

THE VULTURES: THEIR MOVEMENTS, ECONOMIC
STATUS, AND CONTROL IN TEXAS

BY PAUL W. PARMALEE

INSTANCES in which vultures have been known to attack and devour domestic animals, particularly the young, are not uncommon. Lovell (1947) reported on the killing of young pigs by Black Vultures (*Coragyps atratus*) in Kentucky; Sprunt (1946) noted a case of predation on a lamb by this species in West Virginia; Andrews (1942) described some of the losses of lambs and ewes to Black Vultures in Burnet and Lampasas counties, Texas. Attacks by Black Vultures on wild animals such as the skunk and opossum have also been observed (McIlhenny, 1939). In the northern states where comparatively few of these birds are present, predation on livestock also occurs. Most of the damage inflicted on domestic animals is attributed to Black Vultures, with but few exceptions (Hamilton, 1941). As pointed out by Lovell (1947), however, the report by Hamilton that Turkey Vultures (*Cathartes aura*) killed young pigs near Fort Myers, Florida, may have been a "case of misidentification."

During the past ten or fifteen years, there has been an apparent increase in the amount of predation on livestock by Black Vultures, particularly in areas where cattle, hogs, and sheep are raised in large numbers. Greatest losses occur among newly-born animals and cows, ewes, and hogs during labor or shortly after birth of the offspring.

The following data are presented in an effort to represent the situation as it exists and has existed in Texas; in regard to control measures, it is neither a defense nor a condemnation of such practices.

Acknowledgements.—I am indebted to Allen J. Duvall, Fish and Wildlife Service, for band return records and other data pertaining to banding. Without the assistance and information supplied by the county agents as well as the ranchers who trapped vultures, this study would not have been possible. I also wish to express my gratitude to Mr. Allen Burgess, Route 2, Nacogdoches, Texas, for permitting me to band and use for other purposes many of the vultures that he trapped.

METHODS

In order to determine the extent of the vulture problem in Texas, letters were written to 154 county agents between August 1, 1952, and March 1, 1953. After a brief explanation of the author's interest in the problem, they were asked to submit the names and addresses of landowners in their county who had built and operated vulture traps.

Of these 154 county agents, 115 replied, and a list of names of 110 landowners was obtained.

A letter outlining the problem was then sent to each of these landowners, and included with the letter was a questionnaire regarding the trap. Questions relating to the following aspects of trapping were asked: (1) month and year the trap was built, (2) location (open pasture, woods, and woods edge), (3) approximate number of vultures caught, (4) seasonal differences, if any, in trapping success, (5) ratio of Black to Turkey vultures, (6) damage inflicted by the vultures, (7) whether trapping eliminated the vultures, (8) baits used, (9) fate of the trapped birds, and (10) capture of banded birds. Each landowner was also asked to add any additional information he felt was of interest or value.

Between August 1, 1952, and March 31, 1953, 454 Black Vultures were banded and released in Nacogdoches County, Texas, by the author. Traps in Robertson and Trinity counties were visited, although the trap and related vulture problem on the Allen Burgess Ranch, Nacogdoches County, formed the main center of study.

DATA ON TRAPPING

Of the 110 questionnaires sent to land owners who operated "buzzard" traps, 66 were filled out (more or less completely) and returned. In several instances, county agents supplied additional data in regard to past control measures in their county or in neighboring counties, and many indicated that although traps were not being used to control these birds, damage of one type or another had occurred. Loss of livestock and possible pollution of watering places by vultures led to the construction of traps in 66 counties.

Eighty-three per cent of the traps for which data are available were built after 1940. Trapping and other means of control (shooting and the use of poison) have been used for some time, one rancher (in Wharton County) stating that his grandfather had trapped vultures prior to 1900. Trapping was practiced on the King Ranch (Kleberg and Kenedy counties) as early as 1918-1919. Figure 1 shows the counties in which traps have been, or are now, in operation, Counties in which damage has resulted from depredation by vultures, but apparently not enough to warrant the building of traps, are also marked. Table 1 has been assembled from information supplied by landowners and from trap data obtained directly by the author.

Many of the ranchers who returned the questionnaire specifically indicated that the Black Vulture was the species that preyed on their livestock, and, although the Turkey Vultures would join the Blacks in feeding on the ill-gotten carcasses, they never took part in "pulling-

TABLE I
SUMMARY OF VULTURE CONTROL MEASURES AS OF MARCH 31, 1953

	<i>Number</i>	<i>Per cent</i>
Location of trap (59 traps)		
Open pasture	28	(47.5)
Woods	5	(8.5)
Woods edge	26	(44.0)
Baits used (60 traps)		
Primarily dead cows, sheep, pigs and/or goats (plus young)	28	(46.7)
Armadillos and/or rabbits	17	(28.3)
Offal	9	(15.0)
Skunks, opossums, dogs, etc.	6	(10.0)
Season when the greatest number of vultures was captured (42 traps)		
Late winter and spring (February-May)	21	(50.0)
Summer (June-August)	6	(14.3)
Fall (September-October)	6	(14.3)
Early winter (November-January)	3	(7.1)
No difference noted	6	(14.3)
Damage inflicted (data from 56 landowners)		
Killed new-born calves, lambs, pigs, and/or kids	36	(64.3)
Killed new-born animals; adults in labor or shortly after giving birth; sick animals	10	(17.9)
Pollution of water	4	(7.1)
Killed livestock and pollution of water	6	(10.7)

down" stock or in killing live prey. Apparently Turkey Vultures do not have the aggressive characteristics of the Blacks.

Only ten landowners indicated that they caught more Turkey Vultures than Blacks, or about the same number of each. The author is of the opinion this is the result of two factors: first, the Black Vulture is more numerous in the eastern portions of the state than the Turkey Vulture; and, second and most important, the latter species appears to be less aggressive and more wary than the former. Although numerous Turkey Vultures were observed on many occasions flying low over the trap operated by Mr. Burgess and even alighting on it and in nearby trees, only one was captured, as compared with approximately 1,500 Black Vultures.

Approximately one-fourth of the ranchers replying to the questionnaire indicated that they kept exact records of the number of birds caught. Others gave only approximations, and several stated that "after the first 500, 1000, etc., we quit counting." The estimated figure of 100,000 vultures trapped (based primarily on questionnaire data) is without question conservative since data are probably not

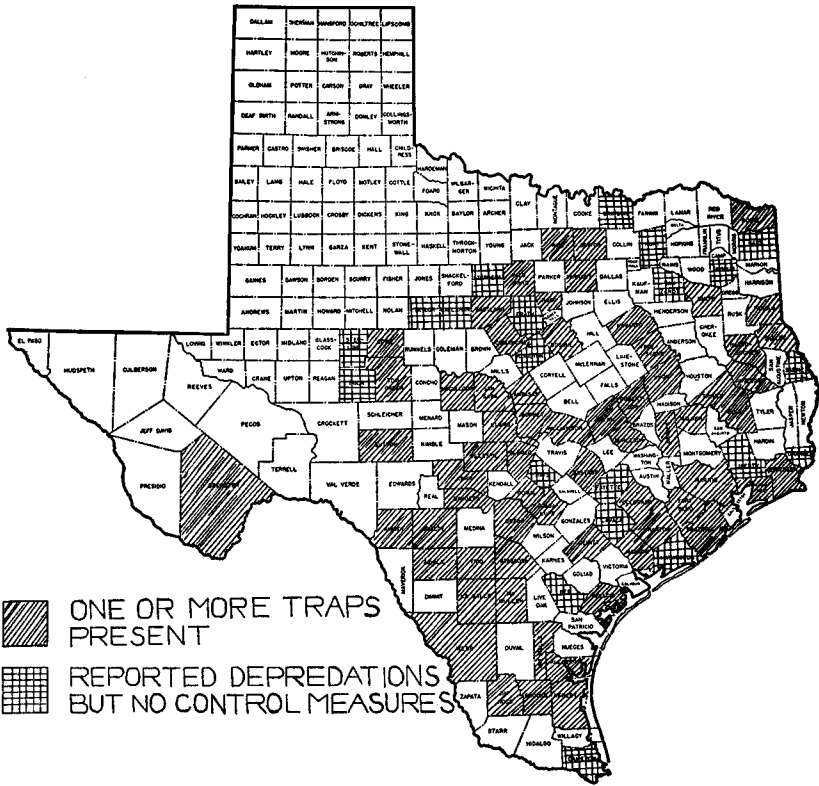
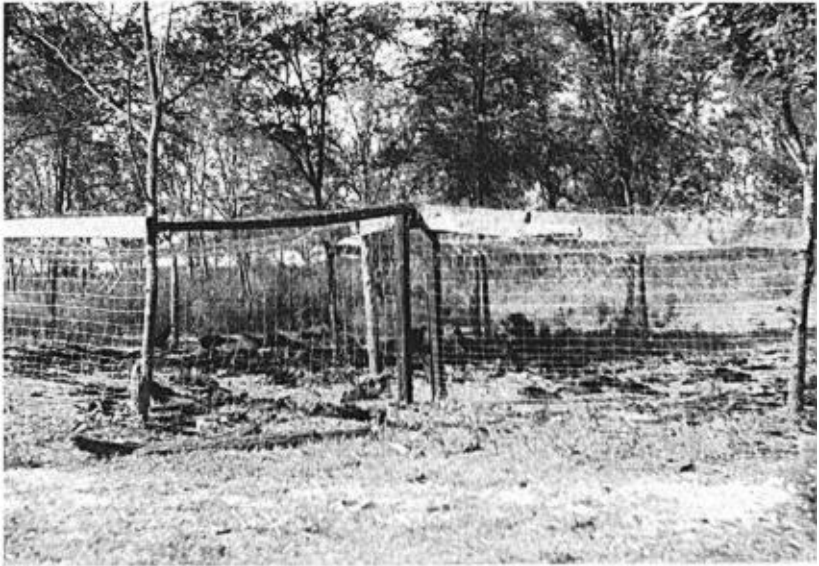


FIGURE 1. Map showing the counties in Texas where depredations by vultures are known to have occurred.

available for all traps that have been operated, and the number of birds caught after a certain number were counted was not recorded, or no count was made.

Large numbers of livestock which range over extensive areas that cannot be, or are not watched closely by their owners at the time when the young are born, constitute an easy source of food for the vultures. The greatest loss to domestic animals occurs in the newly-born and in sick or weakened animals that had difficulty giving birth. Several ranchers reported that cows or ewes, weakened from giving birth to their young and unable to defend or to clean the young or themselves of afterbirth, were often attacked (see table 1).

Vultures tend to utilize a particular local area for roosting, and traps were constructed by a few landowners for the primary purpose of eliminating those birds that were roosting on their land. The



VULTURE TRAP OPERATED BY MR. ALLEN BURGESS, NACOGDOCHES COUNTY TEXAS. (*Top*) Front view showing the V-shaped entrance. (*Bottom*) A portion of over 200 Black Vultures captured the first week in February, 1953.

majority of traps are built and retained permanently in one area, although in some cases (e.g. King Ranch, Kleberg and Kenedy counties) they are so constructed that they can be transported from one area to another. Most are roughly circular in pattern, varying in diameter (10 to 40 feet) and height (4 to 6 feet), and have a V-shaped opening through which the birds walk in (plate 1). Various types of poultry netting and stock fence are used for the sides and top. A door on one side facilitates the placing of bait and the removal of trapped birds.

Eighty-one per cent of the landowners removed the vultures (after killing them or after they died) and burned or buried the carcasses. Many indicated that by leaving a few birds, additional vultures would be decoyed into the trap. Considerable variation of opinion existed as to the most effective bait; apparently availability was the most significant factor in determining what was used. Dead livestock and offal were utilized by over 50 per cent of the trappers while armadillos and rabbits were also used by many (table 1).

Of the 52 landowners making a definite reply to the question concerning the effectiveness of their trapping efforts in eliminating the vultures, and consequently reducing the loss of domestic animals, 43 indicated that their trapping program was successful in alleviating the problem. Only four stated definitely that their attempts at eliminating the vultures were fruitless, while five were "doubtful" as to the effectiveness of such control practices. Nine ranchers noted that they trapped only periodically (all seasons represented) or until the "local population" of vultures had been caught.

Mr. L. O. Weathersbee, County Agent for Kinney County, reported that, although traps had been used with some degree of success, the most satisfactory means of control was poison. A large number of rabbits was obtained and approximately 80 cc. of a 25 per cent solution of 1080 (fluoro-acetic acid) was injected in the heart and body cavities of each dead rabbit. These rabbits, varying in number from 50 to 75, were then spread out in a circular pattern in about a one-fourth mile radius from water holes. Apparently considerable care was exercised in picking up the dead buzzards and burning them. Evidently the effectiveness of the poison bait far surpassed that of the traps and was employed to eliminate the vultures "en masse."

Ten ranchers stated their belief that vultures, by either defecating or regurgitating food, polluted watering places. Several others expressed the popular belief that these birds are transmitters of such diseases as hog cholera and anthrax. Dubos (1948) states that blood-sucking flies, dogs, rats, coyotes, "and particularly buzzards" should

be barred from diseased animals (those with or dying from anthrax) since they "probably" disseminate infectious materials, but published proof of this hypothesis in respect to vultures is wanting.

Texas has not protected the vultures since 1925, and the birds are also unprotected in the states of Delaware, Maryland, Virginia, North and South Carolina, Georgia, Florida, Alabama, Tennessee, Louisiana, and Oklahoma. Although Mississippi does protect vultures, special permits have been issued to individuals to kill these birds when they were causing damage to livestock. As indicated in personal correspondence with Alexander Sprunt, Jr. and Bayard W. Read, the vulture problem has reached such proportions in Florida that trapping has become a standard control method in certain localities.

Apparently there is a tendency for a large number of vultures to congregate in local areas where environmental conditions are particularly favorable. The number of birds occurring in the northern Panhandle and western sections of Texas is small compared to that in the central and eastern portions. Temperature may be a limiting factor during the winter months, although extensive crop farming and the absence of large numbers of domestic animals probably reduce the suitability of the region for their inhabitancy.

In the Edwards Plateau or "hill country" (south-central Texas), which is an important goat- and sheep-raising area, the loss of ewes, lambs, and kids through vulture predation has long been a serious problem. Of equal significance has been the depredation by these birds on pigs and calves in the eastern one-third of the state. Obviously one of the most important ecological factors conducive to large vulture populations is a plentiful food supply. It is reasonable to assume that, when the livestock industry (primarily cattle and sheep raising) began to expand rapidly in Texas 35 or 40 years ago, a larger source of food became available to the vultures. During the last few years there has been an apparent increase in the number of Black Vultures in a few of the southern states (especially Texas and Florida), and in local areas these birds have become quite numerous.

With the increased vulture population the "demand" for food has become greater than the "supply," and consequently the birds have turned to preying on livestock more readily. It has also been suggested (Andrews, 1952) that the efficiency of rendering companies in removing carcasses for processing soon after the animals' death, is, in a sense, competing with the vultures by removing much of their food. Fear of disease and possible epidemics have now induced most stock-owners to burn or otherwise remove carcasses of animals dying of unknown causes.

One of the most unusual situations in regard to the vulture predation problem exists on the dairy ranch of Mr. Allen Burgess at Nacogdoches, Texas. Mr. Burgess, in addition to his dairy cows, has a large number of hogs on one section of his ranch. For two consecutive springs a large percentage of newly-born pigs as well as an occasional calf were killed by Black Vultures. The number of vultures of both species that frequently congregate in large flocks on Mr. Burgess's pasture is truly astounding. On numerous occasions between 150 and 200 vultures have been observed feeding on a section of pasture of less than 50 acres.

The reason for the exceptionally large number of these birds may be attributed to a somewhat unusual agricultural practice employed by Mr. Burgess. Large quantities of chicken feathers are obtained from a local poultry house in Nacogdoches, and these are scattered on the pastures, allowed to decompose for a period of time and are then turned under for mulch. The occurrence of chicken heads and feet, mixed in with the feathers, has been the primary factor in attracting vultures to this ranch. Home butchering and the careless elimination of offal and similar waste has caused similar problems experienced by other ranchers.

In July, 1952, Mr. Burgess built a large circular trap approximately 40 feet in diameter. Over 200 Black Vultures were trapped as a result of the first baiting, and since that time (as of March 31, 1953), an average of 150 vultures a month has been captured. Most of the birds were left in the trap and soon perished from lack of food and water. Several ranchers, however, stated that they provided food and water for the few vultures they left in the trap as decoys and removed all others as soon as they were caught.

As indicated earlier in the paper, 83 per cent of the ranchers considered their trapping efforts successful in eliminating an apparently temporary local population of vultures. For most, the problem is a seasonal one (primarily at lambing and calving time), but in a case such as the one just described, the problem is ever-present. Mr. Burgess indicated that the number of vultures present now is not comparable to the number before trapping was undertaken. In all probability, many of the local birds were removed by trapping, but with such an obvious food supply of chicken remains available, additional vultures are constantly being attracted to the area. Through the coöperation of Mr. Burgess, 454 Black Vultures were banded between August 14, 1952, and March 31, 1953. It was hoped that these banded birds would give some indication of general movements and the possible stability of a population in a local area.

BANDING STUDIES

As of August 1, 1952, 22,703 Black Vultures and 1,381 Turkey Vultures had been banded in the United States, and of these totals, 899 (3.9 per cent) banded Black Vultures and 103 banded Turkey Vultures have been recovered. Only 32 of the 899 banded Black Vultures and none of the 103 Turkey Vultures were recovered in Texas. No significant returns have been recorded for the very few vultures banded in Texas prior to this study. Several thousand Black Vultures were banded at Avery Island, Louisiana, by the late E. A. McIlhenny, and 31 per cent of the total bands recovered in the United States were from these birds. Thirty-one of the 32 Texas recoveries had been banded by Mr. McIlhenny, the points of recovery all being in the eastern one-third of the state.

Ten of the 32 banded Black Vultures recovered in Texas were trapped, while the others were shot or found dead. In answer to whether any banded birds were captured in their traps, three ranchers indicated they had taken banded birds. One rancher (Wharton County) had informed the Fish and Wildlife Service of the three banded birds he had captured. The remaining two, however (Lampasas and Navarro counties), apparently did not, since no recoveries are recorded from these two counties. It is the opinion of the author, however, that in all probability numerous other banded birds have been trapped but have gone unnoticed.

As indicated previously, 81 per cent of the ranchers killed and removed the vultures, while the remaining 19 per cent left the birds in the trap. In either case, apparently little attention is given to the possibility of having caught banded birds since many of these individuals are unaware of bird-banding programs. Also, the task of removing the dead birds is unpleasant and is dispensed with as rapidly as possible, while vultures left in traps to die are given little thought. Probably many banded vultures are overlooked, since the bands soon become covered with fecal matter and would certainly go unobserved unless an individual was specifically looking for bands. Of the 454 Black Vultures banded by the author, bands on all birds that returned to the trap were covered with fecal matter. In several instances, this material had become so caked that the band was cemented to the leg.

Of the 454 banded vultures, 123 were released three and one-half miles south of Nacogdoches, a straight-line distance of approximately 10 miles from the trap, and 321 vultures were released at the trap site (four miles northeast of Nacogdoches). As of May 1, 1953, 19 (5.9 per cent) of the latter group were retrapped; 20 (16.2 per cent)

of the 123 birds released south of Nacogdoches were retrapped (banding started August 14, 1952, and ended March 31, 1953). If a local population existed, one might expect a higher percentage of recoveries from birds released at the trap than of those released some distance away, but such was not the case since approximately three times the number of birds released 10 miles from the trap returned as compared with those released at the trap.

Ten vultures were released at the east edge of Nacogdoches, and only one of these returned to the trap. These birds were released August 14, 1952, and one (Band No. 498-83926) was first retrapped March 7, 1953, and again on April 13, 1953, a time interval of 215 days between the first and second capture. A vulture wearing Band Number 498-45246 was banded August 18, 1952, and retrapped April 17, 1953; a time interval of 247 days. This interval represented the longest encountered during the study. Seven days was the shortest. The average time-interval for the 39 retrapped birds was 72 days. Only six of the 454 banded birds were retrapped twice, and no vulture was retrapped more often. McIlhenny (1937) reported catching 77 banded birds and 279 new birds at one baiting. Approximately 210 vultures represents the largest number of birds taken in Mr. Burgess's trap at one time, and seven the largest number of retrapped birds. Although banding data are limited and those which are available tend to be somewhat confusing and raise some difficult questions, a few factors are rather apparent.

The proximity of the trap to the point of release was not significant in relation to the number of retrapped birds, since the largest percentage of retraps were birds originally released 10 miles from the trap. If there was a tendency to build up a local population of vultures in that area, one would expect to retrap some of these local birds time after time, but such appeared not to be the case in this instance. As noted previously, however, 83 per cent of the landowners who trapped vultures stated definitely that trapping had eliminated local populations or at least the majority of the birds in the area. Several indicated that trapping was repeated (or seasonal) when populations of these birds again built up. When the lambing or calving season ended, and an important source of the vultures' food was gone, the few remaining local birds or occasional transients caused no problem.

The time-interval between first and second capture tends to indicate that at least some of the birds must wander over a considerable area, possibly each bird or local group having a definite territory. One bird (Band No. 498-45286) was banded and released at the trap

September 11, 1952, and was shot 2 miles east of the trap on November 11, 1952. Another vulture (Band No. 498-03619) was banded and released at the trap February 8, 1953, and was killed 10 miles north of Tyler, Smith County, Texas, two days later. This bird had moved an approximate distance of 70 miles during that two-day interval, thus indicating the relatively long distances that can be covered in a short time. A pertinent factor which could greatly influence the correct analysis of the problem is the question of whether all of the banded birds, once they come in contact with the trap again, will re-enter the trap.

Several ranchers stated that after having caught "a trap-full," a period of several days to even weeks would elapse before others would enter, even though many vultures were seen about the area. Four ranchers reported a rather unusual condition in regard to trapping success that was also noted by the author. During hot, dry periods the bait would undergo decomposition and drying without attracting vultures, until little but dried skin and bones remained. After a soaking rain, however, many new birds were caught, the only bait being the remains of the old, dried carcasses. The odor produced by the water on the dried remains of the animals used for bait apparently attracted the vultures to the trap, thus indicating the possible significance of odor in aiding vultures to locate food.

Nomadic movements or a possible territory or range of these birds may also be influenced markedly by seasonal variations and the breeding and nesting periods. It is reasonable to assume that the added pressure on the adult vulture to supply food to the young, the young requiring a considerable amount of food daily (Bent, 1937), might induce them to attack live animals more readily. Regardless of these factors, concentrations of these birds apparently become established locally when a source of food becomes available. Unfortunately this food supply has been in many instances, lambs, kids, pigs, and/or calves, and in the process of controlling vultures in Texas, a multitude of these birds have been and are now being destroyed.

SUMMARY

During the last 50 years, trapping has constituted the principal means of controlling vultures in Texas. With an apparent increase in the number of vultures during the last few years, the control program has been greatly intensified. One or more traps have been or are now being operated in each of at least 66 counties in Texas.

By writing county agents, names and addresses of landowners operating traps were obtained, and 110 of these were sent question-

naires concerning their trapping program. Sixty per cent of these landowners returned the questionnaire and data for 78+ traps were obtained.

Most, if not all, of the depredations on newly-born, sick, and weakened domestic animals is attributed to the Black Vulture.

Eighty-three per cent of the landowners stated that trapping had definitely been effective in controlling vultures and therefore preventing further depredation on their livestock. In one instance poison was used successfully to control these birds.

Between August 1, 1952, and March 31, 1953, 454 Black Vultures were banded in Nacogdoches County by the author. Although data resulting from the banding study are not complete enough to draw definite conclusions, indications are that most Black Vultures do a considerable amount of wandering. There is a tendency, however, for local concentrations to occur when a large food supply is available, and these concentration remain as long as that food supply is available.

Of the 454 vultures banded, 39 returned to the trap where they were first caught, six of these twice. One bird returned to the trap approximately eight months after it was originally banded. The possibility of some vultures becoming trap-shy after having once been captured would affect any conclusions drawn concerning their movements or status in a local population.

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