the periphery of wolf pack territories. He presented much evidence showing

that the RLUs functioned as territorial markers. Scats, on the other hand, were more ambiguous since they were more evenly distributed and were not primarily territorial markers; instead they were eliminative in function, he said. However, when scats accumulated in an area such as at road or trail junctions or at strategic points around "rendezvous sites" they were important markers, he suggested.

The simplest explanation for the clustering of scats more heavily on some sections of the ALR than others is that coyotes more frequently travel on or across those sections for unknown reasons. Coyotes drop scats there initially because it is elevated slightly above the surrounding land. Once droppings begin to accumulate the persistent smell on the road stimulates the same coyote or coyotes to defecate there again when they pass that way later. Peters (1975) noted that when the radio-tagged wolves he was studying travelled a second time over the same route which they had recently travelled they stopped to urinate again at the same spots they had stopped at earlier, even though the markings were all their own. If coyotes behave similarly scats would accumulate rapidly in such areas. An observation by Adolph Murie (1936) indicates that other canids behave similarly to wolves in this respect.

"Droppings are left in all kinds of situations both on and off trails... Certain stretches of trail, perhaps because more frequently travelled by foxes, were especially productive. One dropping seems to suggest another so that sometimes five or six

droppings are found to occur together. In the west I have seen as many as thirty or forty coyote droppings in a favorable location."
(p. 30)

It is logical to think that the location of these scat areas are not arbitrary but instead are related to significant places in the coyotes' world such as rendezvous sites, den areas, food caches or territorial boundaries. However, this remains to be shown for coyote scat areas in general as well as for these areas on the ALR in particular.

SUMMARY

Coyote food habits on USERDA's Hanford Reservation in south-central Washington were studied by analyzing 1152 scats collected during the spring of 1974 and every month in 1975. The coyote's diet was distinctly different in two habitats on the Reservation. On the lowland plain making up most of the Reservation the two principal foods of the coyote in 1975 were Great Basin pocket mice *Perognathus parvus* (60 percent average monthly occurrence) and leporids *Lepus americanus* and *Sylvilagus nuttali* (39 percent). Pocket mice and leporids occurred in every monthly sample of 1974-76. Other food items included pocket gophers (12 percent average monthly occurrence), cricetine mice (7 percent), microtine mice (3), ground squirrels (4.5), grasshoppers (12) darkling beetles (6), birds (5), reptiles (4), fruit (10), and livestock (2).

Sharp fluctuations in the seasonal occurrence of these items and coactions between them are discussed. Occurrence of mice in coyote scats followed closely the rate at which mice were caught in live traps on a low elevation small trapping grid.

At higher elevations in the Rattlesnake Hills the coyote's diet was heavily dominated during all seasons by

microtine mice which were uncommon at low elevation--*Lagurus curtatus* (66 percent), and *Microtus montanus* (32 percent), from an analysis of 102 scats. The rate at which rodents were trapped at the higher elevation trapping grid was not correlated with changes in their occurrence in coyote scats. Overall *Lagurus* was highest in numbers trapped, but *Microtus*, *Perognathus*, and *Peromyscus* were not trapped in the same relative abundance as they are found in coyote scats, possibly due to the heterogeneous environment in the Snively Basin which varied in flora and fauna only short distances from the trapping grids. Besides microtines, food items included *Perognathus parvus* (15 percent average seasonal occurrence), *Peromyscus maniculatus* (1 percent), leporid (9), pocket gopher (25), *Spermophilus townsendii* (2), birds (13), and single occurrences or trace amounts of *Neotoma cinerea*, canid, deer, cattle, darkling beetle, grasshopper, fruit, and grass.

The coyote's food habits varied widely not only in different habitats but also within the same area in different seasons. Coyote food habits are very much a local ecological phenomenon. Since coyotes are wide-ranging, omnivorous, scavenging, "vacuum-cleaners", analysis of their scats can provide valuable, additional, data on the relative abundance of a variety of animals in an area. An example is the unusual abundance of microtines in the coyote's diet in the Rattlesnake Hills in 1975 compared to their

abundance as reflected in small mammal trapping data.

Coyote scats were significantly non-random in their distribution on the three collection transects (Chi square goodness-of-fit test $p < .001$). Reasons discussed to explain the clustered pattern include a territorial marking function for the droppings as well as elimination, preference for elevated places for marking, previous droppings as stimulus to defecate in the same spot again, and juxtaposition of the scat concentrations to a number of significant places in the coyote's world.

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APPENDIX A

COYOTE SCAT ANALYSIS

ARMY LOOP ROAD

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>14 May 74</u>		No. Analyzed <u>18</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		56		61	
<u>Spermophilus townsendii</u>	Ground Squirrel	17		17	
<u>Thomomys talpoides</u>	Pocket Gopher	33		33	
<u>Perognathus parvus</u>	Pocket Mouse	39		39	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		--	
<u>Peromyscus maniculatus</u>	Deer Mouse	--		--	
<u>Unidentified cricetine</u>		17		17	
Total Cricetine		17		17	
<u>Microtus montanus</u>	Montane Vole	--		--	
<u>Lagurus curtatus</u>	Sagebrush Vole	--		--	
Total Microtine		--		--	
Total Rodent		67		67	
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	--		--	
<u>Ovis arles</u>	Sheep	--		--	
<u>Misc. mammal</u>		--		--	
Total Mammal		100		100	
Snakes		--		--	
Lizards		--		--	
Total Reptile		--		--	
Unidentified Feathers		6		6	
Passeriform Feathers		--		--	
Eggshell		--		--	
Total Aves		--		--	
<u>Tenebrionids</u>	Darkling Beetles	6		6	
<u>Orthoptera</u>	Grasshoppers	--		--	
Total Insect		6		6	
Apples		--		--	
Other Fruit		--		--	
Total Fruit		--		--	
Grass		6		11	
Misc. Matter		--		--	

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>21 Jun 74</u>		No. Analyzed <u>16</u>	
Item		Occurrences Expressed as Percentages		Major Total	
<u>Total Leporid</u>		56		56	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	6	6		
<u>Perognathus parvus</u>	Pocket Mouse	19	19		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
<u>Total Cricetine</u>		--	--		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
<u>Total Microtine</u>		--	--		
<u>Total Rodent (1)</u>		31		44	
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
<u>Total Mammal</u>		75		75	
<u>Snakes</u>		--	--		
<u>Lizards</u>		--	--		
<u>Total Reptile</u>		--	--		
<u>Unidentified Feathers</u>		6	12		
<u>Passeriform Feathers</u>		--	--		
<u>Eggshell</u>		--	--		
<u>Total Aves</u>		6		12	
<u>Tenebrionids</u>	Darkling Beetles	--	--		
<u>Orthoptera</u>	Grasshoppers	87	87		
<u>Total Insect (2)</u>		94		94	
<u>Apples</u>		--	--		
<u>Other Fruit (3)</u>		6	12		
<u>Total Fruit</u>		6		12	
<u>Grass</u>		--	--		
<u>Misc. Matter (4)</u>		--	6		

- (1) Unidentified small rodents included
 (2) Includes one occurrence of a cicada
 (3) Plum
 (4) Sand, small stones

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>29 Jun 74</u>		No. Analyzed <u>47</u>
Item		Occurrences Expressed as Percentages		
		Major	Total	
Total Leporid		60	60	
<u>Spermophilus townsendii</u>	Ground Squirrel	2	2	
<u>Thomomys talpoides</u>	Pocket Gopher	--	--	
<u>Perognathus parvus</u>	Pocket Mouse	21	21	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	
<u>Peromyscus maniculatus</u>	Deer Mouse	2	2	
<u>Unidentified cricetine</u>		2	2	
Total Cricetine		4	4	
<u>Microtus montanus</u>	Montane Vole	--	--	
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--	
Total Microtine		--	--	
Total Rodent (1)		26	28	
<u>Odocoileus sp.</u>	Deer	--	--	
<u>Bos taurus</u>	Cattle	--	--	
<u>Ovis aries</u>	Sheep	--	--	
<u>Misc. mammal</u>		--	--	
Total Mammal		74	77	
Snakes		--	--	
Lizards		--	--	
Total Reptile		--	--	
Unidentified Feathers		2	13	
Passeriform Feathers		--	--	
Eggshell		--	--	
Total Aves		2	13	
<u>Tenebrionids</u>	Darkling Beetles	--	2	
<u>Orthoptera</u>	Grasshoppers	53	74	
Total Insect		51	77	
Apples		--	--	
Other Fruit		--	--	
Total Fruit		--	--	
Grass		4	26	
Misc. Matter (2)		--	2	

- (1) Includes unidentified small rodent, one occurrence
 (2) Unidentified material

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>19 Jul 74</u>		No. Analyzed <u>13</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		31		31	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	--	--		
<u>Perognathus parvus</u>	Pocket Mouse	15	15		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--		--	
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--		--	
Total Rodent		15		15	
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
Total Mammal		46		46	
Snakes		--		--	
Lizards		--		--	
Total Reptile		--		--	
Unidentified Feathers		--		8	
Passeriform Feathers		--		--	
Eggshell		--		8	
Total Aves		--		15	
Tenebrionids		Darkling Beetles		--	--
Orthoptera		Grasshoppers		85	100
Total Insect		85		100	
Apples		--		--	
Other Fruit		--		--	
Total Fruit		--		--	
Grass		--		8	
Misc. Matter		--		--	

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>	Collection Date <u>(1)</u>	No. Analyzed <u>38</u>	
Occurrences Expressed as Percentages		Major	Total
<u>Item</u>			
Total Leporid		21	24
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	3	3
<u>Perognathus parvus</u>	Pocket Mouse	18	18
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--
<u>Unidentified cricetine</u>		--	--
Total Cricetine		--	--
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--
Total Microtine		--	--
Total Rodent (2)		24	24
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	--	--
<u>Ovis aries</u>	Sheep	--	--
<u>Misc. mammal (3)</u>		3	3
Total Mammal		42	42
Snakes		5	5
Lizards		--	--
Total Reptile		5	5
Unidentified Feathers		--	--
Passeriform Feathers		--	--
Eggshell		--	--
Total Aves		--	--
<u>Tenebrionids</u>	Darkling Beetles	--	--
<u>Orthoptera</u>	Grasshoppers	87	95
Total Insect		87	95
Apples		--	--
Other Fruit		--	--
Total Fruit		--	--
Grass		5	18
Misc. Matter		--	--

- (1) Collection dates--Jul 30 (7 scats),
Jul 31 (17 scats), Aug 6 (14 scats).
(2) Includes two unidentified-mouse occurrences
(3) Unidentified hair

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>10 Nov 74</u>		No. Analyzed <u>10</u>	
Item		Occurrences Expressed as Percentages			
		Major	Total		
Total Leporid		40	40		
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	10	10		
<u>Perognathus parvus</u>	Pocket Mouse	50	50		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	--		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--	--		
Total Rodent		50	50		
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	10	10		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
Total Mammal		80	80		
Snakes		--	10		
Lizards		--	--		
Total Reptile		--	10		
Unidentified Feathers		--	--		
Passeriform Feathers		--	--		
Eggshell		--	--		
Total Aves		--	--		
<u>Tenebrionids</u>	Darkling Beetles	10	10		
<u>Orthoptera</u>	Grasshoppers	20	30		
Total Insect		20	30		
Apples		10	10		
Other Fruit		--	--		
Total Fruit		10	10		
Grass		--	--		
Misc. Matter (1)		10	10		

(1) Dirt

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>2 Feb 75</u>		No. Analyzed <u>61</u>	
Item		Occurrences Expressed as Percentages			
		Major		Total	
Total Leporid		57		57	
<u>Spermophilus townsendii</u>	Ground Squirrel	2		2	
<u>Thomomys talpoides</u>	Pocket Gopher	7		7	
<u>Perognathus parvus</u>	Pocket Mouse	11		13	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	8		10	
<u>Peromyscus maniculatus</u>	Deer Mouse	11		11	
<u>Unidentified cricetine</u>		7		13	
Total Cricetine		23		31	
<u>Microtus montanus</u>	Montane Vole	2		2	
<u>Lagurus curtatus</u>	Sagebrush Vole	--		--	
Total Microtine		2		2	
Total Rodent		36		43	
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	11		11	
<u>Ovis aries</u>	Sheep	2		2	
<u>Misc. mammal</u>		--		--	
Total Mammal		90		90	
Snakes		2		2	
Lizards		2		2	
Total Reptile		3		3	
Unidentified Feathers		8		8	
Passeriform Feathers		2		2	
Eggshell		--		--	
Total Aves		10		10	
Tenebrionids		Darkling Beetles		--	
Orthoptera		Grasshoppers		--	
Total Insect (1)		--		2	
Apples		13		13	
Other Fruit		5		5	
Total Fruit		18		18	
Grass		3		26	
Misc. Matter (2)		3		7	

- (1) Unidentified insect
 (2) Dirt, paper

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place Army Loop Road Collection Date 14 Mar 75 No. Analyzed 48
 Occurrences Expressed as Percentages

Item		Major	Total
Total Leporid		54	54
<u>Spermophilus townsendii</u>	Ground Squirrel	10	10
<u>Thomomys talpoides</u>	Pocket Gopher	25	25
<u>Perognathus parvus</u>	Pocket Mouse	46	50
<u>Reithrodontomys megalotis</u>	Harvest Mouse	2	4
<u>Peromyscus maniculatus</u>	Deer Mouse	6	8
<u>Unidentified cricetine</u>		--	4
Total Cricetine		8	17
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	2
Total Microtine		--	2
Total Rodent		62	65
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	6	6
<u>Ovis aries</u>	Sheep	--	--
<u>Misc. mammal (1)</u>		2	2
Total Mammal		94	94
Snakes		--	--
Lizards		--	--
Total Reptile		--	--
Unidentified Feathers		--	--
Passeriform Feathers		--	--
Eggshell		--	--
Total Aves		--	--
<u>Tenebrionids</u>	Darkling Beetles	2	2
<u>Orthoptera</u>	Grasshoppers	--	--
Total Insect		2	2
Apples		2	2
Other Fruit		--	--
Total Fruit		2	2
Grass		4	29
Misc. Matter		--	--

(1) Unidentified hair

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place Army Loop Road Collection Date 5 Apr 75 No. Analyzed 36
 Occurrences Expressed as Percentages

Item	Major	Total
Total Leporid	36	39
<u>Spermophilus townsendii</u>	Ground Squirrel	8
<u>Thomomys talpoides</u>	Pocket Gopher	17
<u>Perognathus parvus</u>	Pocket Mouse	78
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--
<u>Peromyscus maniculatus</u>	Deer Mouse	3
<u>Unidentified cricetine</u>		3
Total Cricetine	3	8
<u>Microtus montanus</u>	Montane Vole	--
<u>Lagurus curtatus</u>	Sagebrush Vole	6
Total Microtine	6	8
Total Rodent	89	94
<u>Odocoileus sp.</u>	Deer	--
<u>Bos taurus</u>	Cattle	--
<u>Ovis aries</u>	Sheep	--
Misc. mammal (1)		3
Total Mammal	97	100
Snakes	--	--
Lizards	--	--
Total Reptile	--	--
Unidentified Feathers	--	--
Passeriform Feathers	--	--
Eggshell	--	--
Total Aves	--	--
Tenebrionids	Darkling Beetles	--
Orthoptera	Grasshoppers	--
Total Insect	--	--
Apples	--	--
Other Fruit	--	--
Total Fruit	--	--
Grass	8	22
Misc. Matter (2)	--	3

(1) Unidentified hair

(2) Dirt

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>3 May 75</u>		No. Analyzed <u>58</u>
Item		Occurrences Expressed as Percentages		
		Major	Total	
Total Leporid		66	72	
<u>Spermophilus townsendii</u>	Ground Squirrel	2	2	
<u>Thomomys talpoides</u>	Pocket Gopher	16	19	
<u>Perognathus parvus</u>	Pocket Mouse	66	72	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	
<u>Peromyscus maniculatus</u>	Deer Mouse	2	2	
<u>Unidentified cricetine</u>		--	--	
Total Cricetine		2	2	
<u>Microtus montanus</u>	Montane Vole	--	--	
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--	
Total Microtine		--	--	
Total Rodent		78	86	
<u>Odocoileus sp.</u>	Deer	--	--	
<u>Bos taurus</u>	Cattle	--	--	
<u>Ovis aries</u>	Sheep	--	--	
<u>Misc. mammal</u>		--	--	
Total Mammal		98	100	
Snakes		--	--	
Lizards		--	--	
Total Reptile			--	
Unidentified Feathers		--	5	
Passeriform Feathers		2	2	
Eggshell		--	--	
Total Aves		2	7	
Tenebrionids				
Orthoptera				
Total Insect		2	2	
Apples		--	--	
Other Fruit		--	--	
Total Fruit		--	--	
Grass		--	--	
Misc. Matter (1)		2	2	

(1) Unidentified flesh

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Army Loop Road	Collection Date	25 Jun 75	No. Analyzed	60
		Occurrences Expressed as Percentages			
Item		Major	Total		
Total Leporid		47	52		
<u>Spermophilus townsendii</u>		Ground Squirrel	23	25	
<u>Thomomys talpoides</u>		Pocket Gopher	10	15	
<u>Perognathus parvus</u>		Pocket Mouse	70	72	
<u>Reithrodontomys megalotis</u>		Harvest Mouse	--	2	
<u>Peromyscus maniculatus</u>		Deer Mouse	--	--	
<u>Unidentified cricetine</u>			--	--	
Total Cricetine			--	2	
<u>Microtus montanus</u>		Montane Vole	--	--	
<u>Lagurus curtatus</u>		Sagebrush Vole	--	--	
Total Microtine			--	--	
Total Rodent (1)			83	88	
<u>Odocoileus sp.</u>		Deer	--	3	
<u>Bos taurus</u>		Cattle	--	--	
<u>Ovis aries</u>		Sheep	--	--	
<u>Misc. mammal</u>			--	--	
Total Mammal			93	98	
Snakes (2)			3	10	
Lizards			--	--	
Total Reptile			3	10	
Unidentified Feathers			2	8	
Passeriform Feathers			3	3	
Eggshell			--	--	
Total Aves			5	12	
Tenebrionids		Darkling Beetles	27	30	
Orthoptera		Grasshoppers	3	12	
Total Insect			15	42	
Apples			2	7	
Other Fruit			--	--	
Total Fruit			2	7	
Grass			2	35	
Misc. Matter (3)			--	3	

- (1) Unidentified mouse included, one occurrence
 (2) Western yellow-bellied racer, Coluber constrictor, one occurrence
 (3) Paper, aluminum foil

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>23 Jul 75</u>		No. Analyzed <u>30</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		43		50	
<u>Spermophilus townsendii</u>	Ground Squirrel	7		7	
<u>Thomomys talpoides</u>	Pocket Gopher	13		13	
<u>Perognathus parvus</u>	Pocket Mouse	87		87	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	3		3	
<u>Peromyscus maniculatus</u>	Deer Mouse	--		--	
<u>Unidentified cricetine</u>		3		3	
Total Cricetine		7		7	
<u>Microtus montanus</u>	Montane Vole	--		--	
<u>Lagurus curtatus</u>	Sagebrush Vole	--		--	
Total Microtine		--		--	
Total Rodent		93		93	
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	--		--	
<u>Ovis aries</u>	Sheep	--		--	
<u>Misc. mammal</u>		--		--	
Total Mammal		97		97	
Snakes		20		27	
Lizards		--		--	
Total Reptile		20		27	
Unidentified Feathers		7		10	
Passeriform Feathers		7		10	
Eggshell		--		--	
Total Aves		13		20	
Tenebrionids		--		--	
Orthoptera		37		63	
Total Insect		37		63	
Apples		7		10	
Other Fruit		--		--	
Total Fruit		7		10	
Grass		7		10	
Misc. Matter		--		--	

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>19 Aug 75</u>		No. Analyzed <u>46</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		35		39	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	7	7		
<u>Perognathus parvus</u>	Pocket Mouse	83	91		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	2	2		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine (1)		4		4	
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--		--	
Total Rodent		83		91	
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal (2)</u>		--	2		
Total Mammal		93		96	
Snakes		7		11	
Lizards		--		--	
Total Reptile		7		11	
Unidentified Feathers		--		2	
Passeriform Feathers		2		2	
Eggshell		--		--	
Total Aves (3)		4		7	
Tenebrionids		Darkling Beetles		--	2
Orthoptera		Grasshoppers		24	43
Total Insect		24		46	
Apples		2		9	
Other Fruit		4		4	
Total Fruit		7		13	
Grass		9		26	
Misc. Matter (4)		--		4	

- (1) Includes one occurrence of Onychomys leucogaster
 (2) Unidentified large mammal
 (3) Includes one occurrence of Buteo hawk (three claw nails)
 (4) Plastic wrapper

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Army Loop Road	Collection Date	16 Sep 75	No. Analyzed	40
		Occurrences Expressed as Percentages			
Item		Major	Total		
Total Leporid		10	12		
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	15	18		
<u>Perognathus parvus</u>	Pocket Mouse	70	82		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	2		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	2		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--	--		
Total Rodent		85	85		
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
Total Mammal		80	85		
Snakes		2	8		
Lizards		--	--		
Total Reptile		2	8		
Unidentified Feathers		--	2		
Passeriform Feathers		--	--		
Eggshell		--	--		
Total Aves		--	2		
<u>Tenebrionids</u>	Darkling Beetles	--	5		
<u>Orthoptera</u>	Grasshoppers	32	48		
Total Insect		32	55		
Apples		5	8		
Other Fruit (1)		5	5		
Total Fruit		8	8		
Grass		--	--		
Misc. Matter (2), (3)		8	8		

- (1) Cantaloupe, two occurrences; grapes, one occurrence
 (2) Aluminum and plastic food wrappers
 (3) Unidentified material

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>18 Oct 75</u>		No. Analyzed <u>40</u>	
Item		Occurrences Expressed as Percentages		Major	Total
Total Leporid				18	20
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	12	18		
<u>Perognathus parvus</u>	Pocket Mouse	70	82		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	--		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--	--		
Total Rodent		78	85		
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
Total Mammal		85	90		
Snakes		5	18		
Lizards		--	--		
Total Reptile		5	18		
Unidentified Feathers		--	2		
Passeriform Feathers		--	--		
Eggshell		--	--		
Total Aves (1)		2	5		
Tenebrionids		Darkling Beetles	10	12	
Orthoptera		Grasshoppers	15	20	
Total Insect			20	22	
Apples			10	15	
Other Fruit (2)			2	5	
Total Fruit			12	18	
Grass			--	--	
Misc. Matter (3)			2	5	

(1) Includes one occurrence of a gallinaceous bird

(2) Cherries

(3) Bone from garabage dump, aluminum foil

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place Army Loop Road Collection Date 15 Nov 75 No. Analyzed 29
 Occurrences Expressed as Percentages

Item		Major	Total
Total Leporid		28	28
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	10	10
<u>Perognathus parvus</u>	Pocket Mouse	55	72
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	--	3
<u>Unidentified cricetine</u>		--	--
Total Cricetine		--	3
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	7
Total Microtine		--	7
Total Rodent		62	79
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	--	3
<u>Ovis arles</u>	Sheep	--	--
<u>Misc. mammal</u>		--	--
Total Mammal		76	91
Snakes		--	3
Lizards		--	--
Total Reptile		--	3
Unidentified Feathers		--	3
Passeriform Feathers		7	10
Eggshell		--	--
Total Aves (1)		7	17
<u>Tenebrionids</u>	Darkling Beetles	24	34
<u>Orthoptera</u>	Grasshoppers	21	31
Total Insect		31	38
Apples		7	10
Other Fruit		--	--
Total Fruit		7	10
Grass		10	21
Misc. Matter (2)		--	7

(1) Includes one occurrence of a gallinaceous bird

(2) Plastic food wrapper

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>23 Dec 75</u>		No. Analyzed <u>15</u>	
Item		Occurrences Expressed as Percentages		Major Total	
<u>Total Leporid</u>				73	73
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	7	7		
<u>Perognathus parvus</u>	Pocket Mouse	27	27		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	7	7		
<u>Peromyscus maniculatus</u>	Deer Mouse	13	13		
<u>Unidentified cricetine</u>		--	--		
<u>Total Cricetine</u>				13	13
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
<u>Total Microtine</u>				--	--
<u>Total Rodent</u>				40	47
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis arles</u>	Sheep	--	--		
<u>Misc. mammal</u>		--	--		
<u>Total Mammal</u>				87	87
<u>Snakes</u>				--	7
<u>Lizards</u>				--	--
<u>Total Reptile</u>				--	7
<u>Unidentified Feathers</u>				--	--
<u>Passeriform Feathers</u>				--	--
<u>Eggshell</u>				--	--
<u>Total Aves</u>				--	--
<u>Tenebrionids</u>	Darkling Beetles	--	--		
<u>Orthoptera</u>	Grasshoppers	--	--		
<u>Total Insect</u>				--	--
<u>Apples</u>				27	27
<u>Other Fruit</u>				--	--
<u>Total Fruit</u>				27	27
<u>Grass</u>				--	27
<u>Misc. Matter</u>				--	--

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>7 Jan 76</u>		No. Analyzed <u>42</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		43		43	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	7	7		
<u>Perognathus parvus</u>	Pocket Mouse	19	26		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	2	5		
<u>Peromyscus maniculatus</u>	Deer Mouse	5	7		
<u>Unidentified cricetine</u>		19	29		
Total Cricetine		26		40	
<u>Microtus montanus</u>	Montane Vole	2	2		
<u>Lagurus curtatus</u>	Sagebrush Vole	2	5		
Total Microtine (1)		7		10	
Total Rodent		45		64	
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	14	17		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal (2)</u>		2	2		
Total Mammal		90		93	
Snakes		2		2	
Lizards		2		5	
Total Reptile		5		7	
Unidentified Feathers		--		5	
Passeriform Feathers		--		--	
Eggshell		--		--	
Total Aves (3)		2		7	
Tenebrionids		Darkling Beetles		--	
Orthoptera		Grasshoppers		--	
Total Insect		--		2	
Apples		38		43	
Other Fruit		--		--	
Total Fruit		38		43	
Grass		12		29	
Misc. Matter (4)		5		5	

- (1) Includes one occurrence of unidentified microtine
 (2) Coyote underfur
 (3) Includes an occurrence of gallinaceous bird
 (4) Bone chip from garbage; dirt; plastic wrapper

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Army Loop Road</u>		Collection Date <u>30 Jan 76</u>		No. Analyzed <u>47</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		40		40	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	2	2	2	2
<u>Perognathus parvus</u>	Pocket Mouse	19	19	19	19
<u>Reithrodontomys megalotis</u>	Harvest Mouse	13	17	17	17
<u>Peromyscus maniculatus</u>	Deer Mouse	21	23	23	23
<u>Unidentified cricetine</u>		2	4	4	4
Total Cricetine		32		36	
<u>Microtus montanus</u>	Montane Vole	11	17	17	17
<u>Lagurus curtatus</u>	Sagebrush Vole	9	9	9	9
Total Microtine		19		26	
Total Rodent		62		68	
<u>Odocoileus sp.</u>	Deer	--	--	--	--
<u>Bos taurus</u>	Cattle	2	2	2	2
<u>Ovis aries</u>	Sheep	--	--	--	--
<u>Misc. mammal</u>		--	--	--	--
Total Mammal		89		94	
Snakes		4	6	6	6
Lizards		--	2	2	2
Total Reptile		4		9	
Unidentified Feathers		11	13	13	13
Passeriform Feathers		4	4	4	4
Eggshell		--	--	--	--
Total Aves		15		17	
Tenebrionids	Darkling Beetles	2	2	2	2
Orthoptera	Grasshoppers	--	--	--	--
Total Insect		2		2	
Apples		28	28	28	28
Other Fruit		--	--	--	--
Total Fruit		28		28	
Grass		2	28	28	28
Misc. Matter (1)		2	9	9	9

(1) Dirt

APPENDIX B

COYOTE SCAT ANALYSIS

GATE 111 ROAD

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Gate 111 Road	Collection Date	9 May 74	No. Analyzed	9
Occurrences Expressed as Percentages					
Item		Major	Total		
Total Leporid		44	44		
<u>Spermophilus townsendii</u>	Ground Squirrel	11	11		
<u>Thomomys talpoides</u>	Pocket Gopher	--	--		
<u>Perognathus parvus</u>	Pocket Mouse	--	--		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	--		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--	--		
Total Rodent		11	11		
<u>Odocoileus</u> sp.	Deer	--	--		
<u>Bos taurus</u> (1)	Cattle	11	11		
<u>Ovis aries</u>	Sheep	--	--		
<u>Misc. mammal</u> (2)		56	56		
Total Mammal		100	100		
Snakes		--	11		
Lizards		--	--		
Total Reptile		--	11		
Unidentified Feathers		--	11		
Passeriform Feathers		--	--		
Eggshell		--	--		
Total Aves		--	11		
Tenebrionids		Darkling Beetles	--	11	
Orthoptera		Grasshoppers	--	--	
Total Insect (3)			--	22	
Apples			--	--	
Other Fruit			--	--	
Total Fruit			--	--	
Grass			--	44	
Misc. Matter (4)			--	44	

- (1) One scat, collected April 9, 1974
 (2) Horse (hair only)
 (3) Includes a cicada occurrence
 (4) Dirt

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Gate 111 Road	Collection Date	4 Nov 74	No. Analyzed	14
		Occurrences Expressed as Percentages			
Item		Major	Total		
Total Leporid		14	14		
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	--	--		
<u>Perognathus parvus</u>	Pocket Mouse	36	50		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	--		
<u>Microtus montanus</u>	Montane Vole	--	--		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		--	--		
Total Rodent		36	50		
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	7	7		
<u>Ovis aries</u>	Sheep	21	21		
<u>Misc. mammal</u>		--	--		
Total Mammal		64	71		
Snakes		--	--		
Lizards		--	--		
Total Reptile		--	--		
Unidentified Feathers		--	--		
Passeriform Feathers		14	14		
Eggshell		--	--		
Total Aves		14	14		
Tenebrionids		Darkling Beetles	7	7	
Orthoptera		Grasshoppers	14	21	
Total Insect			29	43	
Apples			--	7	
Other Fruit (1)			43	50	
Total Fruit			43	57	
Grass			7	21	
Misc. Matter (2)			--	7	

- (1) Cherries, one apricot occurrence
 (2) Piece of rubber

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Gate 111 Road</u>		Collection Date <u>Spring 1975(1)</u>		No. Analyzed <u>25</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid				24	24
<u>Spermophilus townsendii</u>	Ground Squirrel	8		12	
<u>Thomomys talpoides</u>	Pocket Gopher	12		16	
<u>Perognathus parvus</u>	Pocket Mouse	48		56	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		8	
<u>Peromyscus maniculatus</u>	Deer Mouse	4		4	
<u>Unidentified cricetine</u>		--		--	
Total Cricetine				4	12
<u>Microtus montanus</u>	Montane Vole	--		--	
<u>Lagurus curtatus</u>	Sagebrush Vole	28		40	
Total Microtine				28	40
Total Rodent				56	76
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	4		4	
<u>Ovis aries</u>	Sheep	--		--	
<u>Misc. mammal</u>		--		--	
Total Mammal				80	88
Snakes				--	--
Lizards				--	--
Total Reptile				--	--
Unidentified Feathers				4	16
Passeriform Feathers				--	--
Eggshell				--	--
Total Aves				4	16
Tenebrionids				4	4
Orthoptera				--	--
Total Insect				4	4
Apples				8	8
Other Fruit (2)				4	8
Total Fruit				12	16
Grass				4	24
Misc. Matter (3)				4	4

(1) Collection dates--March 16 and April 6, 1975

(2) Cherries, grapes

(3) Canvas cloth

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Gate 111 Road</u>		Collection Date <u>20 Aug 75</u>		No. Analyzed <u>32</u>	
		Occurrences Expressed as Percentages			
Item		Major		Total	
Total Leporid		6		9	
<u>Spermophilus townsendii</u>	Ground Squirrel	3		3	
<u>Thomomys talpoides</u>	Pocket Gopher	--		6	
<u>Perognathus parvus</u>	Pocket Mouse	81		91	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		--	
<u>Peromyscus maniculatus</u>	Deer Mouse	--		--	
<u>Unidentified cricetine</u>		--		--	
Total Cricetine		--		--	
<u>Microtus montanus</u>	Montane Vole	3		3	
<u>Lagurus curtatus</u>	Sagebrush Vole	--		--	
Total Microtine		3		3	
Total Rodent		91		97	
<u>Odocoileus sp.</u>	Deer	6		6	
<u>Bos taurus</u>	Cattle	--		--	
<u>Ovis aries</u>	Sheep	--		--	
<u>Misc. mammal</u>		--		--	
Total Mammal		94		97	
Snakes (1)		6		16	
Lizards		--		--	
Total Reptile		6		16	
Unidentified Feathers		12		16	
Passeriform Feathers		3		3	
Eggshell		--		6	
Total Aves		16		25	
Tenebrionids		3		3	
Orthoptera		25		69	
Total Insect		25		69	
Apples		--		--	
Other Fruit (2)		9		9	
Total Fruit		9		9	
Grass		3		6	
Misc. Matter		--		--	

(1) Includes one occurrence of a rattlesnake

(2) Cherries

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Gate 111 Road</u>		Collection Date <u>17 Nov 75</u>		No. Analyzed <u>32</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		3		3	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	--	--		
<u>Perognathus parvus</u>	Pocket Mouse	59	79		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	3	3		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
Unidentified cricetine		--	--		
Total Cricetine		3		3	
<u>Microtus montanus</u>	Montane Vole	3	3		
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--		
Total Microtine		3		3	
Total Rodent		62		75	
<u>Odocoileus sp.</u>	Deer	--	--		
<u>Bos taurus</u>	Cattle	--	--		
<u>Ovis aries</u>	Sheep	3	3		
Misc. mammal		--	--		
Total Mammal		62		75	
Snakes		3		9	
Lizards		--		--	
Total Reptile		3		9	
Unidentified Feathers		--		--	
Passeriform Feathers		--		6	
Eggshell		3		3	
Total Aves		3		9	
Tenebrionids		47		59	
Orthoptera		12		22	
Total Insect		47		62	
Apples		3		3	
Other Fruit (1)		6		9	
Total Fruit		6		9	
Grass		3		9	
Misc. Matter		--		--	

(1) Cherries

APPENDIX C

COYOTE SCAT ANALYSIS

SNIVELY ROAD

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Snively Road	Collection Date	Spring 74 (1)	No. Analyzed 12
		Occurrences Expressed as Percentages	Major	Total
Item				
Total Leporid			33	33
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	50	50	50
<u>Perognathus parvus</u>	Pocket Mouse	33	33	33
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	8	8	8
<u>Unidentified cricetine</u>		--	--	--
Total Cricetine		8	8	8
<u>Microtus montanus</u>	Montane Vole	8	8	8
<u>Lagurus curtatus</u>	Sagebrush Vole	58	67	67
Total Microtine		58	67	67
Total Rodent (2)		92	92	92
<u>Odocoileus sp.</u>	Deer	8	8	8
<u>Bos taurus</u>	Cattle	--	--	--
<u>Ovis aries</u>	Sheep	--	--	--
<u>Misc. mammal</u>		--	--	--
Total Mammal		100	100	100
Snakes		--	--	--
Lizards		--	--	--
Total Reptile		--	--	--
Unidentified Feathers		8	25	25
Passeriform Feathers		--	--	--
Eggshell		--	--	--
Total Aves		8	25	25
Tenebrionids	Darkling Beetles	--	--	--
Orthoptera	Grasshoppers	--	--	--
Total Insect		--	--	--
Apples		--	--	--
Other Fruit		--	--	--
Total Fruit		--	--	--
Grass		--	17	17
Misc. Matter		--	--	--

(1) Collection dates--Mar. 27, 1974 (5 scats),
May 16, 1974 (7 scats).

(2) Includes one occurrence of house mouse (Mus musculus)

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Snively Road</u>		Collection Date <u>Spring 75 (1)</u>		No. Analyzed <u>35</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid		14		14	
<u>Spermophilus townsendii</u>	Ground Squirrel	9		9	
<u>Thomomys talpoides</u>	Pocket Gopher	31		34	
<u>Perognathus parvus</u>	Pocket Mouse	14		20	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		--	
<u>Peromyscus maniculatus</u>	Deer Mouse	--		--	
<u>Unidentified cricetine</u>		3		3	
Total Cricetine		3		3	
<u>Microtus montanus</u>	Montane Vole	3		6	
<u>Lagurus curtatus</u>	Sagebrush Vole	80		91	
Total Microtine		80		91	
Total Rodent		94		97	
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	--		--	
<u>Ovis aries</u>	Sheep	--		--	
<u>Misc. mammal (2)</u>		6		6	
Total Mammal		100		100	
Snakes (3)		3		3	
Lizards		--		--	
Total Reptile		3		3	
Unidentified Feathers		6		11	
Passeriform Feathers		--		--	
Eggshell		3		3	
Total Aves (4)		17		23	
Tenebrionids		Darkling Beetles		--	--
Orthoptera		Grasshoppers		--	--
Total Insect		--		--	
Apples		--		--	
Other Fruit		--		--	
Total Fruit		--		--	
Grass		3		11	
Misc. Matter		--		--	

(1) Collection dates--Mar. 15 (10 scats)
 April 5 (15 scats), May 3 (10 scats).

(2) Marmot; coyote (toenail only)

(3) Gopher snake (Pituophis melanoleucus)

(4) Includes three occurrences of gallinaceous bird

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Snively Road	Collection Date	Summer 75 (1)	No. Analyzed
			18	18
Occurrences Expressed as Percentages			Major	Total
Item				
Total Leporid			11	11
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	
<u>Thomomys talpoides</u>	Pocket Gopher	17	22	
<u>Perognathus parvus</u>	Pocket Mouse	33	33	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--	
<u>Unidentified cricetine</u>		--	--	
Total Cricetine			--	--
<u>Microtus montanus</u>	Montane Vole	33	33	
<u>Lagurus curtatus</u>	Sagebrush Vole	67	67	
Total Microtine			78	78
Total Rodent			89	89
<u>Odocoileus sp.</u>	Deer	--	--	
<u>Bos taurus</u>	Cattle	--	--	
<u>Ovis aries</u>	Sheep	--	--	
<u>Misc. mammal (2)</u>		6	6	
Total Mammal			89	89
Snakes			--	--
Lizards			--	--
Total Reptile			--	--
Unidentified Feathers			6	6
Passeriform Feathers			--	--
Eggshell			11	11
Total Aves (3)			22	22
Tenebrionids			--	--
Orthoptera			17	17
Total Insect			17	17
Apples			--	--
Other Fruit (4)			6	6
Total Fruit			6	6
Grass			6	22
Misc. Matter			--	--

(1) Collection dates--Jun. 25 (6 scats),
Jul. 23 (6 scats), Aug. 20 (6 scats).

(2) Neotoma cinereus

(3) Includes one occurrence of gallinaceous bird

(4) Unidentified berries

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Snively Road</u>		Collection Date <u>Fall 75 (1)</u>		No. Analyzed <u>27</u>	
Item		Occurrences Expressed as Percentages		Major Total	
<u>Total Leporid</u>		--		--	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	37	37	37	37
<u>Perognathus parvus</u>	Pocket Mouse	11	19	19	19
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	4	4	4
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--	--	--
<u>Unidentified cricetine</u>		--	4	4	4
<u>Total Cricetine</u>		--		7	
<u>Microtus montanus</u>	Montane Vole	33	37	37	37
<u>Lagurus curtatus</u>	Sagebrush Vole	63	63	63	63
<u>Total Microtine</u>		78		78	
<u>Total Rodent</u>		93		93	
<u>Odocoileus sp.</u>	Deer	4	7	7	7
<u>Bos taurus</u>	Cattle	--	--	--	--
<u>Ovis aries</u>	Sheep	--	--	--	--
<u>Misc. mammal</u>					
<u>Total Mammal</u>		100		100	
Snakes		--		--	
Lizards		--		--	
<u>Total Reptile</u>		--		--	
Unidentified Feathers		--		4	
Passeriform Feathers		--		--	
Eggshell		--		4	
<u>Total Aves (2)</u>		7		15	
<u>Tenebrionids</u>	Darkling Beetles	7	7	7	7
<u>Orthoptera</u>	Grasshoppers	7	30	30	30
<u>Total Insect</u>		7		30	
Apples		--		--	
Other Fruit		--		--	
<u>Total Fruit</u>		--		--	
Grass		4		11	
<u>Misc. Matter</u>		--		--	

(1) Collection dates--Sept. 21 (8 scats),
Oct. 19 (14 scats), Nov. 15 (5 scats).

(2) Includes two occurrences of gallinaceous bird

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	Snively Road	Collection Date	30 Jan 76	No. Analyzed	33
		Occurrences Expressed as Percentages			
Item		Major	Total		
Total Leporid		6	6		
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--		
<u>Thomomys talpoides</u>	Pocket Gopher	9	12		
<u>Perognathus parvus</u>	Pocket Mouse	--	--		
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--		
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--		
<u>Unidentified cricetine</u>		--	--		
Total Cricetine		--	--		
<u>Microtus montanus</u>	Montane Vole	51	55		
<u>Lagurus curtatus</u>	Sagebrush Vole	64	64		
Total Microtine		97	97		
Total Rodent		97	97		
<u>Odocoileus sp.</u>	Deer	3	3		
<u>Bos taurus</u>	Cattle	3	6		
<u>Ovis aries</u>	Sheep	--	--		
Misc. mammal (1)		--	3		
Total Mammal		100	100		
Snakes		--	--		
Lizards		--	--		
Total Reptile		--	--		
Unidentified Feathers		3	6		
Passeriform Feathers		--	--		
Eggshell		--	--		
Total Aves		3	6		
Tenebrionids		3	3		
Orthoptera		3	3		
Total Insect		3	3		
Apples		--	--		
Other Fruit		--	--		
Total Fruit		--	--		
Grass		3	33		
Misc. Matter		--	--		

(1) Unidentified large mammal

APPENDIX D

COYOTE SCAT ANALYSIS

1200 FOOT ROAD .

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>1200 Foot Road</u>		Collection Date <u>Spring 1974(1)</u>		No. Analyzed
		Occurrences Expressed as Percentages		<u>23</u>
Item		Major	Total	
Total Leporid		43	48	
<u>Spermophilus townsendii</u>	Ground Squirrel	35	35	
<u>Thomomys talpoides</u>	Pocket Gopher	13	13	
<u>Perognathus parvus</u>	Pocket Mouse	39	39	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	
<u>Peromyscus maniculatus</u>	Deer Mouse	4	4	
Unidentified cricetine		--	--	
Total Cricetine		4	9	
<u>Microtus montanus</u>	Montane Vole	--	--	
<u>Lagurus curtatus</u>	Sagebrush Vole	26	30	
Total Microtine		35	39	
Total Rodent		65	70	
<u>Odocoileus sp.</u>	Deer	--	--	
<u>Bos taurus</u>	Cattle	--	--	
<u>Ovis aries</u>	Sheep	--	--	
Misc. mammal		--	--	
Total Mammal		91	96	
Snakes		--	--	
Lizards		--	--	
Total Reptile		--	--	
Unidentified Feathers		4	9	
Passeriform Feathers		9	9	
Eggshell		9	22	
Total Aves		17	35	
Tenebrionids	Darkling Beetles	4	4	
Orthoptera	Grasshoppers	--	--	
Total Insect (2)		9	9	
Apples		13	13	
Other Fruit		--	--	
Total Fruit		13	13	
Grass		--	17	
Misc. Matter (3)		--	4	

(1) March 3, 22, 27, 30; April 6, 7, 11; May 11, 12, 14, 22 were the collection dates.

(2) Includes one occurrence of an unidentified insect

(3) Dirt

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place 1200 Foot Road Collection Date Summer 1974 No. Analyzed (1) 17
 Occurrences Expressed as Percentages

Item		Major	Total
Total Leporid		18	18
<u>Spermophilus townsendii</u>	Ground Squirrel	6	6
<u>Thomomys talpoides</u>	Pocket Gopher	--	--
<u>Perognathus parvus</u>	Pocket Mouse	6	6
<u>Reithrodontomys megalotis</u>	Harvest Mouse	6	6
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--
Unidentified cricetine		--	--
Total Cricetine		6	6
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--
Total Microtine		--	--
Total Rodent		29	29
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	--	6
<u>Ovis aries</u>	Sheep	18	18
Misc. mammal		--	--
Total Mammal		29	35
Snakes		--	--
Lizards		--	--
Total Reptile		--	--
Unidentified Feathers		13	29
Passeriform Feathers		--	--
Eggshell		6	6
Total Aves		18	35
Tenebrionids	Darkling Beetles	6	6
Orthoptera	Grasshoppers	35	47
Total Insect		35	47
Apples		--	--
Other Fruit (2), (3)		35	47
Total Fruit		35	47
Grass		--	29
Misc. Matter (4)		--	6

- (1) Collection dates--June 20, 22; July 12, 24; Aug. 2
 (2) Cherries, six occurrences
 (3) Unidentified berries, one occurrence
 (4) Dirt

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>1200 Foot Road</u>		Collection Date <u>5-12 Nov 74</u>		No. Analyzed <u>22</u>	
		Occurrences Expressed as Percentages			
Item		Major		Total	
Total Leporid		5		5	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	9		9	
<u>Perognathus parvus</u>	Pocket Mouse	50		59	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		--	
<u>Peromyscus maniculatus</u>	Deer Mouse	--		--	
<u>Unidentified cricetine</u>		5		5	
Total Cricetine		5		5	
<u>Microtus montanus</u>	Montane Vole	--		--	
<u>Lagurus curtatus</u>	Sagebrush Vole	5		5	
Total Microtine		5		5	
Total Rodent		59		68	
<u>Odocoileus sp.</u>	Deer	9		9	
<u>Bos taurus</u>	Cattle	5		5	
<u>Ovis aries</u>	Sheep	5		5	
<u>Misc. mammal</u>		--		--	
Total Mammal		64		73	
Snakes		--		--	
Lizards		--		--	
Total Reptile		--		--	
Unidentified Feathers		5		9	
Passeriform Feathers		5		5	
Eggshell		--		--	
Total Aves		9		14	
Tenebrionids		5		5	
Orthoptera		18		18	
Total Insect (1)		27		32	
Apples		9		14	
Other Fruit (2)		32		32	
Total Fruit		36		41	
Grass		--		27	
Misc. Matter		--		--	

(1) Includes two occurrences of unidentified insects

(2) Cherries

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>1200 Foot Road</u> Collection Date <u>(1)</u>		No. Analyzed	
Item		Occurrences Expressed as Percentages	
		Major	Total
Total Leporid		21	21
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	7	7
<u>Perognathus parvus</u> (2)	Pocket Mouse	43	43
<u>Reithrodontomys megalotis</u>	Harvest Mouse	7	7
<u>Peromyscus maniculatus</u>	Deer Mouse	7	7
<u>Unidentified cricetine</u>		14	14
Total Cricetine (3)		21	21
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	14	14
Total Microtine		14	14
Total Rodent		64	64
<u>Odocoileus sp.</u>	Deer	7	7
<u>Bos taurus</u>	Cattle	--	--
<u>Ovis aries</u>	Sheep	--	--
<u>Misc. mammal</u>		--	--
Total Mammal		86	86
Snakes		--	--
Lizards		--	--
Total Reptile		--	--
Unidentified Feathers		14	14
Passeriform Feathers		--	--
Eggshell		--	--
Total Aves		14	14
Tenebrionids		--	--
Orthoptera		7	7
Total Insect		7	7
Darkling Beetles		--	--
Grasshoppers		7	7
Apples (4)		21	21
Other Fruit (5)		7	7
Total Fruit		29	36
Grass		7	29
Misc. Matter		--	--

- (1) Includes scats collected on Feb. 1, 3, and 7, 1975 (6 scats); Apr. 5, 1975 (4 scats); Jul. 23, 1975 (4)
- (2) All in April and July
- (3) All in February
- (4) All in February
- (5) Cherries, one occurrence July 23, 1975.

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>1200 Foot Road</u>		Collection Date <u>16 Sep 75</u>		No. Analyzed <u>26</u>	
		Occurrences Expressed as Percentages			
Item		Major		Total	
Total Leporid		8		8	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	--	--	--	--
<u>Perognathus parvus</u>	Pocket Mouse	46	54	54	54
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	4	4	4	4
<u>Unidentified cricetine</u>		--	--	--	--
Total Cricetine		4		4	
<u>Microtus montanus</u>	Montane Vole	8	8	8	8
<u>Lagurus curtatus</u>	Sagebrush Vole	15	15	15	15
Total Microtine		15		15	
Total Rodent		62		65	
<u>Odocoileus sp.</u>	Deer	--	--	--	--
<u>Bos taurus</u>	Cattle	--	--	--	--
<u>Ovis aries</u>	Sheep	--	--	--	--
<u>Misc. mammal</u>		--	--	--	--
Total Mammal		62		65	
Snakes		--		4	
Lizards		--		--	
Total Reptile		--		4	
Unidentified Feathers		--		--	
Passeriform Feathers		--		--	
<u>Eggshell</u>		4	4	4	4
Total Aves		4		4	
<u>Tenebrionids</u>	Darkling Beetles	--	--	--	--
<u>Orthoptera</u>	Grasshoppers	27	38	38	38
Total Insect		27		38	
Apples		4		4	
Other Fruit (1)		19		19	
Total Fruit		23		23	
Grass		4		19	
Misc. Matter		--		--	

(1) Cherries

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>1200 Foot Road</u>		Collection Date <u>1 Feb 76</u>		No. Analyzed <u>15</u>	
Item		Occurrences Expressed as Percentages			
		Major		Total	
Total Leporid		20		20	
<u>Spermophilus townsendii</u>	Ground Squirrel	13		13	
<u>Thomomys talpoides</u>	Pocket Gopher	13		13	
<u>Perognathus parvus</u>	Pocket Mouse	--		--	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--		13	
<u>Peromyscus maniculatus</u>	Deer Mouse	7		7	
Unidentified cricetine		--		7	
Total Cricetine		7		27	
<u>Microtus montanus</u>	Montane Vole	20		20	
<u>Lagurus curtatus</u>	Sagebrush Vole	47		60	
Total Microtine		47		67	
Total Rodent		60		80	
<u>Odocoileus sp.</u>	Deer	--		--	
<u>Bos taurus</u>	Cattle	--		--	
<u>Ovis aries</u>	Sheep	--		--	
Misc. mammal		--		--	
Total Mammal		73		80	
Snakes		--		--	
Lizards		--		--	
Total Reptile		--		--	
Unidentified Feathers		--		7	
Passeriform Feathers		--		--	
Eggshell		--		--	
Total Aves		--		--	
Tenebrionids	Darkling Beetles	--		7	
Orthoptera	Grasshoppers	7		13	
Total Insect		7		13	
Apples		27		33	
Other Fruit		--		--	
Total Fruit		27		33	
Grass		--		13	
Misc. Matter		--		--	

APPENDIX E

COYOTE SCAT ANALYSIS

DRY CREEK ROAD

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place Dry Creek Road Collection Date 14 May 74 No. Analyzed 19
 Occurrences Expressed as Percentages

Item		Major	Total
Total Leporid		74	74
<u>Spermophilus townsendii</u>	Ground Squirrel	5	5
<u>Thomomys talpoides</u>	Pocket Gopher	11	11
<u>Perognathus parvus</u>	Pocket Mouse	32	42
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--
Unidentified cricetine		--	11
Total Cricetine		--	11
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--
Total Microtine		--	--
Total Rodent		47	58
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	5	11
<u>Ovis aries</u>	Sheep	--	--
Misc. mammal		--	--
Total Mammal		95	95
Snakes		5	16
Lizards		--	--
Total Reptile		5	16
Unidentified Feathers		--	26
Passeriform Feathers		--	--
Eggshell		--	5
Total Aves		--	32
Tenebrionids	Darkling Beetles	--	5
Orthoptera	Grasshoppers	--	5
Total Insect (1)		--	16
Apples		--	--
Other Fruit		--	--
Total Fruit		--	--
Grass		5	11
Misc. Matter		--	--

(1) Includes one cicada occurrence

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Dry Creek Road</u>		Collection Date <u>2 Aug 74</u>		No. Analyzed <u>22</u>	
Item		Occurrences Expressed as Percentages		Major Total	
Total Leporid			36		36
<u>Spermophilus townsendii</u>	Ground Squirrel	5			5
<u>Thomomys talpoides</u>	Pocket Gopher	--			--
<u>Perognathus parvus</u>	Pocket Mouse	32			32
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--			--
<u>Peromyscus maniculatus</u>	Deer Mouse	--			5
Unidentified cricetine		--			--
Total Cricetine			--		--
<u>Microtus montanus</u>	Montane Vole	--			--
<u>Lagurus curtatus</u>	Sagebrush Vole	--			--
Total Microtine			--		--
Total Rodent			36		41
<u>Odocoileus sp.</u>	Deer	9			9
<u>Bos taurus</u>	Cattle	--			--
<u>Ovis aries</u>	Sheep	--			--
Misc. mammal		--			--
Total Mammal			68		68
Snakes			9		9
Lizards			--		--
Total Reptile			9		9
Unidentified Feathers			27		36
Passeriform Feathers			--		5
Eggshell			--		--
Total Aves			27		41
Tenebrionids					
Orthoptera					
Total Insect (1)			36		59
Darkling Beetles		--			--
Grasshoppers		27			50
Apples		--			--
Other Fruit (2)		5			5
Total Fruit		5			5
Grass		--			41
Misc. Matter		--			--

- (1) Includes three cicada occurrences
 (2) Unidentified berries

APPENDIX F

COYOTE SCAT ANALYSIS

COLD CREEK ROAD

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place <u>Cold Creek Valley</u> Collection Date <u>Spring 74</u> (1)		No. Analyzed 17	
Item		Occurrences Expressed as Percentages	
		Major	Total
Total Leporid		94	94
<u>Spermophilus townsendii</u>	Ground Squirrel	18	18
<u>Thomomys talpoides</u>	Pocket Gopher	6	6
<u>Perognathus parvus</u>	Pocket Mouse	12	24
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--
<u>Peromyscus maniculatus</u>	Deer Mouse	--	6
Unidentified cricetine		6	6
Total Cricetine		6	12
<u>Microtus montanus</u>	Montane Vole	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--
Total Microtine		--	--
Total Rodent (2)		24	24
<u>Odocoileus sp.</u>	Deer	--	--
<u>Bos taurus</u>	Cattle	--	--
<u>Ovis arles</u>	Sheep	--	--
Misc. mammal		--	--
Total Mammal		100	100
Snakes		--	--
Lizards		--	--
Total Reptile		--	--
Unidentified Feathers		--	--
Passeriform Feathers (3)		--	6
Eggshell		--	6
Total Aves		--	12
Tenebrionids	Darkling Beetles	--	--
Orthoptera	Grasshoppers	6	6
Total Insect		6	6
Apples		--	--
Other Fruit		--	--
Total Fruit		--	--
Grass		--	12
Misc. Matter		--	--

(1) Collection dates--Mar. 25 (2 scats), Apr. 1-10 (8 scats), May 16, 21 (7 scats)

(2) Includes one porcupine (Erethizon dorsatum) occurrence

(3) Horned lark

APPENDIX G

COYOTE SCAT ANALYSIS

N.E. AREA

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	N. E. Area	Collection Date	Summer 74 (1)	No. Analyzed 28
		Occurrences Expressed as Percentages		
Item		Major	Total	
Total Leporid		21	21	
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	
<u>Thomomys talpoides</u>	Pocket Gopher	--	--	
<u>Perognathus parvus</u>	Pocket Mouse	14	14	
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	--	
<u>Peromyscus maniculatus</u>	Deer Mouse	7	7	
Unidentified cricetine		--	--	
Total Cricetine		7	7	
<u>Microtus montanus</u>	Montane Vole	--	--	
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--	
Total Microtine		--	--	
Total Rodent (2)		21	29	
<u>Odocoileus sp.</u>	Deer	4	4	
<u>Bos taurus</u>	Cattle	--	--	
<u>Ovis aries</u>	Sheep	--	--	
Misc. mammal		--	--	
Total Mammal		39	46	
Snakes		--	--	
Lizards		--	--	
Total Reptile		--	--	
Unidentified Feathers		11	11	
Passeriform Feathers		--	--	
Eggshell		4	4	
Total Aves		14	14	
Tenebrionids		Darkling Beetles	--	--
Orthoptera		Grasshoppers	89	93
Total Insect			89	93
Apples			--	--
Other Fruit (3)			7	7
Total Fruit			7	7
Grass			4	11
Misc. Matter			--	--

(1) Collection dates--May 15 (1 scat), Jun 24, 29
(2 scats), Jul 4 (3 scats), Jul 30, 31 (22 scats)

(2) Includes three unidentified-rodent occurrences

(3) Unidentified berries

COYOTE SCAT ANALYSIS--USERDA HANFORD RESERVATION

Place	N. E. Area	Collection Date	No. Analyzed	
		15 Mar 75	9	
Occurrences Expressed as Percentages			Major	Total
Item				
Total Leporid			44	44
<u>Spermophilus townsendii</u>	Ground Squirrel	--	--	--
<u>Thomomys talpoides</u>	Pocket Gopher	33	33	33
<u>Perognathus parvus</u>	Pocket Mouse	22	33	33
<u>Reithrodontomys megalotis</u>	Harvest Mouse	--	22	22
<u>Peromyscus maniculatus</u>	Deer Mouse	--	--	--
Unidentified cricetine		--	--	--
Total Cricetine		--	--	22
<u>Microtus montanus</u>	Montane Vole	--	--	--
<u>Lagurus curtatus</u>	Sagebrush Vole	--	--	--
Total Microtine		--	--	--
Total Rodent (1)		56	78	78
<u>Odocoileus sp.</u>	Deer	--	--	--
<u>Bos taurus</u>	Cattle	--	--	--
<u>Ovis aries</u>	Sheep	--	--	--
Misc. mammal		--	--	--
Total Mammal		100	100	100
Snakes		--	--	--
Lizards		--	--	--
Total Reptile		--	--	--
Unidentified Feathers		33	33	33
Passeriform Feathers		--	--	--
Eggshell		--	--	--
Total Aves		33	33	33
Tenebrionids	Darkling Beetles	--	11	11
Orthoptera	Grasshoppers	--	11	11
Total Insect		--	22	22
Apples		--	--	--
Other Fruit		--	--	--
Total Fruit		--	--	--
Grass		33	33	33
Misc. Matter		--	--	--

(1) Includes one unidentified-mouse occurrence

APPENDIX H

NUMBER OF POCKET MICE (*Perognathus parvus*)
LIVE-TRAPPED ON A ONE HA SQUARE GRID OF
100 TRAPS NEAR RATTLESNAKE SPRINGS,
1971-1976 (Plot #24)

	1971 ¹	1972 ¹	1973 ¹	1974 ²	1975 ²	1976 ¹
Jan	--	0	--	--	5	--
Feb	--	0	1	3	9	0
Mar	24	18, 37	25	22	50	--
Apr	68	57	38, 36	52	79	68
May	82, 71	65, 49	28, 40	37, 35	52	52
Jun	73, 75	37	34, 29	26	50	--
Jul	73	39	42	35	62	--
Aug	58, 65	31, 37	--	49	69	41
Sep	38	50	31	60	72	--
Oct	38	46, 37	20	72	--	--
Nov	32	33, 11	4	69	33	9
Dec	0	0	0	16	--	--

¹ L. E. Rodgers, J. D. Hedlund, K. A. Gano, and T. P. O'Farrell, unpublished data.

² Rodgers and Hedlund 1976.