

COYOTE DAMAGE IN THE
STATE OF KANSAS

by

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INTRODUCTION

The coming of civilization to the Middle West has meant the passing of most of the larger wild animals. The coyote, however, persists and thrives in spite of man's increased agricultural activity. Young (1939) says that "the coyote is by far the most successful of the larger North American predators in contending with advancing civilization."

Dobie (1949) says that "no other American animal is so apt in adapting himself to changed conditions and in taking advantage of whatever situation arises." Not only has the coyote survived the encroachment of civilization, but he has actually increased his range. Dobie also reports that the coyote followed gold-hunters to the Klondike in the late '90's, feeding on the dead horses they left along the way, and are now firmly established in Alaska. Sperry (1941) states that, unless checked, it seems likely that the coyote will become established in all the Eastern States.

The close association of the coyote with man has led to a serious conflict with the agricultural and livestock industries. Although the importance of coyotes in relation to these industries has long been recognized, factual data on this economically important animal has not been established for the state of Kansas. This study was made to assemble as accurate information as possible concerning the damage done by this mammal, and the most effective means of control now being used, based upon the

observations of county agents and sportsmen over the state. The material is not intended to be conclusive, but to serve as one of the preliminary steps in a five-year study being carried on by the Zoology Department of Kansas State College on the status of the coyote in Kansas.

SOURCE OF MATERIAL

The subject matter of this study was obtained from published works, reports from county agents, county clerks, sportsmen, and other interested individuals.

Questionnaires were sent to each County Agent, asking for (1) as accurate an estimate of damage as possible for each of the past four years, 1945 to 1948, inclusive; (2) what they have observed to be the most effective means of control in their counties; (3) whether the greatest number of coyotes are killed for sport, control, or bounty; (4) the names of game clubs and sportsmen over the county that might be able to add information useful to the study.

The response was relatively good, with 85 of the 103 counties with county agents reporting.

ESTIMATES OF DAMAGE

There was very little consistency to the way in which the county agents reported the amount or type of damage done. In

some cases the amount of damage was listed in dollars, with no mention of the kind of livestock damaged. Others gave their losses as "slight," "chicken industry badly damaged," or "damage chiefly to sheep". An attempt was made to group the losses so reported as light, moderate, or heavy (Fig. 1) and as to the kinds of animals that were attacked (Table 1).

"Light damage" was arbitrarily set at losses of less than \$1000 to the poultry and livestock of the county. Seven counties listing their losses in dollars were placed in this group. The lowest given was \$25 by Rice county. The highest in this group was the \$600-\$700 loss reported by Osborne county.

Twenty-seven other counties suffered only minor losses, but did not list their losses in dollars. These counties were also placed in the "light damage" group. Most of the reports listed actual cases of livestock and poultry losses. Poultry figured most often in the losses reported in this group, with sheep second.

The counties reporting light damage were not concentrated in any certain portion of the state. However, eight counties in the southwest corner of the state did not report any serious damage.

Two counties (Rawlins, Stanton) stated that no damage had been reported.

Losses of \$1000 to \$10,000 were classed as "moderate". Thirteen counties listed such damage in dollars. Six of the thirteen counties gave their losses as \$2000 to \$3000; three

were between \$1000 and \$2000, and four over \$3000. The highest was \$6000 damage reported by Mr. James Shanelec, a sportsman from Ellsworth county. His estimate was made after interviewing several farmers from Black Wolf and Noble townships. He stated that the farmers agreed that the damage would be about \$300 for each township.

Twenty other counties gave information that indicated their losses should be placed in the "moderate" group. Though there were not so many actual cases of loss listed as in the light-loss group, numbers and types of animals lost were usually mentioned. In this group, sheep losses were mentioned most often, with poultry a close second. Calf damage was mentioned rather frequently.

Losses of more than \$10,000 for the year were classed as "heavy". Eight counties in this group listed their damage in dollars. Seven of the eight fell into the \$10,000 to \$20,000 range. By far the highest report of damage was that from Clark county, with a \$50,000 estimate. This damage was principally to poultry and sheep, with some damage to young calves.

Two counties in this group did not list their damage in dollars, but they estimated the numbers of animals killed. Jefferson county estimated the loss to be "100 sheep, 20,000 chickens, and 25 calves", while Neosho county gave "500 lambs, 15,000 chickens, and 100 turkeys" as the estimated loss.

The greatest damage was concentrated in the central and north-central part of the state, with Russell, Lincoln, Cloud,

Dickinson, and Geary counties reporting heavy losses of poultry and livestock, with the heaviest damage to sheep and chickens.

Seven counties answering the questionnaires did not make an estimate of the damage done nor mention the type of damage.

Table 1. Occurrence of livestock and poultry losses among the 79 counties reporting.

Poultry or livestock reported lost*	:	Number of times reported
Sheep and lambs	:	46
Chickens	:	45
Calves	:	23
Pigs	:	10
Turkeys	:	9
Cows	:	2
Pheasants	:	1
Prairie chickens	:	1

*Includes only those reports which indicated the specific farm animal lost.

SHEEP AND LAMBS

Sheep losses ranged all the way from one lamb reported by Johnson county to \$2500 losses reported by Thomas and Russell counties. Washington county stated that sheep losses were down, due to fewer sheep being kept in the county than in previous

years. Several sheep farmers in Mitchell, Russell, Stafford, and Thomas counties have suffered so much loss that they have been forced out of the sheep business.

Chautauqua county reported that much of the damage charged to coyotes may be due to bobcats. Towne and Wentworth (1945) state:

Although the coyote is a wanton killer, the bobcat is worse, since he dines only on the blood of the victim; and many a fat lamb must be jugulated before his appetite is appeased.

With great cunning, and in absolute silence, a solitary bobcat will steal upon the flock, select his victims, rip open their necks, suck the blood and soft parts of the throat and get away unscathed and unheard. Since he does his work quietly, without scattering the flock, one bobcat will sometimes leave more carcasses strewn the ground after the night's work than a whole pack of coyotes.

Bobcat raids are more frequent and deadly at lambing time.

Nine farmers representing nine different townships in Neosho county agreed that when coyotes kill lambs or growing sheep they normally eat only the liver and drink the blood. Neosho is located in the southeast corner of the state, as is Chautauqua county. Labette county, south of Neosho, also reported heavy loss. Cherokee county, however, in the extreme southeast corner of the state, reported the loss of only three sheep in 1948. If bobcats are a menace to sheep raising in this area, they may have been responsible for at least a part of the blood-sucking incidents observed by the Neosho county farmers.

Sperry (1941) in his study of 8,263 coyotes taken from

seventeen states, including Michigan, Wisconsin, Missouri, and all the Western States except Oklahoma, Kansas, and North Dakota, found that sheep and goat remains constituted but 12.92 percent of the coyote's diet. Utah lead the list, with this item 22 percent of the coyote's food. Missouri, with 20 percent, was next highest, while Colorado had a percentage of 18. At the bottom of the sheep-goat column is found Nebraska, with 2 percent. Although no heavy damage was reported by any of the counties bordering Nebraska, the second tier of counties had several cases of rather heavy loss, with Thomas, Mitchell, Cloud, and Ottawa reporting severe sheep damage (Fig. 2).

Several counties reported that much of their sheep damage may have been due to dogs. An article appearing in the Topeka Daily Capital stated that in Franklin county, in March of 1949, a pack of wild dogs caused so much damage that it became necessary for the sheriff to request the aid of sportsmen and wolf hunters in attempting to wipe out the pack of predators. Life (1941) stated that "in settled country, the sheep's worst enemy is the dog." Simmons (1946) observed that

In the farm states, the men who have engaged in the sheep business are agreed that one of the greatest causes for discouragement has been the sheep-killing dog. Thousands of sheep are killed every year by dogs, causing a large monetary loss to sheep owners. Yet the greatest setback of all, which dogs cause the farm-sheep industry as a whole, consists in keeping out of the business men who otherwise are inclined to go into it. No farmer, although desiring to raise sheep, is likely to attempt it while his neighbors' flocks are being chased to death.

Sheep-killing dogs work both singly and in groups, but usually in twos or threes. They do not limit their

attacks to the flocks of the immediate vicinity in which they are kept, but travel for miles in all directions, spreading destruction in the flocks with which they come in contact. Because their work is so often done under cover of darkness it is almost impossible to catch them in the act of worrying sheep; hence they can seldom be positively identified.

The ways in which different dogs attack and destroy vary greatly. Some dogs simply kill one or two in a flock, but others continue the attack until all the sheep are either destroyed or crippled. In many cases large numbers are killed although neither bitten nor wounded---simply chased until they die from exhaustion.

After a dog has once killed sheep it seemingly becomes a mania with him and he is seldom, if ever, broken of the habit. He not only destroys sheep himself, but leads other dogs to do so. No consideration should be given to such a dog. If additional losses from this source are to be avoided, the dog should be killed as soon as his habit is known.

Just how much damage labeled as "coyote damage" is really due to dogs in the state remains to be determined.

POULTRY

Poultry losses were reported by over half of the counties replying to the questionnaire. Losses ranged from a few birds in Lane and Waubunsee counties to 20,000 reported by Jefferson county. Turkey losses were reported only nine times. However, most turkey losses were rather severe, with several farmers having been driven from business because of coyote raids. In Doniphan county one farmer reported the loss of the entire season's hatch of poultry. In some areas of Greenwood county farmers had to stop raising poultry to avoid excessive losses. A similar report was received from Morton county.

Murie (1935), in his four-year study of 2415 food items, found that birds constituted only 73 items, or 3.02 percent, of the coyote's diet. Sperry (1941) found poultry made up only 0.75 percent of the coyote diet. Practically all of the poultry found in the coyote stomachs consisted of chickens. Sperry states that turkey losses are often due to a lone coyote, and with its capture the losses stop. He also pointed out that in cases where coyotes were observed in the act of catching poultry the coyotes made no attempt to molest other birds in the flock.

All "heavy" coyote losses of poultry were reported from the eastern half of the state, with the east central portion of the state bearing the heaviest losses. Only six counties (Russell, Mitchell, Ottawa, Jefferson, Miami, Neosho) reported heavy losses in both sheep and poultry.

High poultry losses were not found to be necessarily associated with large poultry numbers in the county. Only two counties reporting heavy losses (Miami, Neosho) had more than 200,000 chickens (USDA 1947) in the county (Fig. 3). Such counties as McPherson, Marion, and Sedgwick, with over 400,000 chickens in each county, made no mention of poultry losses.

CATTLE

Calf losses were reported by 23 counties. Heaviest losses were reported by Comanche, McPherson, and Geary counties. The ranchers of Comanche county reported the loss of nearly 50

calves killed by coyotes in the spring of 1948. McPherson county gave their loss at 40 calves, as did Geary county. Graham and Jefferson counties reported 25 calves lost. Other calf losses were quite scattered and rather light. Several county agents mentioned that a part of the killing may have been the work of dogs, while others were not sure but that some of the calves may have been dead before being fed upon by the coyotes. Several sources expressed the belief that some of the coyote "kills" were probably due to severe weather.

Two counties (Comanche, Hamilton) reported the killing of cows. In both cases, the cow was in the act of calving, may have been paralyzed, and could not get up. It was also mentioned that there may be considerable loss that cannot be estimated due to the coyotes worrying heifers which are in the act of calving. The heifers are often driven to their feet several times before parturition is completed, resulting in a dead calf.

SWINE

Nine counties mentioned pig losses. Losses were mostly light, except in Elk county which reported 100 pigs lost and Geary county with 75 pigs killed. Both counties have relatively few pigs. Doniphan county, with one of the heaviest pig populations in the state, reported the loss of only one pig. No other county raising a large number of pigs reported any loss.

MISCELLANEOUS

Coyote damage to pheasants and prairie chickens was reported by only one county. This observation was made from piles of feathers found in areas known to be rather heavily populated by coyotes, and cannot be accepted as being more than a surmise.

One county reported that watermelon raising was not profitable due to coyote raids. Fitzgerald (1944) and O'Connor (1936) both commented on the coyote's appetite for watermelon. Dobie (1939) states "they are infallible judges of ripe watermelons, will raid a patch night after night, never biting into a green melon."

Cattlemen in Greenwood county reported that in bad weather coyotes "hang out close to areas where cattle are fed cottonseed cake, and consume considerable quantities of this livestock feed." No reference was found in any of the literature concerning this as an item in the diet of the coyote.

CONTROL METHODS USED

Hunting is the most popular method of killing coyotes in the state. The methods used vary considerably. The use of dogs is most common, followed by coyote drives. Several counties have used planes for locating coyotes. This method has been tried rather successfully in other states. Nordyke (1949) reported that the Fish and Wildlife Service recently used two-way

radios, mounted on a plane and a jeep in coyote control work in Montana. A few cases of destroying new litters by the digging out of dens in the spring were reported.

A number of county agents have come to look upon the usual "coyote drive" with disfavor. The wildlife population in general suffers a greater loss than the coyotes, who often slip through the scattered and not-too-well organized lines. This depletion of the natural food of the coyote only serves to increase the amount of damage by forcing him to turn to domesticated animals to survive.

Four counties specifically mentioned the decreased rabbit population as a direct contributing factor to the increased coyote damage. One source of information suggested a closed season on rabbits for several seasons, with hunting of coyotes only permitted, in order to bring the coyote-rabbit ratio back to normal.

Poisoning ranked second to hunting as a method of destroying the coyote. The so-called cyanide "gun" or "coyote getter" was the principal poisoning method used.

Gerstell (1947) reported that "the effectiveness of the so-called "gas guns" is largely due to the fact they are new to coyotes. As yet, few of the predators have become wise to them." Whether the gas gun will lose its effectiveness because of the "wising-up" of the coyote remains to be seen.

Though there is little doubt as to the effectiveness of the gas gun, there is some evidence to support the several county

agents who went on record as being definitely against its use. An article appearing in the Literary Digest (1927) stated that in the Dakotas poison was responsible for more deaths of stock and animals than coyotes, left to their own natural hunting instincts, would have done. Fitzgerald (1944) stated that the "coyote getter" may be too dangerous for general use in cattle country.

Trapping did not rate as the most important means of control in any of the counties. A few farmers were reported as being rather proficient at it, while a few government or ex-government trappers were reported to be active in the state.

Whatever the means of control now being practiced, it is apparently not causing any great decline in the numbers of coyotes in the state. Twelve counties reported the coyote population as being definitely on the increase. Only two counties stated that their coyote numbers were declining. Credit for this decrease was given to the increased amount of hunting by the returned veterans. Three counties reported their numbers as "slight" or "few".

REASONS FOR COYOTE HUNTING

The chief reason given for hunting coyotes was for sport, followed closely by hunting for control. The killing of coyotes for hides and bounty rated a poor third.

In a state in which there are no deer, bear, elk, or other

large game to hunt, the coyote stands as the largest wild animal left for man to make prey for his guns and dogs. Thirty-seven counties stated that the coyote was hunted mainly for sport. But for his destructiveness to poultry and livestock, the coyote might well be rated the number one big-game animal of Kansas.

Twenty-nine counties reported that coyotes were hunted chiefly for control. In many cases hunting for sport was given an equal rating.

There is no incentive for hunting coyotes for their hides. During the winter of 1949 the Manhattan Hide and Wool Company refused to purchase coyote hides at any price. County Clerks throughout the state estimated that bounties were collected upon over 90 percent of the coyotes killed in the state. However, the one dollar state bounty is not sufficient to encourage the destruction of coyotes for this purpose. Several county agents suggested a higher bounty as being of value in bringing about a decrease in the number of coyotes. They suggested that any increased bounty will have to be uniform over the state to prevent "bootlegging" of coyote scalps to the counties paying the higher bounties.

ESTIMATE OF TOTAL DAMAGE

An attempt was made to arrive at a figure representing the total damage for the year 1948. The loss of the counties of

the light-loss group quoting their losses in dollars was obtained. The average was found to be \$300. This average was used for each of the 37 counties whose estimates indicated they should be placed in the light-loss group. These 37 counties comprised 46.2 percent of the 79 counties making estimates of coyote damage. It may be assumed that 46.2 percent of the 105 counties of the state would then fall into this group. Thus, 49 counties of the state would show an average loss of \$300 per county, or a total of \$14,500.

The same procedure was used in obtaining the amount of loss in the moderate and heavy-loss groups. The average loss of the 33 counties in the moderate-loss group was \$3,100, with a total loss for the calculated 43 moderate-loss counties of \$134,540, and of the 10 heavy-loss counties \$13,540, with a total loss for the calculated 13 heavy-loss counties of \$177,374. The \$50,000 loss reported from Clark county was not used in arriving at the latter average, as it was over twice the amount of the next highest group. The remaining nine reported their losses to be between \$10,000 and \$25,000.

Total loss in the three groups so calculated was \$326,414. To this was added the estimated \$30,000 paid in bounties over the state, making a grand total of \$356,414 for the year 1948 traceable directly or indirectly to coyotes and undetermined dog damage.

None of the 85 counties reporting made mention of the beneficial feeding habits of the coyote in destroying great

numbers of rodents, weakened and diseased game birds, and carrion. This phase of the study will be covered in a report by Dr. Otto W. Tiemeier of the Kansas State College Zoology Department.

SUMMARY

This study was made to secure as accurate information as possible at the present time concerning the damage done by coyotes to the livestock and poultry in the state of Kansas. The subject matter was derived from the Kansas State College Library, newspapers, government bulletins, county agents, sportsmen, and personal observations.

Much of the information received was admittedly in the form of estimates. The present methods of securing information are not sufficiently organized to collect accurately the amount and type of damage done to individual farms and ranches over the state.

Coyote damage is not uniform over the state. Also, the amount of damage is not necessarily in proportion to the numbers of livestock being raised in a county. In some parts of the state the coyote seems to have a definite preference for sheep, in others poultry, in others pigs, and in a few counties it preys rather heavily upon all forms of farm animals.

More study needs to be made concerning the amount of damage that should be attributed to dogs.

Coyote hunting ranks high as a sport in the state. The amount spent for dogs, equipment, and coyote drives represents a considerable monetary outlay. Many people combine the sport of hunting with a desire to, or the necessity for, control of the predator. Coyote drives are used rather extensively, but may be more of a danger to other wildlife than to the coyote. The cyanide gun is the most effective means of control where used by experienced individuals. However, like the coyote drive, the cyanide gun is disliked by some ranchers, farmers, and county agents.

Hides are of no value, and offer no incentive for hunting or trapping coyotes. Bounties are too low to cause much coyote hunting as a source of revenue.

Coyote numbers in general are on the increase, with a decrease in number being reported by only a few sources of information. This may be only an apparent increase in numbers, due to changed food habits. The amount of coyote damage may be expected to decrease, even though there is no decrease in numbers, if the coyote-rabbit ratio can be again restored to normal.

A suitable method of control cannot be based solely upon a study of the damage done, but must also include a study of such things as reproductive rates, total food habits, wild-dog damage, and improved methods of protecting livestock from damage.

ACKNOWLEDGMENT

The writer wishes to express his thanks to Dr. H. T. Gier and Dr. Otto W. Tiemeier for their valuable advice, criticism, and assistance in the preparation of this paper.

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APPENDIX

EXHIBIT A. Form letter sent to County Agents
to accompany questionnaire.

Manhattan, Kansas

Dear Sir:

A year ago, a study of the coyotes of Kansas was begun by members of the Zoology Department of Kansas State College. A report of last year's work is enclosed for your information. It is planned to continue the study for another four years, and expand the work to include numbers of coyotes and damage done by coyotes in Kansas.

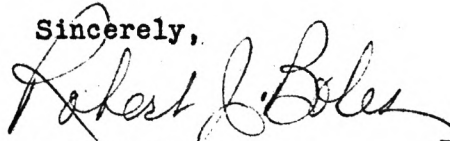
We would appreciate your assistance in helping us in this study. As a County Agent, we feel you are in a position to supply us with certain items of information that will be especially valuable to the study.

Wherever possible, we would like definite facts and figures, as you are able to supply them. You might also include any other information you believe to be pertinent to our study.

You will find a questionnaire and self-addressed return envelope enclosed. We would like to have the questionnaire filled out and returned at your earliest convenience.

Thank you for your time and trouble.

Sincerely,

A handwritten signature in cursive script, reading "Robert J. Boles".

Robert J. Boles

RJB:mas

EXHIBIT B. Questionnaire used in collecting
data for report.

COYOTE SURVEY

What is your estimate (actual cases, if possible) of the damage done by coyotes to livestock? List last year's damage (1948) as accurately as possible, with as accurate an estimate as you can give for several previous years:

1948 damage: _____

1947 damage: _____

1946 damage: _____

1945 damage: _____

From your observations, what has proven to be the most effective means of control over the coyote population in your county?

Hunting (Dogs, coyote drives, etc.) _____

Poisoning (cyanide "guns", etc.) _____

Trapping _____

Would you say most of the coyotes are killed for: Sport? _____

Control? _____ Hides and bounty? _____

Is there an organized game club in your county? _____ If so, please give us the name and address of the secretary, or president:

If you know of other interested persons in your county who might be of assistance in collecting information on the coyote, please list their names and addresses:

Please use the remainder of this sheet (and the back, if necessary) for any additional observations or records pertaining to coyotes in your county:

EXHIBIT C. Form letter used to accompany questionnaire when requesting data from sources suggested by County Agents.

Manhattan, Kansas
March 30, 1949

Dear Sir:

Your name has been suggested by your County Agent as someone who might be able to supply us with some information relative to a study we are making of the coyotes of Kansas. We would appreciate your filling out the enclosed questionnaire as accurately as possible, and returning it as soon as you can.

I am enclosing a copy of the preliminary report for your information.

Thank you for your time and trouble.

Sincerely,

Robert J. Soles

EXHIBIT D. Form letter used in making a second request for data from counties failing to reply to first request.

Manhattan, Kansas
March 30, 1939

Dear Sir:

Some time ago we sent out questionnaires requesting information concerning the coyote damage in the various counties of Kansas.

The response has been quite good. However, we do not have a report from your county. We would appreciate you filling out the enclosed questionnaire and returning it as soon as possible. If you are new to the county, will you please pass it on to some one who can supply us with the desired information, and ask them to send it to us right away?

Thank you for your time and trouble.

Sincerely,

Robert J. Boles

EXHIBIT E. Business reply post card form and
questionnaire used for requesting
data from County Clerks.

Coyote Survey

Estimate of the percent of coyotes killed that are
actually turned in for bounty: _____

If your county pays a bounty in addition to the
state bounty, please list the number and amount paid
in: 1945-No.____, Amt.____. 1947-No.____, Amt. ____
1946-No.____, Amt.____. 1948-No.____, Amt. ____

The amount of money allotted for the state bounty
was not adequate to pay all claims in: 1945--____,
1946--____, 1947--____, 1948--____.

Remarks:

Questionnaire filled out by: _____.
County: _____

THIS SIDE OF CARD IS FOR ADDRESS



County Clerk
_____, County
_____, Kansas

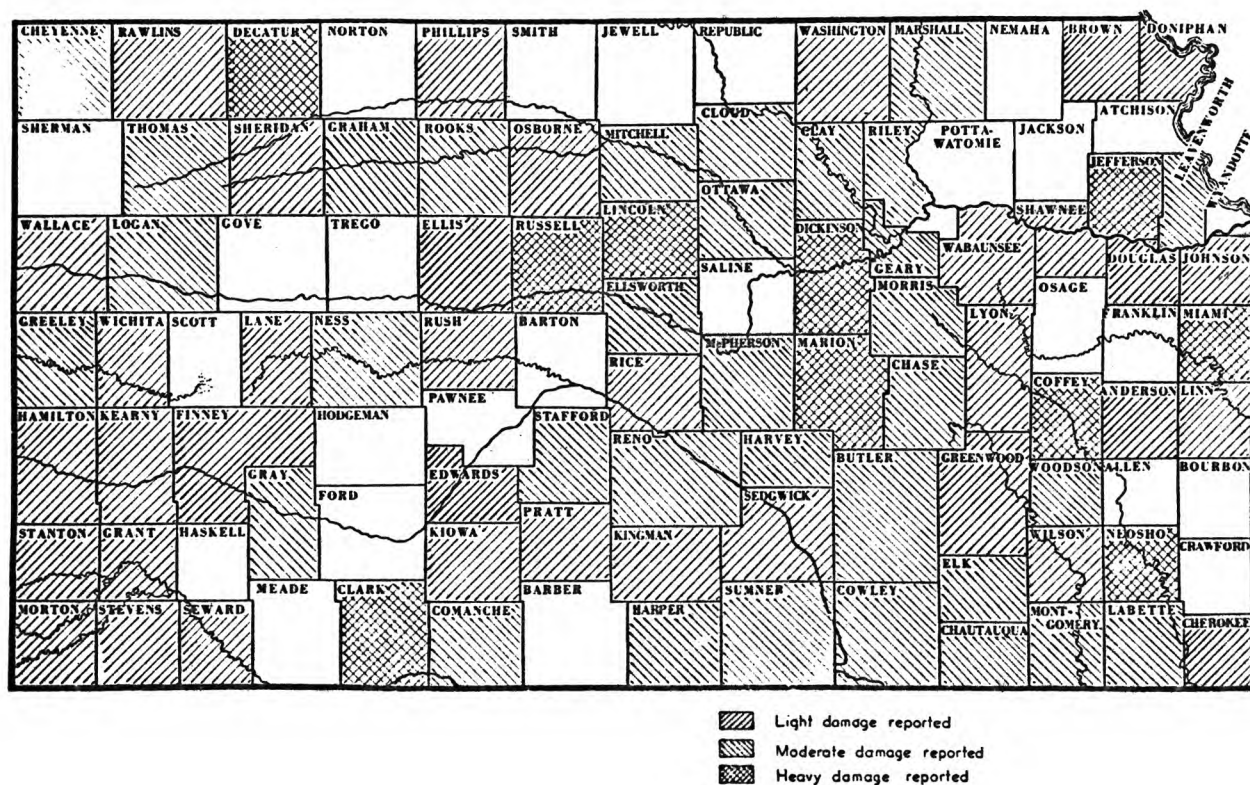


Fig. 1. Map showing coyote damage reported by counties. Unshaded counties made no estimate of damage.

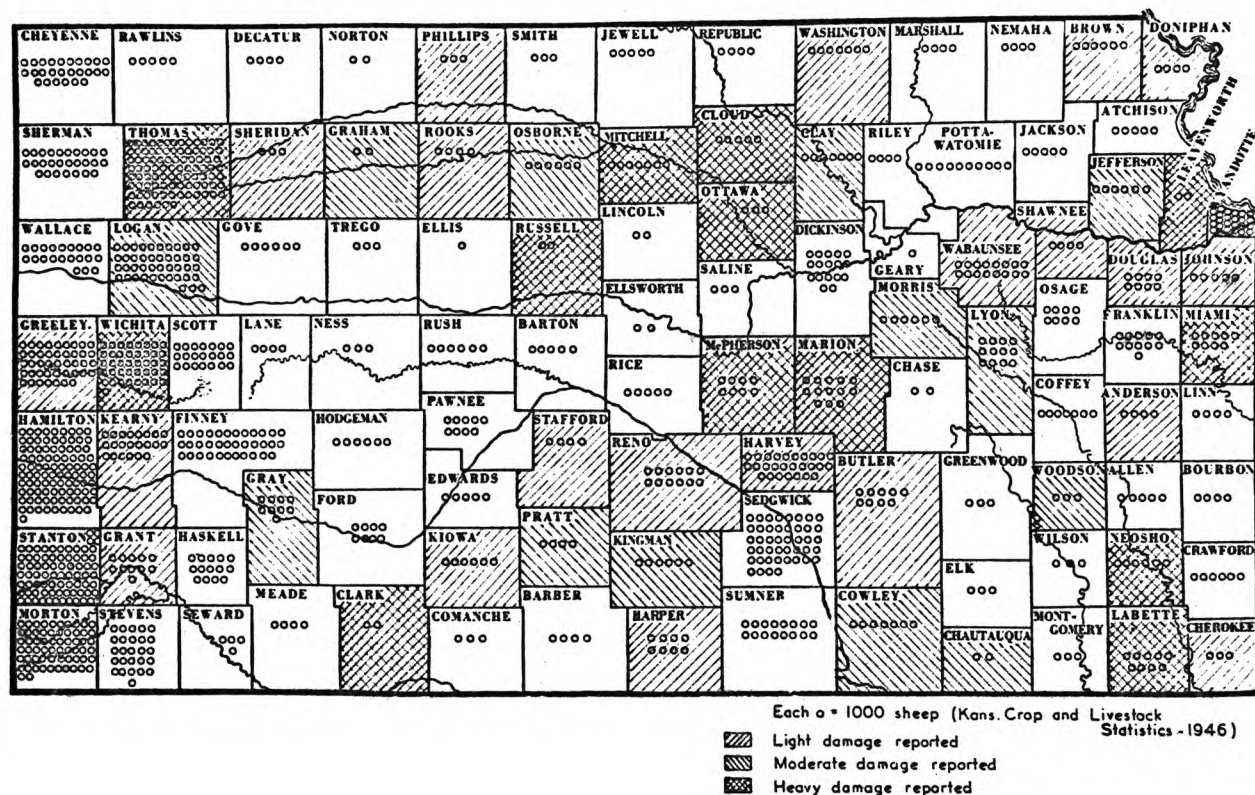


Fig. 2. Map showing coyote damage to sheep in the state. Unshaded counties made no estimate of damage.

