



Ecology and reproduction of bobcats in southeastern Montana during a period of low lagomorph density

by Gregory Lynn Risdahl

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Fish and Wildlife Management

Montana State University

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Abstract:

The ecology and reproduction of bobcats (*Felis rufus*) were studied in eastern Montana from March 1986 to September 1987. Annual home range size estimates for 2 females were 24.8 and 233.5 km². The annual home range sizes for 4 males was 23.9 to 100.5 km². Annual home ranges of males and females overlapped extensively.

Overlap between males was confined to the peripheries of their home ranges. Overlap between female home ranges occurred only once. There were no significant differences ($P < .05$) in the mean distances between locations by sex or season. Creek bottom complexes and rock outcrops were used in significantly greater proportion than their availability. Gumbo/scoria badlands, badlands-brushy draws and reservoir complexes were used in proportion to their availability. Open sagebrush/grasslands were used significantly less than in proportion to their availability. Sigmodontine and arvicoline rodents made up the bulk of the diets of bobcats in 1986-1987; passerine birds ranked second and lagomorphs third. Pronghorn antelope, insects, domestic sheep and reptiles were also utilized as food sources. Population and harvest trend indices indicated a 35-80% decline in bobcat density from 1983-1984 to 1986-1987. The decline in bobcat density was attributed to the crash in the lagomorph population in 1983-1984. Daily activity patterns determined through 24-hour monitoring sessions indicated considerable variation in distances traveled, amount of hunting and periods of activity/inactivity. Analyses of female bobcat carcasses collected during the 1986-1987 trapping season indicated a decline in reproductive rate from carcasses collected between 1980 and 1983. The overall in utero litter size declined from 2.7 in 1980-1983 to 2.1 in 1986-1987. The overall corpora lutea count declined from 4.2 in 1980-1983 to 3.2 in 1986-1987. The highest ovulation rate (3.6) occurred in the 5+ year class in 1986-1987. No kittens and only 1 yearling occurred in the sample of carcasses collected in 1986-1987. Less than 5% of the bobcat fur harvest in MDFWP Region 7 consisted of kittens and few kittens were purchased by local fur buyers during the 1986-1987 trapping season. Basic blood parameters were analyzed from samples taken from 18 adult bobcats captured during this study. Samples were comparable with bobcat blood sample data from 2 other studies and with domestic cats.

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APPROVAL

of a thesis submitted by

Gregory Lynn Risdahl

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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ABSTRACT

The ecology and reproduction of bobcats (Felis rufus) were studied in eastern Montana from March 1986 to September 1987. Annual home range size estimates for 2 females were 24.8 and 233.5 km². The annual home range sizes for 4 males was 23.9 to 100.5 km². Annual home ranges of males and females overlapped extensively. Overlap between males was confined to the peripheries of their home ranges. Overlap between female home ranges occurred only once. There were no significant differences ($P < .05$) in the mean distances between locations by sex or season. Creek bottom complexes and rock outcrops were used in significantly greater proportion than their availability. Gumbo/scoria badlands, badlands-brushy draws and reservoir complexes were used in proportion to their availability. Open sagebrush/grasslands were used significantly less than in proportion to their availability. Sigmodontine and arvicoline rodents made up the bulk of the diets of bobcats in 1986-1987; passerine birds ranked second and lagomorphs third. Pronghorn antelope, insects, domestic sheep and reptiles were also utilized as food sources. Population and harvest trend indices indicated a 35-80% decline in bobcat density from 1983-1984 to 1986-1987. The decline in bobcat density was attributed to the crash in the lagomorph population in 1983-1984. Daily activity patterns determined through 24-hour monitoring sessions indicated considerable variation in distances traveled, amount of hunting and periods of activity/inactivity. Analyses of female bobcat carcasses collected during the 1986-1987 trapping season indicated a decline in reproductive rate from carcasses collected between 1980 and 1983. The overall in utero litter size declined from 2.7 in 1980-1983 to 2.1 in 1986-1987. The overall corpora lutea count declined from 4.2 in 1980-1983 to 3.2 in 1986-1987. The highest ovulation rate (3.6) occurred in the 5+ year class in 1986-1987. No kittens and only 1 yearling occurred in the sample of carcasses collected in 1986-1987. Less than 5% of the bobcat fur harvest in MDFWP Region 7 consisted of kittens and few kittens were purchased by local fur buyers during the 1986-1987 trapping season. Basic blood parameters were analyzed from samples taken from 18 adult bobcats captured during this study. Samples were comparable with bobcat blood sample data from 2 other studies and with domestic cats.

INTRODUCTION

Four studies on the ecology of the bobcat (Felis rufus) in Montana have been completed (Knowles 1981, Smith 1984, Brainerd 1985 and Giddings 1986). The overall goal of these studies has been to obtain trend and status information for management purposes. MDFWP has supported regional studies of the bobcat because of increasingly high pelt prices and the difficulty in monitoring the status of populations located throughout the state. Brainerd (1985) and Giddings (1986) outline the history and motivating factors behind these studies. My study was designed to investigate the reproductive ecology, home range and movements of bobcats in eastern Montana during a period of low lagomorph density, supplementing the eastern Montana home range and movements work done at high lagomorph densities (Giddings 1986).

Studies of bobcats in low productivity populations have been undertaken in Washington (Knick and Bailey unpubl. data), Idaho (Bailey 1972), Oklahoma (Rolley 1983, 1985) and elsewhere. Researchers have suggested that depressed productivity occurs because of a decline in availability of the major prey species (Bailey 1972, Kitchings and Story 1978, Knick and Bailey unpubl. data, and Litvaitis et al. 1987). A primary component of the

diets of these felids is often reported to be hares (Lepus spp.) or rabbits (Sylvilagus spp.) (Hall 1973, Bailey 1972, Berg 1979, Knick et al. 1984, Knick and Bailey unpubl. data, Litvaitis et al. 1986 and Toweill 1986).

The primary objectives of this study were to:

1) Document bobcat population trends and habitat use as reflected by changes in:

- a) home range sizes and movements
- b) habitat use patterns
- c) prey availability and diet
- d) scent post visitations
- e) harvest statistics

2) Examine harvested female bobcats in MDFWP Region 7 to determine:

- a) age at first breeding
- b) ovulation rates
- c) pregnancy rates
- d) litter size
- e) age and condition

Secondary objectives were to:

- 1) Document daylight and night movements and habitat use.
- 2) Determine relative differences in bobcat and coyote densities in the study area.
- 3) Collect baseline data on the blood parameters of bobcats in eastern Montana.

STUDY AREA

The study area was centered on the Hook Ranch located north of the Yellowstone river between Forsyth and Miles City (Fig. 1) but included portions of several additional ranches. BLM and state lands were interspersed among private holdings. The study area encompassed approximately 1,722 square kilometers (km²) (Fig. 2).

The region is characterized by low, rugged gumbo (sodium-affected light-colored clayey soils of cool, arid and semi-arid grasslands deposited as alluvium) and scoria (brick-red to violet colored clinker produced by range fires and underground burning of clayey soils) badlands (Montagne et al. 1982) interspersed with areas of shortgrass prairie which are highly dissected by deeply cut and eroded streambeds. The dominant soil orders on the study area were camborthids, natrargrids and torriorthents which generally comprise the gumbo that is characteristic of the unglaciated sedimentary plains of eastern Montana. The gumbo and scoria hills are banded with layers of coal and sandstone.

The study area was considered part of the Hell creek formation that extends southward from its foci north of Fort Peck reservoir (Alt and Hyndman 1986). The Hell creek

