THE WILD TURKEY
IN EASTERN COLORADO

STATE OF COLORADO — DEPARTMENT OF GAME AND FISH

THE WILD TURKEY IN EASTERN COLORADO

A RESEARCH AND MANAGEMENT STUDY OF MERRIAM'S WILD TURKEY IN EASTERN COLORADO

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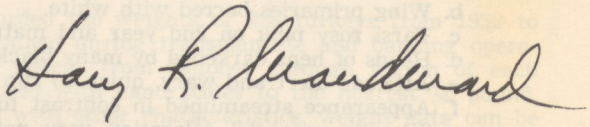
INTRODUCTION

MERRIAM'S wild turkey once faced extinction in Colorado due to natural as well as man-induced factors. Paramount among such factors were uncontrolled hunting, severe winter weather, and the curtailment of suitable habitat through encroachment of agriculture, over-grazing, and human settlements.

Fortunately for this fine game bird, a program of research and restoration was started in the autumn of 1941 under one of the earliest Wildlife Restoration Projects (17-R) in Colorado. The wild turkey is typically a wilderness game bird, yet it has shown marked response to our restoration efforts. The success of the restoration program is exemplified by the re-population of much of the bird's historical range, by development of sizeable flocks in portions of the state heretofore unoccupied, and by the resumption of hunting since 1949. The annual harvest of wild turkeys has been relatively low, but current information indicates this magnificent bird may withstand much greater hunting pressure.

The research findings disclosed in this publication cover a nine-year period. Studies were designed to accomplish two primary objectives: to determine the basic requirements of wild turkeys and to find ways to increase existing populations. It is hoped the results of these studies will aid future workers in their efforts for the continued perpetuation and development of this splendid game species.



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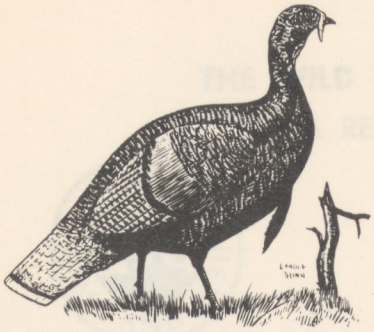


NATURAL HISTORY

THE wild turkey (*Meleagris gallopavo*) once ranged in abundance from the Atlantic Coast to the Dakotas and from Maine and southern Ontario to southern Mexico. It inhabited every state in the U. S. except Washington, Oregon, California, Nevada, Utah, Idaho, Wyoming, and Montana (Zimmer, 1924). This fine game bird has been extirpated over much of its former range.

At present four distinct subspecies of the wild turkey exist in the United States. This work deals only with Merriam's turkey (*Meleagris gallopavo merriami* Nelson). Merriam's turkey, or the mountain wild turkey, is a hardy strain confined to Arizona, Colorado, New Mexico, and a very small area of Texas, according to J. Stokley Ligon (1946). Characteristics of this strain in contrast to the Eastern wild turkey are primarily adjustment to a distinctive habitat and the white markings of the wings and the tips of the tail feathers (Ligon, *op. cit.*).

People in Colorado who are unfamiliar with Merriam's turkey are often confused about distinguishing the true wild birds. Wild turkeys will cross with domestic turkeys, but the result is generally both a poor game bird and a poor domestic bird. This has been found by many ranchers who raise domestic turkeys in areas where Merriam's turkeys exist. It is generally thought that the mortality rate is high among crosses because these birds are much less able to take care of themselves in the wild than are the true wild turkeys. Little variation in the characteristics of birds found throughout the present wild turkey range in Colorado indicates a good basis for this theory. Consequently, an ability to distinguish between the domestic turkey and the true wild turkey is all that should be necessary.

In Colorado the true Merriam's wild turkey is characterized by the following: (See Plate 1)

a. Rump patch white to light buff.
b. Wing primaries barred with white.
c. Tarsi rosy pink on 2nd year and mature birds.
d. Heads of hens darkened by many black, hair-like feathers.
e. Attitude alert and wary, quick to run or fly if disturbed.
f. Appearance streamlined in contrast to heavy build of domestic birds.
g. "Copper peacock" coloration very noticeable during spring breeding season, especially on breeding toms.

AGE AND SEX CHARACTERISTICS

Several authorities (including Mosby, 1941; Keiser and Kozicky, 1943; Bent, 1932; and Petrides, 1942) have discussed ways and means of determining sex and age in wild turkeys. Many of the principles worked out for the Eastern turkey can be used with slight modifications for determining sex and age of Merriam's turkey.

General Appearance: Keiser and Kozicky (*op. cit.*) stated that the general appearance of a live bird is a means of determining sex. The gobbler is usually larger and more heavily framed. The tarsi of the gobbler are thicker than the tarsi of the hen. In the spring during the mating season, the gobbler's head is red to bluish-white in contrast to the dull grey of the hen's. The gobbler also has more caruncles (small, wart-like bumps) around

Plate 1—Mature toms feeding near trapsite in Smith Canyon, Mesa de Maya, February, 1954.

the head and neck, a larger head, a taller appearance, and less feathering in the vicinity of the head. Old gobblers have well developed spurs. These principles also hold true for the Merriam's turkey. (See Plate 3.)

Outer Pairs of Wing Primaries: Bent (*op. cit.*) stated that a complete moult of juvenile turkeys takes place during the first fall except for the two outer primary wing feathers. These two primaries are retained for a year. Petrides (*op. cit.*) found further that these distal remiges become more rounded with age and in older birds are barred with white almost to the tip. In juvenile turkeys the tips are sharply pointed and tipped with plain grey. These characteristics have proven very useful in determining sex and age. (See Plate 2.)

Breast Feathers: Marsden and Martin (1939) and Mosby (*op. cit.*) have stated that the tips of the breast feathers on the Eastern turkey are buff on hens and black on gobblers. On Merriam's turkey these tips are white on hens and jet-black on gobblers. On juvenile hens the tips are narrow and white. On juvenile gobblers they are narrow and grey with a black band below which is a lighter shade than that found on older gobblers. With both sexes these tip bands grow progressively wider with age. The white bands become more noticeable on 2nd year hens and become so broad on old mature hens that they give the breast feathers a greyish cast. On the gobblers the black bands become similarly wider and more noticeable. Since this characteristic is quite consistent and easy to distinguish, it can be used to good advantage in determining both the age and the sex of a Merriam's turkey. (See Plates 2 and 4.)

Weights: The author recorded the weights of 228 turkeys from 1952 to 1958. These weights were obtained during transplanting and banding operations and during hunter field checks from October through March of each year. All weights were measured with hand scales to the nearest ¼ pound.

When used in conjunction with other characteristics, weight data can be extremely helpful in the determination of sex and age. Table 1 shows average weights by age and by season. While the number of birds weighed during most months was too small to evaluate statistically, the averages show an apparent rise in weights during the fall period followed by a drop during the winter period.

Table 2 lists all weights obtained by the writer during the study.

Beards: Two hundred twenty-eight turkeys were examined for the presence of beards. Measurements were taken in centimeters. Table 3 lists all beard-length measurements.

None of the 51 juvenile hens examined had beards, and only one of the 28 2nd year hens had a beard. This beard was 5.00 centimeters long. Eight out of 30 mature hens examined, or 26.67 per cent, had beards. These ranged in length from 8.00 to 15.00 centimeters with an average length of 10.44 centimeters.

TABLE 1.—AVERAGE WEIGHTS OF 228 MERRIAM'S WILD TURKEYS BY MONTHS

Age Class	October		November		December		January		February		March		Total
	No. in Sample	Mean	No. in Sample	Mean	No. in Sample	Mean	No. in Sample	Mean	No. in Sample	Mean	No. in Sample	Mean	
Juvenile Hens	10	7.33	6	8.42	9	9.94	10	9.18	10	8.58	6	9.13	51
2nd year Hens	5	9.20	3	9.00	6	9.58	6	9.83	6	9.75	2	9.25	28
Mature Hens	3	10.00	10	10.90	5	11.15	3	10.33	8	10.38	1	10.00	30
Sub-total	18		19		20		19		24		9		109
Juvenile Toms	25	8.58	12	12.98	14	14.54	11	13.14	8	13.03	....	.....	70
2nd year Toms	3	15.00	2	18.50	1	17.00	....	.....	5	18.05	....	.....	11
Mature Toms	7	18.64	3	20.00	2	20.50	20	17.38	5	18.45	1	22.50	38
Sub-total	35		17		17		31		18		1		119
TOTAL	53		36		37		50		42		10		228

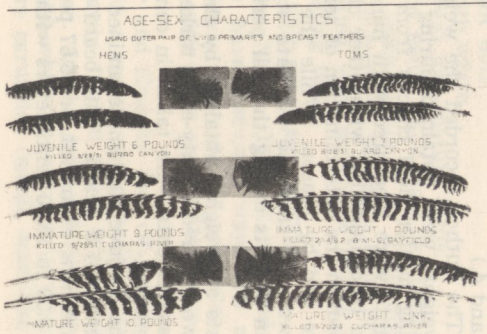
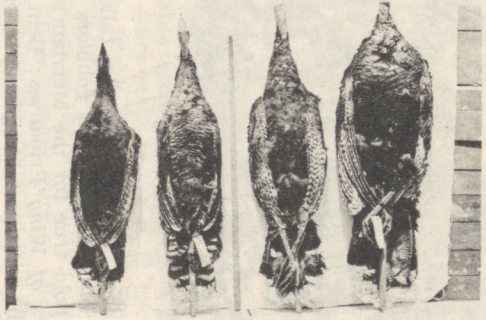


Plate 2 — The shape of the outer pairs of wing primaries can be used to determine the age of a wild turkey. The color of the tip of the breast contour feathers will indicate the sex, and the width of this coloration on the tips will indicate the age of the bird. Note duller markings on tips of juvenile wing primaries and the rounding of these tips with age.



	A	B	C	D
	Juv. Hen	Mat. Hen	Juv. Tom	Mat. Tom
Length	34 inches	36 inches	39 inches	43 inches
Weight	5 pounds	10 pounds	11 pounds	17 pounds

Plate 3 — A comparison of size in individuals in two age classes of male and female Merriam's wild turkeys. Weights and measurements taken prior to mounting.

Twenty-one of 70 juvenile toms, or 30 per cent, had beards. These varied in length from 2.00 to 6.50 centimeters with an average length of 4.20 centimeters. All 11 2nd year toms had beards ranging from 12.00 to 19.50 centimeters in length. The average length for this group was 15.91 centimeters. All 38 mature toms examined had beards varying from 14.00 to 26.00 centimeters with an average length of 20.47 centimeters.

Beard lengths can be very useful in determining sex and age of Merriam's turkeys, particularly when used in conjunction with the other sex and age characteristics outlined in this chapter.

Spurs: All hens and juvenile toms have only rudiments of spurs (See Plate 5). A difference in the shape of the spurs of 2nd year toms and mature toms was noted. The spurs of the mature toms were found to be more pointed than those on the 2nd year toms. The older a tom is, apparently, the longer and more pointed are his spurs. (See Plate 5.)

Three mature toms live-trapped in the La Veta area and one live-trapped in the Mesa de Maya area had a well developed spur on one leg and an underdeveloped spur on the other. This characteristic is apparently hereditary rather than the result of an accident.

SUMMARY

The sex of a Merriam's turkey may be determined by noting the general appearance of the bird, the breast feather characteristics, and the weights. Age may be determined by noting the general appearance of the bird, the breast feather characteristics, the weights, the beard lengths, and the outer pairs of the wing primaries.

LIFE HISTORY NOTES

Observations pertaining to the life history of the wild turkey in southeastern Colorado have been recorded in conjunction with brood count studies. These notes are summarized below.

Although some wild turkeys spend their summers and winters in the same general locality, most tend to move to higher elevations during the summer and to drift down to more sheltered wintering grounds when cold weather starts. The seasonal downward drift of birds in the Spanish Peaks and Mesa de Maya areas begins with the first cold spell and snowfall. In 1953 this movement in these areas was noted in mid-October. Generally, the first heavy snowfall (which often occurs in early November) finds the turkeys already ranging on their favored wintering grounds.

In 1954 the wintering flocks in the Mesa de Maya area started to disperse with the warm, spring-like weather of late February and early March. The dispersal of flocks wintering in the mountain areas apparently does not occur until mid-March most years.

On March 20, 1956. and again in late March, 1957, a rancher in the Spanish Peaks area observed wild turkeys breeding. Several mating groups of mature toms and hens have been seen by the writer in the Spanish Peaks area from early April through early May. W. T. West, a rancher in the North Fork section of the Spanish Peaks area, reported finding two wild turkey nests during the latter part of May. Indications of incubating hens have been noted by the writer during this same period.

Dalke, Leopold, and Spencer (1946) estimate one and one-half days per egg in the completed clutch. According to Zimmer (*op. cit.*) the incubation period for wild turkeys is approximately 4 weeks.

The earliest broods on the eastern slope were noted the second week of June. The earliest broods seen by the writer were observed during the last week of June. Two broods seen by the writer at this time were too young to fly. One brood was estimated to be at least one month old. One hen with a brood too young to fly attempted to distract attention from her young by acting crippled and calling out while the poults took cover.

After September the juvenile wild turkeys are difficult to distinguish from adults.

TABLE 2.—WEIGHTS OF 228 MERRIAM'S WILD TURKEYS[1]

Age Class							
Juv. Hens		2nd yr. Hens	Mature Hens	Juv. Toms		2nd yr. Toms	Mature Toms
5.00	9.50	7.50	9.00	4.00	13.00	15.00	14.50 20.50
5.00	9.50	8.00	9.00	6.00	13.00	15.00	15.00 22.00
5.75	9.50	8.00	9.50	6.00	13.00	15.00	15.00 22.50
6.00	9.50	8.50	10.00	6.00	13.00	17.00	15.00
6.50	10.00	8.50	10.00	6.50	13.50	17.00	15.50
6.50	10.00	8.50	10.00	6.50	13.50	17.00	16.00
7.25	10.00	9.00	10.00	7.00	13.50	17.50	16.00
7.25	10.00	9.00	10.00	7.00	13.50	18.50	16.00
7.50	10.00	9.00	10.00	7.00	13.50	18.50	17.00
7.50	10.00	9.00	10.00	7.00	13.50	19.25	17.00
8.00	10.00	9.00	10.00	7.00	13.50	19.50	17.00
8.00	10.00	9.50	10.00	7.50	13.50		17.00
8.25	10.50	9.50	10.50	7.50	13.50		17.50
8.25	10.50	9.50	10.50	8.00	14.00		17.50
8.50	10.50	9.50	10.50	8.00	14.00		18.00
8.50	11.00	9.50	10.50	8.50	14.00		18.00
8.50		10.00	10.50	9.00	14.00		18.00
8.75		10.00	10.50	9.00	14.00		18.50
8.75		10.00	11.00	9.50	14.00		19.00
9.00		10.00	11.00	9.50	14.00		19.00
9.00		10.00	11.00	10.00	14.00		19.00
9.00		10.00	11.00	10.75	14.00		19.00
9.00		10.50	11.00	11.00	14.00		19.00
9.00		10.50	11.25	11.00	14.50		19.00
9.00		10.50	11.50	11.50	14.50		19.00
9.00		11.00	11.50	11.50	14.50		19.00
9.00		11.00	11.50	12.00	14.50		19.50
9.00		11.50	12.00	12.50	14.50		19.50
9.00			12.50	12.75	14.50		19.50
9.00			13.00	13.00	15.00		19.50
9.00				13.00	15.50		20.00
9.00				13.00	16.00		20.00
9.25				13.00	16.00		20.00
9.50				13.00	16.00		20.00
9.50				13.00	16.00		20.25
Mean							
8.74		9.52	10.63	11.75		17.20	18.26

[1] Weights expressed in pounds.

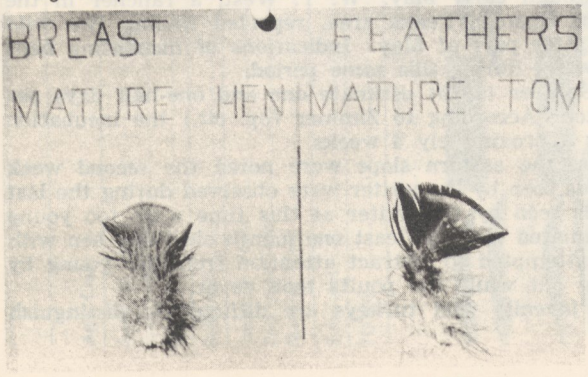


Plate 4 — Breast contour feathers of mature birds. Note white tip on hen breast feather compared with jet black tip on tom breast feather.

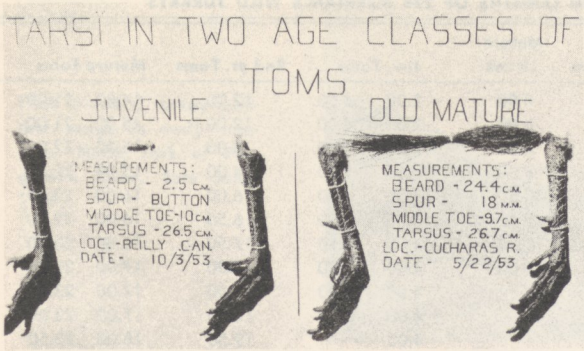


Plate 5 — This black and white photograph does not show the characteristic rosy pink color of the mature turkey tarsi compared with the duller brownish color of juvenile tarsi.

RANGE REQUIREMENTS

SOUTHEASTERN Colorado contains three fairly distant habitats in which Merriam's turkey is now found. These three habitats can be classified as (a) the forests and woodlands of the mountains (which comprise by far the greater part of the wild turkey range), (b) the mesa areas in the eastern portion of the region, and (c) the river bottom and adjacent canyons of the lower Purgatoire River drainage.

In all these habitats, the basic requirements are similar. They may be grouped into four major classes: food, water, cover, and special requirements. Within any range these basic requirements must be suitable for wild turkeys during all seasons. Each of the four is discussed separately below.

FOOD

Summer and early fall rarely present food problems, since foods are normally plentiful in southeastern Colorado during these seasons. Foods may become a critical factor during late fall and during the winter because of deep snow cover.

A study of food preferences has been summarized in Chapter III. Table 6 lists the ten preferred foods during each season in southeastern Colorado.

The grass family provides most of the wild turkey's year-round diet, furnishing green leaves, matured seeds, and cultivated grains. The importance of controlled grazing of domestic stock is apparent in wild turkey management since the birds rely so heavily on the grass group for food.

Ponderosa pine seeds, acorns, and the persistent fruits of hawthorne, snowberry, wild rose, kinnikinnick, skunkberry, and cactus play an important role in the diet of the turkey particularly during the late fall and the winter. Most turkey flocks choose the Ponderosa pine-scrub oak belt for wintering grounds, although during prolonged periods of deep snow, they may be forced to leave their favored wintering grounds and range lower into the pinon pine, cedar belt. Normally, the flocks summer from the Ponderosa pine-scrub oak belt and higher into the Douglas fir, aspen, lodgepole pine belts. Plates 6 and 7 show summer and winter ranges in the Spanish Peaks and the southern Sangre de Cristo Range.

Several species of plants generally considered as weed species are favorite foods of the wild turkey. These include the leaves, flowers, and seed heads of the common dandelion, and the seeds of wild buckwheat, wild sunflowers, sand dropseed grass, sleepygrass, and the giant ragweed. Many different species of insects are eaten in quantity with the grasshopper among the most prominent. Of the cultivated grains, oats is the number one choice followed by barley, corn, and wheat. It has been found, however, that the wild turkey does not require cultivated grains where other favorite foods are plentiful. Where flocks range in the vicinity of grain fields, such foods naturally form a major part of their diet.

TABLE 3.—BEARD LENGTHS OF 228 MERRIAM'S WILD TURKEYS[1]

Juv. Hens	2 nd yr. Hens	Mature Hens	Juv. Toms		2nd yr. Toms	Mature Toms	
	5.00	8.00	2.00	4.00	12.00	14.00	21.00
		8.00	2.00	4.00	12.00	15.00	21.00
		8.00	2.50	4.50	13.00	15.00	22.00
		8.00	3.00	5.00	14.00	15.00	22.00
		11.50	3.50	5.00	16.00	16.00	22.00
		12.00	3.75	5.00	16.50	16.00	22.00
		13.00	4.00	5.50	17.50	16.00	23.00
		15.00	4.00	6.00	18.00	17.00	23.00
			4.00	6.00	18.00	17.00	23.00
			4.00	6.50	18.50	17.00	23.00
			4.00		19.50	18.00	23.50
						19.00	23.50
						19.00	24.00
						20.00	24.00
						20.00	25.00
						20.00	25.00
						20.00	25.00
						20.00	26.00
						20.00	26.00
Mean	5.00	10.44	4.20		15.91	20.47	

[1] Measurements in centimeters. A total of 149 of the 228 birds examined had no beards.

WATER

That wild turkeys require drinking water daily has not been definitely established. Field studies indicate, however, that the birds do drink at least once a day when water is available, especially during hot periods. Findings also indicate that turkeys will desert an area when water becomes scarce. In the winter when snow is available, the flocks will eat snow and drink from melting snow so that open water is not needed as in the warmer seasons.

A good water supply is highly desirable when considering new areas for transplanting.

COVER

Cover requirements can be divided into roosting cover, nesting cover, escape cover, and loafing cover.

Roosting: Tall, over-mature, and dead Ponderosa pines are much preferred for roosting sites. The reason for this distinct preference lies in the formation of the upper crown of these trees. Plates 8 and 9 illustrate the open tops and the angle at which the side branches grow, both of which aid the turkeys in roosting.

Most wild turkeys prefer roosting sites where they can walk up to a ledge or an over-hanging rock and fly across into the roost rather than flying from the ground up into the roost. Flying from the roosts is no problem since the turkeys can sail for long distances. Most roosts are selected in locations sheltered from high winds. When Ponderosa pines are not available, tall cottonwoods and Rocky Mountain junipers are commonly used. Douglas firs are also occasionally used.

Nesting: Nesting cover varies a great deal in different areas and with different hens. Limited observations on nesting hens indicate they prefer rather inaccessible slopes covered by dense thickets of scrub oak or areas of cut-over Ponderosa pine where slash remains. Reports of hens nestling in alfalfa fields have also been received. Field signs indicate hens normally pick nesting sites near a creek or stream where water and grassy areas are available for drinking and feeding during the mornings and afternoons.

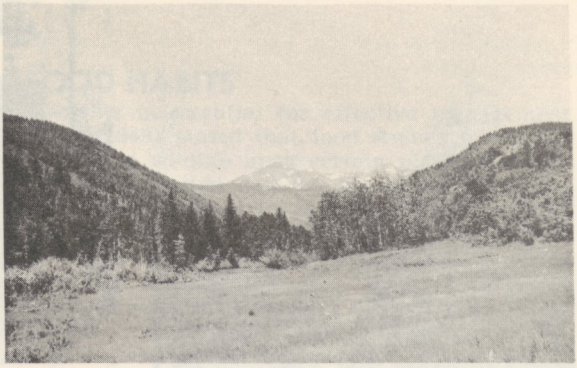


Plate 6—Wild turkey summer range in early summer. North Fork of Purgatoire River. Late June, 1955.

Plate 7 — Late winter on a wild turkey winter range after a new snow. Santa Clara Cr. Early March, 1954.

Escape: Dense stands of pine, cedar, scrub oak, hawthorne, or locust provide good escape cover both from predatory species and hunting pressure. Rugged terrain often complements the dense vegetation within the wild turkey ranges. From the escape standpoint, small clearings or fields containing food species and insects interspersed with dense brush or forested areas are preferred. Areas far from escape cover are generally not used even though feed may be plentiful. A natural fear of eagles is perhaps the main reason for this.

Loafing: Loafing cover appears to be closely allied with escape cover, and the same thickets of scrub oak, Ponderosa pine, or other vegetation may serve this dual purpose. Generally, the preferred loafing cover is found near feeding and watering sites.

SPECIAL REQUIREMENTS

Two special requirements are needed if an area is to support a satisfactory population of wild turkeys. The first requirement is that predators of the turkey do not exist in such numbers that the flocks cannot increase. The bobcat is believed to be the chief predator of the turkey in southeastern Colorado. Eagles, greathorned owls, foxes, coyotes, raccoons, skunks, and badgers are other common predatory species.

The second requirement is that an area be sparsely settled by humans. The wild turkey is primarily a wilderness bird, and while highly adaptable to varying conditions, it does not do well in heavily populated areas. Two of the more important reasons for this are the many contagious diseases that can be contracted from domesticated poultry and the ever-present problem of illegal poaching.

Plate 8 — Group of ponderosa pines in Sarcillo Canyon used by Merriam's turkeys for roosting. Note typical form of upper crown. Summer, 1950.

Plate 9 — Another roost in Sarcillo Canyon. Living and dead ponderosa pines are used at this site. Fall, 1953.

TABLE 4.—SPUR LENGTHS[1]

2nd yr. Toms	Mature Toms			
2.00	5.00	9.00	15.00	20.00
2.00	5.00	9.00	15.00	20.00
3.00	7.00	10.00	16.00	20.00
4.00	7.00	10.00	17.00	20.00
6.00	7.00	10.00	17.00	21.00
6.00	7.00	10.00	17.00	21.00
6.00	8.00	11.00	18.00	22.00
7.00	8.00	11.00	19.00	23.00
7.00	9.00	13.00	19.00	25.00
11.00	9.00	15.00	20.00	
Mean:				
5.40			13.97	

[1] Measurements in millimeters.

TABLE 5.—MERRIAM'S TURKEY FOOD STUDIES
FAMILIES OF FOOD ITEMS REPRESENTING ONE OR MORE PERCENT VOLUME
IN 200 EASTERN SLOPE CROPS FROM EARLY FALL PERIOD 1949-1956

	% Volume
Plant Foods (84%)	
Grass **(Gramineae)**	49
Composite **(Compositae)**	12
Beech **(Fagaceae)**	8
Buckwheat **(Polygonaceae)**	4
Heath **(Ericaceae)**	3
Pea **(Leguminosae)**	3
Capper **(Capparidaceae)**	1
Honeysuckle **(Caprifoliaceae)**	1
Mustard **(Cruciferae)**	1
Lily **(Liliaceae)**	1
Rose **(Rosaceae)**	1
Animal Foods (16%)	
Grasshoppers **(Acrididae)**	16
TOTAL	100%

FOOD HABITS

A knowledge of food requirements is essential for effective management of any game species. Martin (1949) stated that food studies reveal the vital dependence of particular kinds of wildlife upon certain plants and animals in their environment and provide factual data on the beneficial or obnoxious roles of various species in relation to man and his crops. Once the foods upon which wild animals live are known, the environment can be altered more intelligently to aid in the management of wildlife populations.

REVIEW OF LITERATURE

Literature concerning the food habits of Merriam's turkey is far from complete. Judd (1905), one of the first to write about the food habits of wild turkeys, stated that the Biological Survey had examined 16 stomachs and crops of turkeys collected in February, March, July, September, November and December. Of these crops only one was taken within the range of *Meleagris gallopavo merriami*. This one was taken in the Manzano Mountains of New Mexico in November. The crop contained half a pint of the fruiting panicles of *Muhlenbergia* sp., grass blades, seeds of cheat, pinon nuts, and the seeds of other pines.

Ligon (*op. cit.*) reported on the contents of 15 Merriam's turkey crops, the majority of which were taken in October and November. He stated, "The analyses indicate that grasses, including both green blades and fruits as well as the dry seeds, constitute a major proportion of the food, particularly in the fall and early winter. The combination of grass products and grasshoppers in season may be said to comprise the most dependable diet under all conditions."

SCOPE OF THE STUDY

This study of the food habits of Merriam's turkey in southeastern Colorado was started by means of crop and droppings analyses during the winter of 1948-49. A total of 201 crops and 1 gizzard collected from hunting kills, road kills, and predator kills have been examined. In addition, 1,545 droppings have been analyzed to determine food preferences during those seasons when crops were not secured. The laboratory analysis of all samples was done by the author.

For convenience, this study is divided into the fall, winter, spring, and summer seasons. The fall food habits have been the most thoroughly investigated with the analysis of 200 crops. Investigations for the other seasons include the analysis of 540 droppings samples and one gizzard collected during the winter, of 680 droppings samples and 1 crop collected during the spring, and of 325 droppings samples collected during the summer.

PROCEDURES

Crop Analysis (Volumetric Method): The crops collected during the first turkey season in 1949 were preserved in 10% formalin. Later crops were air dried and were found to be much easier to work with than those preserved in formalin.

The contents of the crops were emptied into metal pans, and the different kinds of food were separated and deposited into paper cups. After all food samples had air dried, the volume of each kind of food was measured by using four graduated "shell" vials. These vials were used in preference to graduated cylinders because the former have flat bottoms, making direct volume measurements relatively easy. Although each of the vials has a different diameter, each is graduated by the same volumtric scale. The largest vial was used for acorns and other large foods while the smaller vials were used for grass seeds and similar items. In all cases, the amount of air space between food particles was estimated and subtracted from the reading. The volumetric reading for each food in each crop was then converted into a percentage of the volume of the crop. Volumetric readings for gravel and other non-foods were recorded separately.

Finally, the data for all the crops were compiled giving a per cent volume and a per cent frequency of occurrence for each kind of food.

Droppings Analysis: The individual droppings from each collection were first sorted, and approximately one-half inch of material from each was selected for analysis. This segment was crushed and placed under a nine power stereoscopic microscope. A record was made of each food item which could be identified, and the per cent frequency of occurrence was calculated. Unidentified food fragments were separated with forceps, identified with a symbol, and placed into paper cups for later examination.

Identification of Foods: Throughout the study a complete collection of food samples was maintained and used frequently as an aid in the identification of new samples. This collection consisted of small bottles of identified foods and a pressed plant collection.

The *Manual of Plants of Colorado* by Dr. H. D. Harrington was the main reference for the scientific names of plants for bontanical keys. *The Insect Guide* by Dr. Ralph B. Swain was the main reference for the identification of insects and their scientific names. When necessary, plant and insect specialists were consulted to help identify unknown items.

RESULTS OF THE STUDY

One means of presenting food habits data is by percentage volume. To calculate percentage volume, the volume of each kind of food is recorded for each crop, and the total percentages are divided by the number of crops examined.

A second means of presenting food habits data is percentage frequency of occurrence. This information is needed to determine distribution, acceptability, and possibly, availability of a food, according to Beck (1952). He considered percentage volume and percentage frequency of occurrence of equal value in determining a food's importance.

In the analysis of crops, the writer has worked up the food habits data using percentage volume and percentage frequency of occurrence. In the analysis of droppings samples, only percentage frequency of occurrence has been used since the volume of the remains of food in the droppings does not give a true picture of the volumes eaten.

Fall Period: The early fall food habits of the wild turkey in southeastern Colorado have been the most thoroughly explored. A total of 200 crops has been examined by the writer. One hundred seventy-six different kinds of food were found and identified, showing the omnivorous food habits of the wild turkey. Table 17 lists all foods found in the 200 crops with percentage volume and percentage frequency of occurrence shown for each.

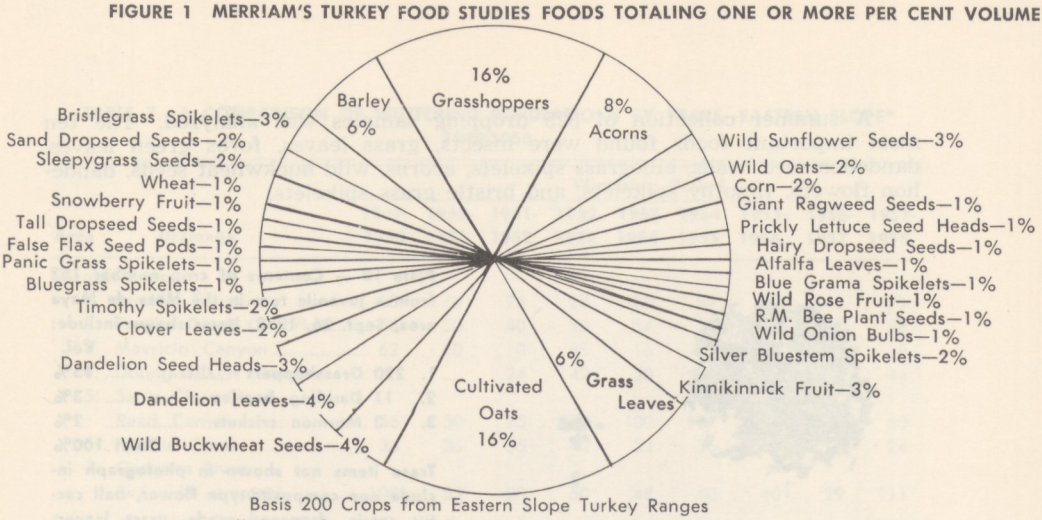
Grasshoppers, comprising 16% of the total volume and found in 55% of the crops, were the leading food during the period. Cultivated oats, comprising 16% of the total volume and found in 43% of the crops, were second. Other foods are listed alphabetically under "Plant Matter" and "Animal Matter" in the table.

Table 5 lists the percentage volume of the different families of foods. The grass family (*Gramineae*), comprising 49% of the total volume, was by far the largest family represented with both the seed heads and the leaves being eaten. Thirty-four species of grass are represented.

Winter Period: One gizzard and 540 droppings samples were analyzed. Table 18 shows the results of the analysis of the gizzard contents. This gizzard came from a road kill along South Veta Creek. It was almost completely filled with the fruit of wild roses and grit. Table 19 lists the important foods found in 540 droppings and their frequency of occurrence. Thirty-six different kinds of food were identified. The five most important foods found were grass leaves (66.5%), Ponderosa pine nuts (36.5%), cultivated oats (32.2%), miscellaneous insects (32.0%), and sand dropseed spikelets (16.7%).

Green grass leaves began showing up in large amounts in the droppings samples in mid-February each year. Once the birds started eating these leaves, they became the main single item of food. During the earlier part

FIGURE 1 MERRIAM'S TURKEY FOOD STUDIES FOODS TOTALING ONE OR MORE PER CENT VOLUME



Basis 200 Crops from Eastern Slope Turkey Ranges
All Crops from Early Fall Periods — 1949 through 1956

of the winter, the birds depended more upon pine nuts, cultivated oats, insects, grass seeds, acorns, cactus fruit, and the persistent fruits of hawthorne, snowberry, and wild rose.

Spring Period: One crop and 680 separate droppings were examined. Table 20 shows the contents of the crop. This crop came from a predator kill in the Cucharas River area. Green grass leaves, kinnikinnick fruit, cultivated barley, dandelion seed heads and leaves, wild oats, clover leaves, and insects made up most of the contents. Table 21 lists the foods found in 680 droppings and their frequency of occurrence. The five most important foods found were grass leaves (90.7%), forbs green leafage (61.5%), insects (29.7%), dandelion flowers (23.4%), and staghorn cactus fruit (8.7%). Thirty-four different foods were identified.

Summer Period: Summer is the least critical of the four seasons for the wild turkey in southeastern Colorado since foods are generally plentiful. A total of 325 separate droppings was examined. Table 22 lists the foods found in these droppings and their frequency of occurrence. Twenty-seven different foods were identified. The five most important foods found were insects (67.1%), grass leaves (56.3%), forbs green leafage (39.7%), dandelion seed heads (35.4%), and bluegrass spikelets (34.5%).

SUMMARY

From 1949 through 1956, 200 crops taken in the early fall were examined, and per cent volume and per cent frequency of occurrence were calculated. One hundred seventy-six different foods were identified in these crops. The ten most important foods were found to be grasshoppers, cultivated oats, acorns, grass leaves, barley, wild buckwheat seeds, dandelion leaves, dandelion seed heads, bristle grass spikelets, and wild sunflower seeds. Thirty-four different species of grass made up 49% of the total volume.

From the examination of one gizzard and 540 droppings samples collected during the winters, the ten most important foods found were grass leaves, Ponderosa pine nuts, cultivated oats, insects, sand dropseed spikelets, forbs green leaves, acorns, sleepy grass seeds, wild buckwheat seeds, and staghorn cactus fruit. During the earlier part of the winter, the birds depended on pine nuts, cultivated oats, insects, grass seeds, acorns, cactus fruit, and the persistent fruits of hawthorne, snowberry, and wild roses. After the grasses and forb leaves began greening up in mid-February, these foods became a prominent part of the wild turkeys' diet.

One crop and 680 droppings samples collected in the spring were examined. The ten most important foods recorded were grass leaves, forbs green leaves, insects, dandelion flowers, staghorn cactus fruit, giant ragweed seeds, cultivated oats, wild rose fruit, Ponderosa pine nuts, and kinnikinnick fruit.

A summer collection of 325 dropping samples was analyzed. The ten most important foods found were insects, grass leaves, forbs green leaves, dandelion seed heads, bluegrass spikelets, acorns, wild buckwheat seeds, dandelion flowers, timothy spikelets, and bristle grass spikelets.

Plate 10 — Contents of crop number 153 from a juvenile tom in the Mesa de Maya area, Sept. 26, 1952. Items shown include:

		Vol.
1.	220 Grasshoppers	95%
2.	11 Darkling beetles	3%
3.	3 Mormon crickets	2%
		Total 100%

Trace items not shown in photograph include one composite-type flower, ball cactus seeds, dropseed seeds, grass leaves, one hawthorne seed, unidentified stem and root fragments, one robber fly, one tiger beetle, one mantid, three spiders, three moths, and bone fragments.

Plate 11 — Total contents of crop number 149, from a juvenile hen on Frisco Cr., Sept. 25, 1952. Items shown include:

		Vol.
1.	36 Acorns	63%
2.	32 Grasshoppers	30%
3.	10 Land snails	5%
4.	Timothy seeds and seed heads	2%
5.	Plant trace items (dandelion leaf fragments, clover leaves, grass leaves, and buckwheat seeds)	Tr.
6.	Animal trace items (one lady beetle, one ichneumon wasp, and one daddy longlegs spider)	Tr.
		Total 100%

TABLE 6.—SEASONAL FOOD PREFERENCES

Fall*	Winter**	Spring**	Summer**
Grasshoppers	Grass leaves	Grass leaves	Bristle grass spikelets
Cultivated oats	Ponderosa pine nuts	Forbs green leafage	Insects
Acorns	Cultivated oats	Insects	Grass leaves
Grass leaves	Insects	Dandelion flowers	Forbs green leafage
Barley	Sand dropseed spikelets	Staghorn cactus fruit	Dandelion seed heads
Wild buckwheat seeds	Forbs green leafage	Giant ragweed seeds	Bluegrass spikelets
Dandelion leaves	Acorns	Cultivated oats	Acorns
Dandelion seed heads	Sleepy grass seeds	Wild rose fruit	Wild buckwheat seeds
Bristle grass spikelets	Wild buckwheat seeds	Ponderosa pine nuts	Dandelion flowers
Wild sunflower seeds	Staghorn cactus fruit	Kinnikinnick fruit	Timothy spikelets

*Based upon 200 crops analyzed by percentage volume and percentage frequency of occurrence methods.

**Based upon 540 droppings (winter), 680 droppings (spring), and 325 droppings (summer) analyzed by percentage frequency of occurrence method.

TABLE 7.—A COMPARISON OF WINTERING POPULATIONS BY YEARS—EASTERN SLOPE*
1949-1958

Area	Drainage	Wintering Period 1949-1950	1950-1951	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	1956-1957	1957-1958
Spanish Peaks										
1.	Sarcillo Canyon	60	70	25	28	28	59	80	148	79
2.	Trujillo Creek (3 forks)	58	50	40	10	54	21	35	32	58
3.	Mavricio Canyon	62	60	0	45	16	20	0	28	8
4.	Duling-Wilkins Creeks	....	....	24	42	50	31	22	80	44
5.	Santa Clara Creek—Read Canyon	55	50	75	80	100	107	100	62	60
6.	Middle Creek	34	36	35	42	23	36	15	15	24
7.	Cucharas River—(w/ side canyons)	100	55	23	50	48	50	40	29	111
Sangre de Cristo Range and Wet Mountains										
8.	Huerfano River	0	0	0	0	8	31	41	45	98
9.	Pass Creek	40	9	0	4	17	60	40	35	6
10.	Oak Creek (Cotopaxi)	....	....	4	26	26	42	60	34	23
11.	Alvarado- Goodwin Cr.	0	0	0	0	0	28	35	12	14
12.	S. Hardscrabble Cr.	60	60	80	100	60	62	110	60	50
Lower Purgatoire River and Eastern Canyons										
13.	Higbee Area	....	100	100	80	80	81	80	75	90
14.	Cottonwood-Carrizo Creeks	0	0	10	16	21	52	88	101	80
	TOTALS	469	490	416	523	531	680	746	756	745

*Turkeys live trapped from flocks not included in counts.
Populations based upon flock counts, track counts, and reports of reliable observers.

POPULATION LIMITING FACTORS

MUCH of the information reported in this study has been obtained from other individuals, Game and Fish Department personnel and landowners. The U. S. Fish and Wildlife Research Laboratory in Denver and the Veterinary Department of Colorado State University performed the post mortem examinations on diseased birds.

PREDATION

Predation plays an important role in disposing of sick and weak birds and is probably more beneficial than harmful except where predator populations become excessively large or the wild turkeys become weak from lack of food caused by deep snow or other adverse conditions.

A number of wild turkey carcasses eaten by predators were observed during the study but the cause of death could not be determined.

Field signs noted in the vicinity of roost sites indicate that bobcats occasionally prey upon turkeys either on their roosts or nearby. In two instances, raccoon tracks were found near nesting sites where hens were killed and the nests broken up. Several observations of eagles attempting to capture wild turkeys were noted.

Potential predatory species commonly found within wild turkey range also included greathorned owls, foxes, coyotes, skunks, badgers, magpies, and crows.

POACHING

Poaching activities do not appear to be localized in any one area. Some poaching has been evident each year of this study. In most instances it was spotty with activity often heaviest just before the Thanksgiving and Christmas holidays.

CASUALTIES OF THE OPEN SEASON

This heading deals with those turkeys which hunters wound or kill, but for some reason do not recover. Since the natural cover in wild turkey ranges is often dense, wounded or dead birds can be difficult to find. Limited observations of carcasses and crippled birds following the hunting seasons indicate that the loss from this factor was not excessive during the study period. An intensive study of hunting effects within specific areas is, however, needed to shed more light on this.

ACCIDENTS

Accidental deaths occurred from poults drowning in springs, birds being struck by automobiles, and one turkey getting caught in a bobcat trap.

Several wild turkeys have been observed with broken wings, and a number have been observed with one crippled leg. The exact causes of these injuries are not known, but it is possible that the birds injure themselves while flying in or out of roosts. One instance of a roost tree blowing down and killing some of the roosting birds was reported.

DISEASES

Of eighteen wild turkeys observed or reported as sick or diseased, it has been possible to secure post mortem examinations on only four. Three of these turkeys were alive when found, but in very poor condition. The fourth was found dead. The following is taken from previous job completion reports on the four birds:

1. One bird, which was taken in the 1949 turkey season in the Spanish Peaks area, was found in such poor condition that it was collected by Harry Figge and sent to the U.S. Fish and Wildlife Service Laboratory in Denver. This bird had no infectious disease. Its poor condition was attributed to the presence of fungus growths on the kidney and hip, probably the result of an injury.

2. A second bird, a hen, was found on January 7, 1950, in Mavricio Canyon in the Spanish Peaks area. This bird was examined by Dr. L. A. Griner of the Veterinary Department at Colorado State University. Because of the advanced decomposition of the carcass, he was unable to arrive at a definite diagnosis. However, Dr. Griner stated that there was a possibility of fowl cholera (*P. multocida*).

3. A third bird, a hen, was collected in the Beulah area on January 29, 1950, in a badly crippled condition. Dr. Griner examined this bird and found an old fracture of the right tibia with extensive soft callus development. This fracture and callus may have been the determining factors in the poor condition of the bird. No disease was found.

Plate 12 — Remains of a two year old tom which died or was killed on Santa Clara Cr., Winter 1951-52.

Plate 13 — W.C.O. J. Frank Cordova with a large native tom partially eaten by predators. Cucharas River. May 22, 1953.

Plate 14 — Wild turkey nest in Cottonwood Cr. - Carrizo Cr. transplant area broken up by a predator (probably raccoon).

4. A young tom weighing 4¼ pounds was found sick and unable to fly in the La Veta area and was caught on October 1, 1951, by W. C. O. Gail Boyd. The bird was in such poor condition that it died in transit to Fort Collins for examination. An autopsy was performed on October 3, 1951, by Dr. Walter R. Graham of the Veterinary Department of Colorado State University. Dr. Graham found that the bird was infested with a large number of tapeworms (*Raillietina sp.*). According to Dr. Graham, this particular species of tapeworm is thought to be carried by dung and ground beetles. The tapeworms were concentrated along a short segment of the small intestine. Several species of lice were also found, but there was no evidence of infectious bacteria.

On February 14, 1953, on the Stevens Ranch in the Cucharas River area, a sick hen was observed in a flock of twenty-six wild turkeys. This bird appeared droopy and did not attempt to eat. Two days were spent in this area trying again to locate this bird, without success.

CASUALTIES RESULTING FROM ADVERSE WEATHER

Two instances in which adverse weather affected wild turkey populations were recorded during this study.

Purgatoire River Flood: During late July, 1954, a flood from heavy rains east of Trinidad moved down the Purgatoire River. Ranchers in the Higbee area reported that a strip of land approximately a half mile wide was flooded.

Mr. W. W. Zimmerman stated that he and several other local ranchers pulled four live wild turkey hens from the flood waters near a wide curve in the main channel above Higbee bridge. Several other hens could be seen, but could not be reached. Those rescued were completely exhausted, but after resting awhile, they wandered off. Mr. Zimmerman checked the hens, and their breasts indicated that they had been setting. Later the same party pulled three dead hens from the waters of the main channel and two more from an irrigation ditch.

The number of hens caught in the flood at this time of year indicates that the hens were probably attempting to hatch a second setting of eggs. Much of the nesting cover in this area is found along the main river bottom where a flood of this intensity can be dangerous.

Late Spring Snows: The late heavy snow during May, 1955, undoubtedly ruined many wild turkey nests on the eastern slope mountain ranges although the turkeys in much of the Lower Purgatoire River and Mesa de Maya areas were apparently unaffected. The snow, which accumulated to depths varying between 3 and 5 feet in most mountainous areas, came when most hens are normally nesting.

The effect of this storm was a reduction in the number of broods in the mountain areas. Many broods were much later and much smaller than usual, indicating that many hens were forced to renest in order to bring off any young.

Two carcasses and seven ruined nests were reported in Huerfano and Las Animas counties following these heavy snows.

Plate 15 — Closer view of the above nest showing broken eggs. The foliage is mostly wild grape and young hackberry plants.

Plate 16 — Carcass of a juvenile tom from the La Veta area which died in October, 1951 due to an infestation of intestinal tapeworms.

Plate 17 — Carcass of a healthy juvenile tom killed in October, 1952 in the Mesa de Maya area. Weight 11 pounds.

POPULATION STATUS

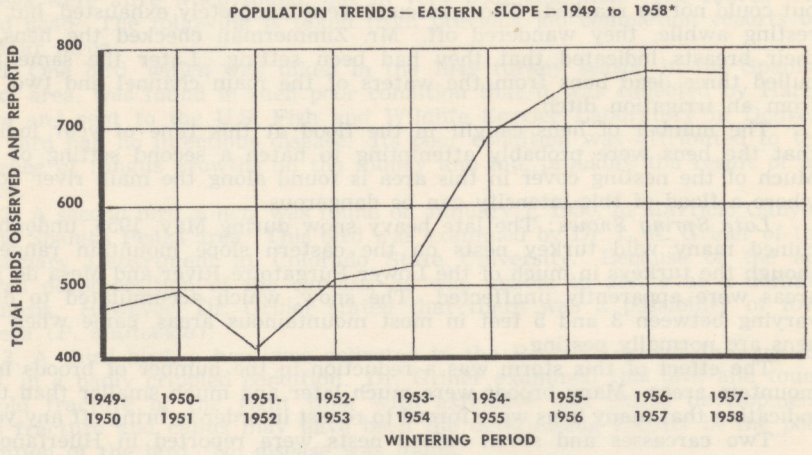
AN accurate determination of population trends is basic for effective management of any wildlife species. The method used to determine wild turkey population trends in southeastern Colorado has been counts of wintering flocks supplemented by spring and summer field checks.

During the spring and summer, wild turkeys tend to disperse and to move to higher elevations, making it difficult to secure population data. In the fall the birds return from these higher summer ranges and congregate in lower wintering grounds. This natural seasonal movement and this flocking habit lend themselves to population studies. In addition, a flock of turkeys, being relatively conspicuous, attracts attention and creates interest among local residents so that observations of flocks made by reliable persons can prove valuable to the researcher.

PROCEDURES

During the earlier part of this study, the writer covered as many turkey wintering areas as time permitted from November 1 through March 31 of each year and recorded all flocks observed. Information from U.S. Forest Service officials, interested landowners, and others was also recorded. In the spring and summer, flocks were observed, field signs were noted, and individuals were contacted to determine populations in areas not covered the previous winter. The main drawback of this earlier work was the inconsistency of the counts received.

FIGURE 2



*Based upon flock counts, track counts, and reports of reliable observers in fourteen major eastern slope wild turkey wintering areas from data Table 0.

Plate 18 — Turkeys heading toward cover on North Trujillo Cr., January, 1954.

Plate 19 — Turkeys in the same area as above feeding on waste grain. North Trujillo Cr., January, 1954.

Plate 20 — Turkey tracks in snow. Pencil is 5½ inches in length.

With the later work, the number of wintering areas used for population studies was reduced to fourteen. Where possible, an automobile was used; otherwise the areas were covered by foot or on horses. Generally two drainages were covered each day. Stops were made at likely places, such as watering sites, feeding areas, and roosts. As many turkeys as could be seen either by the naked eye or with field glasses were counted. Pertinent field signs were also noted. Finally, as many volunteer observers as time permitted were contacted and their observations recorded.

Three types of population data were secured from most areas: (a) actual observations, (b) field sign abundance records. (c) reports from other individuals.

Actual observations of turkeys are best made from the time the turkeys leave the roost in the morning until about 10 a.m. and from 3 p.m. until they go to roost. The birds are usually moving and feeding in these periods.

Data regarding actual wintering flock counts, reports, and field signs are analyzed and an overall wintering population is compiled. A knowledge of flock movements and habits is necessary in this analysis to avoid repetitious counts. The reliability of persons making reports should also be considered.

The data, if secured for the same wintering areas each year, can be used to determine the population trend. The accuracy of the trend will depend upon the accuracy of each count and the proper selection of areas to be studied.

RESULTS OF STUDY

Table 7 presents a yearly tabulation of wintering populations of wild turkeys in fourteen of the important turkey ranges in southeastern Colorado. Figure 2 illustrates graphically the population trends shown by these data.

Within the fourteen selected areas, a gradual increase in wintering populations from the fall of 1949 to the spring of 1956 is evident with the exception of a decline during the winter of 1951-1952. The wintering populations from the spring of 1956 to the spring of 1958 remained relatively stable.

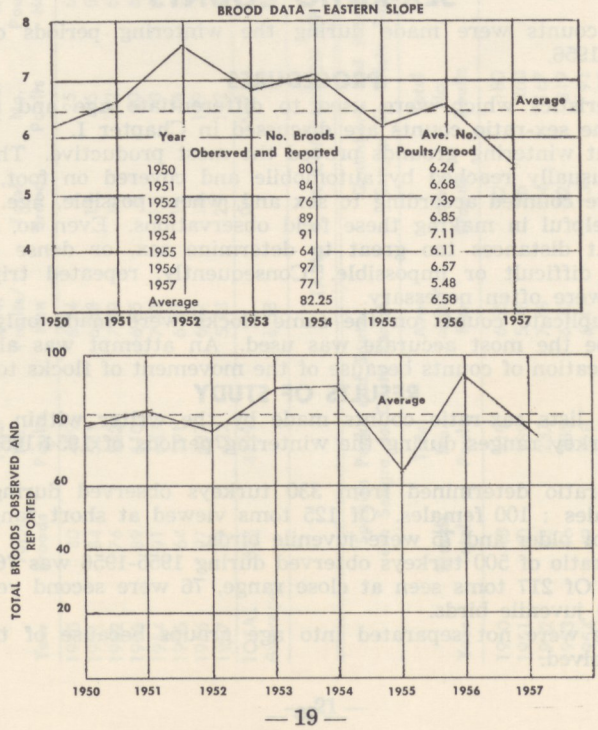
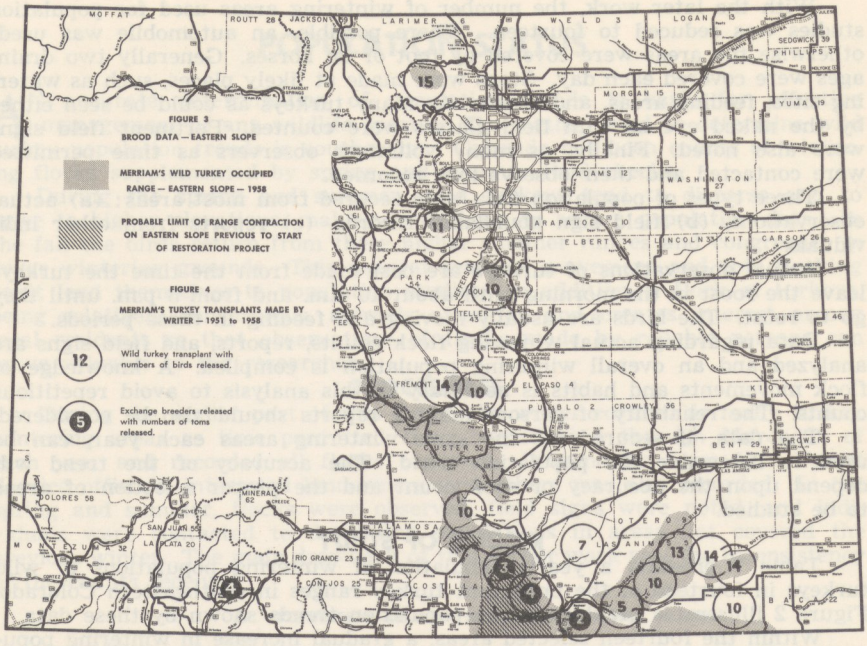


FIGURE 3



SEX-RATIO COUNTS

SEX-ratio counts were made during the wintering periods of 1954-1955 and 1955-1956.

PROCEDURES

Characteristics which were used to differentiate age and sex of wild turkeys in the sex-ratio counts are discussed in Chapter I.

Counts at wintering grounds proved the most productive. The wintering areas were usually reached by automobile and covered on foot, and flocks observed were counted according to sex and, where possible, age. Binoculars were very helpful in making these field observations. Even so, flocks were often seen at distances too great to determine sex, or dense cover made observations difficult or impossible. Consequently, repeated trips into the same areas were often necessary.

When duplicate counts on the same flocks were made only the count thought to be the most accurate was used. An attempt was also made to prevent duplication of counts because of the movement of flocks to new areas.

RESULTS OF STUDY

Table 23 lists sex-ratio counts made by the writer within the eastern slope wild turkey ranges during the wintering periods of 1954-1955 and 1955-1956.

The sex-ratio determined from 330 turkeys observed during 1954-1955 was 60.98 males : 100 females. Of 125 toms viewed at short range, 50 were second year or older and 75 were juvenile birds.

The sex-ratio of 500 turkeys observed during 1955-1956 was 76.68 males : 100 females. Of 217 toms seen at close range, 76 were second year or older and 141 were juvenile birds.

The hens were not separated into age groups because of the extreme difficulty involved.

TABLE 8.—A COMPARISON OF BROOD COUNTS BY INDIVIDUALS 1950-1957

				Counts by D. M. Hoffman			Counts by W.C.O.'s, Trappers, and other Dept. Personnel			Counts by Landowners and Others		
Year	Total Broods	Total No. Poults	Ave. Poults/ Hen	Total Broods	Total No. Poults	Ave. Poults/ Hen	Total Broods	Total No. Poults/	Ave. Poults/ Hen	Total Broods	Total No. Poults	Ave. Poults Hen
1950	80	499	6.24	4	25	6.25	39	269	6.90	37	205	5.54
1951	84	561	6.68	11	65	5.91	14	104	7.43	59	392	6.64
1952	76	562	7.39	10	62	6.20	11	77	7.00	55	423	7.69
1953	89	610	6.85	5	30	6.00	31	186	6.00	53	394	7.43
1954	91	647	7.11	12	70	5.83	28	128	4.57	51	449	8.80
1955	64	391	6.11	11	74	6.73	15	74	4.93	38	243	6.39
1956	97	637	6.57	18	129	7.17	42	249	5.93	37	259	7.00
1957	77	422	5.48	25	112	4.48	7	54	7.71	45	256	5.69
TOTAL	658	4329		96	567		187	1141		375	2621	
Average			6.58			5.91			6.10			6.99

TABLE 9.—A COMPARISON OF BROOD COUNTS BY AREAS 1950-1957*

	Spanish Peaks and Southern Sangre de Cristo Range			Greenhorn and Northern Sangre de Cristo Ranges			Raton Mesa and Mesa de Maya			Lower Purgatoire River and Eastern Canyons		
Year	Broods Total	Total No. Poults	Ave. Poults/ Hen	Total Broods	Total No. Poults	Ave. Poults/ Hen	Total Broods	Total No. Poults	Ave. Poults/ Hen	Total Broods	Total No. Poults	Ave. Poults/ Hen
1950	48	319	6.65	32	180	5.63	....	....	....	....	....	....
1951	40	239	5.98	36	260	7.22	7	58	8.29	1	4	4.00
1952	33	237	7.18	24	167	6.96	18	155	8.61	1	3	3.00
1953	46	285	6.20	32	219	6.84	3	28	9.33	8	78	9.75
1954	49	318	6.49	13	91	7.00	12	79	6.58	12	91	7.58
1955	24	150	6.25	9	59	6.55	10	44	4.40	21	138	6.57
1956	58	362	6.24	10	72	7.20	12	95	7.91	17	108	6.35
1957	41	241	5.88	5	36	7.20	6	33	5.50	25	112	4.48
TOTAL	339	2151		161	1084		68	492		85	534	
Average			6.35			6.73			7.24			6.28

*Includes both observed and reported broods.
5 hens with 68 poults reported in Rampart Range in 1954 not included in table.

FIELD SIGNS OF WILD TURKEYS

SINCE actual obserations of wild turkeys are not always possible, the wildlife researcher must often rely upon field signs to determine their presence in a given area. The relative abundance of field signs will also give a rough idea of populations.

Common field signs of the wild turkey are tracks, feathers, scratchings, dusting sites, and droppings. Less common field signs are distinctive marks left in the snow by turkeys which have flown from a roost and the marks strutting toms' wings leave on the ground during the breeding season. Plates 18 to 28 show the different wild turkey field signs which may be encountered.

Field signs may also lead to further observations. Track counts in new snow or soft soil after a rain may be as valuable as actual observations of flocks (Plate 20). Scratchings will often indicate the turkeys' feeding habits as well as their presence (Plates 22 and 23). The characteristic droppings of incubating hens often aid in locating nesting sites. (See Plate 25.)

Plate 21 — Shed feather along foot trail.

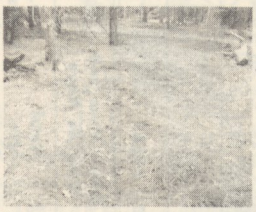


Plate 22 — Turkey scratchings in ponderosa pine litter. Middle Trujillo Cr. April, 1953.

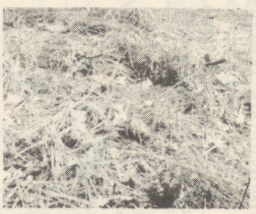


Plate 23 — Closer view of above photo. Middle Trujillo Cr. April, 1953.

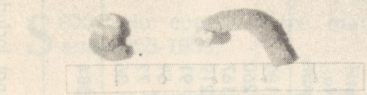


Plate 24 — 2 wild turkey droppings. The scale below droppings is in inches.

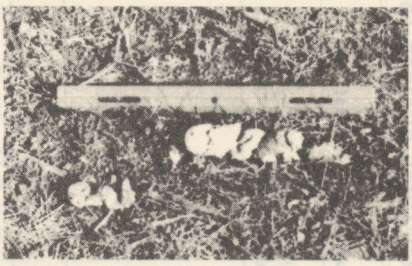


Plate 25 — A comparison of a normal wild turkey dropping (left) with a large dropping of an incubating hen (right). Hayden Cr. ruler is 12" in length. May 20, 1953.

Plate 26 — Turkey flying from roost and landing in snow left the marks shown here. Note wing feather marks. Cucharas River. Feb., 1953.

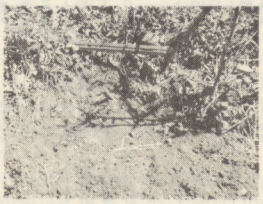


Plate 27 — A strutting tom turkey left these marks where the wings had scraped the ground. Smith Canyon. April, 1953.

Plate 28 — Dusting site on North Trujillo Cr. Ruler is 12 inches in length. April 8, 1953.

BROOD COUNTS

IN wildlife studies no job is more important than gathering data which will accurately reflect the reproductive success of a game species. This information is needed both by the game manager for use in recommendations for open seasons and by the wildlife researcher for basic research studies.

Brood count data on the wild turkey in southestern Colorado have been collected from 1950 through 1957.

PROCEDURES

Brood counts can usually be made from June through September. After September it becomes difficult to distinguish poults from adults, especially at a distance. As many early broods as possible should be counted so that this information may be used in recommendations for open seasons.

Although actual observation of broods by trained personnel is by far the best method for determining reproductive success, it was assumed that project personnel alone would not be able to observe enough broods to make the counts statistically valid. Consequently, brood counts made by (a) Wildlife Conservation Officers and other Department personnel and (b) reliable landowners and others were used in conjunction with brood counts made by project personnel. A later statistical analysis of data personally obtained by the writer proved this assumption to be correct.

This analysis determined that at least 39 samples are needed to reflect yearly changes in brood averages of ten per cent. By combining broods observed by the writer with those observed by other Department personnel, only three brood count seasons (1950, 1954, and 1956) would have been large enough. By combining personal counts with those reported by Wildlife Conservation Officers, other Department personnel, reliable landowners, and others, a sample of sufficient size for statistical validity was secured each year. Occasionally, the opportunity to check brood counts made by these latter individuals presented itself. In most cases the brood counts they had reported were highly accurate. Brood counts received from persons thought not to be reliable were discarded.

The inhabited turkey areas were reached by automobile, wherever possible, and were examined on foot or horses. As many broods as possible were located and counted. Likely places were checked for broods and field signs of broods. If field signs of broods, such as tracks of poults near a watering site, were found, the area was carefully checked. Usually two drainages were visited each day, working one in the morning and a second in the afternoon. Since the birds can be very erratic in their movements, several trips into a given area were often necessary.

When a brood or broods were located, the number of poults and hens were counted, often with the aid of binoculars. Even then, some broods were difficult to count because of dense cover, the wariness of the birds, or high vegetation.

As many reliable local observers as possible were contacted in each area. Often these persons were helpful in giving the locations of broods so that observations could be made by project personnel. The importance of recording these observations at the time they are made or shortly thereafter cannot be over-emphasized since it is very easy to forget numbers if this is not done.

An analysis of data was made to prevent repetitious brood counts and to eliminate reports thought to be unreliable. The average number of poults per hen was determined both for each major turkey area and for the turkey areas as a whole.

RESULTS OF STUDY

Figure 3 shows graphically the average number of poults per hen and the total broods observed and reported each year. It also shows the averages for the eight year period from 1950 through 1957. Of the 658 broods

reported during this time, the average number of poults per brood was 6.58. The average number of broods reported each year was 82.25.

A comparison of brood counts made by(a) the writer, (b) Wildlife Conservation Officers and other Department field men, and (c) interested landowners and others is shown in Table 8. Of 96 broods observed by the writer during the eight year period, the average number of poults per hen was 5.91; of 187 broods observed by Wildlife Conservation Officers, trappers, and other Department personnel, the average was 6.10 poults per hen; of 375 broods observed by landowners and others, the average was 6.99 pouts per hen. This comparison shows brood counts made by the writer and other departmental field men to be very close, while those made by landowners and others were somewhat higher.

A comparison of brood counts by areas is shown in Table 9. The average number of poults per hen was highest in the Raton Mesa-Mesa de Maya area with 68 broods averaging 7.24 poults per hen. Second highest was the Greenhorn and northern Sangre de Cristo range area with 161 broods averaging 6.73 poults per hen. The Spanish Peaks and southern Sangre de Cristo Range area was third with 339 broods averaging 6.35 poults per hen. Eighty-five broods observed in the Lower Purgatoire River and eastern canyons area averaged lowest with 6.28 poults per hen.

Table 10 shows the 96 broods personally observed by the writer during the study period.

Plate 29 — Remains of an old pole-type turkey trap on McDonald's ranch in Sarcillo Canyon. Trap was built by an early settler before Mr. McDonald's father came to the ranch in approximately 1889. Photo taken April 3, 1954.

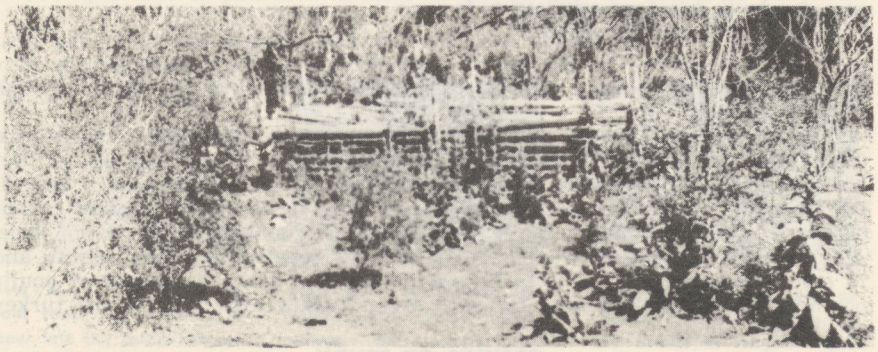


Plate 30 — One of the earliest turkey traps built by the Colo. Game and Fish Dept. after starting a trapping and transplanting program in the early 1940's. East Indian Cr. September, 1953.

TABLE 10.—BROODS OBSERVED BY WRITER BY YEARS

Year	Hens	Poults	TOTALS Hens	Poults
	1	9		
1950	3	16		
			4	25
1951	1	4		
	6	46		
	4	15		
			11	65
1952	3	21		
	3	14		
	1	6		
	1	7		
	1	9		
	1	5		
			10	62
1953	1	4		
	2	16		
	1	2		
	1	8		
			5	30
1954	1	1		
	4	21		
	3	22		
	1	10		
	1	4		
	1	6		
	1	6		
			12	70
1955	1	5		
	1	11		
	1	6		
	3	24		
	2	11		
	3	17		
			11	74
1956	2	11		
	1	9		
	5	38		
	3	28		
	1	7		
	4	24		
	2	12		
			18	129
1957	3	16		
	3	14		
	1	4		
	5	15		
	1	5		
	2	10		
	4	21		
	2	9		
	4	18		
			25	112
TOTAL			hens 96	poults 567

ADDITIONAL MANAGEMENT STUDIES

FROM 1951-1958 the major management practices used with Merriam's wild turkey included transplanting and banding activities and supplemental winter feeding by means of cultivated food plots and stacks of baled oat hay.

Turkeys necessary for transplanting and banding were live-trapped. On the eastern slope chicken-wire live-traps have been used more extensively than the wood-slat type. Turkeys are much less wary of this trap because the wire throws less shadow. The portable sections of this trap are also light, which has proved to be an advantage in erecting and dismantling it. The cannon-net projectile trap was not used because all the live-trapping was done on private lands, and the landowners feared that the noise accompanying this method of trapping might frighten the remaining turkeys away permanently.

Eleven birds out of 243 live-trapped for transplanting and banding studies died or were injured to such an extent they had to be destroyed. This amounts to a loss of 4.53 per cent. Of these 11 casualties 7, including 2 juvenile toms, 2 juvenile hens, 2 mature hens, and 1 mature tom, apparently died of nervous exhaustion. Two hens, 1 mature and 1 juvenile, flew blindly against trees when released. One juvenile tom and 1 mature hen suffered broken legs. The carcasses of these casualties were used for study skins.

TRANSPLANTING

Thirteen transplants of Merriam's wild turkeys were made on the eastern slope from 1951-1958. The specific locations are shown in Tables 12 and 13. General map locations are indicated in Figure 4. In addition 4 areas, including 3 on the eastern slope and 1 on the western slope, received unrelated gobblers, introduced in an attempt to produce more vigorous birds. Two catches were also transported to Utah under authority of the Game Management Division. A total of 187 wild turkeys, including 99 hens and 88 toms, was transplanted during this period.

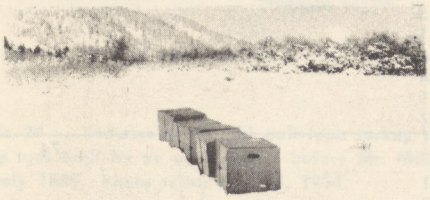


Plate 31 — Transportation crates at release site at West Plum Cr. west of Larkspur before the release of nine wild turkey hens. One mature tom released at site later. March 2, 1954.

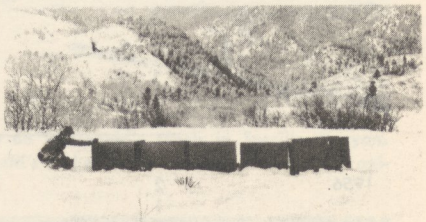


Plate 32 — Hen flying from transportation crate at release on West Plum Cr. March 2, 1954.

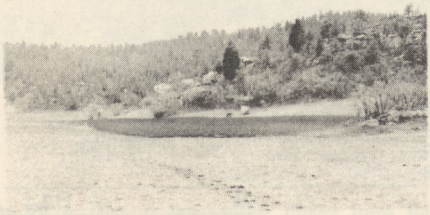


Plate 33 — Dark area shows location of experimental food plot No. 1 before feeding. Sarcillo Canyon. Spring 1953.

Plate 34 — Same experimental food plot after fencing and planting to oats. Summer 1953.

BANDING STUDIES

Forty-five turkeys were live-trapped and banded for the purpose of obtaining data on movements, life histories, and growth. Included in this total were birds caught in excess of what could be transported for transplanting. These were banded and released in the area. In addition the 187 turkeys live-trapped for transplanting purposes were banded. Records of weights, beard length, and spur lengths (toms only) were kept on all birds banded by the writer. Table 14 shows banding studies data.

Studies indicate that the value of aluminum leg bands is limited because of the relatively short time turkeys carry them. Consequently, these leg bands were discontinued during the 1956-1957 live-trapping season in favor of "Jiffy" wing bands. "Jiffy" wing bands, manufactured by the National Band and Tag Company of Newport, Kentucky, are easy to apply, and indications are that they will stay in place much longer than the leg bands. A mature tom, banded with a wing band on January 5, 1957, was examined again on January 22, 1958, and the band was still securely fastened. On the other hand, a mature tom, banded with a leg band on January 13, 1953, was killed by a hunter on October 2, 1953, and the leg band had become so loose it fell off while the hunter was carrying the bird to his car. Two instances of transplanted birds losing their leg bands a few months after release were recorded during the study.

Two bands from birds banded and released in the area and 4 bands from birds transplanted were returned, making a total of 6 bands returned from 232 banded birds.

A mature tom weighing 19 pounds was banded (leg band No. 809) on January 13, 1953, in Smith Canyon on the north side of Mesa de Maya in Las Animas County. This bird was killed during the turkey season on October 2, 1953, by Carl Holder of Rocky Ford, Colorado. It was killed on the southwest rim of Mesa de Maya, approximately 5 airline miles southwest of the banding site, and it reportedly weighed 20 pounds. This band was obtained by Wildlife Conservation Officers Gail Boyd, Preston Steele, and Homer Griffin.

A mature hen weighing 11 pounds was banded (leg band No. 836) on February 8, 1955, in lower Smith Canyon on the north side of Mesa de Maya in Las Animas County. This bird was killed during the turkey season in early October, 1955, by Earl Stewart of Lamar, Colorado. It was killed near the top of Jake Like Canyon, approximately 4 airline miles southeast of the banding site. This band was recovered by Wildlife Conservation Officer Gail Boyd.

A mature tom live-trapped in the San Miguel Canyon area of Las Animas County on January 5, 1957, and released in Sarcillo Canyon, Las Animas County, was recaught on January 22, 1958, approximately 100 feet from the release site. The weights and measurements are shown in Table 11.

TABLE 11.—DATA FROM RECATCH

Band Number	Date	Area	Sex	Age	Weight (lbs.)	Spur (m.m.)	Beard (c.m.)
43	1/5/57	San Miguel Canyon Las Animas County	Tom	Mat.	14½	18	16
91 (Recatch 43)	1/22/58	Carcillo Canyon Las Animas County	Tom	Mat.	17½	20	21

TABLE 12.—EASTERN SLOPE TRANSPLANTS MADE BY WRITER 1951-1958

Date	Number Transplanted Hens	Toms	Transplant Area	Area from Which Live-Trapped
12/28/51	7	0	R. Dodge Ranch, Carrizo Cr., Las Animas Co.	Sugarite Can., Las Animas Co.
1/14/52	0	3	R. Dodge Ranch, Carrizo Cr., Las Animas Co.	Sugarite Can., Las Animas Co.
10/15/52	10	6	Castle Cr., Utah	Mesa de Maya, Las Animas Co.
12/11/52	7	3	W. McCarty Ranch, Poitrey Can., Las Animas Co.	Mesa de Maya, Las Animas Co.
3/ 2/54	9	0	Perry Park Ranch, W. Plum Cr., Douglas Co.	Santa Clara Cr., Huerfano Co.
3/ 7/54	0	1	Perry Park Ranch., W. Plum Cr., Douglas Co.	Mesa de Maya, Las Animas Co.
2/ 9/55	0	3	P. Nardin Ranch, Santa Clara Cr., Huerfano Co.*	Mesa de Maya, Las Animas Co.
11/15/55	3	7	W. Mizer Ranch, Butte Cr., Las Animas Co.	Carrizo Cr., Las Animas Co.
11/24/55	2	2	W. Mizer Ranch, Butte Cr., Las Animas Co.	Carrizo Cr., Las Animas Co.
12/ 7/55	2	6	R. Rose Ranch, Plum Can., Las Animas Co.	Carrizo Cr., Las Animas Co.
12/17/55	4	1	R. Rose Ranch, Plum Can., Las Animas Co.	Carrizo Cr., Las Animas Co.
2/12/56	0	3	Apishapa State Mgmt. Area, Huerfano Co.	Sarcillo Can., Las Animas Co.
2/12/56	0	4	Devil Cr. Refuge, Archuleta Co.*	Sarcillo Can., Las Animas Co.
2/18/56	4	0	Apishapa State Mgmt. Area, Huerfano Co.	Sarcillo Can., Las Animas Co.
10/20/56	10	4	C. Ming Ranch, Soldiers Can., Baca Co.	Carrizo Cr., Las Animas Co.
11/ 6/56	5	4	Mt. Evans State Mgmt. Area, Clear Creek Co.	Sarcillo Can., Las Animas Co.
11/11/56	8	0	P. Wolfe Ranch, Muddy Cr., Huerfano Co.	Sarcillo Can., Las Animas Co.
11/23/56	0	2	M. Walton Ranch, Frisco Cr., Las Animas Co.*	Sarcillo Can., Las Animas Co.
11/23/56	0	2	Mt. Evans State Mgmt. Area, Clear Creek Co.	Sarcillo Can., Las Animas Co.
11/23/56	0	2	P. Wolfe Ranch, Muddy Cr., Huerfano Co.	Sarcillo Can., Las Animas Co.
1/ 6/57	0	4	J. Sakariason Ranch, Sarcillo Can., Las Animas Co.*	San Miguel Can., Las Animas Co.
1/ 6/57	7	8	C. Wisdom Ranch, Buckhorn Cr., Larimer Co.	San Miguel Can., Las Animas Co.
11/21/57	2	2	R. Shumaker Ranch, Millsap Cr., Fremont Co.	Sarcillo Can., Las Animas Co.
11/27/57	5	1	R. Shumaker Ranch, Millsap Cr., Fremont Co.	Sarcillo Can., Las Animas Co.
12/30/57	5	9	N. Patton Ranch, Rice Mtn., Fremont Co.	Sarcillo Can., Las Animas Co.
1/23/58	6	9	Boulder Cr., Utah	Sarcillo Can., Las Animas Co.
2/19/58	3	2	Box Ranch, Vachita Cr., Las Animas Co.	Carrizo Cr., Las Animas Co.
TOTALS	**99**	**88**		

*Exchange Breeders

One band from a hen transplanted December 28, 1961, was found by the writer on May 3, 1952, beneath a roost in the Cottonwood-Carrizo Creek area in Las Animas County. The roost was approximately ½ mile south of the release site.

In February, 1956, a leg band (No. 847) from a juvenile hen was found by rancher William Mizer ¼ mile north of the release site on Butte Creek in Las Animas County. This hen had been transplanted into the area on November 15, 1955. Since no evidence of violence was found near the band, it was assumed that the band had worked loose and dropped off.

In November, 1956, Wildlife Conservation Officer Nathan D. Riggs recovered a band from the carcass of a mature hen which had died at the release site on Muddy Creek in Huerfano County.

WINTER FOOD PLOTS

The establishment of small grain plots in favorable wintering areas was started in the spring of 1953 on an experimental basis. The main purpose of such plots was to supplement natural foods and hold the turkeys in the respective areas. Eight plots ranging in size from one acre to five acres were established during the study period.

Suitable plot sites were located within important wintering areas on Departmental or private land, and an agreement for the development of plots, 1 to 5 acres in size, was made. Table 24 lists the legal description of the experimental food plots and gives the approximate amounts of land under fence, of land in cultivation, and of new fence built.

Each plot was fenced with four-strand barbed wire, utilizing existing fence where possible, and small grains were planted. The landowners prepared the ground and planted the seed which was furnished by the Fish and Game Department. In several instances shrubs and trees were transplanted near the plots.

TABLE 13.—RECAPITULATION OF EASTERN SLOPE LIVE-TRAPPING FOR TRANSPLANTING OPERATIONS

New Transplants	Total Number
R. Dodge Ranch, Carrizo Cr., Las Animas Co.	10
W. McCarty Ranch, Poitrey Can., Las Animas Co.	10
Perry Park Ranch, W. Plum Cr., Douglas Co.	10
W. Mizer Ranch, Butte Cr., Las Animas Co.	14
R. Rose Ranch, Plum Cr., Las Animas Co.	13
Apishapa State Mgmt. Area, Huerfano Co.	7
C. Ming Ranch, Soldiers Can., Baca Co.	14
Mt. Evans State Mgmt. Area, Clear Creek Co.	11
P. Wolfe Ranch, Muddy Cr., Huerfano Co.	10
C. Wisdom Ranch, Buckhorn Cr., Larimer Co.	15
R. Shumaker Ranch, Millsap Cr., Fremont Co.	10
N. Patton Ranch, Rice Mtn., Fremont Co.	14
Box Ranch, Vachita Cr., Las Animas Co.	5
Exchange Breeders (Toms) Released	
P. Nardin Ranch, Santa Clara Cr., Huerfano Co.	3
Devil Creek Refuge, Archuleta Co.	4
M. Walton Ranch, Frisco Cr., Las Animas Co.	2
J. Sakariason Ranch, Sarcillo Can., Las Animas Co.	4
Transported to Utah under Authority of Game Management Division	
Castle Cr. (Utah)	16
Boulder Cr. (Utah)	15
TOTAL	**187**

Once a plot was established, seasonal checks were made to determine food production and turkey use. A method of measuring use — similar to deer pellet group counts — was started in the spring of 1958 by the writer. Three circular 1/100 acre plots were drawn at random within the larger plots. These are carefully examined, and individual droppings of turkeys and pellet groups of deer and rabbits were counted and recorded. Where possible, population counts were made in the vicinity. This kind of use check should show yearly fluctuations in turkey and game use of such plots.

Costs: An average cost of fencing materials of $39.27 per acre fenced was calculated for the eight food plots on the eastern slope. Approximately 14.5 acres were under cultivation.

The cost of land preparation and seeding of the plots varied from $21.12 per acre in 1954 to $7.69 per acre in 1958. This variation depends primarily upon the treatment necessary.

The cost of seed and fertilizer varied from a high of $5.04 per acre in 1957 to a low of $1.55 per acre in 1958. The variation here depends upon the amount of seed required, the kind of seed used, and the amount of fertilizer needed.

In considering the labor necessary to fence the plots, it was determined that 3.08 man days per acre were needed for the four plots that required new fence all the way around. The four plots established with the help of existing fence required 1.35 man days per acre.

Plates 33 and 34 show views of the first experimental food plot established on the eastern slope. Plate 35 shows a wintering flock of turkeys using this plot. Table 15 shows the results of the use checks. Table 16 shows wintering population counts.

Findings: The two food plots in Sarcillo Canyon, Las Animas County, the food plot on state-owned land on the Huerfano River, Huerfano County, and the upper food plot in Alhandra Canyon, Las Animas County, showed wild turkey winter use. Use checks for other game species showed that deer, cottontail rabbits, and jackrabbits also benefited from these plots. Since this was the first year that use checks were made, no comparative data are available.

TABLE 14.—EASTERN SLOPE BANDING STUDIES 1951-1956

Date	Number Banded		Bands Used	Area
	Hens	Toms		
12/27/51	1	0	Leg Band No. 753	M. Walton Ranch, Sugarite Canyon, Las Animas County.
1/20/52	10	1	Leg Bands Nos. 762-773 (No. 770 not used)	Middlemist Ranch, Middle Creek, Huerfano County.
10/14/52	0	1	Leg Band No. 789	B. Lane Ranch, Mesa de Maya, Las Animas County.
1/ 5/53	4	5	Leg Bands Nos. 800-808	Andreoli Ranch, Middle Creek, Huerfano County.
1/13/53	3	2	Leg Bands Nos. 809-813	B. Lane Ranch, Mesa de Maya, Las Animas County.
2/14/53	6	2	Leg Bands Nos. 814-821	G. Steven Ranch, Cucharas River, Huerfano County.
2/ 8/55	6	1	Leg Bands Nos. 832-838	B. Lane Ranch, Mesa de Maya, Las Animas County.
2/17/55	0	2	Leg Bands Nos. 842-843	B. Lane Ranch, Mesa de Maya, Las Animas County.
1/27/56	1	0	Leg Band No. 871	J. Sakariason Ranch, Sarcillo
TOTALS	**31**	**14**		Canyon, Las Animas County.

TABLE 15.—GAME USE OF EASTERN SLOPE FOOD PLOTS WINTER 1957-1958*

Plot No.	Wild Turkey Droppings	Deer Pellet Groups	Cottontail Pellet Groups	Jackrabbit Pellet Groups	Remarks
1	110	45	32	....	79 turkeys used plot 3 months. Excellent crop oats and millet.
2	22	62	12	....	28 turkeys used plot 2½ months. Excellent crop oats and millet.
3	....	....	....	....	Use checks could not be made — road still closed by snow early April, 1958.
4	216	5	12	....	98 turkeys used plot 3 months. Excellent crop oats and barley.
5	....	....	....	....	No turkey use in plot. A few deer pellets seen. Very poor crop grain.
6	....	....	....	....	22 turkeys used plot 2 weeks in fall. No winter use observed.
7	....	....	....	....	No turkey winter use. Flock of 32 ranged in area in fall period.
8	12	1	0	6	12 turkeys used plot during entire winter period. Plot replanted to rye in fall.
TOTALS	**360**	**113**	**56**	**6**	

*The total number of samples found within three 1/100 acre circular plots located at random within each plot.

**See Table 24 for descriptions of plots.

TABLE 16.—A COMPARISON OF WILD TURKEY WINTERING POPULATIONS BY YEARS VICINITY OF ESTABLISHED FOOD PLOTS

Plot No.	Location	Plot Estab.	Wintering Period 1949-1950	1950-1951	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	1956-1957	1957-1958
1	Sarcillo Canyon	1953 (enl. '56)	60	70	25	28	28	59	80*	148**	79***
2	Sarcillo Canyon	1955									
3	Pass Creek	1954	40	9	0	4	17	60	40	35	6
4	Huerfano River	1955	0	0	0	0	8	31	41	45	98
5	Alhandra Canyon	1956	....	....	....	....	....	....	....	....	0
6	St. Charles River	1957	125	40	20	44	20	22	....	....	22
7	Stock Canyon	1957	....	....	....	....	6	6	25	46	32
8	Alhandra Canyon	1957	....	....	....	....	....	....	....	....	12

Where no wintering population counts were made this is shown by (....).

*Count does not include 11 birds live-trapped for transplanting.

**Count does not include 25 birds live-trapped for transplanting.

***Count does not include 41 birds live-trapped for transplanting.

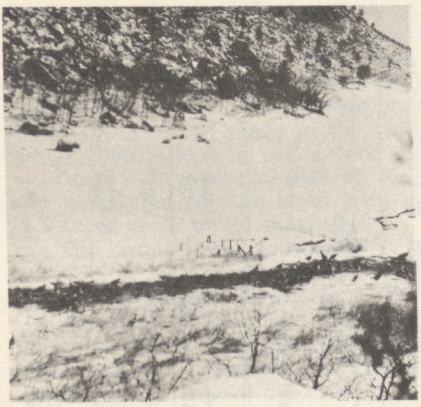


Plate 35 — Wild turkeys feeding in experimental winter food plot No. 1 in Sarcillo Canyon. Flocks totalling ninety-one head overwintered in this area. Cultivated oats are grown in the plot and left for the wild turkeys to harvest.

Plate 36 — A baled oat hay stack in late winter after all bales had been scratched apart by wild turkeys. The loose straw has been raked into a small stack and grain scattered therein. Frisco Canyon.

Two plots which showed no turkey use had excellent crops of oats, but since there was abundant natural food, the plots were not needed. A third plot raised no turkey food and showed no turkey use. Use checks could not be made at one plot because the road was still closed by deep snow in early April, 1958.

Wintering population surveys were made in the vicinities of the food plots where possible.

Of the eight food plots established on the eastern slope, it can be concluded that three have been successful in assisting with increasing wild turkey populations. These are the two in Sarcillo Canyon on private land and one along the upper Huerfano River on state-owned land. The excellent cooperation received from J. Sakariason and the MacDonald brothers and limited predator control are two factors which have aided the increase in the wild turkey population in Sarcillo Canyon.

The food plot on Pass Creek in Huerfano County has aided in holding turkeys in the area, but a poaching situation arose and the plot was removed. This plot must be regarded a failure.

The two food plots in Alhandra Canyon, Las Animas County, have been valuable for experimentation with different grains to determine which are best suited to this dry area. To date, oats, millet, and dry land maize have been tried unsuccessfully. Winter rye offers some promise and was used in later plantings. These three food plots were not in existence long enough to ascertain their true value. The same holds true for the plots established in the spring of 1957 in Stock Canyon, Las Animas County, and near St. Charles Creek, Pueblo County.

BALED OAT HAY STACKS

The use of baled oat hay for the supplemental winter feeding of wild turkeys was first experimented with in the Frisco-Sugarite Canyon area during the winter of 1955-1956. Wildlife Conservation Officer Chester M. Scott suggested the use of baled oat hay and secured a jeep for working the area during deep snows.

The results of this experimentation were so gratifying that baled oat hay was tried and found successful in holding newly transplanted birds near release sites during the winters of 1956-1957 and 1957-1958. Some baled oats were used in other areas as supplemental winter feed.

The oat hay, which was purchased by the Federal Aid Division, was cut and baled when the grain was fairly ripe so that matured grain remained in the bales. The bales were piled 5 to a stack with 2 laid lengthwise on the ground about 12 inches apart; 2 more were placed crosswise and a few inches apart on top of the bottom bales, and the last bale was placed on top of these. One of the wires was removed from each bale, and another bale was broken and scattered on top and about the stack. Additional loose grain was thrown in and around the stack. A barbed wire fence was erected around stacks in areas containing domestic stock; otherwise the stacks were left unfenced. When a stack became scratched apart, it was repiled with a pitchfork, and more loose grain was scattered in and around it (see Plate 36).

In follow-up checks, it was found that this type of winter feedground, while not used extensively during open weather, will succeed in holding the flocks in an area when deep snow does come. Flocks used these feedgrounds regularly when there was as much as two feet of snow on the ground. The piled bales were high enough to afford the turkeys feed above the snow level. All birds observed near these feed stations appeared to over-winter in good condition.

The only instance in which deer appeared to bother the oat hay was at one unfenced station with a salt lick nearby. This station was moved when the deer use was noted. Predation around the feedgrounds was negligible. No predators were observed, and very little predator field sign was found in the vicinity of the stations.

If the feedgrounds are carefully selected away from human inhabited areas, the turkeys using the feed stations stay wary, and since maintenance visits about once every two weeks are usually sufficient, distance from habitation is not a serious problem. During periods of heavy snow when travel to the feedgrounds is difficult, enough grain is available in these stacks to sustain the flocks until the weather opens up.

The use of baled oat hay in wintering areas where a shortage of natural food exists, where the turkeys may drift into less favorable locations, or where turkeys have been recently transplanted has proven successful in the management of the species on the eastern slope.

CONCLUSIONS

There is a need for continued investigations because of the many problems in management which remain unanswered to date.

Census techniques must be refined so that better information on population levels may be secured.

Studies designed to determine the effects of predation, disease, accidents, and other population limiting factors on wild turkey populations are needed.

The need and results of experimental habitat manipulations in wild turkey management should be further explored.

APPENDIX OF TABLES

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES
Compiled Data—Basis 200 Crops*
All Crops from early Fall Periods—1949 through 1956

Kind of Food Plant Matter (84%) Family	% Vol.	% Freq. of Occur.
Amaranthaceae—Amaranth Family (Trace)		
Amaranthus sp.		
Redroot pigweed seeds	Trace	5
Anacardiaceae—Sumac Family (Trace)		
Rhus radicans		
Poison ivy fruit	Trace	1
Rhus trilobata		
Skunkberry fruit	Trace	1
Skunkberry leaves	Trace	1
Boraginaceae—Borage Family (Trace)		
Cynoglossum officinalis		
Houndstongue dogbur seeds	Trace	1
Lappula sp.		
Stickseed seeds	Trace	2
Lithosperinum sp.		
Puccoon seeds	Trace	10
Onosmodium sp.		
False gromwell seeds	Trace	1
Cactaceae—Cactus Family (Trace)		
Mamillaria vivipara		
Ball cactus seeds	Trace	3
Opuntia arborescens		
Staghorn cactus seeds	Trace	2
Opuntia sp.		
Prickly pear cactus seeds and pods	Trace	3
Capparidaceae—Capper Family (1%)		
Cleome serrulata		
Rocky Mountain bee plant seeds	1	3
Caprifoliaceae—Honeysuckle Family (1%)		
Symphoricarpos sp.		
Snowberry fruit	1	16
Snowberry leaves	Trace	7
Caryophyllaceae—Pink Family (Trace)		
Silene sp.		
Catchfly seed pods	Trace	2
Chenopodiaceae—Goosefoot Family (Trace)		
Chenopodium album		
Lambsquarters seeds	Trace	3
Compositae—Composite Family (12%)		
Ambrosia trifida		
Giant ragweed seeds	1	6
Aster sp.		
Aster leaves	Trace	2
Aster seed heads	Trace	1
Bidens sp.		
Spanish needle seed heads	Trace	1
Chrysopsis sp.		
Golden aster seed heads	Trace	5
Carduus sp.		
Thistle seeds	Trace	1

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food	% Vol.	% Freq. of Occur.
Plant Matter (84%)		
Family		
Cirsium sp.		
Thistle seeds	Trace	1
Erigeron sp.		
Daisy seeds	Trace	1
Helianthus sp.		
Wild sunflower seeds	3	22
Lactuca scariola		
True prickly lettuce seed heads	1	6
Ratibida columnifera		
Coneflower seeds	Trace	1
Rudbeckia sp.		
Blackeyed susan seed heads	Trace	3
Taraxacum officinale		
Dandelion leaves	4	35
Dandelion seed heads	3	26
Tragopogon sp.		
Wild salsify seeds	Trace	4
Verbesina encelioides		
Goldweed seeds	Trace	1
Unidentified composite seed heads and flowers	Trace	3
Cruciferae—Musitard Family (1%)		
Camelina sp.		
False flax seed pods	1	8
Capsella bursa-pastoris		
Shepherd's purse seed pods	Trace	4
Cyperaceae—Sedge Family (Trace)		
Eriophorum sp.		
Cottongrass seeds	Trace	1
Ericaceae—Heath Family (3%)		
Arctostaphylos uva-ursi		
Kinnikinnick fruit	3	15
Kinnikinnick leaves	Trace	3
Heath leaves	Trace	1
Euphorbiaceae—Spurge Family (Trace)		
Euphorbia sp.		
Spurge seed pods	Trace	2
Fagaceae—Beech Family (8%)		
Quercus sp.		
Scrub oak acorns	8	26
Scrub oak leaves	Trace	2
Geraniaceae—Geranium Family (Trace)		
Geranium sp.		
Geranium leaves	Trace	3
Gramineae—Grass Family (49%)		
Agropyron smithii		
Western wheatgrass seeds	Trace	1
Agropyron sp.		
Wheatgrass spikelets	Trace	3
Agrostis sp.		
Bentgrass spikelets	Trace	5
Andropogon saccharoides		
Silver bluestem seed heads	2	3

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food Plant Matter (84%) Family	% Vol.	% Freq. of Occur.
Avena fatua Wild oats	2	15
Avena sativa Cultivated oats	16	43
Blepharoneuron tricholepis Hairy dropseed spikelets	1	5
Bouteloua curtipendula Side-oats grama seeds	Trace	1
Bouteloua gracilis Blue grama spikelets	1	4
Bromus carinatus Mountain bromegrass seeds	Trace	1
Bromus inermis Smooth bromegrass seeds	Trace	1
Bromus marginatus Margined bromegrass seeds	Trace	10
Bromus tectorum Cheatgrass seeds	Trace	1
Calamovilfa sp. Sandreed spikelets	Trace	1
Echinochloa sp. Barnyard grass	Trace	1
Elymus macounii Macoun wildrye seeds	Trace	4
Elymus sp. Wildrye seeds	Trace	4
Eragrostis cilianensis Lovegrass spikelets	Trace	1
Eragrostis sp. Lovegrass spikelets	Trace	1
Festuca elatior Meadow fescue spikelets	Trace	6
Festuca sp. Fescue spikelets	Trace	1
Hordeum vulgare Barley	6	41
Muhlenbergia sp. Muhly grass spikelets	Trace	7
Panicum sp. Panic grass spikelets	1	7
Phleum pratense Timothy spikelets	2	23
Poa sp. Bluegrass spikelets	1	6
Secale cereale Cultivated rye	Trace	2
Setaria sp. Bristlegrass spikelets	3	23
Sporobolus asper Tall dropseed seeds	1	10
Sporobolus cryptandrus Sand dropseed seeds	2	48

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food Plant Matter (84%) Family	% Vol.	% Freq. of Occur.
Sporobolus neglectus		
Puffsheath dropseed seeds	Trace	1
Stipa robusta		
Sleepygrass seeds	2	32
Triticum aestivum		
Wheat	1	15
Zea mays		
Corn	2	5
Grass leaves	6	88
Unidentified grass spikelets	Trace	3
Leguminosae—Pea Family (3%)		
Lupinus sp.		
Lupine seeds	Trace	1
Medicago sativa		
Alfalfa leaves	1	5
Alfalfa seed pods	Trace	2
Melilotus sp.		
Sweet clover leaves	Trace	1
Sweet clover seeds	Trace	1
Pisum sp.		
Cultivated pea seeds	Trace	1
Psoralea sp.		
Scurf pea seed pods	Trace	1
Robinia neomexicana		
New Mexican locust seeds	Trace	8
Thermopsis sp.		
Golden banner leaves	Trace	1
Trifolium sp.		
Clover leaves	2	31
Clover seeds	Trace	2
Vicia sp.		
Vetch leaves	Trace	14
Legume leaf portions	Trace	1
Pea seeds (cultivated variety)	Trace	3
Liliaceae—Lily Family (1%)		
Allium sp.		
Wild onion bulbs	1	3
Malaceae—Apple Family (Trace)		
Crataegus sp.		
Hawthorne fruit and seeds	Trace	2
Melanthaceae—Bunchflower Family (Trace)		
Melanthium virginicum		
Bunch flower seeds	Trace	1
Plantaginaceae—Plantain Family (Trace)		
Plantago sp.		
Plantain leaves	Trace	1
Pinaceae—Pine Family (Trace)		
Abies concolor		
White fir needle fragments	Trace	1
Juniperus scopulorum		
Rocky Mountain juniper leaves	Trace	2
Pinus edulis		
Nut pine needles	Trace	1

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food Plant Matter (84%) Family	% Vol.	% Freq. of Occur.
Pinus ponderosa		
Ponderosa pine needles	Trace	2
Ponderosa pine nuts	Trace	1
Pinus sp.		
Pine needle fragments	Trace	4
Polygonaceae—Buckwheat Family (4%)		
Polygonum sp.		
Bindweed leaves	Trace	4
Wild buckwheat seeds	4	43
Rumex sp.		
Dock seeds	Trace	1
Ranunculaceae—Buttercup Family (Trace)		
Clematis sp.		
Clematis leaves	Trace	2
Thalictrum sp.		
Meadow rue leaves	Trace	1
Rosaceae—Rose Family (1%)		
Fragaria sp.		
Wild strawberry leaves	Trace	1
Wild strawberry fruit	Trace	1
Prunus virginiana		
Chokecherry fruit	Trace	2
Rosa sp.		
Rose leaves	Trace	1
Rose fruit and seeds	1	4
Salicaceae—Willow Family (Trace)		
Salix sp.		
Willow leaves	Trace	1
Saxifragaceae—Saxifrage Family (Trace)		
Ribes sp.		
Wild currant leaves	Trace	1
Wild currant fruit	Trace	5
Solanaceae—Potato Family (Trace)		
Physalis sp.		
Ground cherry fruit	Trace	1
Solanum sp.		
Nightshade leaves	Trace	1
Sparganiaceae—Burreed Family (Trace)		
Sparganium sp.		
Burreed seeds	Trace	1
Violaceae—Violet Family (Trace)		
Viola sp.		
Violet seed pods	Trace	2
Umbelliferae—Parsnip Family (Trace)		
Angelica sp.		
Angelica seeds	Trace	3
Sium cicutaefolium		
Water parsnip seeds	Trace	1
Plant galls (insect)	Trace	4
Unidentified broadleaf fragments	Trace	19
Unidentified flower portions	Trace	2
Unidentified fruit	Trace	2
Unidentified rootlets	Trace	2

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food Plant Matter (84%) Family	% Vol.	% Freq. of Occur.
Unidentified seeds	Trace	2
Unidentified woody stem fragments	Trace	11
Animal Matter (16%)		
Acrididae		
Short-horned grasshoppers	16	55
Asilidae		
Robber flies	Trace	4
Carabidae		
Ground beetles	Trace	19
Cerambycidae		
Long-horned beetles	Trace	2
Chrysomelidae		
Leaf and flea beetle adults	Trace	14
Leaf and flea beetle larvae	Trace	1
Cicadellidae		
Leafhoppers	Trace	11
Cicindelidae		
Tiger beetles	Trace	3
Coccinellidae		
Lady beetles	Trace	10
Coreidae		
Box-elder and squash bugs	Trace	13
Curculionidae		
Snout beetles	Trace	7
Cydnidae		
Common negro bug	Trace	1
Elateridae		
Click beetles	Trace	1
Formicidae		
Ants	Trace	15
Fulgoridae		
Planthoppers	Trace	1
Gryllidae		
Crickets	Trace	5
Hydrophilidae		
Hydrophilid beetles	Trace	3
Ichneumonidae		
Ichneumon wasps	Trace	11
Ichneumon larvae	Trace	1
Lampyridae		
Common black lampyrid	Trace	1
Lycosidae		
Wolf spiders	Trace	1
Lygaeidae		
Chinch bugs	Trace	2
Mantidae		
Mantids	Trace	3
Membracidae		
Treehoppers	Trace	16
Miridae		
Plant bugs	Trace	3
Pentatomidae		
Shield and stink bugs	Trace	6

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

Kind of Food Animal Matter (16%) Family	% Vol.	% Freq. of Occur.
Phalangidae		
Daddy long legs spiders	Trace	6
Reduviidae		
Assassin bugs	Trace	1
Sarcophagidae		
Sarcophagid larva	Trace	1
Scarabaeidae		
Scarab and may beetles	Trace	8
Scarab larvae	Trace	2
Silphidae		
Carrion beetles	Trace	3
Staphylinidae		
Rove beetles	Trace	1
Tabanidae		
Horsefly larva	Trace	1
Tenebrionidae		
Darkling beetles	Trace	13
Tettigoniidae		
Mormon crickets	Trace	5
Vespidae		
Hornets	Trace	1
Coleoptera (order)		
Beetle adults	Trace	1
Beetle cocoons	Trace	1
Beetle larva	Trace	1
Diptera (order)		
Fly adults	Trace	12
Fly cocoons	Trace	1
Fly eggs	Trace	2
Fly larvae	Trace	3
Hemiptera (order)		
Bug fragments	Trace	3
Hymenoptera (order)		
Hymenopter wasps	Trace	4
Lepidoptera (order)		
Moth adults	Trace	8
Moth caterpillars	Trace	6
Moth cocoons	Trace	1
Moth pupae	Trace	1
Arachnida (class)		
Spiders	Trace	11
Chilopoda (class)		
Centipedes	Trace	2
Diplopoda (class)		
Millipedes	Trace	8
Gastropoda (class)		
Land and water snails	Trace	13
Oligochaeta (class)		
Earthworms	Trace	1
Unidentified insect fragments	Trace	4
Unidentified insect larvae	Trace	2

TABLE 17.—MERRIAM'S TURKEY FOOD STUDIES—Cont'd

	% Vol.	% Freq. of Occur.
Non-Food Items		
	% of Gross Volume	
Bone fragments *	Trace	4 5
Glass fragments	Trace	1 1
Gravel and fine sand	1	95 76

*All crops from eastern slope wild turkey ranges — includes 128 crops from mountain type ranges, 71 crops from mesa type ranges, and 1 crop from canyon type ranges.

TABLE 18.—MERRIAM'S TURKEY FOOD STUDIES

Gizzard Analysis

Eastern Slope — South Veta Creek

January 5, 1951 (Winter)

Food Items	
Plant Matter (100%)	
Family — Species	**% Volume**
Rosaceae—Rose Family	
Rosa sp.	
Wild rose fruit	100
Unidentified stem fragments	Trace
TOTAL	**100%**
Non-Food Items	
Gravel (Grit) — (5% of total volume)	100
TOTAL	**100%**

TABLE 19.—MERRIAM'S TURKEY FOOD STUDIES

Winter Foods in Order of Preference — Basis 540 Droppings*

Food Item	% Frequency of Occurrence
Grass green leafage (**Gramineae**)	66.5
Ponderosa pine nuts (**Pinus ponderosa**)	36.5
Cultivated oats (**Avena sativa**)	32.2
Insects	32.0
Sand dropseed spikelets (**Sporobolus cryptandrus**)	16.7
Forbs green leafage — chiefly dandelion and clover	13.9
Scrub oak acorns (**Quercus** sp.)	12.6
Sleepygrass seeds (**Stipa robusta**)	11.1
Wild buckwheat seeds (**Polygonum** sp.)	9.8
Staghorn cactus fruit (**Opuntia arborescens**)	9.4
Hawthorne fruit (**Crataegus** sp.)	8.9
Snowberry fruit (**Symphoricarpos** sp.)	8.5
Wild rose fruit (**Rosa** sp.)	6.9
Wild sunflower seeds (**Helianthus** sp.)	5.9
Kinnikinnick fruit (**Arctostaphylos uva-ursi**)	5.6
Panic grass spikelets (**Panicum** sp.)	5.4
Skunkberry fruit (**Rhus trilobata**)	4.3
Sideoats grama spikelets (**Bouteloua curtipendula**)	4.1
Barnyard grass spikelets (**Echinochloa** sp.)	3.7
Rocky Mountain juniper fruit (**Juniperus scopulorum**)	2.0
Blue grama spikelets (**Bouteloua gracilis**)	1.9
Cultivated wheat (**Triticum aestivum**)	1.5
Dandelion seed heads (**Taraxacum officinale**)	.7
Giant ragweed seeds (**Ambrosia trifida**)	.6
Bluestem spikelets (**Andropogon** sp.)	.6
Ponderosa pine needle fragments (**Pinus ponderosa**)	.6
Woody stem fragments	.6
Alkali sacaton spikelets (**Sporobolus airoides**)	.4
Amaranth seeds (**Amaranthus** sp.)	.4
Chokecherry fruit (**Prunus virginiana**)	.4
Golden aster seed heads (**Chrysopsis** sp.)	.2
Pinon pine seeds (**Pinus edulis**)	.2
Prickly pear cactus fruit (**Opuntia** sp.)	.2
Puccoon seeds (**Lithospermum** sp.)	.2
Sweetclover seeds (**Melilotus** sp.)	.2
Rootlets	.2

*All samples from eastern slope wild turkey ranges — includes 300 droppings from mountain type ranges; 100 from mesa type ranges; and 140 from river canyon type ranges.

TABLE 20.—MERRIAM'S TURKEY FOOD STUDIES
Crop Analysis
Eastern Slope — Cucharas River
April 24, 1950 (Spring)

Food Items	
Plant Matter (99%)	
Family — Species	**% Volume**
Compositae—Composite Family	
Taraxacum officinale	
Dandelion leaf fragments	2
Dandelion seed heads	8
Ericaceae—Heath Family	
Arctostaphylos uva-ursi	
Kinnikinnick fruit	23
Fagaceae—Beech Family	
Quercus sp.	
Scrub oak acorns	Trace
Gramineae—Grass Family	
Avena fatua	
Wild oats	4
Hordeum vulgare	
Barley	13
Grass leaves	47
Leguminosae—Pea Family	
Trifolium sp.	
Clover leaves	2
Pinaceae—Pine Family	
Pinus ponderosa	
Ponderosa pine seeds	Trace
Animal Matter (1%)	
Family	
Scarabaeidae	
1 scarab beetle	1
Diplopoda (class)	
1 millipede	Trace
Oligochaeta (class)	
1 earthworm	Trace
TOTAL	100%
Non-Food Items	
Bone fragments (2% of total volume)	25
Gravel (Grit) — (6% of total volume)	75
TOTAL	100%

TABLE 21.—MERRIAM'S TURKEY FOOD STUDIES

Spring Foods in Order of Preference — Basis 680 Droppings*

Food Item	% Frequency of Occurrence
Grass green leafage (**Gramineae**)	90.7
Forbs green leafage—chiefly dandelion, clover, and alfalfa	61.5
Insects	29.7
Dandelion flowers **Taraxacum officinale**)	23.4
Staghorn cactus fruit (**Opuntia arborescens**)	8.7
Giant ragweed seeds (**Ambrosia trifida**)	7.5
Cultivated oats (**Avena sativa**)	7.5
Wild rose fruit (**Rosa** sp.)	7.4
Ponderosa pine seeds (**Pinus ponderosa**)	7.4
Kinnikinnick fruit (**Arctostaphylos uva-ursi**)	5.6
Rocky Mountain juniper fruit (**Juniperus scopulorum**)	3.4
Scrub oak acorns (**Quercus** sp.)	3.2
Snowberry fruit (**Symphoricarpos** sp.)	2.5
Hawthorne fruit (**Crataegus** sp.)	1.6
Ponderosa pine needles (**Pinus ponderosa**)	1.6
Pasque flower leaves (**Pulsatilla** sp.)	1.5
Chokecherry fruit (**Prunus virginiana**)	1.0
Sleepygrass seeds (**Stipa robusta**)	1.0
Dandelion seed heads (**Taraxacum officinale**)	.7
Sand dropseed spikelets (**Sporobolus cryptandrus**)	.7
Skunkberry fruit (**Rhus trilobata**)	.6
Tall dropseed spikelets (**Sporobolus asper**)	.6
Crayfish	.6
Horsetail stem fragments (**Equisetum** sp.)	.6
Wheatgrass spikelets (**Agropyron** sp.)	.6
Land snails	.4
Bluegrass spikelets (**Poa** sp.)	.3
Panic grass spikelets (**Panicum** sp.)	.3
Wild buckwheat seeds (**Polygonum** sp.)	.3
Wild sunflower seeds (**Helianthus** sp.)	.1
Pinon pine seeds (**Pinus edulis**)	.1
Rocky Mountain juniper leaves (**Juniperus scopulorum**)	.1
Woody stem fragments	.1
Nightshade fruit (**Solanum** sp.)	.1

*All samples from eastern slope wild turkey ranges — includes 320 droppings from mountain type ranges; 200 from mesa type ranges; and 160 from river canyon ranges.

TABLE 22.—MERRIAM'S TURKEY FOOD STUDIES

Summer Foods in Order of Preference — Basis 325 Droppings*

Food Item	% Frequency of Occurrence
Insects	67.1
Grass green leafage (**Gramineae**)	56.3
Forbs green leafage — chiefly dandelion and clover	39.7
Dandelion seed heed heads (**Taraxacum officinale**)	35.4
Bluegrass spikelets (**Poa** sp.)	34.5
Scrub oak acorns (**Quercus** sp.)	33.2
Wild buckwheat seeds (**Polygonum** sp.)	19.7
Dandelion flowers (**Taraxacum officinale**)	**17.8**
Timothy spikelets (**Phleum pratense**)	12.9
Bristle grass spikelets (**Setaria** sp.)	10.2
Cultivated oats (**Avena sativa**)	10.2
Sand dropseed spikelets (**Sporobolus cryptandrus**)	7.4
Sleepygrass seeds (**Stipa robusta**)	3.4
Wild sunflower seeds (**Helianthus** sp.)	3.4
Ponderosa pine seeds (**Pinus ponderosa**)	2.8
Wild rose fruit (**Rosa** sp.)	2.2
Snowberry fruit (**Symphoricarpos** sp.)	2.2
Giant ragweed seeds (**Ambrosia trifida**)	**1.8**
Prickly pear cactus fruit (**Opuntia** sp.)	**1.2**
Wild currant fruit (**Ribes** sp.)	1.2
Wild onion bulbs (**Allium** sp.)	.9
Horsetail stem fragments (**Equisetum** sp.)	.9
Juniper fruit (**Juniperus** sp.)	.6
Angelica seeds (**Angelica** sp.)	**.3**
Hawthorne fruit (**Crataegus** sp.)	**.3**
Kinnikinnick fruit (**Arctostaphylos uva-ursi**)	**.3**
Panic grass spikelets (**Panicum** sp.)	.3

*All samples from eastern slope wild turkey ranges—includes 270 droppings from mesa type ranges and 55 from mountain type ranges. Collections and analyses by Donald M. Hoffman.

TABLE 23.—SEX-RATIO STUDIES EASTERN SLOPE

Fall 1954 — Spring 1955

Area	Date Observed	Drainage	Hens	Toms Juv.	Toms Mat.
Spanish Peaks	12/11/54	Dry Canyon	24	6	----
	12/18/54	Sarcillo Canyon	29	8	----
	12/30/54	N. Trujillo Cr.	11	----	5
	2/21/55	Sarcillo Canyon	14	4	3
	2/25/55	N. Trujillo Cr.	----	----	5
	4/15/55	North Fork	----	----	2
	5/ 3/55	Bear Cr.	----	----	5
		TOTAL	**78**	**18**	**20**
		Sex-ratio = 48.72 males : 100 females			
Raton Mesa-Mesa de Maya	11/19/54	Smith Canyon	----	----	7
	11/24/54	Louden Canyon	17	12	2
	12/ 7/54	Like Canyon	15	16	----
	1/ 9/55	Sugarite Canyon	15	----	2
	1/12/55	Smith Canyon	----	----	3
		TOTAL	**47**	**28**	**14**
		Sex-ratio = 89.36 males : 100 females			
Sangre de Cristo-Greenhorn Ranges	3/ 9/55	Huerfano River	13	7	----
	3/11/55	Oak Cr.	13	1	----
	3/11/55	Oak Cr.	8	4	1
	3/18/55	S. Hardscrabble Cr.	18	3	10
	4/29/55	Pass Cr.	1	----	----
		TOTAL	**53**	**15**	**11**
		Sex-ratio = 49.06 males : 100 females			
New Areas Planted	1/19/55	Cottonwood Cr.	19	11	----
	1/19/55	Cottonwood Cr.	----	----	4
	2/ 2/55	W. Plum Cr.	8	3	1
		TOTAL	**27**	**14**	**5**
		Sex-ratio = 70.37 males : 100 females			
OVERALL EASTERN SLOPE TOTAL (1954-1955)			**205**	**75**	**50**

OVERALL EASTERN SLOPE SEX-RATIO (1954-1955) = 60.98 males : 100 females
Based upon a total sample of 330 turkeys.

TABLE 23 (Continued)

Fall 1955 — Spring 1956

Area	Date Observed	Drainage	Hens	Toms Juv.	Toms Mat.
Spanish Peaks	10/21/55	N. Trujillo Cr.	10	8	....
	10/28/55	Mavricio Canyon	9	9	....
	11/12/55	Santa Clara Cr.	3	3	....
	11/12/55	N. Trujillo Cr.	....	....	3
	12/10/55	Santa Clara Cr.	15	4	....
	12/31/55	Sarcillo Canyon	55	12	24
	2/ 2/56	Abbott Cr.	8	4	....
	2/28/56	Santa Clara Cr.	13	1	3
	2/29/56	Whiskey Cr.	....	2	....
	4/27/56	North Fork	6	....	1
	4/27/56	North Fork	3	....	....
	5/ 9/56	Wildcat Cr.	....	....	1
	5/ 9/56	North Fork	4	....	1
		TOTAL	**126**	**43**	**33**
		Sex-ratio = 60.32 males : 100 females			
Lower Purgatoire River	10/26/55	Alhandra Canyon	6	7	....
	11/13/55	Alhandra Canyon	1	4	....
	4/13/56	Alhandra Canyon	....	....	1
	5/ 2/56	Alhandra Canyon	....	2	....
	5/ 6/56	Alhandra Canyon	....	....	1
		TOTAL	**7**	**13**	**2**
		Sex-ratio = 214.29 males : 100 females			
Raton Mesa-Mesa de Maya	1/21/56	Smith Canyon	16	5	....
	2/22/56	Frisco Canyon	8	....	....
	2/22/56	Frisco Canyon	....	32	....
	3/21/56	Frisco Canyon	14	3	4
	3/21/56	Frisco Canyon	....	....	3
		TOTAL	**38**	**40**	**7**
		Sex-ratio = 123.68 males : 100 females			
Sangre de Cristo Greenhorn Ranges	12/14/55	N. Hardscrabble Cr.	....	....	9
	2/25/56	Huerfano River	14	....	4
	5/ 1/56	Pass Cr.	5	....	3
		TOTAL	**19**	**0**	**16**
		Sex-ratio = 84.21 males : 100 females			
Misc. Areas (newly transplanted areas)	12/ 6/55	Cottonwood-Carrizo	53	22	11
	12/ 6/55	Cottonwood-Carrizo	8	....	....
	12/ 6/55	Butte Cr.	5	7	2
	12/12/55	Perry Park	5	2	2
	12/17/55	Poitrey Canyon	20	14	3
	5/16/56	Spring Cr.	2	....	....
		TOTAL	**93**	**45**	**18**
		Sex-ratio = 67.74 males : 100 females			
OVERALL EASTERN SLOPE TOTAL (1955-1956)			**283**	**141**	**76**

OVERALL EASTERN SLOPE SEX-RATIO = 76.68 males : 100 females
Based upon a total sample of 500 wild turkeys.

TABLE 24.—DESCRIPTIONS OF ESTABLISHED WINTER FOOD PLOTS — EASTERN SLOPE 1953-1958

PLOT NO. 1

John Sakariason ranch, Sarcillo Canyon, Las Animas Colnty, approximately in **Sec. 14, T. 32S, R. 67W,** with approximately 1 acre under fence and 1 acre in cultivation. There are approximately 1150 feet of 4 strand barbed wire fence.

PLOT NO. 2

MacDonald Brothers ranch, Sarcillo Canyon, Las Animas County, approximately in **Sec. 22, T. 32S, R. 67W,** with approximately 5 acres under fence and 3 acres in cultivation. There are approximately 1100 feet of 4 strand barbed wire fence (two sides of plots were already fenced).

PLOT NO. 3

Wm. Schmidt anch, Pass Creek, Huerfano County, approximately in **Sec. 3, T. 28S, R. 70W,** with approximately 1.5 acres under fence and 1.5 acres in cultivation. There are approximately 1000 feet of 4 strand barbed wire fence. This plot was removed during the Spring of 1958.

PLOT NO. 4

Dept. of Game and Fish property, Huerfano River, Huerfano County, approximately in **Sec. 13, T. 27S, R. 72W,** with approximately 5 acres under fence and 3 acres in cultivation. There are approximately 400 feet of 4 strand barbed wire fence (most of plot already fenced).

PLOT NO. 5

L. A. Waller ranch, Alhandra Canyon, Las Animas County, approximately in **Sec. 11, T. 30S, R. 57W,** with approximately 1.5 acres under fence and 1.5 acres in cultivation. There are approximately 1150 feet of 4 strand barbed wire fence.

PLOT NO. 6

B. Lambuth ranch, St. Charles Creek, Pueblo County, approximately in **Sec. 14, T. 23S, R. 68W,** with approximately 1.5 acres under fence and 1 acre in cultivation. There are approximately 875 feet of 4 strand barbed wire fence (one side of this plot was already fenced).

PLOT NO. 7

F. Zele ranch, Stock Canyon, Las Animas County, approximately in **Sec. 33, T. 31S, R. 65W,** with approximately 2 acres under fence and 2 acres in cultivation. There are approximately 1500 feet of 4 strand barbed wire fence.

PLOT NO. 8

M. Hudson ranch, Alhandra Canyon, Las Animas County, approximately in **Sec. 32, T. 30S, R. 56W,** with approximately 4 acres under fence and 1.5 acres in cultivation. There are approximately 325 feet of 4 strand barbed wire fence (most of this plot was already fenced).

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