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Coyote in the Edwards Plateau of Texas — an Update

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Introduction

In the early 1900s, organized predator control was initiated to remove coyotes and wolves from the sheep- and goat-producing areas of Texas. Operations were begun in the Edwards Plateau, the largest area of sheep concentration. The Edwards Plateau and, to a lesser extent, portions of other adjoining ecological areas presently account for 18% (1.2 million head) of the sheep and lambs and 85% (1.2 million head) of the goats in the United States (Texas Agriculture Statistics Service, 2004). These numbers are down in both actual numbers and as a percent of the national flocks. It is important that the industries be protected and preserved. The inventory and distribution of sheep and goats by counties in 2003 is reflected in Figures 1 and 2. The Edwards Plateau itself encompasses about 24 million acres of "Hill Country" in West-Central Texas comprising all or portions of 37 counties (Fig. 3). By the 1920s, many of the interior Edwards Plateau counties were considered to be free of coyotes and wolves.

In 1950, there were 33 counties covering nearly 24,000,000 acres, which were considered to be coyote free (Fig. 4). This area remained virtually void of coyotes for several decades until their encroachment began in the 1960s. This process has been described by several authors (Caroline, 1973; Shelton and Klindt, 1974; Hawthorne, 1980; Nunley, 1985; Nunley, 1995a). The purpose of this paper is to review and update the progress of the re-establishment of coyotes into the Edwards Plateau of Texas, since that reported by Nunley (1995a). This area is historically and currently unique due to its unsurpassed intensive level of coyote control over an extensive area.

Organized Predator Control

The predecessors of what is currently known as the cooperative Texas Wildlife Services Program have been involved in providing predatory animal control services for the last eighty years. This cooperative wildlife damage management agency is comprised of the Wildlife Services Program of USDA's Animal and Plant Health Inspection Service, the Texas Cooperative Extension Service of the Texas A&M University System, and the Texas Wildlife Damage Management Association.

Figure 1. Distribution of sheep and lambs in Texas (Texas Agricultural Statistics Service 2003).

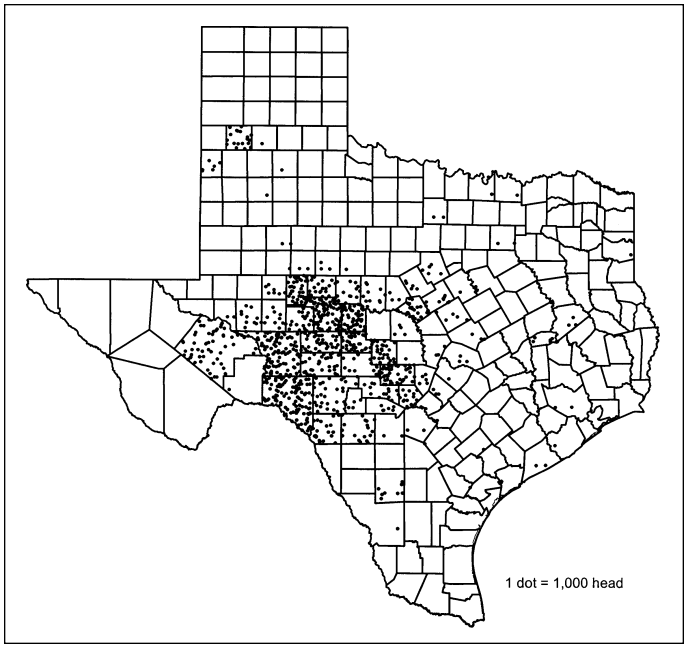
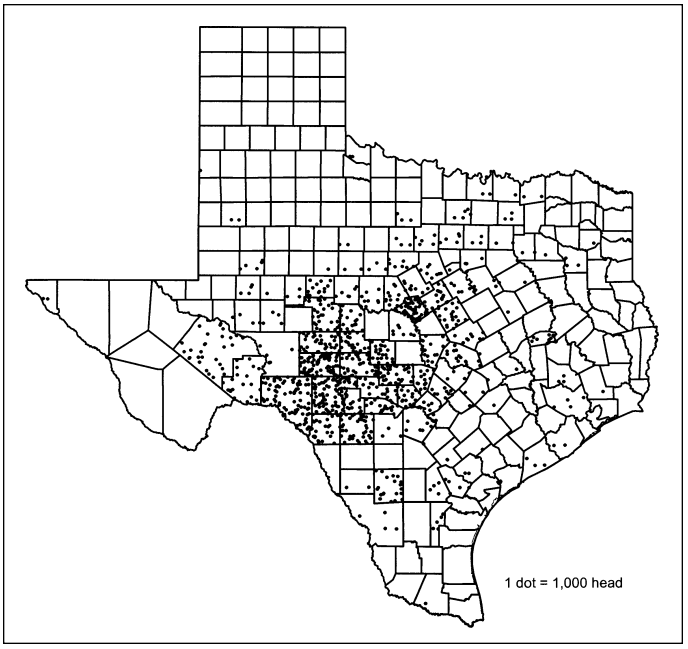


Figure 2. Distribution of all goats in Texas (Texas Agricultural Statistics Service 2003).



Extirpation of Coyotes

The coyote and wolf take by county of the organized control program during fiscal year 1950 is reflected in Figure 5 (Landon, 1950). This categorized illustration of the number of animals taken per county provides a relatively representative picture of the re-establishment of coyotes into the Edwards Plateau when examined every tenth year. Those counties within the sheep and goat production areas, which indicate no "take," either had no program or had a program and did not take any coyotes. In either case, this usually indicated that few coyotes, if any, were present in those counties at that time.

In the predatory animal control agency's 1958 annual report, the status of coyotes and wolves in the Edwards Plateau in the 1950s was reported as follows (Landon, 1958):

In those counties where the sheep and goat industry is a major importance the coyotes have been practically eradicated, and they were well under control even in the border counties. The gray or lobo wolf is no longer found in Texas. The Texas red wolf of central and east Texas is no longer numerous where the hog, turkey and cattle raisers show much more interest in control than formerly.

Caroline (1973) cited several reasons why this early control work in the

Figure 3. Texas ecological regions.

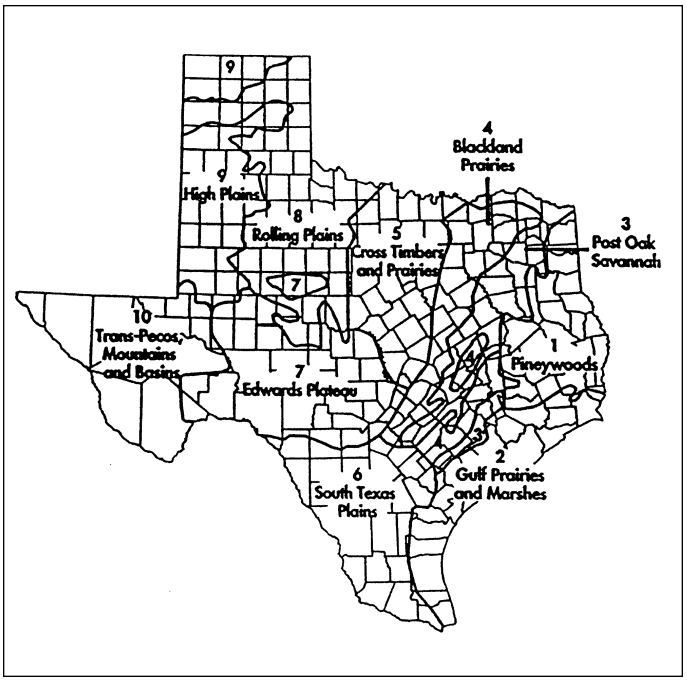


Figure 4. Coyote-free Texas counties in 1950 (about 24 million acres).

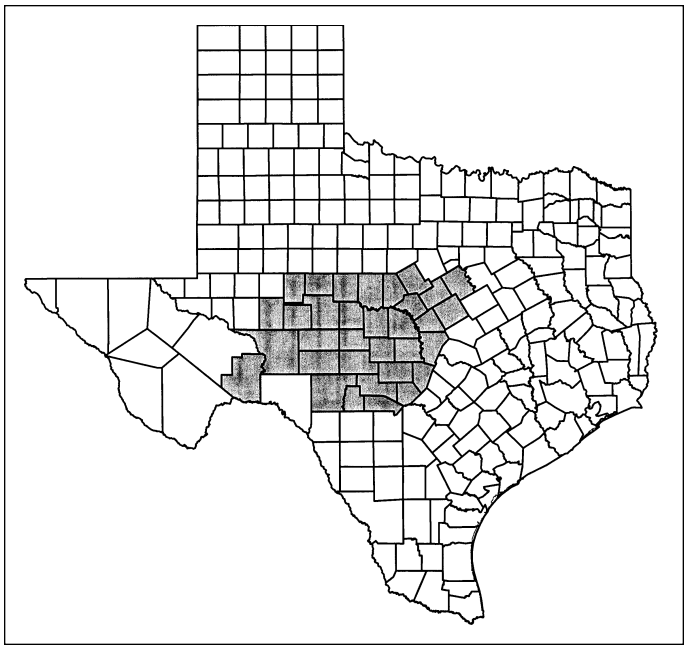


Figure 5. Coyote and wolf take of the Texas cooperative damage management program in 1950.

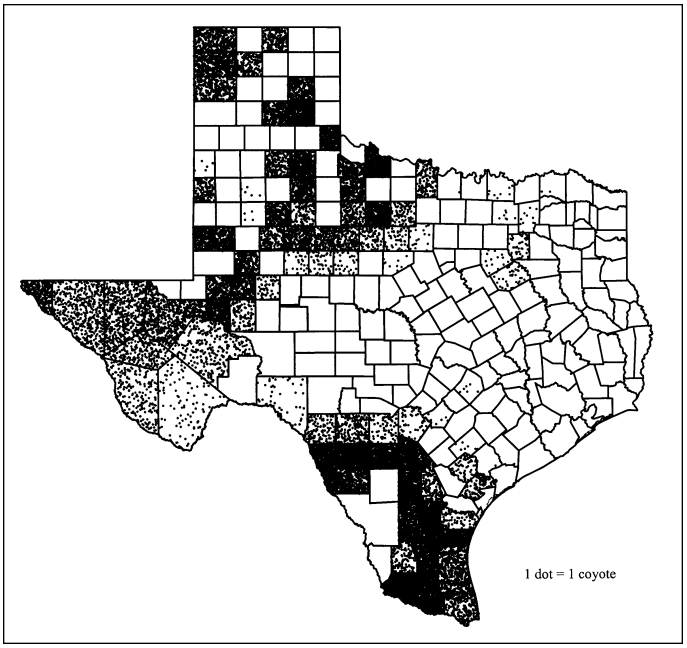
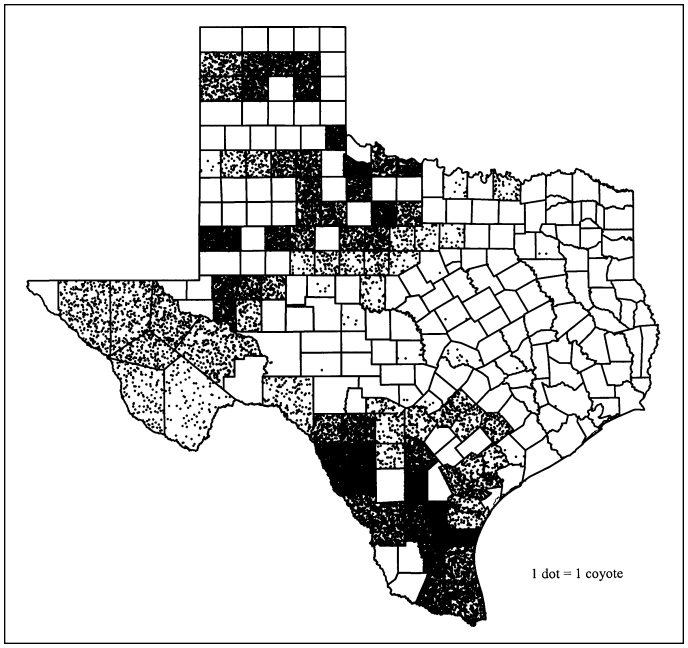


Figure 6. Coyote and wolf take of the Texas cooperative wildlife damage management program in 1960.



Edwards Plateau was successful: (1) the wild canid population contained a large proportion of red wolves or hybrids, which were relatively easy to capture; (2) many ranchers participated with professional animal damage control staff; (3) the increased use of net-wire fencing; (4) many ranchers kept hounds to remove coyotes; (5) economic incentives to ranchers; and (6) extensive use of traps. Shelton and Klindt (1974) suggested that the success of early control work resulted from a "massive human effort using all of the tools and techniques which could be brought to bear."

Re-Establishment of Coyotes

In fiscal year 1960, 118 coyotes were taken from within the former coyote-free area. Nearly 31,000 coyotes were taken from throughout the coyote's range in Texas during that same year, double the number taken in 1958. The explanation for this very conspicuous upswing in coyote numbers is not fully understood, but may have been in response to the drought-breaking rains of the late 1950s, which resulted in a dramatic increase in available prey. These rains provided an exceptional environment of food, water and cover, which was relatively absent during the drought, for the coyote's prey species. Populations of one prey species in particular, the Hispid cotton rat, erupted to unbelievable numbers with estimates as high as several hundred rats per hectare (W. B. Davis and D.J. Schmidly, 1994). In years of high rodent density, it is known that coyote liter sizes increase and more females, especially yearlings, breed. This relative coyote population increase, in response to an increasing food supply, was probably a major factor when an unprecedented 34,754 coyotes were taken in 1962. Coupled with this increase in the coyote population was the effect that the drought had on the sheep and goat industry itself. Shelton (2004) observed that the drought of the '50s caused a marked reduction in the number of sheep and goats, livestock producers, as well as the number of ranch hands involved in livestock care. Livestock producers also worked off the property or were involved in other pursuits resulting in fewer people living on range lands or involved in sheep and goat production (Shelton, 2004). Thus, many factors came together to facilitate the movement of coyotes back into the principal sheep and goat production area of the Edwards Plateau. The relative intensity and distribution of the coyote and wolf taken by the organized control program during fiscal year is reflected in Figure 6 (Caroline, 1960). It has been shown (Shelton and Klindt, 1974) that livestock losses (especially lambs) is greater in areas of coyote encroachment and that the decline in number of sheep and goats are accelerated.

In fiscal year 1970, 420 coyotes were taken from within the former coyote-free area, and the distribution of coyotes within the Edwards Plateau area continued to expand (Caroline, 1970) (Fig. 7). In 1972, the use of chemical toxicants for predator control, such as strychnine and 1080 (sodium monofluroacetate) were canceled by EPA. The use of 1080 on the periphery of the major sheep- and goat-production areas was successfully utilized to prevent or reduce the infiltration of coyotes into these regions. The protection of sheep and goats from predators has since been limited to more manpower-intensive control tools, which include traps, snares, shooting, calling, aerial hunting and M-44 devices utilizing sodium cyanide.

Caroline (1973) described the status of the coyote within the Edwards Plateau in 1973 as follows:

In 1950 coyotes were a rarity in the heart of the Hill Country. On occasion a single animal would appear in the western part of the area but it was soon removed. Along the South Pacific tracks west of San Antonio ranchers to the north were interested in control south of the tracks, and for many years this was sufficient. Although much land improvement took place, "wolf-proof" fences were allowed to deteriorate.

Figure 7. Coyote and wolf take of the Texas cooperative wildlife damage management program in 1970.

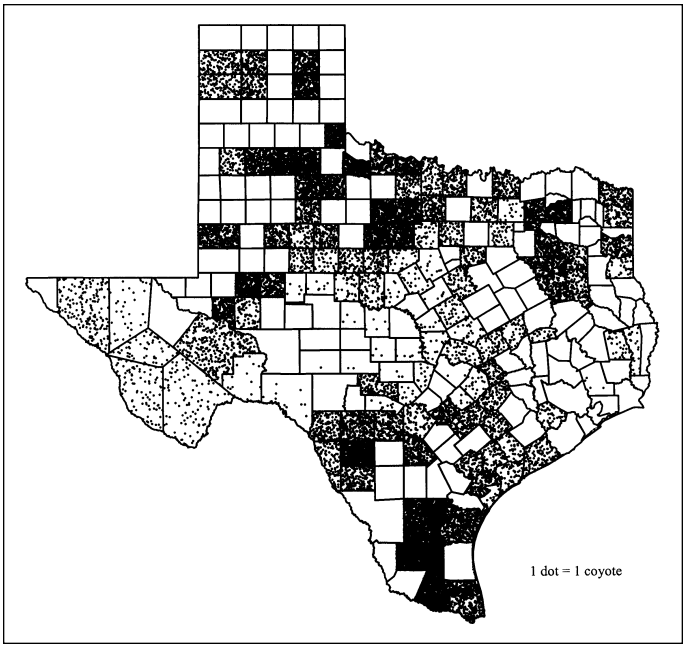
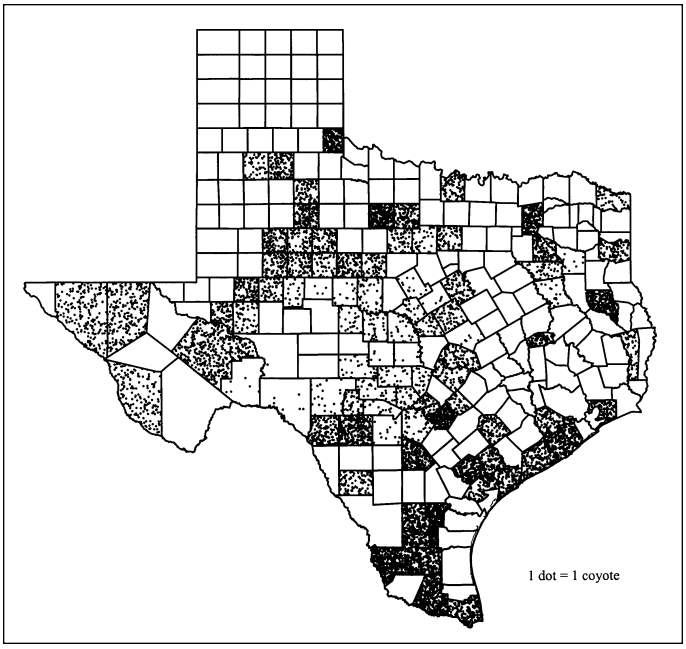


Figure 8. Coyote take of the Texas cooperative wildlife damage management program in 1980.



Coyotes could enter any pasture. (This is an important part because removal of the wolves was half due to fencing and half to organized control). For some time there was no one who recognized this fact. Losses were light and what were found were usually attributed to bobcats, foxes, and raccoons. By the time it was known that coyotes were present, there were far more of them than anyone expected. Consequently, today and in some cases as late as this year, there are coyotes in every formerly coyote-free county in the heart of sheep and goat country.

The re-establishment of coyotes within the Edwards Plateau had further progressed by fiscal year 1980 as reflected by Figure 8 (Hawthorne, 1980). A total of 637 coyotes were taken from within the former coyote-free area. This continued encroachment of coyotes into the sheep- and goat-production areas had become a serious concern. In 1981, a request for the emergency use of Compound 1088 bait stations as per Section 18 of FIFRA was prepared and submitted to EPA for consideration (Nunley, 1981). The request was eventually denied by EPA after a lengthy administrative hearings process. In fiscal year 1990, 2,168 coyotes were taken from within the former coyote-free area (Nunley, 1990) (Fig. 9). In fiscal year 1994, the cooperative program provided

Figure 9. Coyote take of the Texas cooperative wildlife damage management program in 1990.

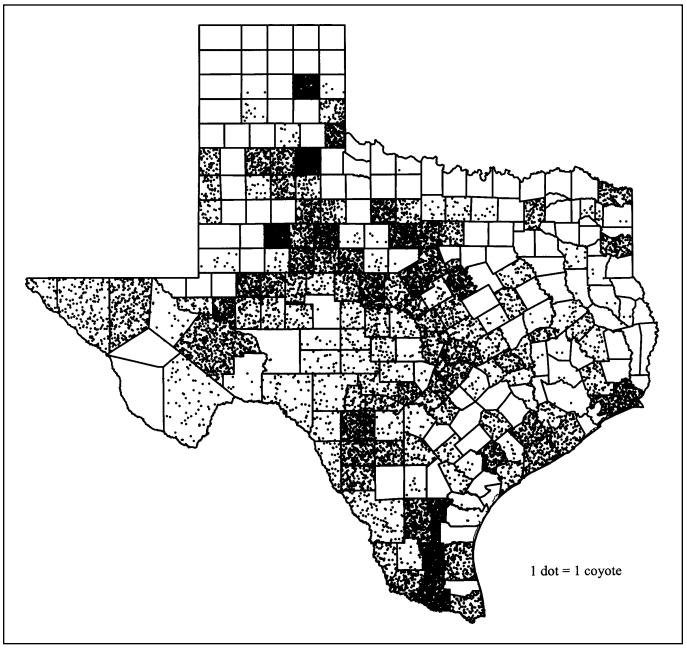


Figure 10. Coyote take of the Texas cooperative wildlife damage management program in 2000.

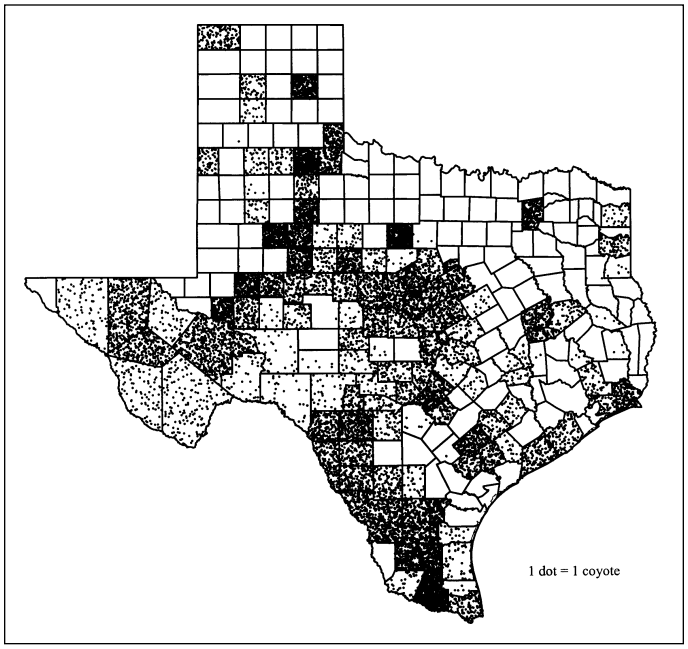


Figure 11. Coyote take of the Texas cooperative wildlife damage management program in 2003.

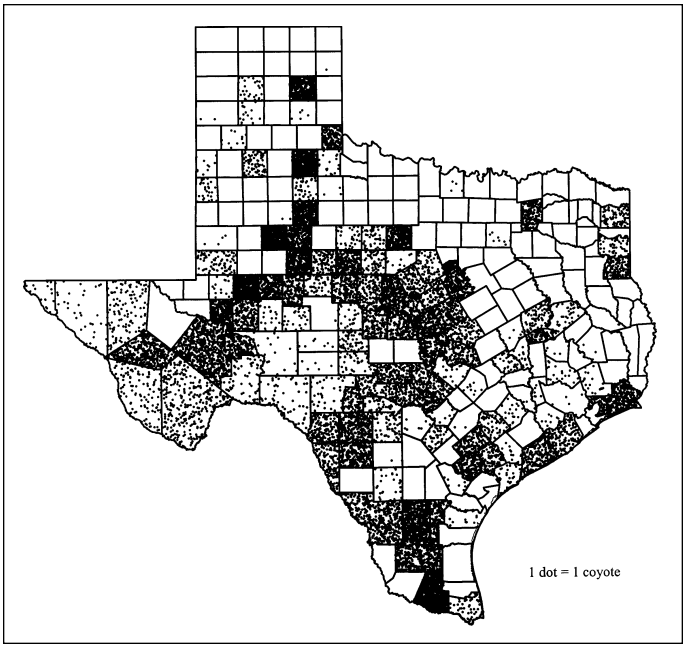
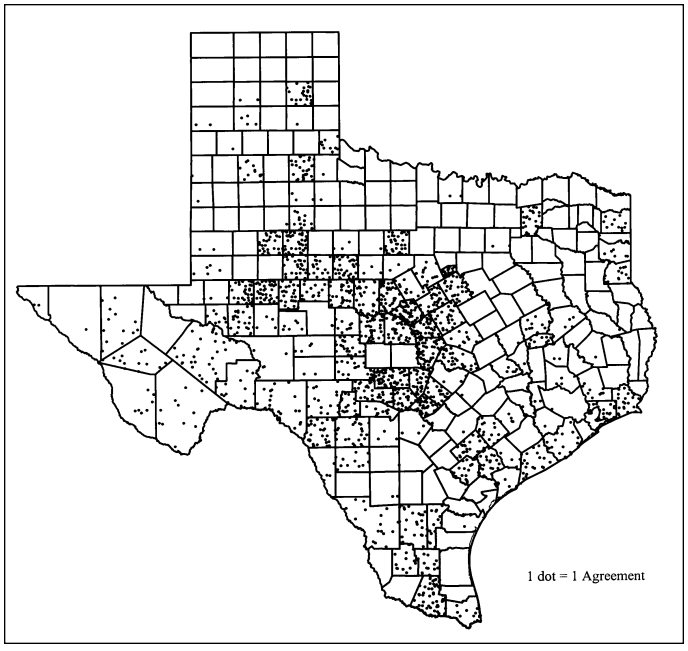


Figure 12. Properties where coyotes were taken by the Texas cooperative wildlife damage management program in 2003.



predator damage management services on 7.5 million acres within the former coyote-free area. This was a 64% increase over the acreage worked in fiscal year 1984. The primary reason behind this additional control effort was related to the increasing exposure of additional livestock to coyote predation. This exposure is directly related to the relative degree and geographical distribution of the coyote's movement into the Edwards Plateau.

Present Status of Coyotes

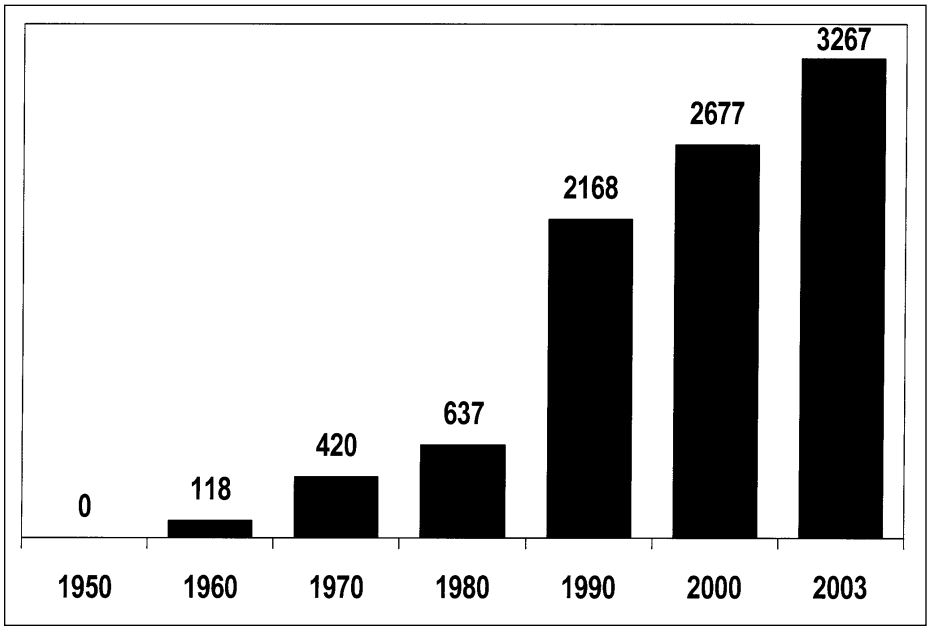
Coyote take within this area continues to increase, as reflected by the take of 2,677 coyotes in fiscal year 2000 (Fig. 10) and 3,267 in fiscal year 2003 (Fig. 11). The distribution of properties worked, where coyotes were taken in fiscal year 2003, is also reflective of the presence of coyotes throughout the area (Fig. 12). While the take of coyotes in the area has increased for the past fifty years (Fig. 13), the acres worked by the cooperative program in FY 2003 reflected a reduction of 10% from the area worked in fiscal 1994. This is primarily related to fewer numbers of sheep and Angora goats within each county. Eighteen of the 33 counties in the area had decreased acreages worked, and the remainder had increased acreages worked. All of which is reflective of the further movement of coyotes into sheep and goat areas, which is facilitated by a combination of factors as described below.

Factors Responsible for Coyote Re-Establishment

The range expansion of coyotes within the Edwards Plateau is directly related to the presence, viability, and geographical distribution of the sheep and goat industry as previously indicated. Gee, et al. (1977) also surveyed former sheep producers in Colorado, Texas, Utah, and Wyoming who had terminated sheep production. Factors which they rated of greatest importance in their decisions to discontinue sheep production were (1) high predation losses, (2) low lamb and wool prices, (3) shortage of good hired labor, (4) the sale of their land, and (5) their own age. Predation losses due to the limitations and cost of the application of current predator-control techniques has also contributed to the decline in the number of sheep and goats in Texas (Nunley, 1995b). The loss of toxicants in 1972 greatly reduced the efficiency and effectiveness of coyote control over large areas. However, in more recent years, the loss of the wool- and mohair-incentive program greatly influenced and accelerated the inventory decline of sheep and Angora goats.

Another major factor for declining sheep and goat production on the eastern periphery, and increasingly in all areas of the Edwards Plateau, has been the changing land use away from sheep and goat production. This occurs through the sale of properties due to economic pressures, especially near urban centers and recreational areas. This results in the fragmentation of rural lands into smaller parcels, which generally are too small to maintain the economy of scale for traditional farming and ranching (Wilkins et al., 2000). It often follows that the new land managers and absentee landowners do not pasture sheep or goats, or in many cases, do not allow coyote-control activities on their properties. Consequently, sheep and goat producers who border, or are surrounded by properties where coyote control is not conducted, bear the brunt of the coyote predation. These producers on the fringe of the sheep- and goat-production area find that it is very difficult to control losses to predators on their ranges (Nunley, 1995).

Figure 13. Trends in the number of coyotes taken by the Texas cooperative wildlife damage management program within the formerly coyote-free area shown in Figure 4.



Prognosis for the Future

Since the majority of the factors, especially in regards to land use, will continue and most likely accelerate in the future, coyote damage management options will become increasingly challenging. Additional sheep and goat producers who have not had any or little problems with coyote predation in the past will have in the future, as the distribution and abundance of coyotes within the Edwards Plateau continues to increase.

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