



A two-year study of the Rocky Mountain goat in the Crazy Mountains, Montana
by Jack W Lentfer

A THESIS Submitted to the Graduate Faculty 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:

A study of an introduced mountain goat herd was conducted in the Crazy Mountains, southwestern Montana, from March, 1952, 11 years after the first introduction, to October, 1953. Biological comparisons were made between Crazy Mountains goats and goats from the herd which supplied the original stock for introduction. Population data were secured by aerial and ground censuses. The Methods are described and compared. Parturition period, kid/adult ratios, and numbers of single kids, twins, and triplets are discussed. Examination for presence of sperm in males and corpora lutea in females gave information on time of breeding. Live-trapped and dead animals were examined to obtain data on dentition, weights, body measurements, and horns. Each is evaluated as a criterion for estimating age. Seasonal movements are described. Distribution of animals from original release site is delimited. Live-trapped goats were marked and released for movement studies. Effectiveness of marking is discussed. Two observations on longevity are recorded. Other observations of activities and behavior, pelage, moisture requirements, and adverse factors are described.

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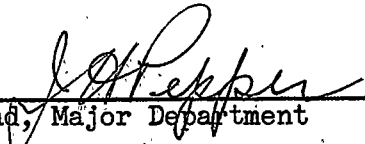
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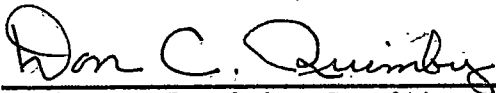
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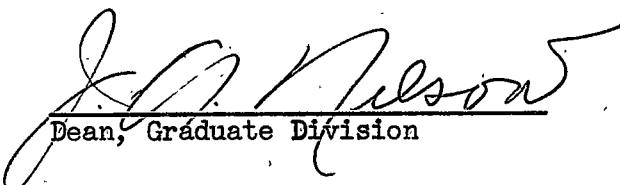
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Chairman, Examining Committee


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ABSTRACT

A study of an introduced mountain goat herd was conducted in the Crazy Mountains, southwestern Montana, from March, 1952, 11 years after the first introduction, to October, 1953. Biological comparisons were made between Crazy Mountains goats and goats from the herd which supplied the original stock for introduction. Population data were secured by aerial and ground censuses. The methods are described and compared. Parturition period, kid/adult ratios, and numbers of single kids, twins, and triplets are discussed. Examination for presence of sperm in males and corpora lutea in females gave information on time of breeding. Live-trapped and dead animals were examined to obtain data on dentition, weights, body measurements, and horns. Each is evaluated as a criterion for estimating age. Seasonal movements are described. Distribution of animals from original release site is delimited. Live-trapped goats were marked and released for movement studies. Effectiveness of marking is discussed. Two observations on longevity are recorded. Other observations of activities and behavior, pelage, moisture requirements, and adverse factors are described.

INTRODUCTION

The Montana Fish and Game Department has conducted a program of live-trapping and transplanting Rocky Mountain goats (Oreamnos americanus missoulae) into "new" areas. Twenty-one were transplanted into the Crazy Mountains, southwestern Montana, as follows: two mature females, one mature male, and one yearling male, April 16, 1941; three females and two males two years old or older and one yearling female April 26, 1941; six females and four males two years old or older, and one yearling female April 17, 1943. All were released along Sweetgrass Creek a few miles above the Brannin Ranch (Fig. 1). Mr. Barney M. Brannin, a rancher in Sweetgrass Canyon, requested the plant. He solicited half the necessary funds from residents of the Crazy Mountains area and helped Game Department personnel trap the original stock on Deep Creek west of Choteau in the northwestern part of the state.

Each year following the plants, Mr. Brannin placed block salt along the high, rough ridge on the north side of Sweetgrass Creek and in Milly Creek, a tributary. Each successive year the salt was placed at lower elevations and each year it was used by goats. Mr. Brannin recorded observations each year, mostly in May and June during the kidding season. New kids were observed each spring. His diary reveals a gradual increase in numbers.

This highly successful plant provided an opportunity to conduct an intensive investigation of an expanding herd in a new environment. Data were secured on populations, movements, reproduction, and other biological factors from March, 1952, to October, 1953. The findings provide a basis

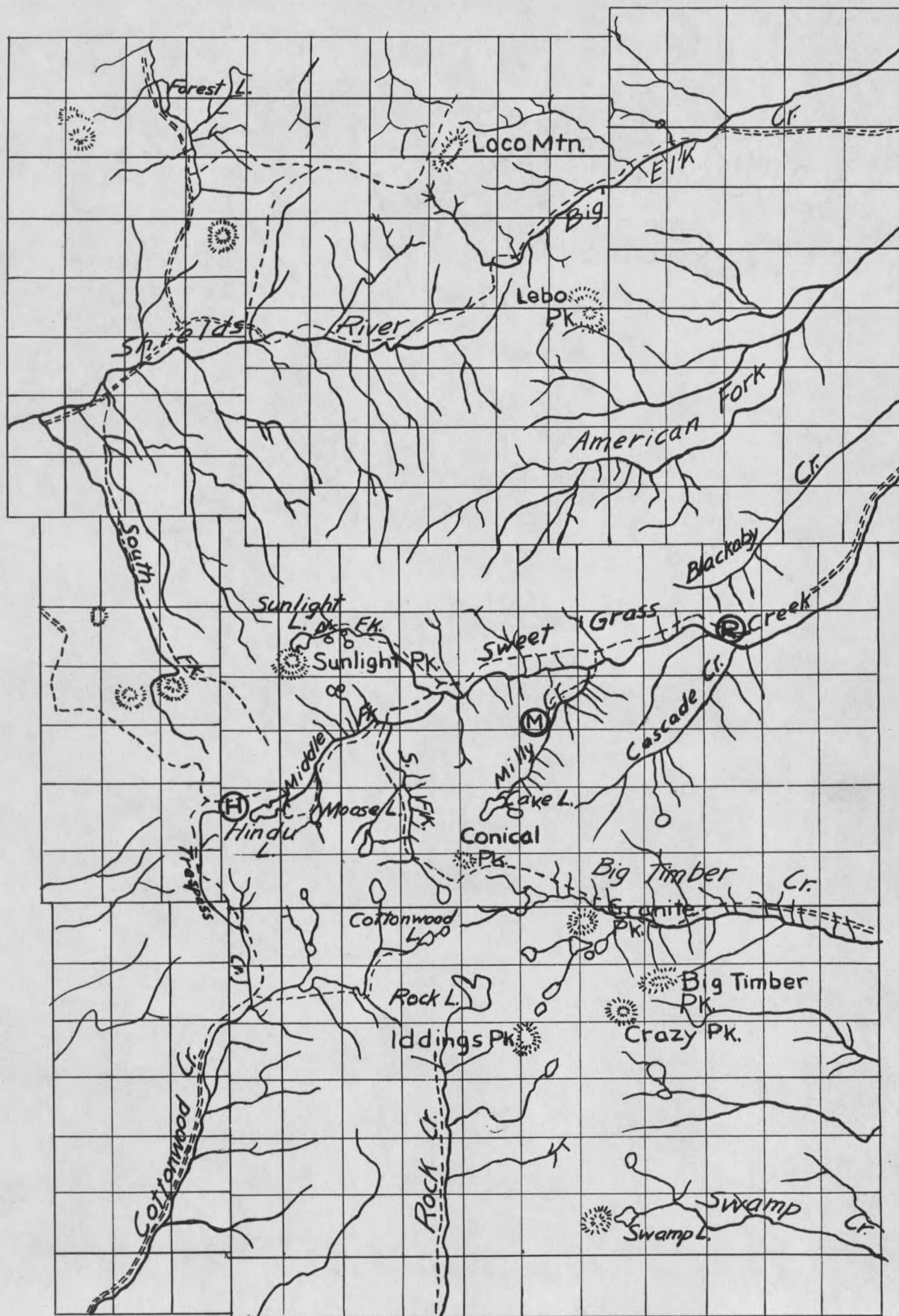
for comparison with older stabilized goat herds of the state, chiefly those of the Continental Unit studied by Casebeer, et al. (1950).

The writer extends grateful thanks to the following: the Montana Fish and Game Department for financing the investigation; Dr. Don C. Quimby of Montana State College who directed the study and gave valuable aid in preparing the manuscript; J. E. Gaab of the Montana Fish and Game Department who assisted in setting up the project and aided in the field; Jack K. Saunders, Jr., and Philip R. South for aid in the field; the Brannin Ranch, whose members provided information and hospitality; Prof. Harold Watling of Montana State College for assistance in histological examination of testes and ovaries; and my father, Henry H. Lentfer, for aid in care of specimens.

THE CRAZY MOUNTAINS

The following geological descriptions are from the works of Weed (1899) and Wolff (1938). The Crazy Mountains, an isolated group of connected peaks from 10 to 20 miles wide and 30 miles long, surpass most other mountains of the state in elevation and ruggedness. The highest peaks reach an elevation of over 11,000 feet, or 6,000 feet above the surrounding, open bench lands. The mountains consist of sandstones and shales of late Cretaceous or Eocene Age into which three great cores of igneous rock have been injected with thousands of associated lacoliths, sills, and dikes. The igneous rocks and sediments hardened by contact metamorphism have resisted the general erosion of the region to remain as sharp peaks and ridges (Fig. 2).

The mountains are bisected by the broad headwater valley of the Shields River flowing westward and the eastward-flowing American Fork.



(H) Hindu L. Trap
(M) Milly Cr. Trap

(R) Original Release Site

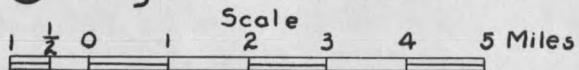


Fig. 1. Map of the Crazy Mountains.



Fig. 2. Hindu Lake and summer goat range from Hindu Lake Trap. Goats were commonly seen along the ridges, in the cliffs, and in the slide rock areas. Wind blowing over the top of the ridge formed deep snowdrifts, remains of which are shown in the right side of the picture. No goats or tracks were found here in the winter.

The highest peaks and most rugged topography occur in the southern half. Great numbers of radial dikes form prominent walls. The northern part has no sharp alpine peaks and, except for Loco Mountain, is generally timbered.

The mountains receive heavy snows in winter and frequent rains in summer, sometimes of cloudburst intensity. Many snow banks last all summer and furnish water for the numerous small lakes and alpine meadows in the high basins at heads of drainages. Drainage is distinctly radial.

Although the southern portion provides excellent mountain goat habitat as demonstrated by the success of introduction, the animals apparently were never native there. The absence of goats in the ranges surrounding the Crazy Mountains and the isolated nature of the Crazy Mountains themselves probably explain this.

METHODS

The two summers were spent in the mountains in immediate goat habitat. Five trips were made into the area during winter and spring. Flying for censusing and observing was done at various times throughout the year.

Two traps were constructed to live-trap goats. One was on Milly Creek, the other, five and one-half airline miles away on the main divide above Hindu Lake at the head of Sweetgrass Creek. The traps were baited with salt. The Hindu Lake trap was in operation 24 days in the summer of 1952; the Milly Creek trap eight days in the summer of 1952, 30 days in the summer of 1953. Of 21 goats trapped, 14 were marked and released, six were trap casualties; one, a kid which later died, was retained to raise for study purposes. To mark individuals, plastic ear markers of different shapes and colors (Johnson, 1951) and sheep branding paint were used.

Markers were put in the right ear of goats caught at one trap and in the left ear of those caught at the other. Red paint was used at one trap; blue at the other. Large numbers and other diagnostic designs were painted on the animals (Fig. 3).

Sex, weight, standard measurements, horn development, and condition of incisors were obtained. The three goats intentionally collected and the six that died during trapping operations provided skulls and reproductive organs in addition to the data secured from live specimens. A special hunting season in the fall of 1953 provided data from 22, jaws from 18, and reproductive organs from nine.

Two methods, ground and aerial, were used for censusing. One ground count covering the northern half of the range was made in August, 1952, by two men traveling from north to south with horses and a light camp. Each covered a certain area each day on foot. By using binoculars, it was possible to examine much of the goat habitat.

Preliminary to making an aerial count of the entire area, several flights were made at various times to enable pilot and observer to become familiar with the area, and to locate concentrations of goats. From these flights, goat range was determined and intensive censusing limited to Loco Mountain, Lebo Peak and the entire southern area (Fig. 1). The plane used was a 125 HP Super Cub piloted by James D. Stradley of the Gallatin Flying Service, Belgrade, Montana. The writer was the observer on all censuses.

Censusing was done by drainages. The ridge or ridges separating a drainage from areas not yet counted were flown to locate goats near the top which might move into or out of the area to be counted. The drainage

