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Food Habits of the Bobcat, *Lynx rufus*, in the Coast and Cascade Ranges of Western Oregon in Relation to Present Management Policies

Abstract

The food habits of bobcats were studied in the Coast and Cascade Ranges of western Oregon. Food was determined by analysis of the contents of randomly collected scats. Rabbits occurred in 52.5% of the scats ($n=143$) from the Coast Range and in 70.6% of the scats ($n=34$) from the Cascade Range. Weight-frequency relationships of prey indicate that rabbits are the most important food of bobcats in these regions. Rodents were present in 70.0% and 82.3% and insectivores in 2.2% and 5.8% of the scats from the Coast and Cascade Ranges, respectively. Deer, probably carrion, were present in 2.1% and 2.9% of the scats. Remains of domestic sheep were found in 0.7% of the scats from the Coast Range, but were not observed in scats from the Cascade Range. Bird remains occurred infrequently in both samples. In light of these results, and because of the rapidly rising price of bobcat pelts, we suggest that the current management practices for bobcats in Oregon badly need revision. Bobcats should be removed from the status of "predatory animal" and be given the status of "fur-bearer" with the provision that control measures may be carried out on a local, problem-area basis if proved necessary.

Introduction

The bobcat, *Lynx rufus*, a medium-sized predator, occupies diverse habitats throughout most of the United States and Mexico. Two subspecies occur in Oregon: *fasciatus*, found largely in coniferous forests west of the crest of the Cascade Range, and *pallascens*, a subspecies of open sagebrush plains and rocky canyons confined east of the crest of the Cascade Range (Hall and Kelson, 1959).

According to Mace (1974) "Oregon law currently classifies the bobcat as a predator which may be taken by any means and any time of the year," and he estimated that 4500 bobcat pelts were sold by Oregon fur trappers during the 1973/74 trapping season for an estimated \$250,000. Bobcats are currently being killed by licensed and nonlicensed fur trappers, federal trappers, sport hunters, hound hunters, and landowners. As late as 1972, 10 Oregon counties (mostly western counties) paid bounties on 935 bobcats (Robert U. Mace, pers. comm.). In Oregon bobcats may be killed legally even during the breeding season when their pelts are still commercially valuable. Since the commercial value of pelts has soared (Mace, 1974), there is need to reevaluate the bobcats' economic status, population status, and future as the world's only spotted cat allowed unlimited harvesting (IUCN, 1972).

Bobcats are secretive and not easily observed in the field, and population densities or trends within a given area are difficult to estimate. Only through the study of its food habits can we begin to evaluate the bobcats' role in man's economy. Gashwiler *et al.* (1960) reviewed the literature on bobcat food habits, revealing a dearth of such information for Oregon. The purpose of this paper, therefore, is twofold: (1) to present new data on the food habits of bobcats in western Oregon, and (2) to show how these data relate to current management policies.

Methods

During the years 1970-72 we routinely collected scats of carnivores in western Oregon while engaged in various field activities. In the Coast Range, bobcat droppings were collected at many localities, nearly spanning the length of the Oregon Coast. In the Cascade Range, however, most scats were collected within the H. J. Andrews Experimental Forest, Lane and Linn counties.

Prey were identified from bones, teeth, hair, claws, feathers, and other recognizable remains. Prey were determined to species only when diagnostic parts were available, or when only one species of a genus occurred in the region where the scat was collected. The number of individuals of each prey within a scat was estimated, but this is a minimum estimate since some parts may represent more individuals than we could definitely count. For example, two skulls were scored as two individuals, but three molars were scored as only one prey even though three prey could conceivably be involved. Average adult weights of the prey were taken mostly from our own records; a few were obtained from the literature. Because of the method of collecting we are unable to report seasonal differences in food habits.

Predator-Prey Relationships

Mammals. (1) Lagomorphs: Cottontail rabbits, *Sylvilagus bachmani*, are most abundant along the southern Oregon Coast Range from approximately Gardiner, Douglas Co., southward. Between Gardiner and Florence, Lane Co., brush rabbits and snowshoe hares, *Lepus americanus*, occur together, whereas north of Florence the snowshoe hare is the dominant lagomorph. In the Coast Range, brush rabbits and snowshoe hares occurred in 52.5% of the scats; however, the snowshoe hare, the only lagomorph of the family Leporidae in the Cascade Range, occurred in 79.6% of the scats from that area. It is clear from consideration of weight-frequency relationships of prey (Tables 1 and 2) that lagomorphs are the most important food of bobcats in the Coast and Cascade Ranges. Both cottontail rabbits and snowshoe hares are considered to be detrimental to commercially important timber; they are a "major concern in reforestation" (Canutt, 1969).

(2) Rodents: Rodents occurred in 70.0 and 82.3% of the scats from the Coast and Cascade Ranges, respectively. The deer mouse, *Peromyscus maniculatus*, Oregon vole, *Microtus oregoni*, Townsend vole, *Microtus townsendi*, dusky-footed woodrat, *Neotoma fuscipes*, mountain beaver, *Aplodontia rufa*, Townsend chipmunk, *Eutamias townsendi*, and California ground squirrel, *Spermophilus beecheyi*, occurred in 62.3% of the scats in the Coast Range. In the Cascade Range, the Oregon vole, Mazama pocket gopher, *Thomomys mazama*, Townsend chipmunk, deer mouse, bushy-tailed woodrat, *Neotoma cinerea*, mountain beaver, and California ground squirrel occurred in 47.0% of the

TABLE 1. Food of the bobcat in the Coast Range of Oregon as determined by scat analysis.
Number of scats = 143.

Prey	Average adult wt. (g) of prey	No. prey items	Percent of all prey	No. scats in which prey occurred	Percent occurrence
<i>Sylvilagus bachmani</i>	741	65	28.6	63	44.1
<i>Peromyscus maniculatus</i>	24	21	9.3	18	12.6
<i>Microtus oregoni</i>	22	19	8.4	10	7.0
<i>Microtus townsendi</i>	54	18	7.9	12	8.4
<i>Neotoma fuscipes</i>	339	16	7.0	16	11.2
<i>Lepus americanus</i>	1097	12	5.3	12	8.4
<i>Aplodontia rufa</i>	985	12	5.3	12	8.4
Large birds	1000*	12	5.3	12	8.4
<i>Eutamias townsendi</i>	90	10	4.4	10	7.0
<i>Zapus trinotatus</i>	24	9	4.0	8	5.6
<i>Tamiasciurus douglasi</i>	219	7	3.1	7	4.9
Small passerine birds	20*	7	3.1	7	4.9
<i>Spermophilus beecheyi</i>	528	4	1.8	4	2.8
<i>Sorex</i> sp.	4*	3	1.3	3	2.1
<i>Odocoileus hemionus</i>	—	3	1.3	3	2.1
<i>Sorex vagrans</i>	5	2	.9	2	1.4
Beetles	—	2	.9	1	.7
<i>Microtus</i> sp.	25*	2	.9	2	1.4
ruffed grouse	619	1	.4	1	.7
domestic sheep	—	1	.4	1	.7
<i>Arborimus</i> sp.	24	1	.4	1	.7
vegetation	—	—	—	13	9.1
Total		227			

*Crude estimate.

TABLE 2. Food of the bobcat in the Cascade Range of Oregon as determined by scat analysis.
Number of scats = 34.

Prey	Average adult wt. (g) of prey	No. prey items	Percent of all prey	No. scats in which prey occurred	Percent occurrence
<i>Lepus americanus</i>	1097	24	39.3	24	70.6
<i>Glaucomys sabrinus</i>	167	6	9.8	4	11.8
<i>Tamiasciurus douglasi</i>	219	4	6.6	4	11.8
<i>Microtus oregoni</i>	22	4	6.6	4	11.8
<i>Thomomys mazama</i>	96	3	4.9	3	8.8
<i>Eutamias townsendi</i>	90	3	4.9	3	8.8
<i>Microtus</i> sp.	25*	3	4.9	2	5.9
<i>Peromyscus maniculatus</i>	24	2	3.3	2	5.9
<i>Neotoma cinerea</i>	346	2	3.3	2	5.9
<i>Aplodontia rufa</i>	985	1	1.6	1	2.9
<i>Spermophilus beecheyi</i>	528	1	1.6	1	2.9
<i>Clethrionomys californicus</i>	24	1	1.6	1	2.9
<i>Neurotrichus gibbsi</i>	10	1	1.6	1	2.9
<i>Zapus trinotatus</i>	24	1	1.6	1	2.9
<i>Sorex</i> sp.	4*	1	1.6	1	2.9
<i>Odocoileus hemionus</i>	—	1	1.6	1	2.9
<i>Gerrhonotus coeruleus</i>	20	1	1.6	1	2.9
grouse	830*	1	1.6	1	2.9
small passerine birds	20*	1	1.6	1	2.9
vegetation	—	—	—	1	2.9
Total		61			

* Crude estimate.

scats. All of these rodents are considered to be detrimental to commercial timber (Canutt, 1969), and some to crops. Continuous and costly control measures are being sought and/or implemented, e.g., a recent campaign has been launched to study and control pocket gopher damage to commercial timber (Barnes, 1973). Rodents, such as the Pacific jumping mouse, *Zapus trinotatus*, chickaree, *Tamiasciurus douglasi*, northern flying squirrel, *Glaucomys sabrinus*, and voles, *Arborimus*, which are of little or no detrimental economic importance occurred in 11.2 and 29.4% of the scats from the Coast and Cascade Ranges, respectively.

(3) Insectivores: Shrews, *Sorex* sp., and shrew-moles, *Neurotrichus gibbsi*, occurred in 2.2 and 5.8% of the scats from the Coast and Cascade Ranges, respectively. The shrews are considered to be detrimental to commercial timber by eating the seeds (see Kangur, 1954; Moore, 1942), but shrew-moles may be wholly beneficial by destroying many invertebrates.

(4) Artiodactyls: Deer, *Odocoileus hemionus*, occurred in 2.1 and 2.9% of the scats from the Coast and Cascade Ranges. Although the deer remains were those of fawns, as indicated by size of hoofs, and might have been killed by bobcats, they may have been carrion. Domestic sheep, *Ovis* sp., occurred in 0.7% of the scats from the Coast Range, and did not occur in scats from the Cascade Range.

Birds. (1) Passerine birds: Most of the small passerine birds were sparrows which nest close to or on the ground.

(2) Marine birds: During the winter of 1971 there was a widespread die-off of marine birds along the Oregon coast, primarily murres, *Uria* sp. We observed many of these sick murres and found that they were unable to fly, thus they would have been easily caught by bobcats. The 8.4% occurrence of large birds in the scats from the Coast Range was largely murres, and possibly individuals suffering from disease.

Biological and Commercial Value vs. Legal Statute

Oregon Revised Statute (ORS) 610.002 currently defines the bobcat as a "predatory animal" (Oregon Wildlife Code, 1973/74 edition). Also included in this category are coyotes, red fox, rabbits, rodents, and birds which may be destructive to crops or other valuable resources. ORS 610.005 relegates authority for the destruction, eradication, or control of these predatory animals to the State Department of Agriculture. ORS 610.105 implies that it is the "duty" of every landowner to poison, trap, or otherwise eliminate these "noxious" predatory animals.

Prior to 1961 Oregon maintained a state bounty on bobcats, and since then 10 counties have continued to pay bounties ranging from two to four dollars per bobcat. Even though the state bounty was banned, the Oregon State Wildlife Commission is compelled by ORS 610.020 to set aside 3% of the annual fees from the sale of licenses, fines, and gifts for the control of predatory animals, not to exceed \$40,000/annum.

During the four trapping seasons from 1969/70 through 1972/73, 15,976 bobcats were taken in Oregon, exclusive of those killed by hunters and landowners (Mace, pers. comm.). The average price per bobcat pelt climbed from \$2.76/pelt in 1957/58 to \$55.26/pelt in 1973/74. The average price per pelt from central and eastern Oregon was \$78.61 in 1973/74. Annual increments in the price of pelts have been largest since 1970/71 when the average value for all Oregon bobcats was \$13.66/pelt

(Mace, pers. comm.). If the price of pelts continues to rise at these rates, trapping and hunting pressure on bobcats undoubtedly will increase enormously.

The results of food-habit studies (V. Bailey, 1936; T. N. Bailey, 1972; Gashwiler *et al.*, 1960; present study) indicate a logical inconsistency in ORS 610.002 which defines bobcats, rabbits, and rodents as predators destructive to agricultural crops and products. Aside from the fact that rabbits and rodents are not predators in the biological sense, to destroy them all seems self-defeating since rabbits and rodents are the major food of bobcats.

Although some domestic birds and mammals are destroyed by bobcats, this situation must not be construed as a generalized, behavioral trait. Bobcat predation on domestic livestock is mostly incidental. There are areas, however, where bobcat predation is a more chronic problem, such as the brushy, western side of the Oregon Coast Range. Good management practices can allow control of bobcats on an individual and/or chronic-problem-area basis. Bounties, on the other hand, waste the taxpayers' money because they are nonselective with respect to the individual bobcat killed. For example, bobcats killed incidentally or for sport on nonagricultural lands or in counties where no bounty exists, can, nonetheless, be sold in nearby counties which still maintain bounties.

V. Bailey (1936) stated that sheep remains were found in 27 out of 200 bobcat stomachs from eastern Oregon. He also stated that 3 stomachs contained deer meat, and 95 contained "... rabbits of the four common species." T. N. Bailey (1972) studied aspects of the bobcats' life history in east-central Idaho and found results similar to ours. He reported that jackrabbits and cottontails made up more than 90% of the diet, with rodents and birds the next most frequently eaten food. Only one of the 300 stomachs which he examined contained the remains of sheep; furthermore, he cited a study which showed that 23 of 26 deer eaten by bobcats were carrion. Although bobcats can and do kill some deer and sheep, we suspect that many of the deer and sheep remains which appear in bobcat stomachs and scats represent carrion. Nevertheless, both deer and sheep are very minor components of the bobcats' diet, to the extent that any cost/benefit analysis would surely favor the bobcat for its role in lagomorph and rodent control.

Conclusions

In light of the results of food-habit studies, and because of the increasing value of bobcat pelts, we strongly urge that the public and responsible officials review the economic status of the bobcat in Oregon and consider its reclassification. A logical first step would be to remove the bobcat from the status of "predatory animals" and to place it in the status of fur-bearer, with provisions that, when shown (or proved) necessary, proper control measures may be carried out.

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