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FOOD HABITS AND PLACENTAL SCAR COUNTS
OF BOBCATS IN SOUTH DAKOTA

BY

DAVID ERIC NOMSEN

A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science
Major in Wildlife and Fisheries Sciences
(Wildlife Option)

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1982

FOOD HABITS AND PLACENTAL SCAR COUNTS
OF BOBCATS IN SOUTH DAKOTA

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Adviser

Wildlife and Fisheries Sciences Dept.

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
STUDY AREA	2
METHODS	3
<u>Bobcat Collection</u>	3
<u>Food Habits</u>	3
<u>Reproduction</u>	4
<u>Sex and Age</u>	4
<u>Statistical Analysis</u>	4
RESULTS AND DISCUSSION	5
<u>Food Habits</u>	5
<u>Sex Ratios</u>	15
<u>Placental Scar Counts</u>	15
CONCLUSIONS	19
LITERATURE CITED	20
APPENDIX	25

LIST OF TABLES

Table	Page
1 Food items in 164 bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons)	6
2 Food items in 180 bobcat intestines from South Dakota (1978-79 and 1979-80 seasons)	8
3 Frequency of 5 major food items from South Dakota bobcat stomachs by sex from 1978-79 and 1979-80 seasons. (Percent occurrence in parentheses.)	13
4 Frequency of 5 major food items from South Dakota bobcat stomachs by age from 1978-79 and 1979-80 seasons. (Percent occurrences in parentheses.)	14
5 Placental scar counts of bobcats with known ages from South Dakota (1978-79 and 1979-80 seasons).	16
6 Analysis of variance of placental scar counts of yearling and adult bobcats from South Dakota (1978-79 and 1979-80 seasons)	17

LIST OF APPENDIX TABLES

Table	Page
1 Food items in 344 stomachs and intestines from South Dakota bobcats (1978-79 season, 81 bobcats and 1979-80 season, 122 bobcats)	26
2 Food items in 68 male bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons)	28
3 Food items in 70 male bobcat intestines from South Dakota (1978-79 and 1979-80 seasons)	29
4 Food items in 77 female bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons)	30
5 Food items in 89 female bobcat intestines from South Dakota (1978-79 and 1979-80 seasons)	31

FOOD HABITS AND PLACENTAL SCAR COUNTS
OF BOBCATS IN SOUTH DAKOTA


Abstract

DAVID E. NOMSEN

Bobcat (Lynx rufus) food habits and placental scar counts were investigated in western South Dakota during 1978-79 and 1979-80 trapping and hunting seasons. Food habits were recorded by frequency of occurrence and placental scar counts were used to determine litter size for South Dakota bobcats. Rabbits (Sylvilagus spp. and Lepus spp.), rats and mice (primarily Microtus spp. and Peromyscus spp.), and deer (Odocoileus spp.) were identified in 56, 32, and 7% of bobcat stomachs, respectively. Analysis showed that rabbits, rats and mice, and deer occurred in 58, 36, and 9% of bobcat intestines, respectively. Occurrences in rabbits decreased from 67% of bobcat stomachs in 1978-79 to 48% in 1979-80. Occurrence of rats and mice in the intestines increased from 26% in 1978-79 to 43% in 1979-80.

Bobcats collected exhibited a sex ratio of 1.04 males per female. Mean placental scar count for juveniles was 2.27, and the mean for adults was 3.11. The mean for all placental scar counts was 2.74.

Changes were noted over the 2-season period for the major food items of rabbits and rats and mice. Additional information on prey item availability is needed to predict the effect of prey item abundances on bobcats in South Dakota.

INTRODUCTION 

The bobcat (Lynx rufus) is the only wild felid remaining in South Dakota in significant numbers. Historically, the bobcat has been hunted and trapped in South Dakota because it was considered a detrimental predator of livestock. More recently the bobcat has become an important component of South Dakota's fur industry.

The Convention of International Trade in Endangered Species of Wild Fauna and Flora placed the bobcat on its Appendix II list on 4 February 1977. Notice of review for the bobcat was published on 13 July 1977 (42 FR 35996) and findings regarding export were based on a state-by-state assessment of bobcat population levels (42 FR 40979-40980).

South Dakota did not have the necessary information for developing a bobcat management plan. The objectives of this study were to investigate bobcat food habits and reproduction and to provide information to develop a sound management plan for the bobcat in South Dakota.

STUDY AREA

Bobcat carcasses were collected from the entire West River portion of South Dakota (that portion of South Dakota west of the Missouri River). The area is made up of 7 physical divisions including the Missouri River trench, Northern and Southern plateaus, and the Pierre, Black, and Sand hills regions (Hogan et al. 1970). Bailey (1980) described the majority of the area as in the wheatgrass-needlegrass section of the Great Plains-Shortgrass Prairie Province (3112). A small portion of the southeast corner of the study area lies in the wheatgrass-bluestem-needlegrass section of the Tall-Grass Prairie Province (2532).

Soils information may be found in Westin et al. (1967). Climate data are available in Spuhler et al. (1971).

METHODS

Bobcat Collection

Bobcats were taken during hunting and trapping seasons from 15 December to 15 January each season. All bobcats taken were tagged by Wildlife Conservation Officers and furdealers were requested to collect carcasses. Tagged bobcat carcasses were collected by South Dakota Cooperative Wildlife Research Unit personnel with the aid of South Dakota Department of Game, Fish and Parks personnel.

Food Habits

Food habits of bobcats were identified as described by Korschgen (1969). When possible, food items were identified macroscopically with the use of reference collections. Hair was also identified by using keys from Williams (1938), Mathiak (1938), Mayer (1952), and Stains (1958). Occasionally it was necessary to look at hair structure following methodology from Williamson (1951), Carter and Dilworth (1971), and Moore et al. (1974). Williamson's technique was modified as described by Jones and Smith (1979) to use liquid acrylic plastic. Hair was identified by using hair structure keys from Dearborn (1939), Adorjan and Kolenosky (1969), and Moore et al. (1974). A key to the mammal skulls was also used (Glass 1951). All food items were recorded by frequency of occurrence.

Reproduction

Female reproductive tracts were examined for the presence of placental scars as described by Gashwiler et al. (1961) and Brand and Keith (1979). Placental scar counts are indicators of actual litter size with the exception of uterine losses and stillbirths (Crowe 1975a, 1975b; Fritts and Sealander 1978b).

Sex and Age

Sex of all bobcats was determined by internal observation. Age information was provided by South Dakota Department of Game, Fish and Parks personnel and based upon annular ring readings of lower canines (Fredrickson and Rice 1979).

Statistical Analysis

Contingency table analysis (Steele and Torrie 1960) was used on the 5 major groupings of food items (rabbits, rats and mice, deer, birds, and porcupine). Frequencies of remaining food items were too small to warrant statistical analysis. One-way analysis of variance (Steele and Torrie 1960) was used on placental scar counts between yearlings and adults. One asterisk indicates significance at the $P \leq 0.05$ level and 2 asterisks indicates significance at the $P \leq 0.01$ level.

RESULTS AND DISCUSSION

Food Habits

Two hundred thirty bobcat carcasses were available for food habits inspection. Of these, 203 contained identifiable remains in a portion of the digestive tract.

Rabbits (jackrabbits--Lepus spp., cottontails--Sylvilagus spp.) were the most frequently found food items occurring in 56% of stomachs (Table 1) and 58% of intestines (Table 2) examined. A significant decrease was noted in rabbit occurrences between years in both stomachs ($X^2 = 5.821^{**}$) and intestines ($X^2 = 9.151^{**}$). Percent occurrences decreased from 67% of bobcat stomachs in 1978-79 to 48% in 1979-80. Intestines showed 71% rabbit occurrence in 1978-79 and decreased to 48% in 1979-80.

The cottontail rabbit has been reported as the most common prey of the bobcat (Progulske 1955; Kitchings and Story 1979). Rabbit was found in 60% of 208 bobcat stomachs or intestines from New England states (Pollack 1951). Fritts and Sealander (1978a) found rabbits in 39% of 150 bobcat stomachs from Arkansas and Gashwiler et al. (1960) reported hare and rabbit in 45% of 53 bobcat stomachs from Utah and Nevada. Westfall (1956) found hare in 22% of bobcat digestive tracts from Maine bobcats and Rollings (1945) reported hare in 26% of 50 Minnesota bobcat stomachs. Hare and rabbit were also identified in 23% of 140 bobcats collected in Vermont (Hamilton and Hunter 1939). Beasom and Moore (1977) expected rabbit occurrences to vary as rabbits exhibit annual variation in population levels (Lord 1963).

Table 1. Food items in 164 bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons).

Food item	1978-79 (N = 72)		1979-80 (N = 92)		Total 1978-79 1979-80 (N = 164)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Lagomorph- <u>Lepus</u> & <u>Sylvilagus</u> spp.	48	66.67	44	47.83	92	56.10
Rats and mice						
<u>Microtus</u> spp.	11	15.28	22	23.91	33	20.12
<u>Peromyscus</u> spp.	7	9.72	5	5.43	12	7.32
Unidentified mouse	3	4.17	5	5.43	8	4.88
<u>Neotoma cinerea</u>	1	1.39	2	2.17	3	1.83
<u>Zapus hudsonius</u>	1	1.39	1	1.09	2	1.22
<u>Dipodomys ordii</u>	-	-	1	1.09	1	0.61
<u>Onychomys leucogaster</u>	1	1.39	-	-	1	0.61
<u>Reithrodontomys megalotis</u>	-	-	1	1.09	1	0.61
Total ^a	21	29.17	31	33.70	52	31.71
<u>Odocoileus</u> spp.	4	5.56	7	7.61	11	6.71
<u>Erethizon dorsatum</u>	3	4.17	6	6.52	9	5.49
Birds						
Unidentified bird	4	5.56	2	2.17	6	3.66
<u>Meleagris gallopavo</u>	-	-	1	1.09	1	0.61
<u>Phasianus colchicus</u>	1	1.39	-	-	1	0.61
<u>Pica pica</u>	-	-	1	1.09	1	0.61
Total	5	6.94	4	4.35	9	5.49
<u>Cynomys ludovicianus</u>	-	-	6	6.52	6	3.66

Table 1. (Continued)

Food item	1978-79 (N = 72)		1979-80 (N = 92)		Total 1978-79 1979-80 (N = 164)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Unidentified mammal	2	2.78	3	3.26	5	3.05
<u>Thomomys talpoides</u>	2	2.78	2	2.17	4	2.44
<u>Antilocapra americana</u>	-	-	3	3.26	3	1.83
<u>Eutamias minimus</u>	-	-	1	1.09	1	0.61
<u>Mephitis mephitis</u>	-	-	1	1.09	1	0.61
<u>Mustela</u> spp.	1	1.39	-	-	1	0.61
<u>Procyon lotor</u>	-	-	1	1.09	1	0.61
<u>Tamiasciurus hudsonicus</u>	1	1.39	-	-	1	0.61
<u>Taxidea taxus</u>	-	-	1	1.09	1	0.61
Sheep	1	1.39	-	-	1	0.61
Vegetation	-	-	1	1.09	1	0.61

^a Stomachs containing 1 or more rats and mice.

Table 2. Food items in 180 bobcat intestines from South Dakota (1978-79 and 1979-80 seasons).

Food item	1978-79 (N = 78)		1979-80 (N = 102)		Total 1978-79 1979-80 (N = 180)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Lagomorph- <u>Lepus</u> & <u>Sylvilagus</u> spp.	55	70.51	49	48.04	104	57.78
Rats and mice						
<u>Microtus</u> spp.	14	17.95	34	33.33	48	26.67
Unidentified mouse	9	11.54	10	9.80	19	10.56
<u>Peromyscus</u> spp.	2	2.56	3	2.94	5	2.78
<u>Reithrodontomys megalotis</u>	-	-	1	0.98	1	0.56
Total ^a	20	25.64	44	43.14	64	35.56
<u>Odocoileus</u> spp.	6	7.69	11	10.78	17	9.44
Birds						
Unidentified bird	4	5.13	5	4.90	9	5.00
<u>Pedioecetes phasianellus</u>	1	1.28	-	-	1	0.56
Total	5	6.41	5	4.90	10	5.56
<u>Erethizon dorsatum</u>	3	3.85	6	5.88	9	5.00
Unidentified mammal	3	3.85	5	4.90	8	4.44
<u>Cynomys ludovicianus</u>	-	-	4	3.92	4	2.22
Vegetation	1	1.28	3	2.94	4	2.22
<u>Thomomys talpoides</u>	-	-	3	2.94	3	1.67

Table 2. (Continued)

Food item	1978-79 (N = 78)		1979-80 (N = 102)		Total 1978-79 1979-80 (N = 180)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
<u>Tamiasciurus hudsonicus</u>	1	1.28	1	0.98	2	1.11
<u>Mephitis mephitis</u>	-	-	1	0.98	1	0.56
<u>Scalopus aquaticus</u>	1	1.28	-	-	1	0.56
Unidentified shrew	-	-	1	0.98	1	0.56
Unidentified snake	-	-	1	0.98	1	0.56

^a Intestines containing 1 or more rats and mice.

The frequency of occurrence of rabbit in bobcat decreased 23% following an 87% decline in rabbit numbers in southern Idaho while rodent and bird frequencies increased to 11 and 16%, respectively (Bailey 1981). Bobcat were reported to enlarge or abandon known home ranges during the rabbit decline. Home ranges may have been enlarged to incorporate additional prey, or abandoned in search of higher prey concentrations (Bailey 1981).

Rats and mice were identified in 32 and 36% of stomachs (Table 1) and intestines (Table 2), respectively. A significant increase was noted in occurrence of rats and mice in intestines from 1978-79 to 1979-80 (Table 2, $\chi^2 = 5.905^*$). Rats and mice occurred in 21% of Arkansas bobcats (Fritts and Sealander 1978a), and 25% of Vermont bobcats (Hamilton and Hunter 1939).

Deer remains (Odocoileus spp.) were identified in 7 and 9% of the stomachs and intestines, respectively. White-tailed deer (O. virginianus) has been identified as a common prey item of the bobcat (Marston 1942; Young 1958; Fritts and Sealander 1978a; Jones and Smith 1979). Mule deer (O. hemionus) was found in 30% of 53 bobcat stomachs from Utah and eastern Nevada (Gashwiler et al. 1960). Hamilton and Hunter (1939) identified deer in 22% of 140 Vermont bobcats collected in winter. Deer remains were identified in 14% of 124 Virginia bobcat scats collected in fall and winter (Progulske 1955). Deer was identified in 41% of 88 Maine bobcat digestive tracts (Westfall 1956) and Rollings (1945) identified white-tailed deer in 22% of 50 Minnesota bobcat stomachs. Numerous other studies have shown that bobcat utilize deer as a food item (Young 1928; Newsom 1930; Smith 1945; Dill 1947;

Matson 1948; Petraborg and Gunvalson 1962; Cook et al. 1971). Erickson (1955) reported that most deer eaten by Michigan bobcats were carrion.

Porcupine (Erethizon dorsatum) remains were identified in 5% of stomachs and intestines (Tables 1 and 2). Three bobcat carcasses collected had porcupine quills embedded in either the front foot or mouth region. One bobcat had 2 quills embedded in the stomach wall.

The porcupine has been reported as a possible preferred food item of the bobcat in Utah and eastern Nevada (Gashwiler et al. 1960). Rollings (1945) reported finding porcupine in 10% of 50 Minnesota bobcat stomachs, and Pollack (1951) reported identifying porcupine in 18% of 208 stomachs or intestines from bobcat collected in the New England states. Porcupine was identified in 11% of the digestive tracts of 88 Maine bobcat (Westfall 1956).

Porcupine quills were found embedded in stomach walls without apparent harm to the bobcat by Pollack (1951). Rollings (1945) identified softened quills in both stomachs and intestines. Berg (1979) reported 2 bobcat mortalities due to quills working through the body wall and piercing vital organs.

Bird remains were identified in 5 and 6% of stomachs (Table 1) and intestines (Table 2), respectively. Birds have been reported as occasional food items of the bobcat (Hamilton and Hunter 1939; Pollack 1951; Westfall 1956; Beasom and Moore 1977; Jones and Smith 1979). Bird was identified in 7% of 150 bobcat stomachs from Arkansas (Fritts and Sealander 1978a).

One occurrence of a domestic animal (sheep) was recorded from a male bobcat stomach collected in 1978-79. Fritts and Sealander (1978a) identified domestic animals (chicken, cow, goat) in 4 of 150 bobcat stomachs from Arkansas. Gashwiler et al. (1960) identified sheep in 1 bobcat stomach from 53 bobcats collected in Utah and eastern Nevada.

Contingency table analysis was conducted between stomachs and intestines for both seasons and totals. No significant differences were detected ($P \leq 0.05$).

Frequencies of 5 major food items were recorded by sex from 1978-79 and 1979-80 (Table 3). No significant differences were identified between males and females for either season or totals ($P \leq 0.05$). Fritts and Sealander (1978a) reported that occurrences of rats and mice were greater in females than males. They suggested that females may possibly select more abundant or smaller sized prey items than males.

Frequencies of 5 major food items were recorded by age from 1978-79 and 1979-80 (Table 4). The food item categories of rabbit and rats and mice totals allowed statistical evaluation. No significant difference ($P \leq 0.05$) was noted between rabbits and age groupings. A significant difference ($X^2 = 6.417^*$) was noted between kittens and adults for rats and mice. A significant difference ($X^2 = 9.421^{**}$) was noted between yearlings and adults for rats and mice. No significant difference ($P \leq 0.05$) was noted between kittens and yearlings. Rats and mice were identified in 43 and 50% of kittens and yearlings, respectively. Rats and mice were identified in 17% of adult bobcat stomachs.

Table 3. Frequency of 5 major food items from South Dakota bobcat stomachs by sex from 1978-79 and 1979-80 seasons. (Percent occurrence in parentheses.)

Food item	Males			Females		
	1978-79 (N = 28) Frequency of occurrence	1979-80 (N = 40) Frequency of occurrence	Total (N = 68)	1978-79 (N = 27) Frequency of occurrence	1979-80 (N = 50) Frequency of occurrence	Total (N = 77)
Rabbits	20 (71)	20 (50)	40 (59)	20 (74)	24 (48)	44 (57)
Rats and mice	8 (29)	17 (43)	25 (37)	11 (41)	22 (44)	33 (43)
Deer	1 (4)	2 (5)	3 (4)	-	5 (10)	5 (6)
Porcupine	2 (7)	3 (8)	5 (7)	-	3 (6)	3 (4)
Birds	-	-	-	1 (4)	3 (6)	4 (5)

Table 4. Frequency of 5 major food items from South Dakota bobcat stomachs by age from 1978-79 and 1979-80 seasons. (Percent occurrences in parentheses.)

Food item	Kitten			Yearling			Adult		
	1978-79 (N = 18)	1979-80 (N = 17)	Total (N = 35)	1978-79 (N = 6)	1979-80 (N = 26)	Total (N = 32)	1978-79 (N = 14)	1979-80 (N = 28)	Total (N = 42)
	Frequency of occurrence			Frequency of occurrence			Frequency of occurrence		
Rabbits	15 (83)	7 (41)	22 (63)	2 (33)	16 (62)	18 (56)	12 (86)	14 (50)	26 (62)
Rats and mice	7 (39)	8 (47)	15 (43)	3 (50)	13 (50)	16 (50)	3 (21)	4 (14)	7 (17)
Deer	-	-	-	-	1 (4)	1 (3)	-	4 (14)	4 (10)
Porcupine	-	2 (12)	2 (6)	-	-	-	1 (7)	3 (11)	4 (10)
Birds	2 (11)	-	2 (6)	-	2 (8)	2 (6)	1 (7)	1 (4)	2 (5)

Most attempts by bobcats to capture prey are unsuccessful (Provost et al. 1973). Observations of captive bobcats have suggested that hunting skill is related to experience (Crowe 1975b). Fritts and Sealander (1978a) found no age differences related to diet, but hypothesized that younger bobcats have difficulty in capturing more elusive prey species.

Sex Ratios

Ninety-four bobcat carcasses were collected with a sex ratio of 1.25 males per female in 1978-79. In 1979-80, 136 bobcat carcasses were collected with a sex ratio of 0.91 males per female. A total of 230 bobcats collected over the 2-year period exhibited a sex ratio of 1.04 males per female. No significant differences were noted from a 1 : 1 sex ratio ($P \leq 0.05$). Young (1958) reported a ratio of 1.26 males per female. Gashwiler et al. (1961) pointed out that it is not known if trapped samples reflect the actual sex ratio of bobcat populations and suggested that males may be more frequently caught because of larger range movements than females.

Placental Scar Counts

Average litter size of South Dakota bobcats was estimated from placental scar counts. Placental scars had a mean of 2.74 (Table 5) with a range of 1-5 and mode of 2. Fifteen yearling bobcats averaged 2.27 scars and 19 adults averaged 3.11 (Table 6). All reproductive tracts were anestrus at time of collection. No reproductive tracts taken from kittens exhibited signs of reproductive activity. One-way analysis of variance indicated a significant difference between scars in yearlings and adults (Table 6, $P \leq 0.05$).

Table 5. Placental scar counts of bobcats with known ages from South Dakota (1978-79 and 1979-80 seasons).

Age*	Bobcats with scars	Range	Mode	Total scars	Mean
1 1/2	15	1 - 4	2	34	2.27
2 1/2	4	2 - 5	2	13	3.25
3 1/2	4	2 - 5	4	15	3.75
4 1/2	4	2 - 4	4	13	3.25
5 1/2	6	2 - 3	2, 3	15	2.50
8 1/2	1	3	3	3	3.00
TOTAL	34			93	2.74

* Ages provided by South Dakota Department of Game, Fish and Parks personnel.

Table 6. Analysis of variance of placental scar counts of yearling and adult bobcats from South Dakota (1978-79 and 1979-80 seasons).

	Bobcats with scars	Range	Mode	Total scars	Mean
Yearlings	15	1 - 4	2	34	2.27
Adults	19	2 - 5	2	59	3.11

Analysis of Variance

Source	d.f.	ss	MS
Total	33	36.62	
Treatment	1	5.90	5.90*
Residual	32	30.72	0.96

Bobcats usually breed during their first reproductive season (Pollack 1950; Erickson 1955; Crowe 1975a). Fritts and Sealander (1978b) reported that females ovulate during the first reproductive season, but may possibly fail to become pregnant. Erickson (1955) found a mean of 3.6 ova released during the first ovulation and 5.5 ova for subsequent ovulations. Crowe (1975a) has suggested that late season litters may be attributed to juveniles that ovulate later in the breeding season than older females.

Placental scars with a mean of 2.74 is in the range of other reported litter sizes. Gashwiler et al. (1961) reported that placental scar counts averaged 3.9 with a range of 3-5 and mode of 4. Placental scar and embryo counts averaged 2.49 for Arkansas bobcats (Fritts 1973), with a range of 1-4, and counts from Texas bobcats showed a mean of 2.7, with a range of 1-5 and mode of 3 (Blankenship 1979; Blankenship and Swank 1979). Placental scar counts from adult females in northern Minnesota averaged 3.2 (Berg 1979).

CONCLUSION

Bobcats in South Dakota utilize rabbits and small mammals as a large proportion of their diet. Rabbits or rats and mice were identified in 88% of bobcat stomachs collected during 1978-79 and 1979-80 seasons. Deer, porcupine, and birds made up the remainder of the 5 most often identified food items. Only one occurrence of a domestic animal (sheep) was recorded.

One aspect of the food habits data that could not be examined in detail was the large reduction in rabbit occurrences over the 2-year period. The 1978-79 season was not a typical closed winter situation and the winter of 1979-80 was open with little extended snow cover. Annual changes in prey populations, when combined with varying availability rates due to snow conditions, may cause substantial changes in prey items. Black-tailed prairie dog (Cynomys ludovicianus) was not recorded as a prey item during 1978-79, but was identified in 10 stomachs or intestines from the open winter of 1979-80. Additional information on prey availability would be helpful in determining effects on bobcats in South Dakota.

Bobcat litter size, as determined by placental scar counts, was consistent with the ranges as reported over other parts of the bobcat's range.

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APPENDIX

Appendix Table 1. Food items in 344 stomachs and intestines from South Dakota bobcats (1978-79 season, 81 bobcats and 1979-80 season, 122 bobcats).

Food item	1978-79 (N = 150)		1979-80 (N = 194)		Total 1978-79 1979-80 (N = 344)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Lagomorph- <u>Lepus</u> & <u>Sylvilagus</u> spp.	103	68.67	93	47.94	196	56.98
Rats and mice						
<u>Microtus</u> spp.	25	16.67	56	28.87	81	23.55
Unidentified mouse	12	8.00	15	7.73	27	7.85
<u>Peromyscus</u> spp.	9	6.00	8	4.12	17	4.94
<u>Neotoma cinerea</u>	1	0.67	2	1.03	3	0.87
<u>Reithrodontomys megalotis</u>	-	-	2	1.03	2	0.58
<u>Zapus hudsonius</u>	1	0.67	1	0.52	2	0.58
<u>Dipodomys ordii</u>	-	-	1	0.52	1	0.29
<u>Onychomys leucogaster</u>	1	0.67	-	-	1	0.29
Total	41	27.33	75	36.66	116	33.72
<u>Odocoileus</u> spp.	10	6.67	18	9.28	28	8.14
<u>Erethizon dorsatum</u>	6	4.00	12	6.19	18	5.23
Birds						
Unidentified bird	8	5.33	7	3.61	15	4.36
<u>Meleagris gallopavo</u>	-	-	1	0.52	1	0.29
<u>Pedioecetes phasianellus</u>	1	0.67	-	-	1	0.29
<u>Phasianus colchicus</u>	1	0.67	-	-	1	0.29
<u>Pica pica</u>	-	-	1	0.52	1	0.29
Total	10	6.67	9	4.64	19	5.52
Unidentified mammal	5	3.33	8	4.12	13	3.78
<u>Cynomys ludovicianus</u>	-	-	10	5.15	10	2.91

Appendix Table 1. (Continued)

Food item	1978-79 (N = 150)		1979-80 (N = 194)		Total 1978-79 1979-80 (N = 344)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
<u>Thomomys talpoides</u>	2	1.33	5	2.58	7	2.03
Vegetation	1	0.67	4	2.06	5	1.45
<u>Antilocapra americana</u>	-	-	3	1.55	3	0.87
<u>Tamiasciurus hudsonicus</u>	2	1.33	1	0.52	3	0.87
<u>Mephitis mephitis</u>	-	-	2	1.03	1	0.58
<u>Eutamias minimus</u>	-	-	1	0.52	1	0.29
<u>Mustela spp.</u>	1	0.67	-	-	1	0.29
<u>Procyon lotor</u>	-	-	1	0.52	1	0.29
<u>Scalopus aquaticus</u>	1	0.67	-	-	1	0.29
<u>Taxidea taxus</u>	-	-	1	0.52	1	0.29
Sheep	1	0.67	-	-	1	0.29
Unidentified shrew	-	-	1	0.52	1	0.29
Unidentified snake	-	-	1	0.52	1	0.29

Appendix Table 2. Food items in 68 male bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons).

Food item	1978-79 (N = 28)		1979-80 (N = 40)		Total 1978-79 1979-80 (N = 68)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Rabbits	20	71.43	20	50.0	40	58.82
Rats and mice	8	28.57	17	42.5	25	36.76
Porcupine	2	7.14	3	7.50	5	7.35
Birds	4	14.29	-	-	4	5.88
Deer	1	3.57	2	5.00	3	4.41
Pronghorn	-	-	2	5.00	2	2.94
Northern pocket gopher	1	3.57	1	2.50	2	2.94
Unidentified mammal	-	-	2	5.00	2	2.94
Black-tailed prairie dog	-	-	1	2.50	1	1.47
Least chipmunk	-	-	1	2.50	1	1.47
Striped skunk	-	-	1	2.50	1	1.47
Raccoon	-	-	1	2.50	1	1.47
Sheep	1	3.57	-	-	1	1.47

Appendix Table 3. Food items in 70 male bobcat intestines from South Dakota (1978-79 and 1979-80 seasons).

Food item.	1978-79 (N = 29)		1979-80 (N = 41)		Total 1978-79 1979-80 (N = 89)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Rabbits	20	68.97	18	43.90	38	54.29
Rats and mice	7	24.14	18	43.90	25	35.71
Deer	2	6.90	6	14.63	8	11.43
Birds	3	10.34	2	4.88	5	7.14
Black-tailed prairie dog	2	6.90	2	4.88	4	5.71
Porcupine	2	6.90	2	4.88	4	5.71
Unidentified mammal	2	6.90	2	4.88	4	5.71
Red squirrel	1	3.45	1	2.44	2	2.86
Vegetation	-	-	2	4.88	2	2.86
Striped skunk	-	-	1	2.44	1	1.43
Northern pocket gopher	-	-	1	2.44	1	1.43

Appendix Table 4. Food items in 77 female bobcat stomachs from South Dakota (1978-79 and 1979-80 seasons).

Food item	1978-79 (N = 27)		1979-80 (N = 50)		Total 1978-79 1979-80 (N = 77)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Rabbits	20	74.07	24	48.00	44	57.14
Rats and mice	11	40.74	22	44.00	33	42.86
Black-tailed prairie dog	-	-	5	10.00	5	6.49
Deer	-	-	5	10.00	5	6.49
Birds	1	3.70	3	6.00	4	5.19
Porcupine	-	-	3	6.00	3	3.90
Vegetation	-	-	2	4.00	2	2.60
Unidentified mammal	1	3.70	1	2.00	2	2.60
Pronghorn	-	-	1	2.00	1	1.30
Badger	-	-	1	2.00	1	1.30
Northern pocket gopher	-	-	1	2.00	1	1.30

Appendix Table 5. Food items in 89 female bobcat intestines from South Dakota (1978-79 and 1979-80 seasons).

Food item	1978-79 (N = 32)		1979-80 (N = 57)		Total 1978-79 1979-80 (N = 89)	
	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence	Frequency of occurrence	Percent occurrence
Rabbits	22	68.75	29	50.88	51	57.30
Rats and mice	7	21.88	27	47.37	34	38.20
Deer	1	3.13	5	8.77	6	6.74
Porcupine	-	-	5	8.77	5	5.62
Unidentified mammal	2	6.25	3	5.26	5	5.62
Black-tailed prairie dog	2	6.25	1	1.75	3	3.37
Birds	-	-	3	5.26	3	3.37
Northern pocket gopher	-	-	2	3.51	2	2.25
Vegetation	1	3.13	1	1.75	2	2.25
Eastern mole	1	3.13	-	-	1	1.12
Unidentified snake	-	-	1	1.75	1	1.12