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HISTORICAL PERSPECTIVE ON COYOTE CONTROL METHODS IN TEXAS

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Abstract: A variety of control methods used over an 80-year period (1915-1995) contributed to the effective and successful coyote (*Canis latrans*) damage management program that exists in Texas today. Traps, toxicants, shooting, denning, and dogs were important during the early years of the Texas Animal Damage Control Service (TADCS) program. Aerial hunting and snares evolved as important control tools following the ban on strychnine and Compound 1080 in 1972. The livestock protection collar (LPC) has received increased use in recent years and has been useful in resolving difficult depredation problems. ADC policy along with changing state and federal regulations and public opinion will dictate how specific control tools are used in the future.

Texas leads the nation in the production of domestic sheep and goats. Although the total number of these livestock has declined in recent years, there were 1,700,000 sheep and 1,950,000 goats present in the state during 1995 (USDA 1995) (Fig. 1). The Edwards Plateau and adjoining ecological areas contain the highest concentration of both species (Fig. 2).

Organized predator control sponsored by the U.S. Bureau of Biological Survey began in Texas with the hiring of 8 hunters in November 1915. Their work was concentrated in the sheep producing areas of the Edwards Plateau and expanded to other areas in later years (Nunley 1986). Traps, shooting, and strychnine baits were the primary control tools used. As the sheep industry expanded, so did federal and state government efforts to protect livestock producers. Today there are 142 employees involved in coyote predation control efforts in 140 of the 254 counties in Texas.

This paper describes the history of coyote control as conducted by the TADCS since the beginning of the program. Primary emphasis is given to the period from 1972 to the present. We also evaluate how public attitudes and political events have influenced the use of control tools in the past and how they may influence the use of tools in the future.

Coyote control methods

Perhaps no other area of the United States (U.S.) can boast of a more effective and successful coyote predation control program than the Edwards Plateau region of Texas. This area has been under intensive predator management since at least1915. The use of a variety of control tools eventually led to the extirpation of coyotes, red wolves (*C. rufus*), and gray wolves (*C. lupus*) from the major sheep production areas. Exactly how this task was accomplished is unknown, but Shelton and Klindt (1974) suggested that it resulted from a "massive human effort using all of the tools and techniques which could be brought to bear."

By the early 1920s, all red wolves and nearly all coyotes were eliminated from the interior sheep and goat producing counties of the Edwards Plateau (Nunley 1986). It wasn't until the 1970s that coyotes began to re-establish; red wolves have not reinvaded the area.

Over the years many control tools have been used, including toxicants, shooting, aerial hunting, calling, dogs, traps, cyanide ejectors, snares, denning, and more recently the LPC. A historical review of each major control method is provided below.

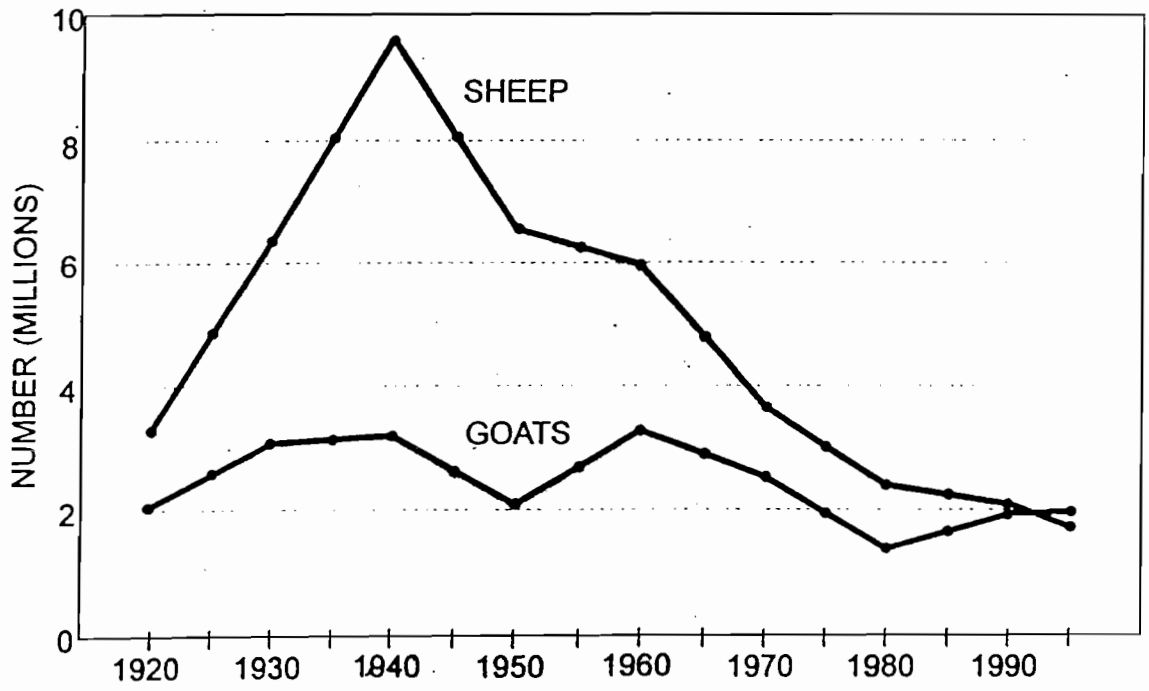

Figure 1. Trends in sheep and goat numbers in Texas (1920-95).

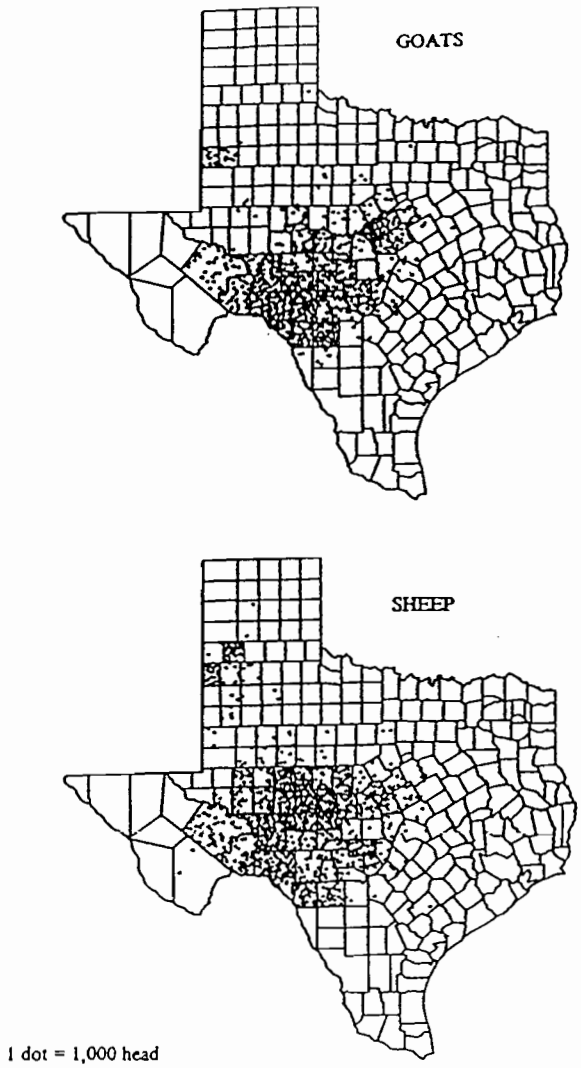

Figure 2. Distribution of sheep and goats in Texas (Texas Crop and Livestock Reporting Service 1994).

Toxic baits. Strychnine placed in meat and tallow baits was widely distributed in all sheep- and goat-raising areas when organized control efforts began in 1915. No records on the number of baits used are available for the early years, but in FY 1950, over 182,000 baits were used to reduce coyote populations. In FY 1960, over 328,000 baits were distributed, and by 1971 this number had increased to 408,000. Undoubtedly, strychnine played a major role in suppressing coyote numbers in buffer areas and reduced the possibility of reinvasion into major sheep and goat raising areas.

Compound 1080 was first used in Texas in 1949. Like the rest of the West, large meat baits were treated and placed in strategic locations during the winter months. During the peak of 1080 use in the 1960s, approximately 1,000 baits per year were used (Fig. 3). Compound 1080 was used in all regions of the state except east Texas, but most frequently in the counties adjacent to the Edwards Plateau and Panhandle regions. The use of 1080 and strychnine ceased in 1972 following Executive Order 11643 and the cancellation of predacides by the Environmental Protection Agency (EPA).

Traps. Steel foothold traps were an important tool when organized wolf and coyote control efforts began. The No. 4 Newhouse has been the trap of choice by Texas trappers since the program first started purchasing traps. The TADCS has over 9,000 traps in its inventory today and 86% are No 3½ or 4 Newhouse. ADC field personnel relied heavily on traps following the cessation of 1080, strychnine, and M-44 cyanide ejector use. In FY 1973, TADCS personnel used traps to take 10,058 coyotes which represented 67% of the coyotes taken by all control methods. By comparison, in 1994, only 1,666 coyotes were taken in traps; this equaled 8% of the coyotes taken by all methods (Fig. 4).

A similar pattern showing the declining use of traps is prevalent in many other western ADC programs. The reduced use of traps has come about for several reasons. Perhaps the most significant is the increased effectiveness and use of the M-44 device which became available for experimental use in 1974, and was subsequently improved substantially and reregistered. Traps will continue to be an important tool in coyote control, but with availability of other less labor intensive methods, they will not receive the use they have in the past.

Snares. Although snares were always available as a control tool, they were not widely used in the TADCS program until 1959. As woven ("net") wire fences became more common in sheep and goat producing areas, the potential effectiveness of snares as a "first line of defense" against coyotes invading pasture was recognized.

Snares are typically set in "crawl holes" under fences. The most common fence snare used by TADCS personnel is about 34 inches (86 cm) in length and constructed with 5/64 inch (2.0 mm) diameter aircraft cable using a "sure lock". By 1972, snares were responsible for taking 1,576 coyotes. Their use has expanded since then and in 1994, snares were used to capture 5,879 coyotes or 28% of the coyotes taken by all control methods (Fig. 5). Guthery and Beasom (1978) working in South Texas reported that neck snares were about 12 times more selective than leghold traps for capturing predatory mammals.

Aerial hunting. Although aerial hunting with fixed-wing aircraft and helicopters was used prior to 1972, this control method was not common until toxicant uses were canceled. Both fixed-wing aircraft and helicopters are used in the Texas program. Fixed-wing aircraft are typically used in the more rolling and open areas of the Trans-Pecos, Panhandle, and the western portion of the Edwards Plateau while helicopters are used in the rougher terrain around the Edwards Plateau.

The TADCS program currently owns 1 helicopter and 2 fixed-wing aircraft. Two helicopters are used on a contractual basis. These aircraft are used in all areas of the state (except east Texas) as specific needs occur. The number of coyotes taken by aircraft peaked in 1975 with 5,983 animals taken that year. Since 1982, there has been a gradual increase in the number of coyotes taken each year by aircraft with 3,692 taken in 1994 (Fig. 6).

Coyote-getters/M-44 devices. The Coyote-Getter, a primer-powered cyanide ejector using a sealed .38 special casing, was widely used in Texas after it was introduced into governmental predator control around 1940. Young and Jackson (1951) reported

that in October 1946, A. B. Bynum, a TADCS employee took 536 coyotes using 325 "getters" in Maverick County. The coyote getter proved to be an effective control tool for the next 30 years and was widely used by TADCS personnel. For example, in FY 1960, 21,526 coyotes were taken by "getters" in the Texas program.

After years of development and testing, the M-44 device cyanide ejector officially replaced coyote getters in the ADC program (Bacus, 1969, n.d.). M-44s were immediately used in the Texas ADC program and in 1972 were responsible for taking 7,567 coyotes. Use of this tool was suspended following the EPA cancellation of all predacide registrations in 1972. Use was resumed under experimental permits in 1974. Registration by EPA occurred in 1975 and reregistration under the new guidelines, in 1994.

Despite early mechanical problems with ejectors and sealants, there has been a progressive increase in M-44 use since 1975. The highest number of coyotes taken with this device was 8,250 in 1993 (Fig. 7). M-44s receive their greatest use during the winter months but can be effective during all times of the year.

During the period 1976-86, more coyotes were taken by M-44s in Texas than in all other states combined. Connolly (1988) attributed this to the following reasons: (1) the Texas ADC program is much larger than the others; (2) most Texas grazing lands are in private ownership, which is appropriate for M-44 use; (3) dense vegetation in many areas of Texas precludes effective aerial hunting, which is a primary technique in most other states; and (4) much control work in Texas is done in livestock pastures, where livestock interfere less with M-44s than with steel trap sets.

Livestock Protection Collar. The Livestock Protection Collar (LPC) was invented by Roy McBride as a method to take "problem coyotes" that were difficult to take with conventional control tools. The LPC is the most selective and specific of all control tools because it removes only the individual animal responsible for killing livestock. Although 5 states have established programs to use the LPCs, only Texas has made substantial use of this new control tool. The LPC has been used by state-certified rancher applicators since 1988 and by ADC field personnel since 1990.

Connolly (1993) summarized use of the collar by the TADCS program for the period FY 1990 - 1992. He reported 2,348 collars were placed on livestock which resulted in 46 being punctured by coyotes. J. Dorsett, TADCS District Supervisor (pers. commun.) reported that since 1992, an additional 3,196 collars were placed on livestock resulting in 63 coyote punctures.

Nonlethal control methods

Texas sheep and goat producers have used a variety of nonlethal techniques to protect their livestock from coyote predation. When sheep were first established on the Edwards Plateau, herders were used extensively to guard sheep. In the 1920s, a major effort was made to fence individual ranches into large pastures with woven wire fences. Many of the fences were equipped with wire aprons to make them "predator proof". The elaborate fence network on the Edwards Plateau probably contributed more than any other factor to reducing or, in many cases, eliminating predator losses.

In recent years, many livestock producers have experimented with different types of guarding animals to protect their flocks. One of the most popular techniques has been the use of guard dogs such as the Great Pyrenees, Komodor, and Akbash breeds. In 1993, TADCS estimated that 5 to 10% of the sheep and goat producers were using guard dogs. The use of guard donkeys has also increased in popularity in recent years. Walton and Feild (1990) estimated that approximately 9% of the sheep and goat producers were using donkeys in 1989. Most of the donkeys being used are single jennies or geldings.

The TADCS and Texas Department of Agriculture advocate and promote the use of nonlethal techniques to reduce conflicts between predators and livestock producers. In 1994, Texas ranchers spent an average of $0.51 per head (breeding ewe) annually on nonlethal predator control measures (USDA 1995). This effort will most likely continue in the future.

Public opinion and coyote control methods

A historical review of the use of coyote control methods has demonstrated the importance of public opinion in dictating the availability of specific tools. During the early years of predator control in the West, there was public support for removal and elimination of large predators such as wolves and coyotes. This was because a large percentage of the American public lived on the land or had a close association with relatives that made their living from farming or ranching. The movement of people from rural environments to urban areas in the past 50 years has brought about substantial change in public attitudes towards predator control.

The most significant events that brought immediate changes to the use of coyote control methods were the Cain Committee Report (Cain et al. 1972) and the cancellation of predacide registrations by EPA. Toxicants were important in the TADCS program and were very effective in suppressing coyote predation in many areas of the state. The use of Compound 1080 bait stations was believed to be extremely effective in reducing coyote numbers on the fringe areas of the Edwards Plateau.

Despite the lack of 1080 and strychnine baits over the past 23 years, the TADCS has been able to minimize predator losses by shifting to and improving the use of other control methods. Aerial hunting, although more costly and hazardous to ADC personnel, has been effective in removing coyotes from many problem areas. Improvements in the use of snares and M-44s have been helpful in resolving depredation problems. Lastly, the LPC has proved effective in removing coyotes that were difficult to take with other methods.

Public sentiment against the use of foothold traps to capture animals has increased in recent years (Gentile 1987). An effort is underway through the International Organization for Standardization (ISO) to develop an international standard with criteria for the humane use of traps for capturing particular species (Jotham and Phillips 1994). Recent testing of several types of traps suggests that only padded jaw traps among the traps currently in use would meet proposed criteria for capturing coyotes with minimal injury. The future of the ISO standards is unknown at this time; however, some type of national or international standard, reflected in state laws, appears likely in the next few years.

Within the past 2 years, 2 western states (Arizona and Colorado) have made major changes that affect how traps can be used for capturing coyotes. Arizona currently prohibits all trapping on public lands. Colorado has passed regulations which allow only padded traps to be used in land sets. Because most of the land in Texas is under private ownership it appears unlikely that such changes affecting the use of traps for predator control in Texas will occur in the near future. We expect all current tools for managing coyote predation will continue to be used in Texas into the foreseeable future and that some new techniques will become available.

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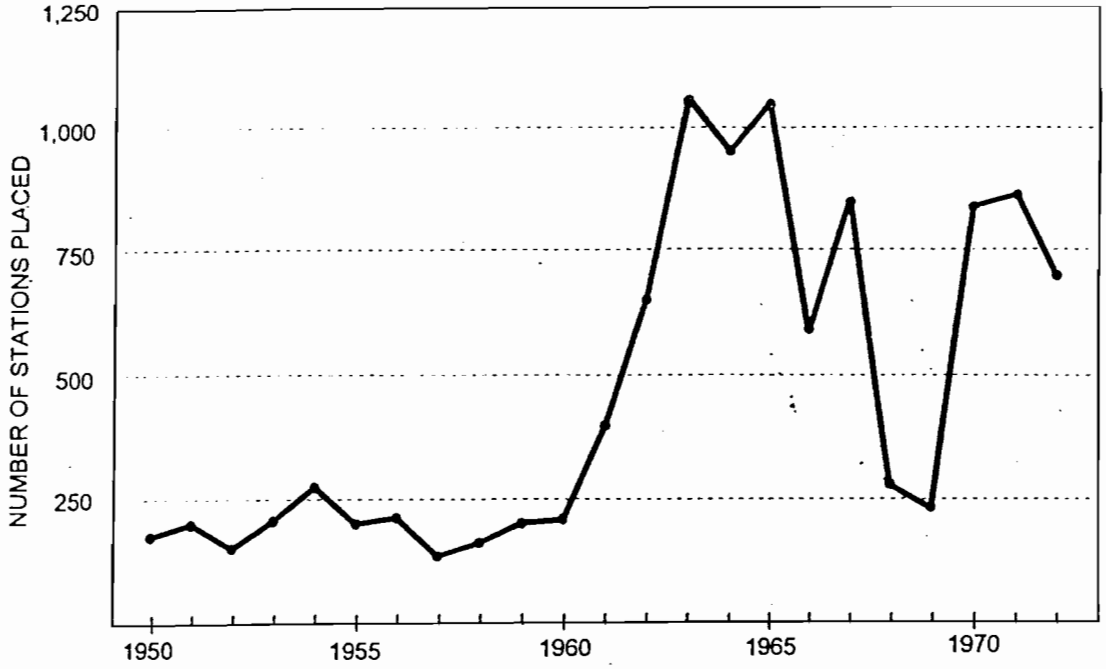

Figure 3. Numbers of 1080 baits placed in Texas (1950-1972).

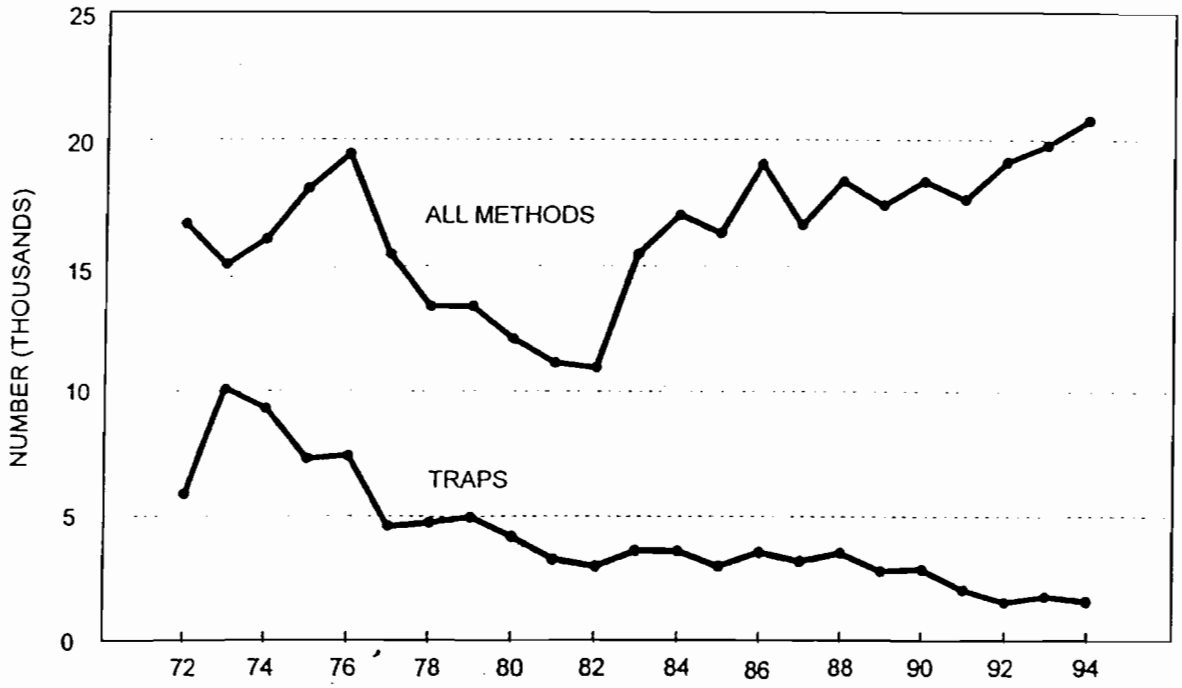

Figure 4. Trends in the number of coyotes taken in foothold traps by TADCS (1972-1994).

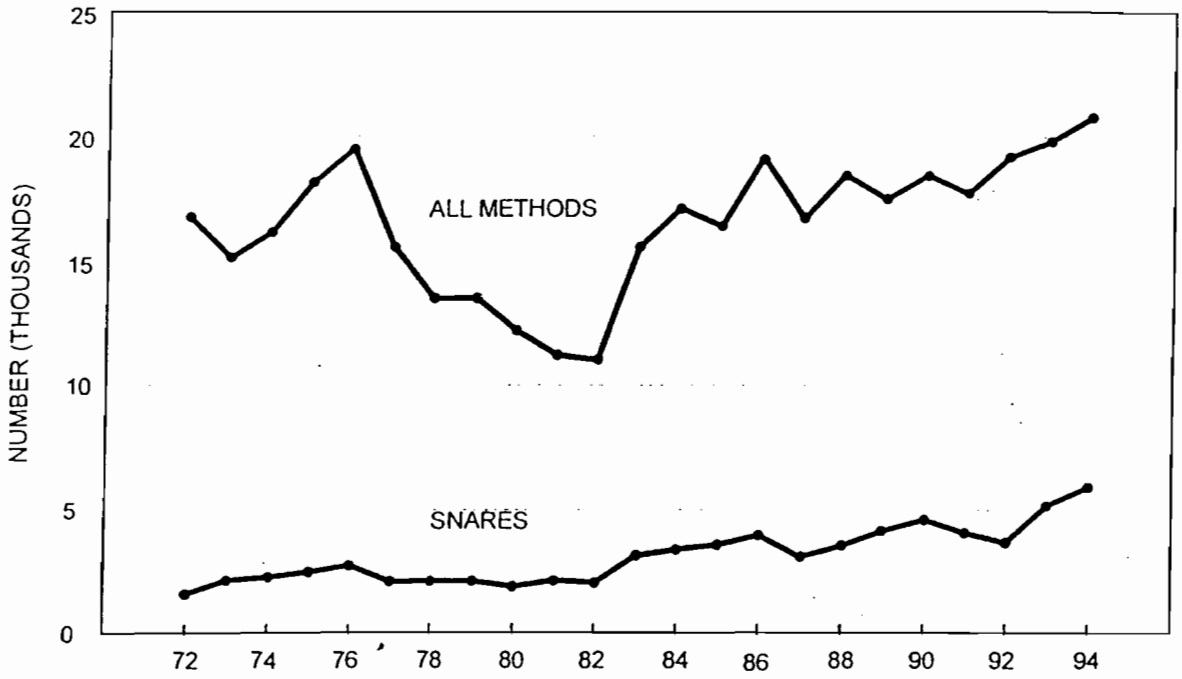

Figure 5. Trends in the number of coyotes taken in snares by TADCS (1972-1994).

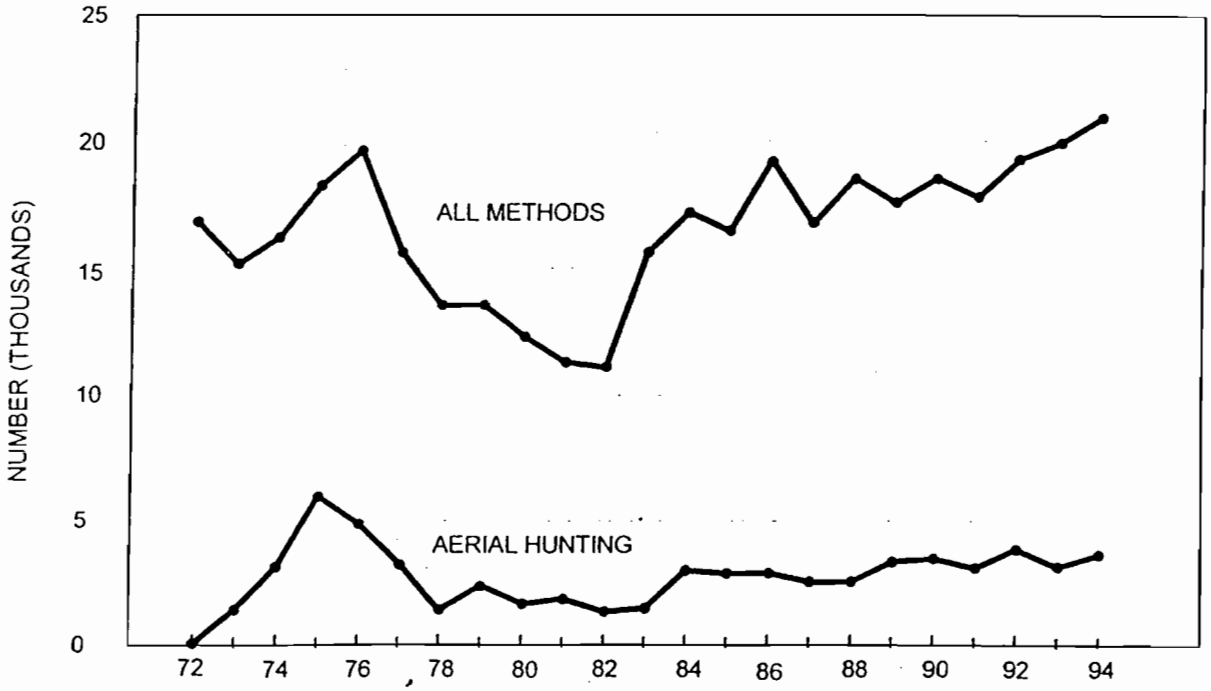

Figure 6. Trends in the number of coyotes taken by aerial hunting by TADCS (1972-1994).

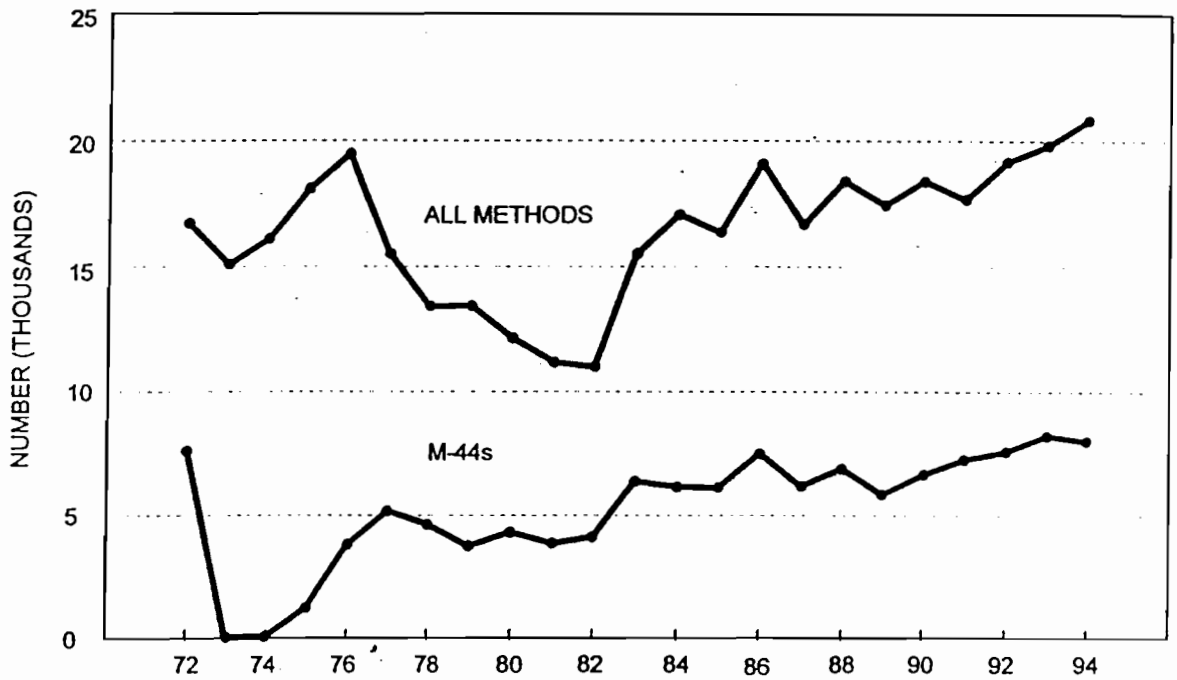

Figure 7. Trends in the number of coyotes taken by M-44s by TADCS (1972-1994).