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COYOTES: A SOUTH TEXAS PERSPECTIVE

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Abstract: Coyotes (Canis latrans) are abundant throughout North America, some of the highest densities occur in south Texas Most studies indicate abundance of food as a contributing factor of coyote density. High coyote populations can lead to localized depredation problems and the current canine rabies epizootic is of concern to residents of south Texas

The coyote was 1 of the native inhabitants of Texas when it was first settled by European settlers. It has survived and expanded its range despite control attempts that have surpassed those for any species in North America. For decades, coyotes have been killed by stockmen and ranchers because of their depredation on domestic livestock. Their adaptability is the main reason they flourished. Coyotes are now found in all of the continental United States

Coyote densities

The coyote is probably the most extensively studied carnivor, and considerable research has been conducted on the species' population dynamics. Since estimates were begun in 1965 (Knowlton 1972, Bean 1981), the greatest abundance of coyotes in North America consistently occurs in the southern region of Texas. Most studies of the factors limiting coyote populations have identified food as the predominant constraint (McLean, 1934; Murie, 1940; Robinson, 1956; Gier, 1968; Clark, 1972). Since the abundance of coyotes is related to abundance of winter foods, one would expect coyote densities to increase from north to south as food supplies become more available.

Limited studies of absolute densities for coyotes are available A breeding population of 2 0 coyotes/ mi^2 in a 6-county area of Kansas was estimated by Gier (1968). Clark (1972) estimated post-whelping season densities in Curley Valley, Utah, at 1 coyote per 2-4 mi^2 Andelt (1985) estimated that pre-whelping coyote densities on the Welder Wildlife Refuge in southern Texas were 2.1-2.3/mi^2.

Studies conducted by Knowlton (1972) suggest coyote densities in certain areas of south Texas may average 4-6/mi^2, with 0.5-1 0/mi^2 seemingly realistic over a large portion of their range. High coyote densities in the region are associated with a broad food base as evidenced by dietary studies. Coyotes in south Texas feed on a variety of native fruit and insects during the lengthy warm season, then shift their diets to mammalian prey during the winter months.

Coyotes are most vulnerable to natural and human-caused mortality during their first year. Most studies show a correlation between coyote mortality and human exploitation. In south Texas, human exploitation of coyotes has been light because control efforts for livestock protection are limited, with no significant sport hunting or trapping Human activity still accounted for 57% of all coyote mortality (Windberg et al. 1985) Shooting, trapping, and road fatalities were the most common cause of mortality A much smaller percentage apparently succumb to other causes such as disease and malnutrition

Coyote diets

Diet-wise, the coyote is an extremely versatile scavenger and predator (Murie 1939, Sperry 1941, Gier 1975). Unlike the wolf, which is a predator almost exclusively of ungulates (Mech, 1970; Pimlott, 1975), the opportunistic character of coyote feeding is likely most responsible for its great success in the face of habitat manipulation and destruction by man (Hilton 1978).

The abundance and availability of food affect both coyote density and reproduction. Fluctuations in coyote abundance have been related to abundance of rodents (Knowlton 1972), carrion (Todd and Keith 1983, Todd 1985), and black-tailed jack-rabbits (*Lepus californicus*) (Clark 1972, Gross et al 1974, Knudsen 1976, Stoddart 1977) and to social intolerance mediated by food supplies (Knowlton 1983).

In southern Texas, the coyote food base is broad and abundant, and coyotes attain high densities (Andelt 1985, Bean 1981, Knowlton 1972, Knowlton et al. 1986). Based on dietary studies in the region, coyotes ate primarily mammalian prey in winter, and fed mainly on a variety of fruit, insects, and white-tailed deer (*Odocoileus virginianus*) fawns as available during the warm season (Andelt 1985, Andelt et al. 1987, Brown 1977, Knowlton 1964). Coyotes are known for their particular fondness of watermelons and cantaloupes and will readily seek them as a food source.

Andelt (1985) found that mammals composed 87% of the winter and 28% of the summer diet on the Welder Wildlife Refuge in south Texas. Fruits, including persimmon (*Diospyros texana*), agarito (*Mahonia trifoliata*), dewberry (*Rubus trivialis*) and pricklypear cactus (*Opuntia lindheimeri*) composed 65% of the summer diet, but only 1% of the winter diet. White-tailed deer composed a large percentage of the diet in June, coinciding with births of fawns. Lagomorphs, rodents (cotton rats, pocket gophers, harvest mice, and woodrats), and cattle appeared in coyote diets primarily during the winter. Insects, mostly grasshoppers, occurred in the diet primarily in late summer.

In summary, coyotes consume a variety of foods year-round but emphasize small mammals, fawns, plants and assorted birds and invertebrates during summer. Winter diet emphasizes larger items such as deer (either prey or carrion), livestock carrion, or locally abundant lagomorph species (Voigt 1987, Berg, 1987)

Damage caused by coyotes

Coyote depredation to livestock and poultry has been reported from all counties of south Texas. Numerous exotic game ranches have requested assistance from the Texas Animal Damage Control Service after axis deer (*Axis axis*) , blackbuck antelope (*Antelopa cervicapra*) and other exotic animals were reportedly killed by coyotes. Severity of individual losses range from light to extremely high levels. Sheep and goat ranches located in Jim Wells, Live Oak, and Bee counties have also experienced losses contributed to coyotes.

Studies reveal that fawns compose a large percentage of the coyote's summer diet. South Texas is known for its substantial trophy white-tailed deer population and subsequently, the high dollar figure demanded for prime deer hunting leases. One component of the ADC program is the protection of this species. The overall impact of coyotes on deer populations is unknown; however, fawn survival increased after coyote control programs were implemented in south Texas (Beasom 1974).

A common concern to individual producers in Jim Wells, Duval, Brooks, Starr, Hidalgo, and Cameron counties is coyote damage to watermelon and cantaloupe crops. During early-spring and fall plantings, coyotes and other carnivores are attracted to ripe watermelons as a food source and can cause considerable damage. In some areas, coyotes and other species disrupt irrigation by chewing holes in plastic pipe

A unique project to south Texas is the removal of coyotes and other predators from the spoil islands of the Padre Island National Seashore where colonial water birds traditionally nest At the request of the Texas Parks and Wildlife Department, this project is carried out to improve survival rates of ground nesting birds and their young. In the past, TADCS personnel have initiated control efforts on 10 separate islands where coyote sign had been found A spokesman for the Padre Island National Seashore states that as a result of these control efforts, 1993 was the first time in the last several years that birds had nested on 2 particular islands which in the past were scarce of birds.

Rabies in South Texas

It would be difficult to mention coyotes without discussing the current rabies outbreak in south Texas involving the canine strain of rabies virus Canine rabies is a strain of rabies virus that has become established in coyotes and is readily transmitted from coyotes to domestic dogs and, subsequently, between domestic dogs Because it often infects domestic dogs, this rabies strain poses a greater risk for human exposure.

Since September 1988, 20 counties in South Texas have become involved in the canine rabies epizootic: Atascosa, Brooks, Cameron, Dimmit, Duval, Frio, Hidalgo, Jim Hogg, Jim Wells, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Nueces, Starr, Webb, Willacy, Zapata, and Zavala A total of 638 animal rabies cases and 2 human rabies cases associated with the canine strain of rabies occurred

during that time period. The animal rabies cases included 322 coyotes, 244 dogs, 25 raccoons (*Procyon lotor*), 21 cats, 15 cattle, 5 bobcats (*Lynx rufus*), 4 horses, 1 skunk (*Mephitis mephitis*), and 1 goat (Table 1). The outbreak has reached epidemic proportions, prompting Governor Ann Richards to declare the rabies outbreak in South Texas a State Health Emergency in July 1994.

In an effort to contain the rabies epidemic, the Texas Department of Health has declared an Area Rabies Quarantine for all of Texas effective January 13, 1995. Under this quarantine no person shall remove from or transport within the quarantine area any dog or cat over the age of 3 months without a current rabies vaccination certificate for the duration of the quarantine Also included in this list are hybrids (any offspring of 2 animals of different species), skunks, bats (Chiroptera), foxes (*Urocyon* spp., *Vulpes vulpes*), coyotes, or raccoons

In February 1995, 850,000 dog-food-based baits filled with an oral rabies vaccine were air-dropped over a 15,000 mi^2 area of south Texas in an effort to stop the northern spread of the epizootic. This project was made possible by a cooperative agreement between USDA-APHIS-ADC and the Texas Department of Health. Additional drops are planned for January 1996. The canine rabies virus remains a public health threat.

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Table 1. Species involved in a canine rabies epizootic in south Texas, 1988-1995.

COUNTY	COYOTES	DOGS	OTHER*	TOTAL
Atascosa	4	2	1	7
Brooks	47	14	4	65
Cameron			3	3
Dimmit	2	1		3
Duval	18	21	8	47
Frio	7	3	2	12
Hidalgo	5	60	8	73
Jim Hogg	26	12	5	43
Jim Wells	31	15	11	57
Kenedy	12	1	2	15
Kleberg	24	20	6	50
La Salle	16	5	2	23
Live Oak	22	2	6	30
McMullen	1		2	3
Nueces		7	1	8
Starr	42	68	7	117
Webb	45	5	3	53
Willacy	5	2		7
Zapata	7	12	1	20
Zavala	1	1		2
TOTALS	322	244	72	638

**Others - raccoon, cat, cattle, bobcat, horse, skunk, and goat.*