Section 6 Performance Report Review

Attachment to letter dated: March 5, 1998

Project : Conservation Strategy for the Texas Panhandle Short Grass Prairie

Final or Interim report? Final

Job # : 63

Report: X is acceptable as is

____ is acceptable as is for interim report, but the following comments are made for future reference

____ needs some minor revision

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E-1-9

ENDANGERED AND THREATENED SPECIES CONSERVATION

Project No. 63: Conservation Strategy for the Texas Panhandle Short Grass Prairie

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January 30, 1998

FINAL REPORT

State: Texas **Grant Number:** E-1-9

Grant Title: Endangered and Threatened Species Conservation

Project Title: Conservation Strategy for the Texas Panhandle Short Grass Prairie

Contract Period: September 1, 1995 through August 30, 1997

Project Number: 63

Submitted by: Kevin Mote **Date:** November 1, 1997

Approved by: Neil E. Carter **Date:** January 31, 1998

Neil (Nick) E. Carter

I. Objective: To identify and quantify available short grass prairie; to determine the status of mountain plover, swift fox, prairie dogs, burrowing owl and plains spotted skunk; to develop management strategies that may further enchance or maintain populations of species of concern; to cooperate with private landowners and other agency biologists to develop at least one strategy for conserving the Panhandle short grass prairie ecosystem; and to provide public outreach.

II. Justification

The short grass prairie ecosystem is home to a variety of unique and increasingly rare group of animals. Growing concern over the status of prairie species has resulted in petitions to list 2 of these species including the swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), as well as focusing attention to others like the black tailed prairie dog (*Cynomys ludovicianus*), burrowing owl (*Athene cunicularia*), and plains spotted skunk (*Spilogale putorius interrupta*). The most obvious threat to all of these species appears to be loss of native habitat. The High plains of Texas is a highly agriculturalized region. Approximately 50% of native rangeland in the Texas Panhandle has been converted to agricultural practices or other uses (USDA-NRCS 1997). Approximately 97% of Texas is privately owned. In light of these facts, it is imperative to develop conservation strategies that can be incorporated into farming/ranching operations currently being utilized by private landowners.

III. Procedures

The following section addresses each of the project objectives by providing a literature review where applicable and a description of procedures used to address the objective.

Objective #1

It was originally planned to use aerial photography and county maps to identify remaining short grass prairie (SGP) habitat. After several consultations with local NRCS biologist Charles Coffman, Texas Parks and Wildlife Department (TPWD) geographic information system (GIS) specialist Kim Ludeke, and Raymond Simms with Texas Gap Analysis Program (TXGAP), it was decided that the most effective approach to the problem would be to utilize satellite imagery. This technique was selected because it provides continuous coverage of the study area (High Plains Region of The Panhandle), a detailed map of land cover can be produced, the map can be easily incorporated into a GIS database, and it would provide the baseline information to establish a long term monitoring program for SGP. For such a large study area, aerial photos were believed to be inferior to satellite imagery.

A pilot study is being conducted through a cooperative effort between TPWD and TXGAP. This study is being used to determine the feasibility of utilizing thermatic mapping scenes to accurately depict areas of remaining SGP habitat. TXGAP is currently mapping general land cover types in West Texas using this technique. The pilot study is being conducted to determine if mapping efforts can be refined such that SGP habitats can be differentiated from similar habitats like CRP and improved grass pastures. Mapping procedures for this pilot study will entail using one 1993 satellite imagery (TM scene) in conjunction with 60 georeferenced points, using a portable GPS unit and post-processed data, within known SGP habitat. The pilot study area will encompass approximately ¼ of the northwest Panhandle. From these 60 points the map is refined in the lab to produce a hard copy that can be taken into the field for further verification of accuracy. With the first hard copy, TPWD biologist will collect 60 additional georeference points that will be used to further refine the map. This process will continue until an accurate map has been produced or it is determined that the technique is not adequate. If this pilot study is successful, this technique will be used to construct a map of the entire Panhandle from 1997 TM scenes.

Objective #2

Thorough literature review has been conducted along with field training of the principal investigator to determine the best methods for determining status and performing long term monitoring of each of the 5 species of concern which includes mountain plover, swift fox, prairie dog, plains spotted skunk, and burrowing owl. The following information gives a review of the literature, by species, and the methods employed to determine status and monitoring.

1. Mountain plover

Literature Review. The mountain plover is 1 of only 12 bird species endemic to the grasslands of North America (Mengel 1970, Knopf 1988), spending it's entire life on the grasslands of North America. It breeds on the short grass prairie of the Western Great Plains, with it's breeding stronghold in Northeast

Colorado (Miller and Knopf 1993, Knopf and Miller 1994), and winters in California, Texas, and Northern Mexico. According to the literature, the best times to detect the presence of mountain plovers in the Texas Panhandle occur during their spring migration, breeding season, and fall migration. Spring and fall migrations in Texas are reported to occur during early March to mid-May and early August to late October, respectively (Gallucci 1980). If breeding populations still occur in Texas, they should begin arriving on breeding grounds in March, with the height of the breeding season occurring between April 15 and July 14 (Oklahoma Dept. Wildlife Conservation 1995).

Numerous publications describe the breeding habitat of mountain plovers. Typically mountain plovers can be found on short grass prairies dominated by buffalograss (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*). Nest site characteristics are generally described by flat terrain, short, sparse vegetation shorter than 8cm in April, and near objects like rocks or manure piles (Graul 1975, Johnsgard 1981). Prairie dog towns and plowed fields have been found to provide important nesting requirements throughout portions of their range (Olsen and Edge 1985, Shackford 1991).

Survey Methods. Shackford (1991) describes a belt of cultivation bisecting Cimmaron County, Oklahoma from the northeast to the southwest east of which he found no plovers. In light of these findings coupled with plover sighting records of a local birder (Seyffert 1995), 2 survey routes were designated in the northwest quarter of Dallam County, Texas in an attempt to record a breeding population of mountain plovers. Survey route #1 began in the middle of the Rita Blanca National Grasslands and sampled primarily native prairie habitat including 3 prairie dog towns. Survey route # 2 was located north of the grasslands and sampled a variety of prairie and agricultural habitats. In March, prior to the start of surveys, 25 sites were selected along both of the 20 mile survey routes. Beginning at daylight, one observer would drive the route which followed county and state roads. At each of the 25 sites the observer would stop the vehicle, turn off the engine, look, and listen for mountain plovers for a minimum of 3 minutes per stop. Initially the area would be scanned with the naked eye, then a pair of 10X50 binoculars were used to scan the same area. A 60X spotting scope was occasionally used for species identification. Between stops the observer would scan the landscape and occasionally additional stops were made to verify sightings. During the spring of 1996 each survey route was conducted once in March and twice a month during April, May, and June 1996. Due to the unusually tall vegetational conditions, the short grass prairie route was dropped and survey efforts during the spring of 1997 consisted of only 1 route which sampled cultivated areas. This route was conducted twice in March and once in April. A general site description was recorded at each stop along with species observed.

2. Swift Fox

Literature Review. The swift fox has been reported to occupy the short and mixed grass prairies from Canada to Texas and New Mexico (Egoscue 1979). The information we have concerning the historical distribution of swifts in Texas is provided in the museum records and accounts in published literature. Prior to the initiation of this project, the last confirmed report of swift fox in Texas occurred in 1986 with a reported road-killed swift in Dallam County (Texas Biological and Conservation Data System 1996). The earliest report of swift fox in Texas was given by Bailey (1905). Cutter (1958a, 1958b) conducted studies of swift food habits and denning habits in Hansford County, Texas. The most recent attempt at describing the current distribution in Texas is presented by Jones et al. (1987) (Fig.1). The Authors of this report utilize museum specimens, historical accounts in the literature along with anecdotal information from trappers and fur buyers to support the assumption that the swift occurs over much of the Texas High Plains. However no field surveys have been conducted to support this theory.

While generally the habitat can be described as short and mid grass prairies with flat to gently undulating topography with dens located primarily in friable soils (Brown et al. 1987), local and regional variations have been documented. No known studies were conducted on swift fox prior to the rapid cultivation of native prairie that quickly followed the westward movement of early settlers. Therefore it is impossible to know the exact habitat characteristics required by swifts prior to European Settlement. It is not surprising that a species with such a large geographic range can currently be found in a variety of native and altered habitats including agricultural dominated landscapes. In 1958, Cutter reported 8% of swift fox dens on his

study area were located in cultivated fields while almost 50% was reported by Kilgore (1969). Jackson et al. (1997) reported 27 of the 60 dens identified were located in cropland.

Survey Methods. Prior to establishing a swift fox survey program in Texas, the principle investigator (PI)obtained field training in various survey techniques from Kansas Dept. of Wildlife & Parks furbearer biologists Christiane Roy and Loyd Fox. In October 1995, the PI participated in a week-long survey of Hamilton, Morton, and Stanton Counties, Kansas. The PI was trained in several survey methods including spotlight, track plates, ¼ mile track searches, and live-trapping.

In January 1996, funding was secured to conduct a large-scale survey of the short grass prairie region of the Texas Panhandle to determine presence/absence of swift fox. Beginning in the spring of 1996, 28 survey routes were conducted in 25 Panhandle counties (Fig. 2). Each survey was conducted along a 20-mile route of public county/state roads. While the most suitable looking areas were selected for survey routes, all routes sampled a variety of habitats including cropland, short grass prairie, and CRP fields. An attempt was made to sample as much short grass prairie habitat as possible with each route. Routes were selected by interviewing local NRCS personnel, TPWD biologists, county soil survey maps, and extensively driving roads to identify the proper areas to survey. Survey techniques utilized to determine presence/absence of swift fox include:

1. Track Plates - . Track plates are 24" square piece of galvanized sheet metal that is coated with carpenter's chalk and a piece of bait placed in the center. Animals attracted to the bait leave tracks in the chalk and can be identified to species.
2. Spotlight Surveys - Spotlight surveys consist of 1 or 2 observers driving at 20-30 mph shining a spotlight to detect eye-shine. Once eye-shine is detected, 1 observer identifies the animal with binoculars.
3. Headlight surveys are similar to spotlight surveys except that vehicle headlights on high-beam are used instead of spotlights.
4. Track Search - When used to sample large areas, track searches should be conducted over a known length of road or trail for a set period of time in order to standardize amount of effort. For smaller areas such as individual ranches, effort should be made to search ranch roads, cattle trails, and water holes in sufficient quantity to make a determination of swift presence/absence. Although there are several field guides to animal tracks that accurately depict swift tracks, there is no substitute for field experience with a competent tracker.
5. Live-Trapping - Single door, wire mesh live traps with approximate dimensions of 81cm long X 25cm wide X 30cm tall should be baited with a visual attractant such as small mammals, birds, chicken eggs, etc. along with a scent lure like fish oil. Traps are most successful when placed along travel lanes (ranch roads, cattle trails, etc.). Traps should be placed in the open and be perfectly flat (traps should not move or rock when the animal enters. Due to swifts nocturnal nature, traps should be checked at first light and avoid trapping entirely during periods of warm temperatures (greater than 90 degrees F).

Surveys conducted in 1996 were comprised of 20 track plates, setting 1 track plate every mile in the road ditch. Plates were checked each morning for 2 consecutive mornings. Spotlight surveys or vehicle headlight surveys were conducted along the same routes concurrent with track plate surveys. The headlight method was used in areas of high human population in order to cause less disturbance to local human populations. When a swift track was obtained on a track plate or an observation made during spotlighting, live-traps were set in the area to confirm the species identification. For each of 24 survey routes, land cover types were mapped in the field, on grid paper, to an accuracy of 0.1 mile and to a width of ¼ mile on either side of the survey route. Land cover types were placed into 3 categories, rangeland, cropland, and CRP.

Due to problems discussed in detail below, survey methods used to detect presence/absence in 1997 were modified. New survey protocol consists of conducting surveys on private land, where written permission can be obtained. Methods employed are track searches, spotlighting and live-trapping. Track searches are conducted on ranch roads, cattle trails, and around water holes. If initial track and spotlight surveys indicate swift presence then live-trapping is conducted. Monitoring of known populations consist of spotlighting and live-trapping for 2 consecutive nights. Monitoring and survey efforts will be conducted during late summer and fall, annually. During this period population levels are at their peak due to the

presence of juvenile individuals. Similar efforts are being conducted in other states throughout the range of the swift (Luce and Lindzey 1996). Monitoring of known swift fox populations in 1997 was conducted in Dallam County primarily on the Rita Blanca National Grasslands and in Sherman County on 1 private ranch.

3. Black-Tailed Prairie Dog

Literature Review. Conservation of black-tailed prairie dogs in Texas and probably elsewhere is a controversial issue. Few authors disagree that significant population reductions have occurred over the last 100 years with some estimates as much as 98% (Miller et al. 1990). While the distribution of prairie dogs in Texas has not changed significantly from historical accounts (Fig. 3), it is clear that colony size and colony density has been reduced. Bailey (1905) describes one continuous prairie dog town 100 miles wide and 200 miles long. A study conducted by Cheatheam (1977) using aerial photography found primarily the same distribution (1,336 colonies in 89 counties)(Fig.) but the average colony size was only 27.27 ha.

Major causes of population declines reported include: (1) human induced reductions directly resulting primarily from state, federal, and private control programs (Daley 1992) and (2) natural factors such as drought, floods, disease, and predation (Cottam and Caroline 1965). Although no government subsidized control program exists currently in Texas, private landowner attitudes are generally negative toward this animal. Several studies question the amount of competition between prairie dogs and livestock (Hansen and Gold 1977, O'Meilia et al. 1982, Krueger 1986) as well as cost/efficacy of control (Collins 1981). Although an increasing number of Texas ranchers are learning to live with prairie dogs, many continue to eradicate them in the name of increasing livestock forage production (Gilliland 1997). Figure 4 depicts the present range and historical of black-tailed prairie dogs in Texas as reported by Cheathem (1977) and Bailey (1905), respectively.

Survey Methods. In 1990-91 prairie dog colonies were mapped on public land and in 29 counties in the Texas Panhandle using aerial photographs maintained in Agricultural Stabilization Conservation Service offices (Linam 1992). Although the study focused on prairie dog towns (PDT's) larger than 100 acres, all PDT's that were identified during this study were mapped regardless of size. The majority of PDT's and the largest towns were reported to occur in 8 Panhandle Counties (Bailey, Cochran, Dallam, Deaf Smith, Hockley, Moore, Randall, and Sherman Counties). Using the PDT's mapped under this project, a goal was set to ground truth (determine actual presence/absence) 20% of all towns mapped in each of the 29 counties previously selected (Fig. 5). However, field experience using this method proved to be very time consuming and impractical for repeated future monitoring efforts. Therefore, 7 counties reported to contain the largest acreage of occupied habitat (Bailey, Cochran, Dallam, Deaf Smith, Moore, Sherman, and Randall counties) have been selected for ground-truthing and subsequent monitoring. Monitoring protocol entails revisiting the original 20% of towns ground truthed to determine presence/absence. Monitoring change of individual PDT size will be accomplished by using ASCS aerial photography as described by Linam (1992) depending upon the availability of resources.

4. Burrowing Owl

Literature Review. Burrowing owl populations have been declining for a number of years (Zarn 1974). Analysis of Christmas Bird Counts between 1954 to 1986 showed an overall stable population for the 33 year period but a steady decline since the mid-1970's (James and Ethier 1989). Due to the reported declines of the fossorial animals such as prairie dogs, upon which burrowing owls depend to provide burrows for nesting and shelter (Pezzolesi 1994), efforts have begun to implement conservation and monitoring programs throughout it's range (Winchell 1994).

Little is known about the migratory behavior of burrowing owls especially the location of wintering grounds for many populations in North America. A study done in the Oklahoma Panhandle reported less than 1% of the summer population was present during winter months (Butts 1976). However Ross and Vaughn (1970) reported capturing an owl in February that had been banded at the same site the previous August. This suggests that at least a portion of summer residents over-winter. Haug and Oliphant (1990) reported that burrowing owls become strictly nocturnal to coincide with the nocturnal habits of small rodents when

insects and reptiles become scarce. This could be one explanation for the reduction of owl observations in Texas during winter months.

Survey Methods. No attempt has been made to estimate burrowing owl populations in the Panhandle due to the vast size of the study area coupled with limited manpower and resources. Population distribution information is being collected in conjunction with prairie dog survey efforts. Presence/absence information is recorded at each PDT visited during summer months.

In order to determine population trends, 3 sites were selected for monitoring efforts in 1997 and 3 additional sites will be added in 1998 (Fig. 6). Monitoring will be conducted 2 times per month during the period of March 1-July 1, annually. The number of adults, chicks, and weather data will be recorded for each location. An attempt will be made to capture and band juvenile owls at each of these sites in 1998 and mark with aluminum USF&WS leg bands as well as a number coded colored leg bands. Data obtained from banding and monitoring efforts is expected to provide population trend information and help determine if wintering populations of burrowing owls are summer residents or migrants from northern areas.

In addition to monitoring efforts, 4 sites have been selected to install artificial nest boxes. Nest boxes have been found to increase nesting success through the reduction of nest predation by badgers and other mammals (Holroyd 1997). One nest box was installed April 15 at a Randall County prairie dog town and was monitored for use throughout the summer. Materials have been purchased to install 3 nest boxes at each of the 4 sites prior to nesting season of 1998. Nest boxes will be monitored in conjunction with population monitoring program described above. Information gained from this project will help document burrowing owl utilization and reproductive success within these artificial structures in the Panhandle.

5. Plains Spotted Skunk.

Literature Review. Two subspecies of Eastern spotted skunk exist in Texas (Kinlaw 1995). *Spilogale putorius putorius* enters into extreme southeast Texas which represents the western most limits of it's distribution. The distribution of the plains spotted skunk (*S. p. interrupta)* is very localized within it's range which encompasses the eastern one-half of the state east of the Balcones escarpment, to the Panhandle south to Garza County (Davis and Schmidly 1994). Choate et al. (1973) theorizes that plains spotted skunks documented decline in population levels and more importantly the limits of distribution are a result of changes in agricultural practices in the Great Plains since the time of European settlement. He suggests that as early settlers moved west, the spotted skunks followed using the many out-buildings and junk piles common around early homesteads. As agricultural technology improved, farms became larger and grain storage practices more efficient thus eliminating much of the habitat that allowed the species to exist in an otherwise unfavorable environment. Only 6 counties within the Panhandle have historical records of plains spotted skunk including Hansford, Moore, Hemphill, Hockley, Lubbock, and Garza Counties (Jones et al. 1985, Davis and Schmidly 1994).

Survey Methods. Initially, an attempt was made to locate and interview trappers, furbuyers, Department biologists, and other agency personnel that might have information concerning where field survey efforts should be focused. A review was made of federal aid reports, concerning small game research and surveys, submitted by the department as required by the Federal Aid in Wildlife Restoration Act. This review was made to determine current efforts being conducted to asses spotted skunk density and distribution, and to derive information about population status. Based upon this information, historical records, and published literature, 41 annual surveys routes have been established in 32 Panhandle Counties (Fig. 7). These surveys are conducted in conjunction with annual deer spotlight surveys. Prior to initiation of 1997 deer surveys, TPWD personnel were provided instruction on identification of spotted (Eastern and Western subspecies), striped, and hognose skunks and required to record sightings made of each during deer surveys. These survey routes sample a large portion of the areas believed to be potential spotted skunk habitat in the Panhandle. Spotlight surveys consist of a driver/data recorder and 2 observers. Observers sit on a seat that is mounted to the bed rails of a pickup with the observers' eye-level approximately 2.5m above ground level. The driver maintains a speed of 5-7 mph while observers direct the spotlight be perpendicular to the direction of travel. Once eye-shine is detected, one observer identifies the animal through binoculars.

Starting and ending mileage is recorded along with the mileage at which an observation is made and numbers and species of animals observed.

Objective # 3.

The short grass prairie region (High Plains) of the Texas Panhandle is heavily agriculturalized. Irrigated and dryland agriculture along with cattle ranching currently comprise the 3 major land use practices. Where adequate ground-water is available, irrigated cash crops of wheat, sorghum, corn, and cotton locally dominate the landscape. However, the Ogallalla Aquifer is too deep or insufficient to permit profitable irrigation of crops in many areas of the High Plains. Areas where adequate ground water does not exist primarily support domestic livestock grazing operations as well as some dryland farming. For this reason it is reasonable to believe that the short grass prairie in Texas will not be reduced to remnant pieces in cemetery corners like much of the country's tall grass prairies. Although large areas of native prairie still exist in the Panhandle, habitat fragmentation and degradation is a continued concern. Based on knowledge gained from personal observations in the field and conversations with local Natural Resources Conservation Service (NRCS), university researchers, private landowners, and other knowledgeable individuals over the past 2 years, 2 broad issues have been identified upon which conservation efforts should be focused. The first deals with conservation of existing prairie and restoration of highly altered prairie and will be referred to as habitat management. The second involves development of actual population management techniques that are conducive to current sustainable land-use practices.

Although these are not new concepts, development of ways to successfully address these issues require new ways of thinking. Aldo Leopold (1949) wrote that a "A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self renewal. Conservation is our effort to understand and preserve this capacity." With few exceptions, current agricultural practices are based upon tradition and technology both of which were developed with intentions of improving productivity. Because it would be counterproductive for a land manager to intentionally and willingly abuse the resource from which they derive a living, it would stand to reason that most landowners have a land ethic. The problem rests in the fact that many do not have the proper knowledge or ability to understand or preserve the lands ability for self renewal. Therefore it is imperative that they are empowered to act on their land ethic by educating them about the importance of ecosystem management as it relates to agricultural productivity and then provided methods by which conservation is made economically feasible. Programs within the 1996 Farm Bill provide excellent opportunities to do both.

Objective # 4

Throughout the past 2 years the P.I. has had many opportunities to talk with private land managers about rare/threatened/endangered species conservation issues. The Western Governors' Association-Great Plains Partnership initiated a project to interview a cross section of people in several communities across the Great Plains (Creighton and Harwood 1996). One of the issues that arose was that landowners would be more inclined to incorporate conservation practices into farm/ranch operations if they could afford it. Also they believed that if they are required to conduct conservation practices that result in an economic loss that they should be compensated for it.

In 1996, TPWD initiated a pilot study called the Landowner Incentives Program (LIP). The LIP provides monetary incentives to private landowners who agree to engage in active conservation practices for rare species. Because it is the first program in the nation to provide money to landowners for rare species conservation it was important to obtain successful agreements with landowners from the very beginning. The P.I. was responsible for screening applications and phone calls from private landowners, making on site inspections of potential project areas, working with landowners to develop project proposals. If a project proposal is selected by the advisory panel for funding then the P.I. is responsible for writing the management plan and negotiating the terms of the Memorandum of Agreement.

Objective # 5

Texas is 97% privately owned. Therefore any conservation strategies that are developed must be made available to private landowners. In an effort to influence private lands conservation of rare species,

materials are being developed to educate adults and children about the short grass prairie ecosystem and sound management practices for some of the species native to the region. Methods of education and outreach include local meetings, 1 on 1 contact with landowners, media articles and interviews, slide presentations, teacher workshops, and information/educational pamphlets.

IV. Results

Objective #1

A pilot study has been initiated to determine the cost/effectiveness of using this method. Texas Gap Analysis Program (TXGAP) in Lubbock, Texas has conducted an unsupervised classification on 1 scene which includes approximately 1/3 of the northwest portion of the Panhandle. Initial ground truthing has been completed and a first draft of this scene is ready for additional field verification to ensure accuracy. The principal investigator will conduct subsequent ground-truthing of the map until satisfied with it's accuracy. If this technique proves to accurately identify short grass prairie habitat, a map of the entire High Plains Region in Texas will be produced. TXGAP is providing the satellite imagery, personnel, equipment, and facilities to complete the mapping procedures for the pilot study.

If this technique proves to be cost-effective, it will be proposed to utilize this technology to implement a habitat monitoring program using this map as the baseline for comparing future habitat changes. Once an accurate map is constructed, regional conservation can be planned much more effectively. By using GIS overlays, areas in greatest need of habitat conservation can be identified. Utilization of species habitat can be overlaid onto this map telling us much about the habitat requirements of rare prairie species such as minimum habitat size, the influence of other land use activities, and where habitat corridors currently exist and where they are needed the most.

One major potential problem with this technique is it's ability to accurately differentiate between short grass prairie habitat and other similar habitat types, primarily grasslands established under the Conservation Reserve Program. Approximately 3 million acres of cropland were planted to perennial warm season bunch-grasses under this program in the early 1980's. However most were seeded to monocultures of tall introduced grasses like old world bluestems, and weeping lovegrass (*Eragrostis curvula*) instead of native short grass species. Success of this mapping project will depend upon the ability to distinguish native from introduced grasses.

Objective # 2

Mountain Plover

A total of 2 survey lines were established in April of 1996. Both routes were surveyed once in April and twice in May and June. No mountain plovers were located during 1996 surveys.

Table 1. Dates which mountain plover survey routes were conducted in 1996.

Survey Route	Date Conducted (1996)
1	4-25, 5-7, 5-8, 6-5, 6-28
2	4-26, 5-7, 5-28, 6-13, 6-26

During late summer and early fall of 1997 the area received unusually high rainfall amounts resulting in a lush growth of vegetation in the prairie habitats of survey route # 1. This rank vegetation eliminated any possibility of finding mountain plovers during the spring of 1997, therefore the route was not conducted. Route # 2 was surveyed on March 12, 28, and April 17. On March 28, 6 mountain plovers were observed at one of the designated stops along route #2. They were observed for approximately 1 hour during which time one pair appeared to be engaged in sporadic courtship behavior. The birds were feeding and resting near the center of a irrigated crop circle approximately 160 acres in size. The ground was freshly plowed and the earth was smooth with relatively small ped sizes and no furrows. No vegetation could be seen in the plowed area, however there were a few forbs present around the center pivot of the irrigation sprinkler. Weather conditions were; 45 degrees F, wind N. 15-25, and partly cloudy. One mountain plover was

observed at the same site on April 17. Due to manpower limitations, no additional surveys were made. It is unknown if the birds observed on these 2 dates were passing migrants or if some or all initiated nests in the area. This area will be closely monitored in 1998.

Swift Fox

Results from swift fox surveys identified 2 areas of the Panhandle that are occupied by swift fox. Dallam and Sherman Counties in extreme the northwestern corner of the Panhandle both have known populations of swifts (Fig. 2). A total of 30 sites in the Panhandle were surveyed. However only data from 25 survey routes are given due to incomplete or inaccurate data obtained during the beginning of the project when survey methodology were being refined (Table 2). No swift fox were located on surveys not reported here.

A total of 4 swift foxes were observed on spotlight/headlight routes along with 7 other categories of animals (Table 3). Swift fox visited a total of 13 track-plates (Table 4) and 4 female swifts were caught and released (Table 5).

Survey methodology used in 1996 are not believed to reliably detect swift fox presence. Surveys were conducted along public road rites-of-way. Swift fox are known to utilize roadsides as travel and hunting areas in Kansas and elsewhere. However most roads in the Panhandle are there due to cultivation of the area. The large ranches that comprise the majority of swift habitat do not contain public roads. This fact alone prevents the survey of the majority of prime habitat by any large-scale project. Table 6 shows the percent of survey routes based on 3 land-cover categories (note the relatively low percentage of rangeland compared to the other categories). For this reason, future surveys will focus on individual ranches where permission can be obtained. This is a slow but more accurate method of assessing potentially occupied habitat. Although track-plates or scent stations are popular throughout the majority of other states conducting swift fox searches, a combination of spotlight and trapping surveys have been found more reliable and less time consuming in Texas. In the future, with landowner permission, areas will be initially assessed by searching for tracks and sign indicating swift presence. If swift fox sign is found, then spotlight and trapping surveys will be conducted. This allows quick and accurate assessment of potential habitat and resources are conserved by conducting lengthy surveys only in promising areas.

Surveys were conducted in Randall and Gray counties on private land in 1997. A combined total of 17.6 spotlight miles, 12 trap/nights, and 3 track-plate/nights were used at both areas. No swift foxes were located during these surveys. Monitoring of swift populations in Dallam County produced 6 swift observations during 57.6 miles of route combined over 2 nights. No swifts were caught during the 2 night period based on 24 trap/nights of effort. Sherman County monitoring resulted in 8 swift observations during 28 miles of route combined over 2 nights. Twenty trap/nights produced 5 swifts. Spotlight routes and trap-set locations were mapped and identical effort will be expended during future monitoring of these 2 areas.

Black-Tailed Prairie Dog

Ground-truthing of PDT's was conducted during the summer of 1996. Towns were searched for in 8 counties previously mapped in 1991. Since ground-truthing was conducted from public roads, the fait of some towns could not be determined as present or absent. Topography, vegetation, and distance a town was originally mapped from a road as well as accuracy of mapping procedures effected the observers ability to determine if a town had actually died out, moved over a hill out of sight, or was never where it was mapped to begin with. Before a town was classified as absent (once present at mapped location but subsequently died out), some evidence of its previous existence was required. Areas recently inhabited by a prairie dogs generally show indications of there presence for several years after they are gone. Indicators used for this purpose were short vegetation with high percentage of forbs and bare ground, and/or the presence of mound remnants. Another criteria was if a large area surrounding the mapped location was visible and the area had been cultivated or developed, then the town could be recorded as absent with a high degree of confidence. If the mapped site did not show evidence of previous prairie dog use and the habitat had not been destroyed, then it was recorded as can't be seen from road (CBS). Prairie dogs can also disappear from towns very rapidly due to plague or human prairie dog control practices. During extremely hot or windy periods, prairie dogs will seek shelter in their burrows thus giving the appearance of an abandoned

town. Therefore if prairie dogs were not observed, then the town was recorded as No Dogs Seen (ND). To be recorded as present, prairie dogs had to be observed.

Of the 169 newly mapped or previously mapped PDT's that were searched for in 1996, 55.6% were recorded as present, 10.7% as absent, 5.9% as ND, and 27.8% as CBS. Table 7 gives the results by category and county. This method proved to be an efficient way to establish baseline information for future monitoring efforts. Approximately 20% of PDT's in a county can be verified in a single day. This is no more time consuming than looking at NRCS aerial photos. Some areas where PDT's exist are not covered by NRCS crop slides taken annually. These photos are targeted at cropland and therefore exclude important areas. These photos could be used to help asses long term changes in areas of towns depicted in photographed areas.

Burrowing Owl

Information concerning burrowing owl distribution has been collected incidental to prairie dog surveys and effort has been minimal to determine actual presence/absence in any given PDT. Burrowing owls have been observed in 15 Panhandle Counties (Figure 8). Exclusion of county observations does not imply the absence of the species, only lack of survey effort in that area. During the summer of 1997 a formal data sheet and protocol was developed for distribution surveys and monitoring programs. Since that time seasonal population trend data collection has been initiated at 3 sites in the Panhandle. The 3 sites include a PDT on private land in Randall County, 6 PDT's on U.S. Department of Defense-Pantex Nuclear Facility in Carson County, and Texas Parks & Wildlife Department -Gene Howe Wildlife Management Area in Hemphill County. Randall Co. monitoring was initiated in January of 1997, Hemphill Co. in June 1997, and Carson Co. in October 1997. The number of single adults, adult pairs, and juveniles are being recorded to help asses population trends. Three additional monitoring sites have been established in Dallam, Randall, and Castro counties to be monitored beginning in March 1998. Insufficient data have been collected at these sites to warrant inclusion in this report. Banding efforts at the Randall county site produced 6 banded juveniles. No Owls were observed using the artificial nest structure. This is believed to be a result of installing the structure after most pairs had selected nest sites.

Plains Spotted Skunk

Results of personal interviews with local fur buyers provided no information about any spotted skunks being trapped or bought in the Panhandle. It is worthy to mention that both buyers have not renewed there commercial furbuyer license in at least 2 years due to low fur prices and lack of available furs to buy. One buyer stated that it would be difficult to find anyone still trapping for profit. Seven TPWD biologists and technicians located in the Panhandle were interviewed about their knowledge of Spotted skunks with no positive results. Records obtained from USDA, APHIS-ADC reporting hog-nosed, spotted, and striped skunk by county for 1995-1997 showed only 1 spotted skunk taken in Crocket County which was most certainly the Western species. As previously mentioned, spotlight surveys are being conducted over most of the Panhandle in 1997. Data will not be reported in time to be included in this report.

Lack of current information about this species makes it difficult to asses the threats or develop management recommendations. Therefore, efforts to locate historical or recent information about this species on the High Plains will continue.

Objective # 3

The CRP program allows habitat management issue to be addressed while helping to maintain or enhance the income derived from land enrolled in this program. North Central Texas, including the Panhandle, has over 3 million acres enrolled in the CRP program. Therefore this program has major implications for rare species conservation. For this reason the P.I. became involved in assisting with development of program guidelines by attending state NRCS technical sub-committee meetings, attending local meetings for landowners to provide input into the process, as well as working through joint venture efforts like the Lesser Prairie Chicken Interstate Working Group to help Panhandle landowners and wildlife obtain the maximum benefit from these programs. Recommendations were made concerning the proper native seed mixtures to be allowed under the CRP program and management practices needed to ensure long-term maintenance of

habitat established by the program. Technical assistance was also provided to private landowners concerning use and implementation of the CRP program.

Although the lesser prairie-chicken (LPC) is not a species identified in the objectives for this project, it's conservation has implications for other species of concern like the swift fox and ferruginous hawk. The LPC is a species that currently inhabits the transitional zone between short and mixed grass prairie. Because it is being considered for federal listing as threatened under the Endangered Species Act, the P.I. became involved with conservation efforts and currently chairs the Lesser Prairie Chicken Interstate Working Group. This working group is comprised of state, federal, and private partners with a goal of conserving the species and it's habitat. The LPCIWG is currently in the process of writing a regional conservation plan that will become the guiding document for LPC conservation throughout it's 5 state range.

The swift fox is currently a Candidate species for listing (C1). In response to the petition to list the swift, the Swift Fox Conservation Team was formed to develop a conservation plan. The P.I is currently the Texas representative on the team. The SFCT is very near the completion of a conservation plan and has been responsible for organizing research and survey efforts across the swift fox range.

Population management techniques have focused on the black-tailed prairie dog. The prairie dog has been described as a keystone species of the short grass prairie ecosystem providing an oasis of species diversity on the arid plains (Miler et al. 1990). For this reason it is believed that the conservation of many prairie species, including most of the animals detailed in Objective # 2, could benefit from conservation of prairie dogs and the habitat they create. Through a cooperative effort with local Animal and Plant Health Inspection Service - Animal Damage Control (ADC) biologists, the P.I. is developing information materials and guidelines to help landowners manage prairie dog towns instead of eliminating them.

Objective # 4

Under the new LIP program, 2 projects have been implemented under MOU's with private landowners. The first project is located in Hockley County. Because of this program a new flock of prairie chickens were located in an area previously believed to be unsuitable and unoccupied habitat. Under the agreement with the landowner, the landowner agreed to conduct habitat improvement practices that will provide increased winter and summer food, improve nesting and brood rearing habitat, and act as a liaison to other area landowners for prairie chicken habitat improvements. In less than one year this landowner has influenced the management practices of many of his neighbors to the point that they are actively conducting habitat management practices over a much larger area than what is designated under the MOU. The end result was 12 lesser prairie chicken poults produced from that single flock in 1997.

The second project is designed to conserve a federally endangered plant, the Texas Poppy Mallow (*Callirhoe scabriuscula*). The terms of this MOU provides for economic incentives to the landowner that will allow him to implement a rotational grazing program on 320 acres of habitat occupied by the rare plant. This grazing regime will allow annual grazing deferment of critical areas during the reproductive stage of the poppy mallow's life cycle. This method will not only improve range quality for his livestock operation but will also conserve an endangered species.

Objective # 5

During the course of this project numerous presentations have been made to grade schools, college classes, local landowner groups, and sportsmen organizations to help educate the public about the rare species of the short grass prairie ecosystem conservation. From these presentations, a scripted slide presentation has been developed so that teachers or other biologists can give share this information without much advanced preparation. A Rare and Wild activity packet has been developed for teachers to help educate their students about rare Panhandle species. A informational brochure has been developed and distributed detailing some basic information about swift fox. Many newspaper and magazine articles have been written as well as radio and television interviews about rare species issues in the Panhandle. Most importantly many personal contacts have been made with local private landowners resulting in numerous cooperative relationships throughout the area. A quarterly newsletter is authored by the PI and mailed to 50 landowners/operators informing them of current rare resource issues and needs. Private landowners have demonstrated an eager

willingness to help in conservation efforts as long as they are well informed and requested to help, not ordered to.

Table 2. Type of data collected for each of the 25 counties surveyed for swift fox in 1996.

Counties	Spotlight	Headlight	Track-plates	Traps	Veg. Mapping
Dallam		xx[b]	xx	xx	x
Sherman[a]		x	x	x	
Hansford[a]		x	x	x	
Ochiltree		x	x		x
Hartley		x	x	x	x
Moore			x		
Oldham		x	x		x
Carson		x	x		x
Deaf Smith	xx	x	xxx		xxx
Armstrong	x		x		x
Parmer	x		x		x
Castro	x		x		x
Swisher	x		x		x
Bailey	x		x		x
Lamb	x		x		x
Hale	x		x		x
Floyd	x		x		x
Cochran	x		x		x
Hockley	x		x		x
Crosby	x		x		x
Yoakum	x		x		x
Terry	x		x		x
Lynn	x		x		x
Gaines	x		x		x
Dawson	x		x		x

[a]Denotes surveys on private land.
[b]Denotes number of routes surveyed.

Table 3. Total number of species observed on 1996 spotlight/headlight surveys.[a]

Swift fox	Jack Rabbit	Cotton-tail	Badger	Striped Skunk	Coyote	Porcu-pine	Rodent	Unkno wn
4	150	60	3	3	8	1	18	1

[a]Based on 17 surveys covering 860 miles of route.[a]

Table 4. Total number of species visits on track-plate surveys in 1996.[a]

Rabbit	Rodent	Striped Skunk	Coyote	Rac-coon	Swift Fox	Badger	Porc-upine	Unk-nown	Stolen plates
17	141	85	70	1	13	1	1	52	20

[a]Based on 1091 plate/nights from 30 locations.

Table 5. Description of trapping effort and results in 1996.[a]

Swift Fox	Striped Skunk
4	3

[a]Based on 82 trap/nights from 5 surveys.

Table 6. 1996 land cover types mapped for each survey route.

County	% of Route in Rangeland	% of Route in Cropland	% of Route in CRP	Total Length of Route Mapped (miles)
Armstrong	37	48.7	22.2	[a]42
Bailey	11	70.8	18.2	46.8
Carson	21.7	66.7	11.6	37.8
Castro	30.5	50.5	18.9	46.5
Cochran	25.2	38	36.8	45.7
Crosby	6.6	85.2	8.2	45.2
Dallam	79.5	10.9	9.5	44
Dawson	0.6	77.5	21.9	47.5
Deaf Smith east	32.4	50.5	17.1	38.6
Deaf Smith middle	30.1	69.9	0	43.2
Deaf Smith west	42.2	34.8	22.9	41.9
Floyd	21.6	49.4	29	51
Gaines	5	73.7	21.3	48
Hale	2.3	88.5	9.2	43.6
Hartley	86	14.1	0	39.2
Hockley	4	72.1	24	63
Lamb	3.4	92.2	4.4	50
Lynn	10.6	62.9	26.5	44.2
Ochiltree	39.2	38.4	22.4	37
Oldham	16.7	38	45.2	44.9
Parmer	3.9	81.3	14.8	43.2
Swisher	29	44.3	26.6	37.2
Terry	23.4	48.8	27.8	41
Yoakum	23.8	58.5	17.6	53.3

[a]Includes area on both sides of route ¼ mile wide.

Table 7. Results of PDT ground-truthing effort for 8 Panhandle counties in 1996.

County	Present	Absent	No Dogs Seen	Can't Be Seen From Road	# Previously Mapped
Dallam	7	1	5	0	185
Hartley	8	4	2	0	18
Moore	13	5	2	4	76
Bailey	11	3	0	0	49
Swisher	1	1	0	2	18
Deaf Smith	30	0	0	22	137
Randall	17	4	0	11	91
Cochran	7	0	1	8	37
Totals	94	18	10	47	611

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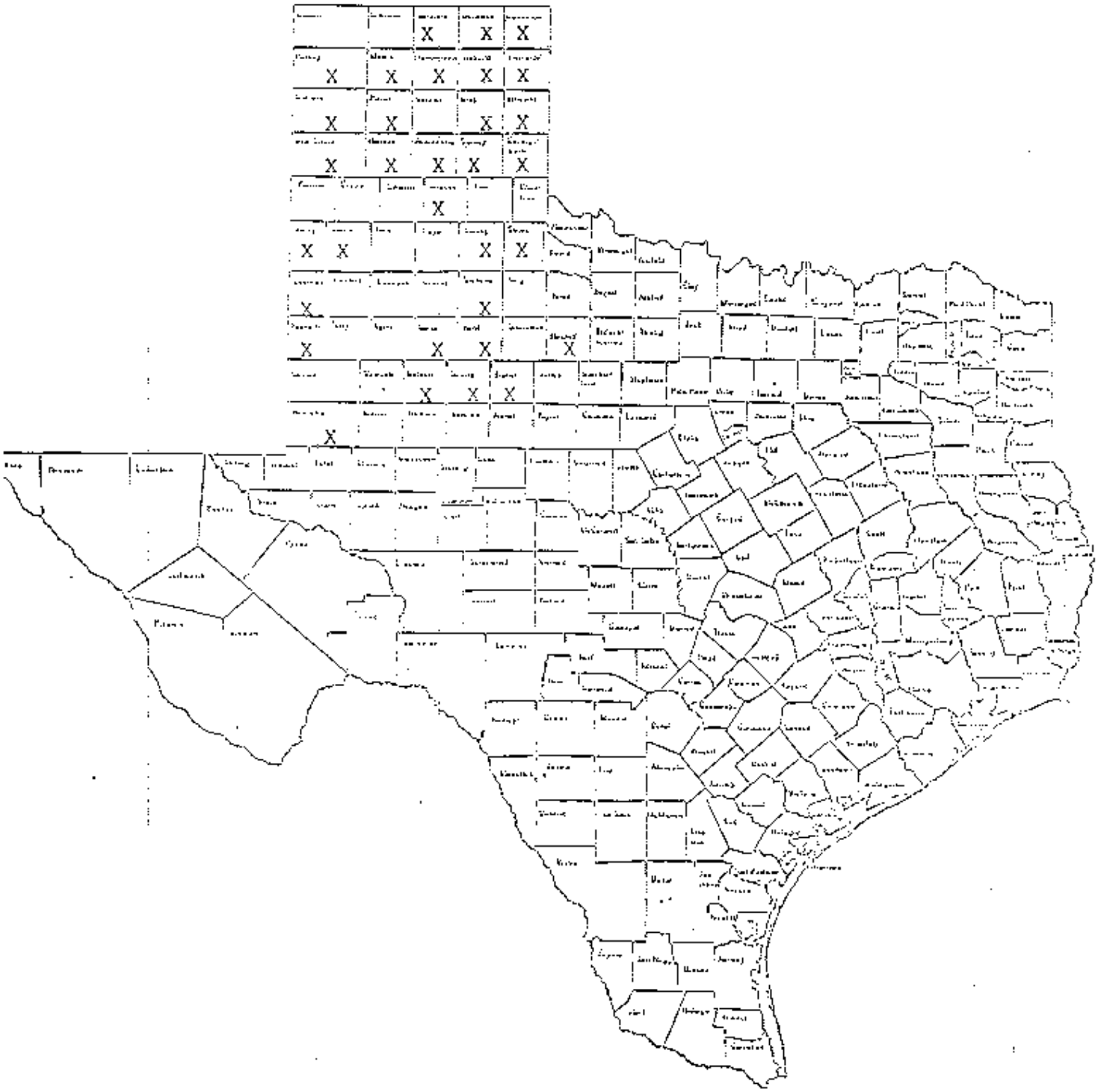


Figure 7. Counties being surveyed for plains spotted skunk in 1997.

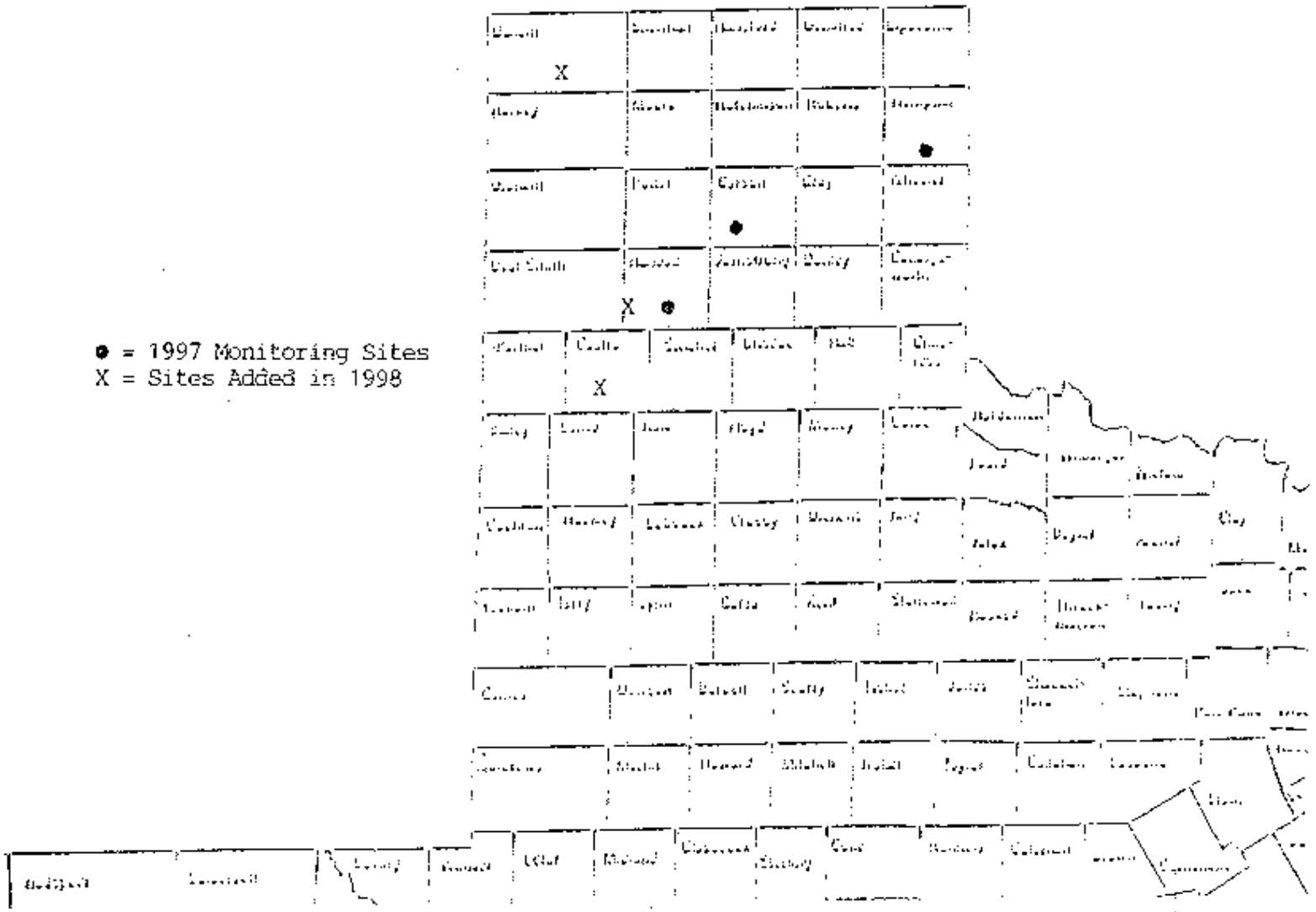


Figure 6. Burrowing owl monitoring sites in Texas for 1997 and 1998.

Figure 8. Panhandle Counties With Burrowing Owl Observations For 1996-97

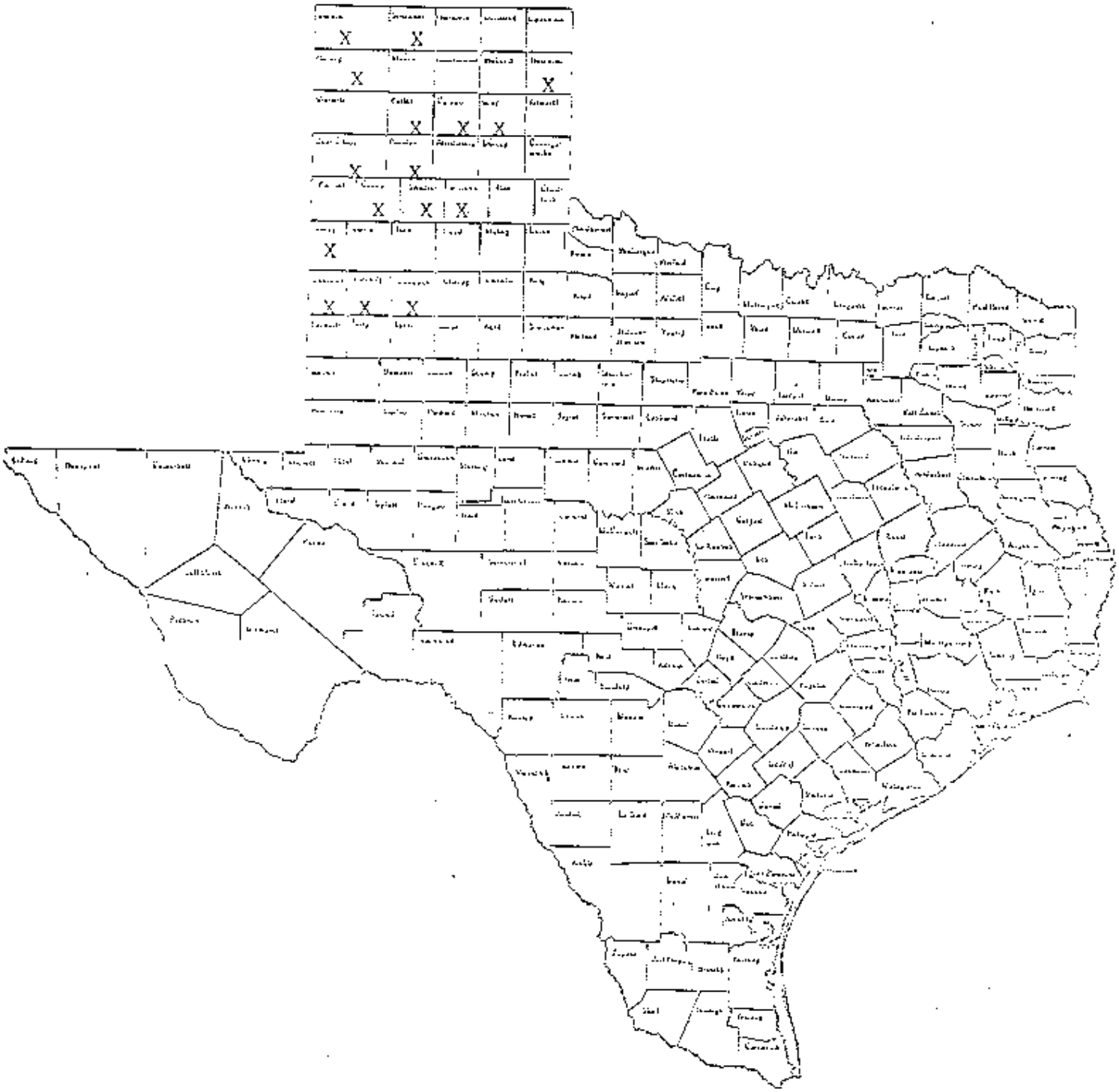
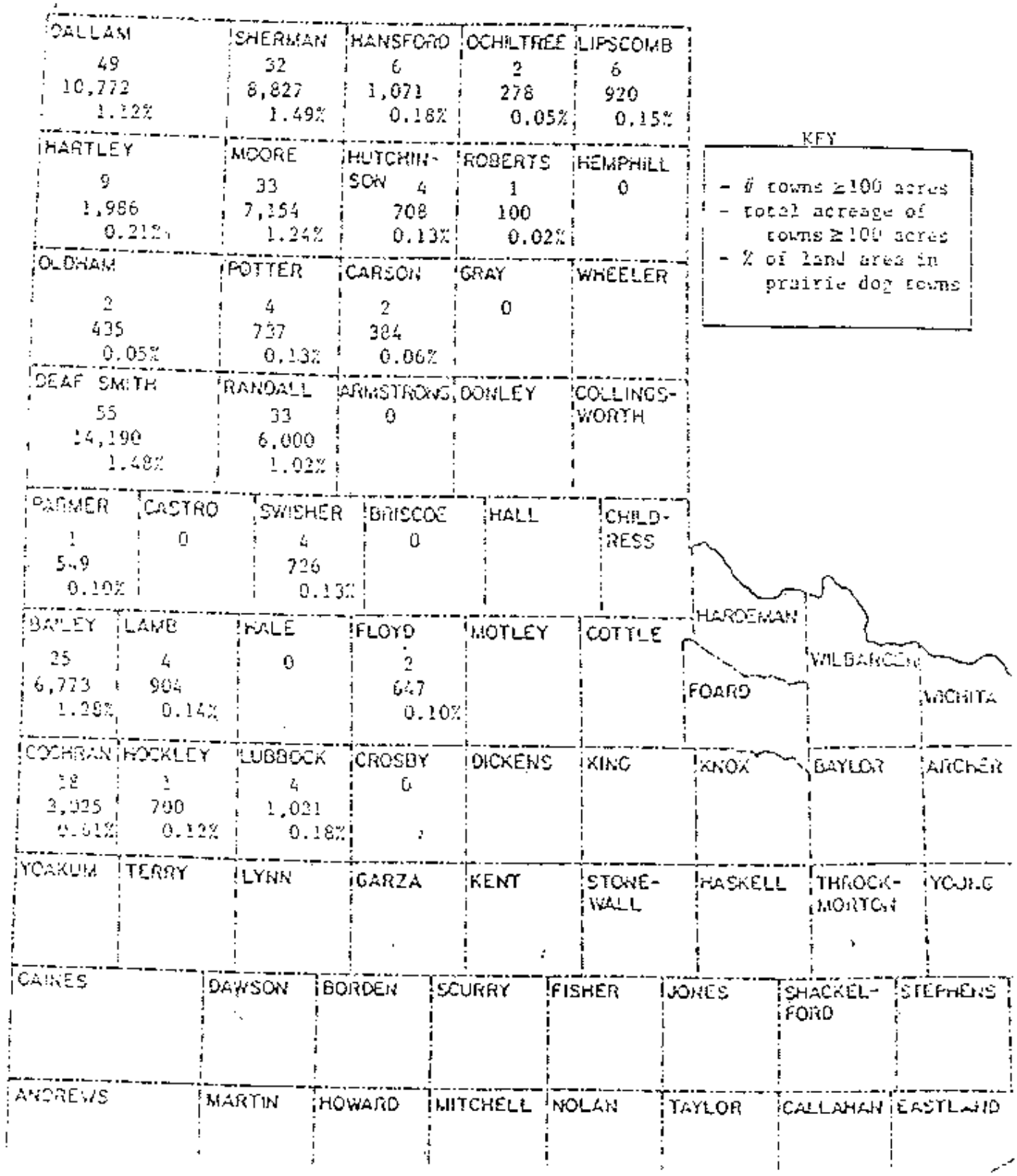


Figure 5. Distribution by county of prairie dog towns ≥100 acres in size in the Texas panhandle (Linam 1992).



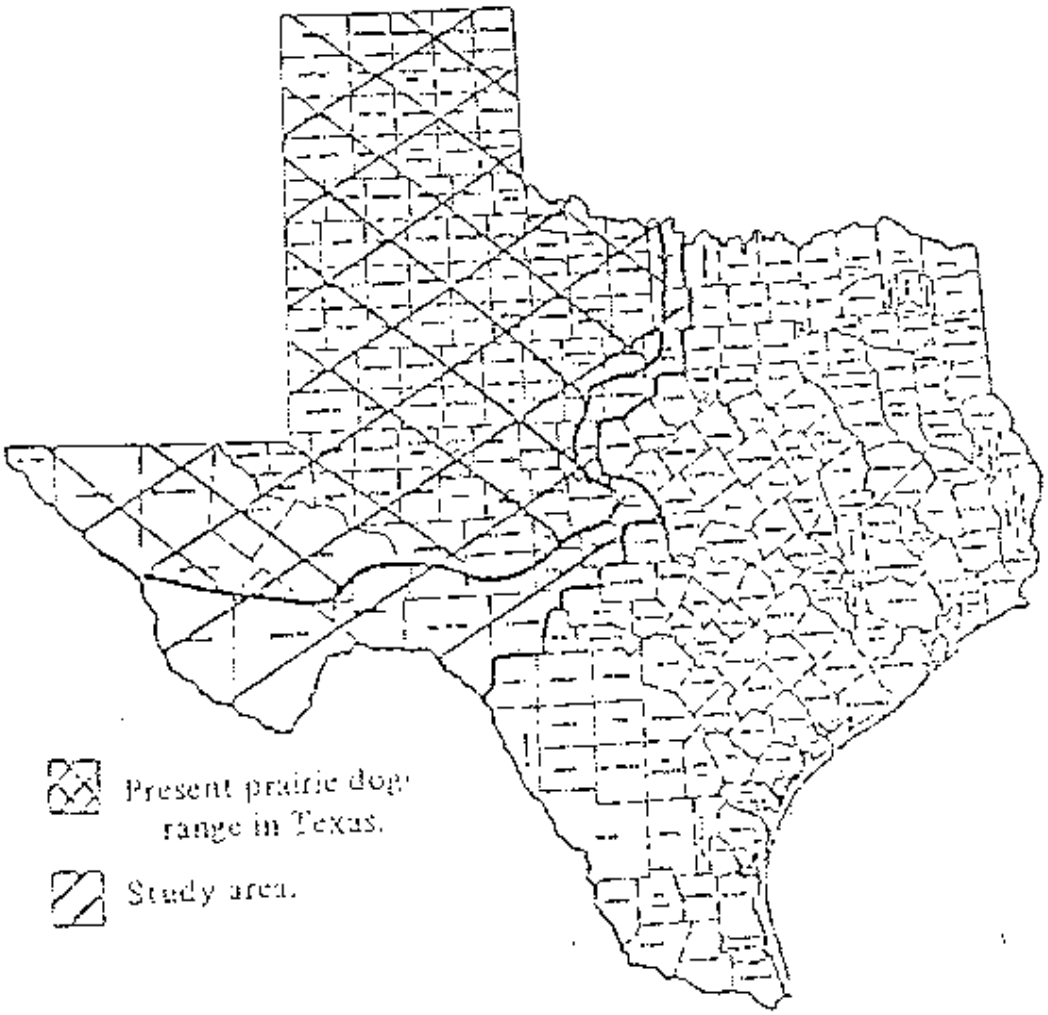


Figure 4. Present range of black-tailed praire dogs in Texas according to Cheatheam (1977), and historical range reported by Bailey (1905). Adapted from Cheatheam (1977).

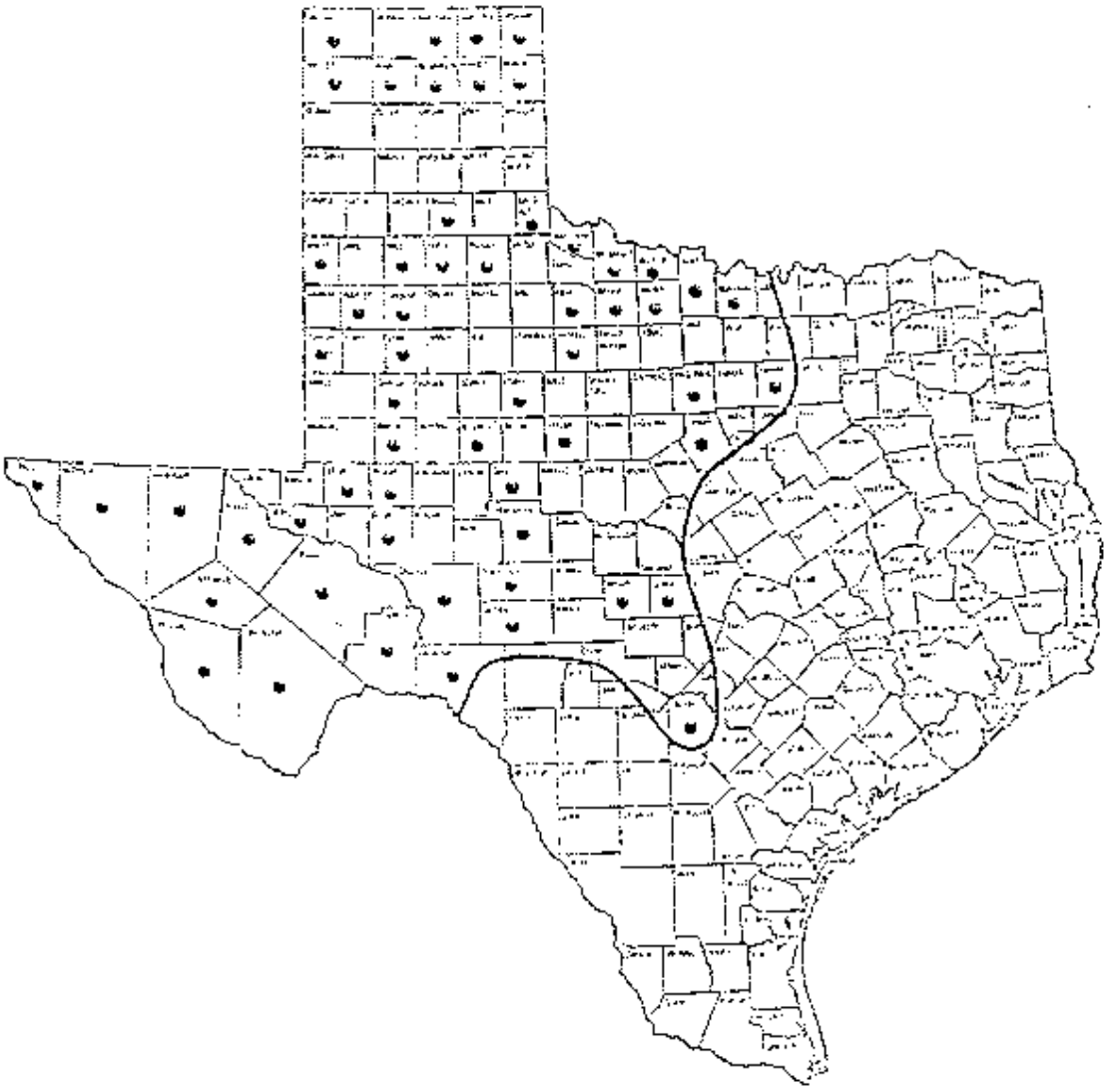


Figure 3. Distribution of black-tailed prairie dogs based on known county records (Davis and Schmidly 1994).

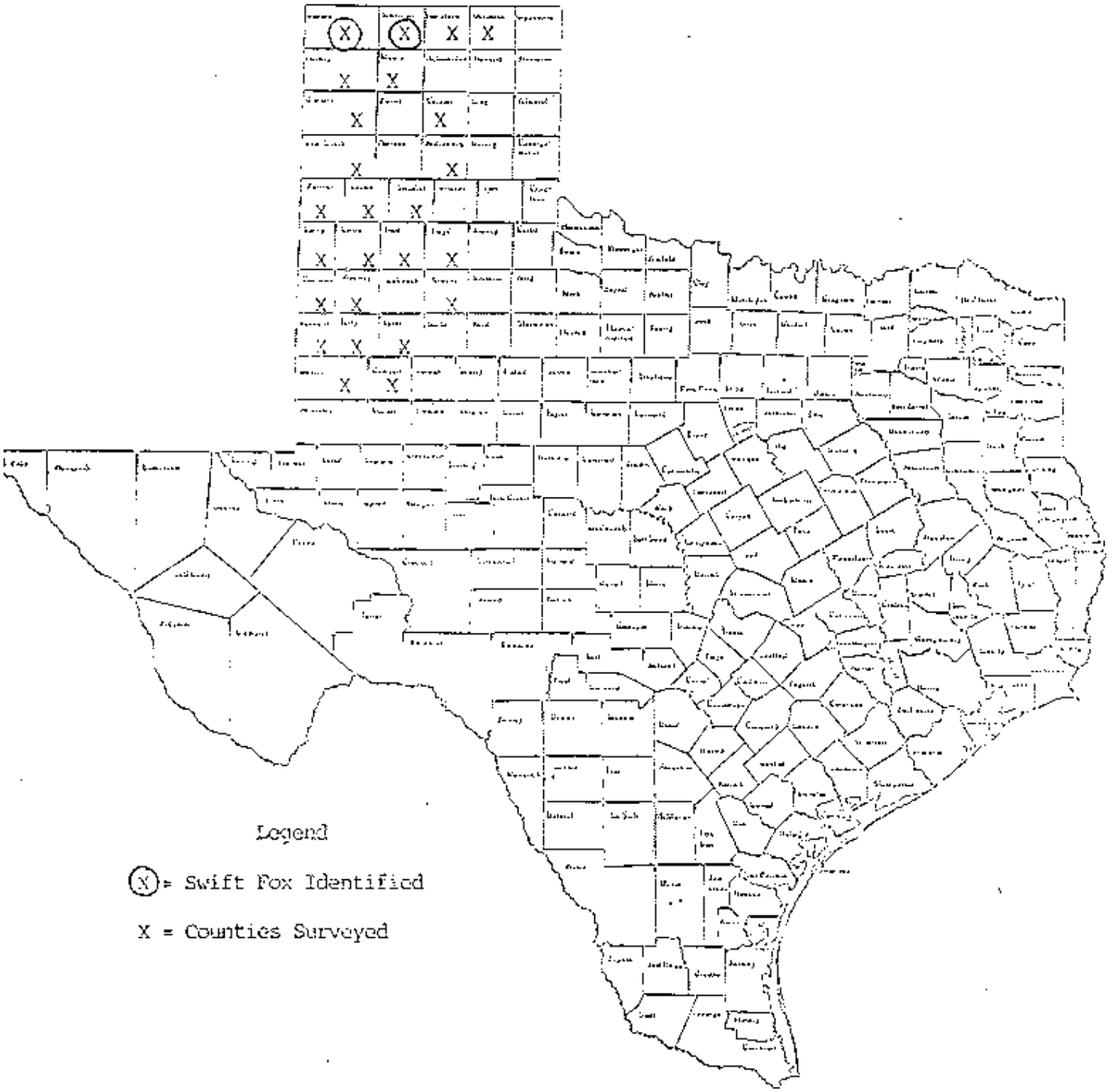


Figure 2. Texas counties surveyed for swift fox in 1996.

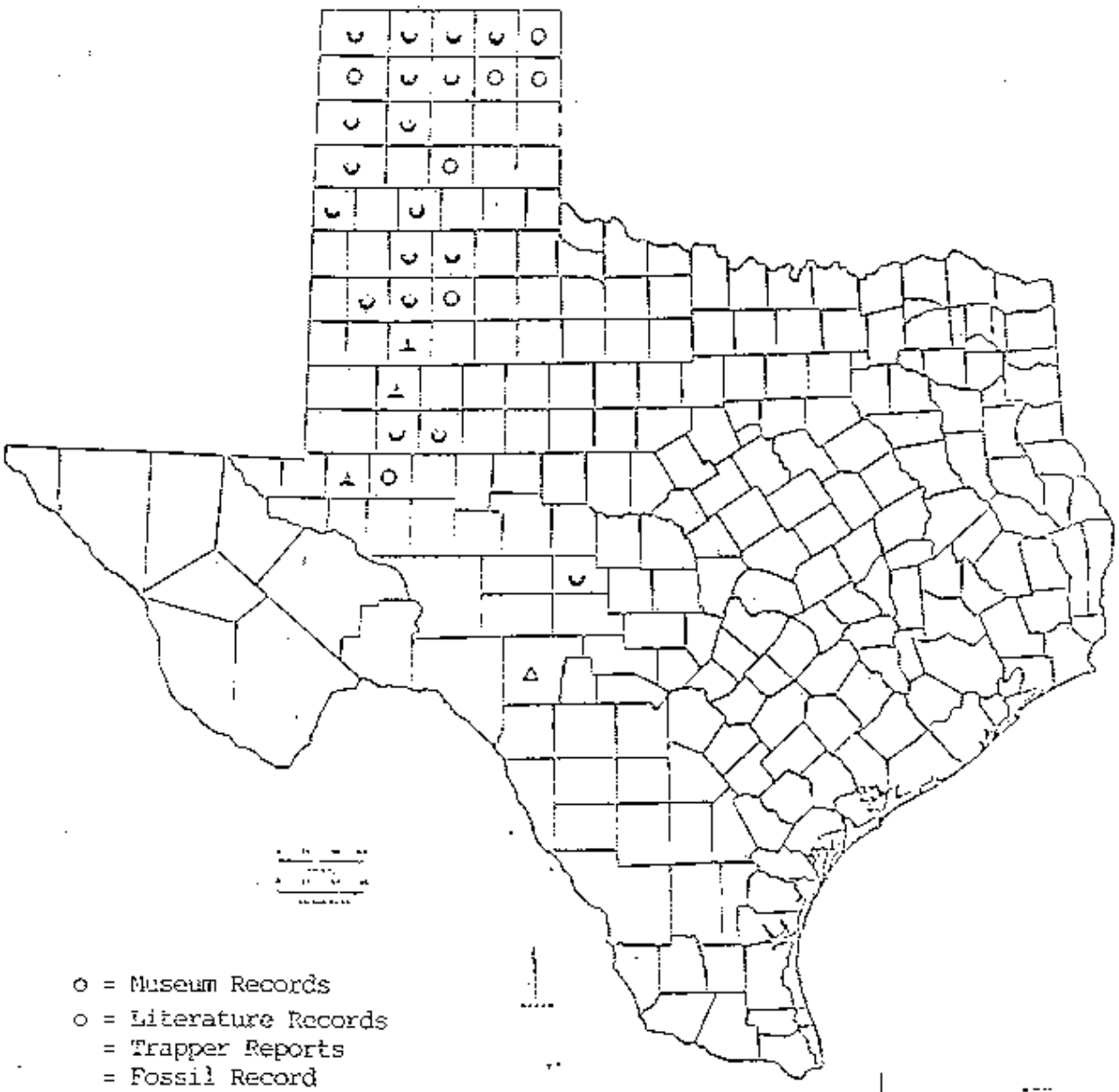


Figure 1. Historical distribution of swift fox in Texas. Adapted from Jones et al. 1987.