MANAGEMENT IMPLICATIONS OF COYOTE SPACING PATTERNS IN SOUTHERN TEXAS

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Abstract: We determined the spatial distribution and social composition of female coyotes (*Canis latrans*) on 2 areas in southern Texas. The population contained territorial (66%) and transient (34%) females. Exclusive core areas for animals in adjacent territories enabled interpretation of territorial spacing patterns. The harmonic mean estimate of territorial range size (75% utilization contour) was 2.4 km² with 76% of the ranges ≤3 km². Transients had considerably larger ranges ($\bar{x}$ = 12.4 km²) and were located predominantly along the periphery of territories and in interstitial areas. Territorial females were primarily (71%) adults (≥2.5 yr); 65% of the transients were 1–2 years old. We explored implications of spacing patterns for coyote management programs, especially population reduction, with mathematical simulations using demographic estimates from this study. Simulations indicated that there were 1.5 and 4.2× as many coyotes using areas of 100 and 5 km², respectively, as might be inferred from density estimates. The simulations suggested that coyote population reduction, even on small areas, may be difficult to achieve.

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Coyotes exhibit a well-developed social organization throughout most of their geographic range (Camenzind 1978; Bowen 1981, 1982; Andelt 1985; Bekoff and Wells 1986). Although social organization provides the basis for territorial spacing mechanisms, and undoubtedly varies with mortality rates within populations, it has not been evaluated with regard to management programs aimed at manipulating coyote populations. We studied the spatial distribution and social composition of female coyotes in a high-density, lightly exploited population in southern Texas (Knowlton 1972, Andelt 1985, Windberg et al. 1985). We quantify spatial use patterns in the coyote population and describe the social composition in terms of age and territorial status. We also explored implications of spacing patterns for population management via a mathematical simulation.

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STUDY AREAS

The Mines (55 km²) and Galvan (52 km²) study areas were located 30 and 60 km, respectively, northwest of Laredo, Webb County, Texas. The west side of the Mines area abutted the Rio Grande and the western boundary of the Galvan area was about 5 km from the river.

The habitat of both study sites is typical of the South Texas Plains vegetational area (Gould 1975). Windberg et al. (1985) described the vegetation, soils, and climate of the area. Rolling to sharply dissected topography is associated with proximity to the Rio Grande and deep, intermittent stream drainages that coursed through each study area. Both study sites were privately owned rangeland used for grazing cattle. Human exploitation of the coyote population was light and representative of the region (Windberg et al. 1985).

METHODS

We captured and marked coyotes on both study areas in February and March 1984 and 1985, and in October 1984. Additional marking was conducted on the Mines area during June

1984. All coyotes were captured using leghold traps with tranquilizer tabs (Balser 1965) containing approximately 500 mg of propiopromazine hydrochloride to reduce injury and trauma. Traps were set for 3,400 and 2,700 trap days on the Mines and Galvan areas, respectively.

We recorded capture location, weight, body length, and general condition for each coyote. A premolar was extracted from each animal to estimate age. We instrumented each female coyote with a radio-telemetry transmitter (Kolz et al. 1973) (Telonics, Inc., Mesa, Ariz., identification of commercial products and companies does not constitute endorsement by the U.S. Government) that weighed 250 to 350 g. All coyotes were confined for 1 day following capture to assure recovery from tranquilization before release at capture sites.

Coyote ages (yearling = 1.0 yr, second-yr = 1.5–2.0 yr, ad >2.0 yr) were assigned from interpretation of cementum layers in microscopic sections of premolars (Linhart and Knowlton 1967). In cases where age assignment was difficult, we used radiographs of the pulp cavity and sections of canines from individuals sacrificed at the end of the study.

Radio-instrumented coyotes were monitored by fixed-station triangulation (Heezen and Tester 1967) with model TR-2 receivers (Telonics, Inc., Mesa, Ariz.) and arrays of 2 5-element Yagi antennas coupled out-of-phase (null system) with a hybrid junction. The receiving equipment was operated simultaneously from 2 truck-mounted tracking shelters paired at various combinations of 5 fixed locations. Antenna orientation was maintained with beacon transmitters. Relative positions of the antenna sites and orientation beacon were established by surveyor's transit and scaled to aerial photographs.

We monitored coyotes in spring (24 Mar–21 Apr) and fall (15 Aug–28 Sep) 1984, and spring (20 Feb–4 May) 1985 on the Mines area, and in spring (14 Mar–4 May) 1985 on the Galvan area. A full-night sampling strategy (Smith et al. 1981) was used with locations taken at 15–30-minute intervals from 1 hour before sunset until 1 hour after sunrise. Portions of the study areas were monitored sequentially within each seasonal period. During spring 1985, we estimated the proportion of time each marked female spent on the study areas by routinely checking signals from each transmitter 3×/night.

Azimuth data were converted to x-y coordinates with a computer program and then synthesized and plotted using program HOME RANGE (Samuel et al. 1985). Paired azimuths with differences of <20° or >160° were discarded. The HOME RANGE program provided range estimates based on an extension of the harmonic mean measure of activity (Dixon and Chapman 1980). Outlier locations identified by the program in the initial analysis were excluded from the final estimate of range size and shape. For comparisons with other studies, we delineated the boundaries of coyote ranges using the 90 and 95% minimum convex polygon method (Mohr 1947). We measured the area of polygon ranges and interstitial space (space between adjacent territorial ranges) with a compensating polar planimeter.

Female coyotes were classed as territorial or transient (nonterritorial) based on the areal distribution of radio-telemetry locations. Most locations of territorial females were confined within contiguous and well-defined areas whereas locations of transients were less concentrated, frequently overlapped several territories, and/or showed concentrated use of several small areas dispersed within areas subsequently identified as interstitial space. Range delineation by the harmonic mean estimator aided objectivity in assessment of territorial status.

We analyzed spatial use by identifying territorial ranges (core areas and peripheral zones around the cores) and interstitial areas. The core area, as plotted by program HOME RANGE, was defined as the maximum area in which the observed utilization distribution exceeded a uniform utilization distribution (Samuel et al. 1985). The peripheral zone was arbitrarily defined as the space between the 75% contour of the utilization distribution and the core area (mean contour = 62%).

Mathematical simulations of the size of areas influenced and number of coyotes exposed to management programs were based on the theoretical and computational aspects described by Stoddard et al. (in press) using estimates of range size, social composition, and population density reported here.

We compared mean range sizes using paired t-tests and 1-way analysis of variance. We used Chi-square goodness-of-fit tests to compare distributions among age ratios, between ratios of territorial and transient females, and locations of territorial and transient females in spatial

zones defined within the study areas. Statistical significance was assigned at $P < 0.05$.

RESULTS

From February 1984 to March 1985, 80 male and 90 female coyotes were marked on the 2 study areas. There were 9 known capture-related mortalities. Data from 65 instrumented females were incorporated in our analyses. Insufficient data from other instrumented females, because of transmitter failure or movement away from the study areas, precluded classification of their territorial status. The age ratio and the proportion of females classed as territorial and transient did not differ ($P = 0.43$ and 0.13, respectively) between the 2 areas. Greater capture and radio-tracking efforts expended on the Mines study area resulted in delineation of 17 adjacent territories (Fig. 1). Six territories were delineated on the Galvan area.

Range Size

The overall mean estimate of range size (75% utilization contour) for territorial females for both study areas and for all seasonal periods averaged 2.4 km^2 ($n = 33$, range = 0.6–6.4 km^2). Most territorial ranges (76%) were ≤3 km^2 (Fig. 1). Accuracy of these estimates is dependent upon adequate samples of locational data and comparable range sizes among seasons and age classes. Each territorial female was monitored from 9 to 34 nights resulting in 59–351 ($\bar{x}$ = 164) locations/animal. Mean range sizes for territorial females were similar ($P = 0.46$) between fall (2.8 km^2, $n = 7$) and spring (2.3 km^2, n = 26). Although a trend for larger ranges associated with increasing age was evident, mean range sizes of territorial females were not significantly ($P = 0.38$) different ($P = 0.38$) among the age classes: yearlings (1.6 km^2, $n = 3$); second-year females (1.8 km^2, $n = 5$); and adults (2.6 km^2, $n = 25$).

The estimate of mean range size of territorial females (2.4 km^2) by the harmonic mean method did not differ ($P = 0.07$) from the mean range for the same 33 animals derived by the 90% minimum convex polygon method ($\bar{x} = 2.6$ km^2) and was smaller ($P < 0.01$) than the 95% polygon estimate ($\bar{x} = 3.2$ km^2).

Nine of the 12 coyotes classed as transients had ranges >11 km^2 (as delineated by the 75% utilization contour of program HOME RANGE). Three females with smaller ranges were also classed as transients because 2 had widely disjunct ranges (6 km^2) and the other had a narrow range (2 km^2) located in space identified as peripheral zone and interstitial area.

Transient females ($n = 24$) were located on the study areas only 55% of the time during telemetry monitoring in spring 1985 compared with 94% of the time for territorial females (n = 17). A mean activity range of 12.4 km^2 was computed for 12 transients that were located on the study area >75% of the time. This estimate was based on 74–221 ($\bar{x} = 123$) locations/animal over 10–20 nights of monitoring. Delineation of activity ranges for additional individuals identified as transients was inappropriate because of their extended absences from the study areas or insufficient locations to reasonably define their activity areas.

Spacing Patterns

The composite spatial distribution on the Mines study area (Fig. 1) was composed of 7 fall (1984) and 10 spring (1985) territorial ranges. One range was occupied by the same female and 2 others by different instrumented females during both seasons. In addition, 3 of the ranges defined in fall 1984 had been occupied by the same females the preceding spring. Two territorial females died between fall 1984 and spring 1985; transmitter malfunction was presumed for the others that could not be located. Only portions of the ranges of 2 territorial females were identified (Fig. 1) because their transmitter signals were received from only 1 of the tracking stations when they moved outside of the study area.

Most of the Mines area was covered with contiguous territories (Fig. 1). Segments of the peripheral zones of several territorial ranges overlapped. With 1 exception, the core areas were mutually exclusive. The single area of core overlap was primarily atypical habitat (cultivated field) and may not have been actively defended by either territorial group. A space near the center of the area probably included an additional territory that was not occupied by an instrumented female during fall 1984 or spring 1985, although it had been in spring 1984 (Fig. 1).

On the Mines area, territorial females were located in the core of their ranges more often than in the peripheral zone or interstices compared with the relative areal distribution of those spaces on the study area ($P < 0.01$) (Table 1). Eleven percent of the locations of territorial fe-

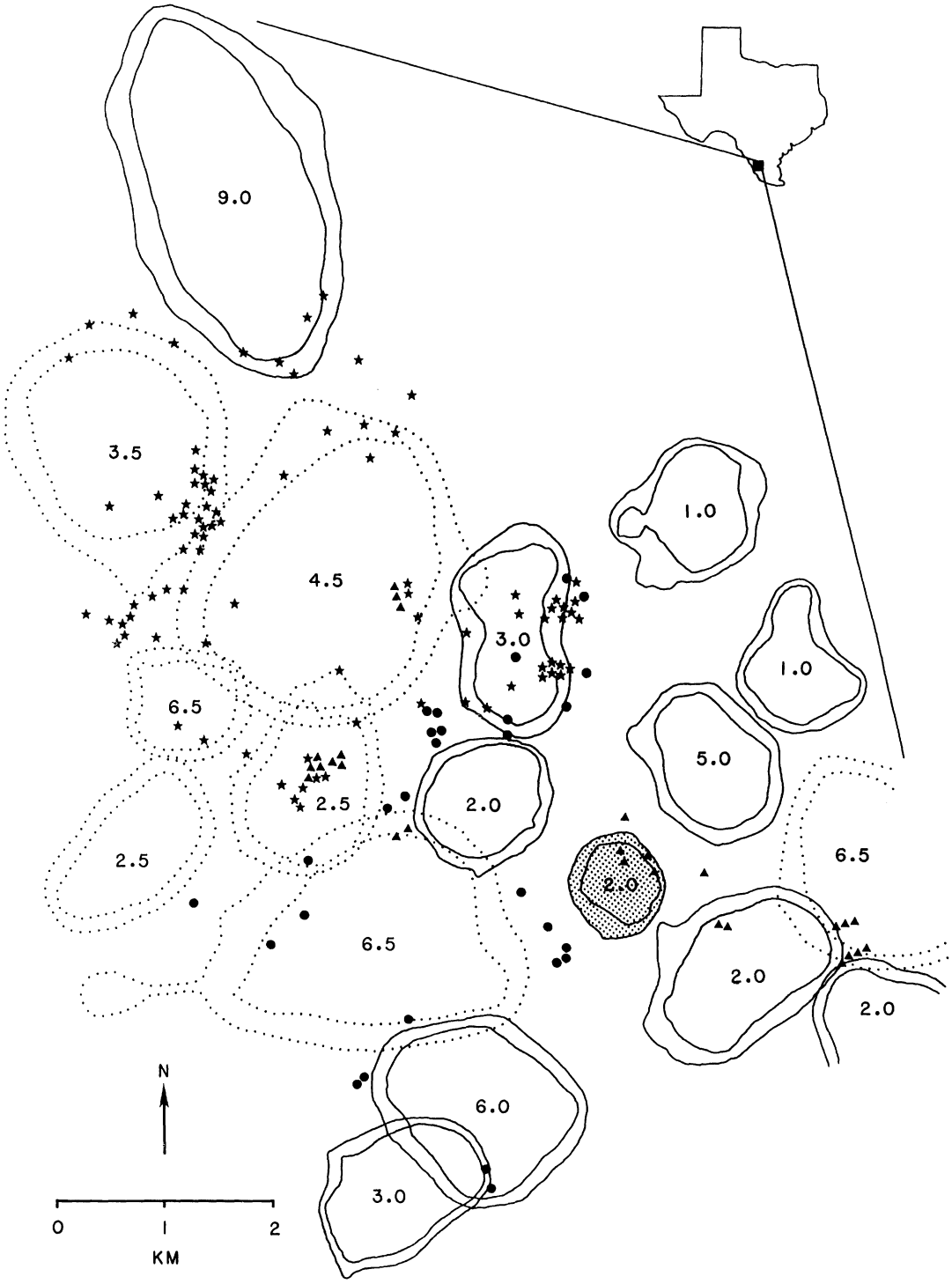

Fig. 1. Spatial distribution of territorial female coyotes on Mines study area, Webb County, Texas, 1984–85. Core areas and peripheral zones were delineated in fall 1984 (dotted lines) and spring 1985 (solid lines), with 1 range (stippled) defined in spring 1984 but not occupied by an instrumented female during fall 1984–spring 1985. Ages (yr) of marked females are shown inside ranges. Use of space by transients is illustrated by telemetry locations of 3 transient females (●, ▲, and ★) during spring 1985.

Table 1. Location frequencies of territorial and transient females in relation to distribution of space[a] on Mines study area, Webb County, Texas, 1984–85.

Category	Behavioral category		
	Territorial		
	Ad (≥2.5 yr)	Young (1–2 yr)	Transient
Sample sizes			
No. individuals	14	6	15[b]
No. locations	2,394	758	735
Distribution of locations (%)			
Within own territory:			
Core area	79	76	
Peripheral zone	10	12	
Within interstitial area	5	7	35
Within territories of others:			
Core area	2	2	26
Peripheral zone	4	3	39

[a] Study area comprised of 57% core area, 28% peripheral zone, and 15% interstitial area.
[b] Thirteen young, 2 ad.

males were outside of their respective ranges; i.e., in other ranges (6%) or interstitial area (5%). Frequency of location of territorial individuals in core, periphery, and the interstices was similar for adult and young (1–2 yr of age) females (Table 1).

Compared with the distribution of spatial zones within the study area, transients were disproportionately located ($P < 0.01$) more in interstitial area and less in core areas of territorial ranges (Table 1, Fig. 1). Transients were also located more often ($P < 0.01$) in the peripheral zones and interstices than territorial females.

Age and Social Composition

We made 74 classifications of territorial status of female coyotes, including 50 on the Mines study area (spring 1984, $n = 13$; fall 1984, $n = 14$; and spring 1985, $n = 23$) and 24 on the Galvan area (spring 1985). Nearly half (47%) of the females captured on the study areas were transients that were predominantly (65%) younger animals (1–2 yr) compared with territorial females ($P < 0.01$). Four of the 12 transient adults were 9.5–12 years old whereas 28 territorial adults ranged from 2.5 to 9 years old. Because they were only located on the study areas a mean of 55% of the time, the number of transients captured and monitored was reduced proportionally to estimate the relative number of territorial and transient females in the study area population at any specific time. Based on the adjusted estimate, the population comprised 66% territorial and 34% transient females, including 47% territorial adults. Approximately half of the yearling (50%) and second-year females (44%) were territorial.

Using radioactive feces marking techniques (Pelton and Marcum 1975), Knowlton et al. (1986) estimated the mean coyote density on the 2 areas in spring 1985 at 2.0/km^2, or 1.3 territorial and 0.7 transient coyotes/km^2.

Simulated Effect of Removal

We simulated complete coyote removal from areas of 1, 5, 10, 20, 50, and 100 km^2 using population and behavioral estimates of range size and social composition from this study and population density from Knowlton et al. (1986). We assumed that population removal areas and ranges of territorial and transient coyotes were circles; coyote density was uniformly 2.0/km^2; territorial individuals composed 66% of the coyote population with a mean range of 2.4 km^2; and transients, using mean activity areas of 12.4 km^2, composed 34% of the population. Estimates for territorial and transient coyotes were calculated separately. Neither ingress, as a result of animal removal, nor exploratory movements of coyotes from outside the area were considered in the simulation.

The simulations (Table 2) indicated that removal of coyotes from a specific area would influence numbers of transients up to 4.0 km away and reduce territorial coyotes up to 1.8 km outside the removal zone. Under the conditions stated, 23 coyotes could be expected to use a 1-km^2 area even though the initial (instantaneous) density was only 2.0/km^2. For 5 km^2, the ratio of coyotes using and hence removable from the area, in relation to the initial number in the area, was 4.2:1. The relative number of coyotes using a simulated removal zone compared with the initial density is greater for smaller than for larger areas (Table 2) but the ratio is still 1.5:1 for a 100-km^2 area. Also, smaller removal areas involve proportionately more transients than larger removal areas (Table 2).

DISCUSSION

Our capture data indicated a balanced population sex ratio. Other studies found that territorial males and females shared the same range and that range sizes were similar between sexes (Bowen 1982, Laundré and Keller 1984, Pyrah 1984, Andelt 1985, Bekoff and Wells 1986).

Table 2. Effect of simulated removal of all coyotes from circular areas of different size.

Size of removal area (km^2)	Total area affected (km^2)		Potential no. coyotes removed[a]			Instantaneous no. coyotes in removal area
	Territorial coyotes[b]	Transient coyotes[c]	Territorial[d]	Transient[e]	Total	
1	17	65	9	14	23	2
5	28	86	19	23	42	10
10	39	104	29	31	60	20
20	57	133	47	45	92	40
50	103	199	97	79	176	101
100	172	290	174	128	302	202

[a] Includes coyotes in the removal area and a portion of those in a peripheral zone 1 range diameter wide around the removal area.
Assumptions:
[b] Circular ranges of 2.4 km^2 (diam = 1.8 km),
[c] circular ranges of 12.4 km^2 (diam = 4.0 km),
[d] density of territorial coyotes = 1.3/km^2 (66% of 2.0/km^2), and
[e] density of transient coyotes = 0.7/km^2 (34% of 2.0/km^2).

Therefore, we assumed our data for females were representative of the coyote population.

Our use of the terms territory and territorial violates the strict definition accepted by behavioral scientists (Kaufmann 1983). Territoriality can only be established by intensive behavioral observations of a population of identifiable individuals. Territoriality can be inferred if the social units of a species live in definable areas that are stable over time and used exclusive of neighboring social units. Studies summarized by Bekoff and Wells (1986) leave little doubt that coyotes are territorial and have a well-developed social organization. Territorial defense in the form of active chasing or fighting has been observed (Camenzind 1978, Andelt 1985, Bekoff and Wells 1986) but evidently occurs infrequently. We had 2 coyotes mauled while held in traps and we captured 6 individuals with extensive scars thought to be inflicted by other coyotes (L. A. Windberg, unpubl. data) suggesting agonistic interactions in our study population. We accepted apparent exclusive use of space by female coyotes, as determined by radio-telemetry locations, as the diagnostic feature of territoriality.

Our location data for the Mines study area suggested exclusive core areas for instrumented territorial females. We believe these females were members of territorial pairs or groups and that they reasonably portrayed the population spatial distribution. Based on extensive radio-telemetry and observation data, Andelt (1985) documented essentially nonoverlapping ranges for 7 social groups on a smaller study area of similar habitat located about 200 km east of our areas in southern Texas. Bowen (1982) showed 9 adjacent ranges for resident packs and pairs with minimum overlap in Alberta.

Because location data were collected using a standardized strategy throughout the period of greatest coyote activity (Smith et al. 1981, Andelt 1985) with a mean of 164 observations for territorial females, we believe each individual's range was adequately sampled. Our estimates of coyote ranges were derived primarily from location data in spring. The mean range of 2.4 km^2 (3.2 km^2 using 95% convex polygon method) for territorial females on our study areas was similar to spring estimates from 2 other studies in southern Texas (Harris 1983, Andelt 1985). Although Andelt (1985) had similar estimates for spring, he reported a composite mean range of 4.3 km^2 for resident females during the entire year. Our use of the 75% utilization contour to depict range boundaries was arbitrary. A larger utilization contour would have resulted in larger range estimates and reduced the amount of interstitial space but would have been equally arbitrary without supporting behavioral observations. Sizes of territorial ranges of coyotes in the high density populations of southern Texas were only 8–27% as large as those reported on northern sites (Hibler 1977, Althoff 1978, Bowen 1982, Harris 1983, Pyrah 1984, Roy and Dorrance 1985, Allen et al. 1987).

Most studies, including those by Camenzind (1978), Bowen (1982), and Andelt (1985), describe a class of transient coyotes that had considerably larger ranges than territorial coyotes. Females we classified as transients also ranged over significantly larger areas than territorial females. Although transients were often within core areas of territorial females (39% of loca-

tions), they were located more frequently in interstices and peripheral zones.

Coyotes classified as transients on our study areas were predominantly yearling and second-year females (65%) whereas only 29% of territorial females were in those age groups. By comparison, Camenzind (1978) reported about half the transients on his Wyoming area were <1 year old, whereas Roy and Dorrance's (1985) data indicated 14 of 17 coyotes captured and classed as transients in Alberta were subadults (<2 yr old) and, in Texas, Andelt (1985) reported only 2 of 25 transients were <1 year old. A variety of factors, including mortality rate, techniques used, and timing of capture efforts, and population level relative to carrying capacity of the habitat, undoubtedly influence the number, proportion, and relative age of transients captured.

Some studies of coyote social organization provided estimates of the proportion of the population composed of territorial groups (and pairs) and transients (Camenzind 1978, Bowen 1981, Andelt 1985) that were derived using various procedures and computations. We emphasize that the percent transients captured on relatively small study areas is not a reliable estimate of the proportion of transients in the population. An instantaneous estimate of the proportion of transients in the population should incorporate estimates of the amount of time transients are on the study area in the computation. Although 47% of the coyotes captured and marked on our study areas were classed as transients, we estimated transients composed only 34% of the population. Our areas were in contiguous habitat and sampled an open population. Transients were captured at a rate disproportionately higher than their relative presence in the population because of their larger activity areas and perhaps greater vulnerability to capture than territorial females (Hibler 1977, Harris 1983).

Our study reinforces previous interpretations that, in areas where coyotes are not subject to intense human exploitation, 2 behavioral classes of coyotes can be readily distinguished: territorial individuals that spend most of their time within relatively restricted areas, apparently to the general exclusion of coyotes outside their immediate social group, and transients that usually are younger and spend most of their time around the periphery and in interstices among the territories.

Significance of these 2 behavioral classes, each with its own motivational level and survival strategy, with regard to livestock depredations is not clear but some speculations are warranted. Althoff and Gipson (1981) and Till and Knowlton (1983) provided evidence that provisioning pups can be a major stimulus for adults to prey on livestock. Following removal of pups, depredations frequently terminate (Till and Knowlton 1983). Knowlton et al. (1986) provided evidence that only territorial adult females whelped. In concert, these observations suggest territorial and reproductive individuals may pose greater risks to some agricultural interests than other classes of coyotes. Implications of territorial and transient behavioral patterns to other depredation situations remain obscure but certainly warrant investigation.

Our estimates of coyotes using a removal zone are undoubtedly conservative because (1) use of circular areas in the simulations minimizes the area affected and number of individuals involved, (2) no provisions were incorporated to account for exploratory excursions that territorial coyotes typically make 5–6×/month (Hibler 1977, Harris 1983), and (3) the simulation did not include ingress of coyotes into the area to occupy vacant territories. Although achieving complete removal of coyotes from an area would be a formidable task, our simulation appears realistic considering results of 2 separate intensive coyote removal efforts in south Texas. Beasom (1974) removed 129 coyotes from a 23.3-km^2 area in 5 months (Feb–Jun). Guthery and Beasom (1977) removed 69 coyotes from a 15.5-km^2 area from January to July. Those efforts represented removals of 5.5 and 4.5 coyotes/km^2, respectively, which were 3–6× greater than density estimates for the region (Knowlton 1972, Andelt 1985, Knowlton et al. 1986) and within reasonable expectations of our simulation.

MANAGEMENT IMPLICATIONS

Two ramifications for coyote population reduction efforts are evident. The first is that removal of coyotes from a specific area will influence coyote abundance over a much larger area. The second is that the effectiveness of reducing coyote numbers (or activity) in a problem area (e.g., an area where predation on livestock is occurring) could be substantially improved by applying removal efforts over a broader area.

The presence of a reservoir of transient animals available to occupy vacant territories emphasizes logistical problems associated with resolving coyote depredation problems through population reduction, especially on small areas.

Alternatively, where depredations are temporary or local, efforts might be focused on selective removal of territorial adult coyotes. There are obvious difficulties in identifying territorial animals without substantial study. Some studies (Harris 1983, Knowlton et al. 1986) suggest a potential for developing control methods that differentially affect various segments of populations. Territorial coyotes might be more vulnerable to some removal techniques than others. An alternative strategy might entail sterilizing territorial coyotes so they would not have the motivations associated with provisioning young but would still engage in territorial defense and thus exclude other coyotes that could pose a greater risk (Till and Knowlton 1983).

Coyote population reduction has been, and will continue to be, an important element of programs attempting to protect domestic livestock, agricultural crops, and other wild species from coyote depredations. However, with the methods currently available, extirpation of coyotes over large areas is not feasible or practical. Where removal efforts are limited in duration or scope, they have only transitory effects (Connolly and Longhurst 1975). The maintenance aspects of coyote population reduction need to be considered when planning that type of depredation control program. Ultimately, recurring costs and benefits of a repetitive removal strategy should be weighed in relation to those of other protective measures.

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HOME RANGE AND HABITAT USE OF COYOTES IN SOUTHEASTERN COLORADO

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Abstract: We tracked 72 radio-collared coyotes (*Canis latrans*) for 13 consecutive biological seasons spanning 4 years. Coyotes displayed 2 behavior modes based on home-range characteristics: resident and transient. Resident and transient coyotes comprised 78 and 22% of the population, respectively. The mean annual home-range size was 11.3 km^2 (range = 2.8–32.0 km^2) and 106.5 km^2 (range = 60.9–185.3 km^2) for resident and transient coyotes, respectively. Yearlings and very old coyotes (>8 yr) accounted for 68% of the transient cohort. Resident annual home ranges in canyon, hill, pinyon (*Pinus edulis*)–juniper (*Juniperus monosperma*)–prairie, and prairie habitats averaged 5.5, 6.6, 11.1, and 16.5 km^2, respectively. Coyotes preferred pinyon–juniper woodlands and shrub–grasslands but used open grassland habitat less than expected. Regression analysis showed that 65% of the variation in resident home ranges could be explained by the amount of available pinyon–juniper cover. Coyotes with access to little or no pinyon–juniper cover used shrub–grasslands. Similarily, 47% of the variation of home ranges for coyotes inhabiting the prairie could be explained by the amount of available shrub–grassland habitat within an animal's home range.

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Coyote home ranges have been studied throughout the United States (Gipson and Sealander 1972, Berg and Chesness 1978, Andelt and Gipson 1979, Springer 1982, Woodruff and Keller 1982, Andelt 1985). Most studies pooled home-range sizes from their study area, reported a mean size, and compared their estimate to other studies. To date, no one has attempted to explain the variance in home-range sizes. Laundré and Keller (1984) concluded that future studies should examine coyote home-range use in relation to physical, faunal, and vegetal characteristics. We describe home-range use and size relative to habitat use by coyotes in southeastern Colorado. We examined the relationship between home-range size and availability of vegetative components.

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