MANAGEMENT IMPLICATIONS OF HEAVY HUNTING PRESSURE ON TEXAS WHITE-TAILED DEER ON THE KERR WILDLIFE MANAGEMENT AREA[1]

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ABSTRACT

Since 1954, 3,438 white-tailed deer have been harvested from 5,500 acres on the Kerr Wildlife Management Area. Initial attempts to reduce the deer herd by harvest were unsuccessful due to ingress of deer from adjoining ranches. Range recovery and habitat improvement were impossible to achieve because of the constant grazing pressure exerted by the extensive deer population. The over-all quality of harvested deer was poor. Deer-proof fences were erected around the wildlife area in 1968 and the inflow of deer from surrounding rances was stopped. Since 1968, the deer herd has been reduced from an estimated 1,038 deer to the present estimate of 320 deer by an average annual harvest of 27 percent. Data indicates that the heavy harvest has resulted in a younger age class herd, lower over-all fawn production, lower hunting success, and insufficient age in buck deer to produce trophy antlers. Favorable effects have been improved range conditions reflected by an increase in the quantity of preferred deer foods. an increase in body size of deer, better antler development within individual age classes, and improved animal vigor and survival. The cause of poor reproduction in young does was unknown.

INTRODUCTION

The effects of hunting pressure on the dense white-tailed deer herds of the Edwards Plateau of Texas have been considered negligible by wildlife biologists of the region (Teer, Thomas, and Walker, 1965), (Ramsey and Walker, 1954), (Thomas and Marburger, 1965a), (Thomas and Marburger, 1965b). Harvest estimates for the region have varied from an average 9-20 percent of the fall populations (Teer, Thomas, and Walker, 1965), Thomas and Marburger, 1965b). As a result of low annual harvest, the extremely high deer populations are subject to periodic, large scale die-offs (Thomas and Marburger, 1965a) and poor quality (Thomas and Marburger, 1965b). Hosley (1956) said that over a long period, an average of about 33 percent of a deer population could be removed by hunting, if both sexes were removed in near equal numbers. Chase and Jenkins (1962) reported that a herd on the George Reserve in Michigan produced a sustained yield of 37 percent from 1942 to 1961. Van Etten, et al., (1965) reported that from 1952 through 1958, an average of 44 percent of the fall deer population was removed annually, reducing the herd materially on the Cusino Wildlife Experiment Staion in Michigan. During an effort to reduce the deer population on the Kerr Wildlife Management Area to allow range recovery and improve the over-all quality of the deer herd, data became available that indicated the Area's deer population would not sustain the reported harvests of other states.

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STUDY AREA

The 6,493 acre Kerr Wildlife Management Area is owned and operated by the Texas Parks and Wildlife Department and is utilized as a research and demonstration area. Located in the western portion of Kerr County, Texas, it is representative of the Edwards Plateau ecological type which incompasses some 26,000 square miles or 18 million acres of central Texas. Mean annual precipitation on the study area was 24.61 inches with most of the moisture being received as rainfall during the late spring and summer months. Rainfall fluctuated between years and droughts lasting several months were common. Livestock ranching is the primary economic endeavor in the Edwards Plateau and the region is probably unique in its combined productivity of deer and livestock in high densities (Hahn, 1945), (Taylor and Hahn, 1947). Previous studies of its vegetation in relation to deer and livestock were reported by Buechner (1944), Taylor and Buechner (1943), and Whisenhunt (1949). On the Kerr Area, the prominent vegetation is a savannah of live oak (*Quercus virginiana*), in which ashe juniper (*Juniperus ashei*), shin oak (*Quercus breviloba*), and Texas oak (*Quercus texana*) are conspicuous. Understory species include catclaw (*Acacia* sp.), pricklypear (*Opuntia atrospina*), green briar (*Smilax bonanox*), agarito (*Berberis trifoliolata*), flameleaf sumac (*Rhus copallina*), woollybucket bumelia (*Bumelia lanuginosa*), Texas persimmon (*Diospyros texana*), sugar hackberry (*Celtis laevigata*), and elm (*Ulmus spp.*). Grasses include curlymesquite (*Hilaria* belangeri), bluestems (*Andropogon spp.*), needle grass (*Aristida sp.*), Texas wintergrass (*Stipa leucotricha*), hairy grama (*Bouteloua hirsuta*), and rescue grass (*Bromus catharticus*). Forbs found on the area include croton (*Croton* spp.), filaree (*Erodium cicutarium*), verbena (*Verbena spp.*), plantains (*Plantago spp.*), mat euphorbia (*Euphorbia serpens*), whorled nodviolet (*Hybanthus* verticillatus), and dayflower (*Commelina spp.*).

The wildlife area is presently stocked with Hereford cattle at a rate of one animal unit (A.U.) per 27 acres. Previous investigations on the Kerr Area have established desirable stocking rates (McMahan and Ramsey, 1965) and food habits of deer and three classes of domestic livestock (McMahan, 1964). A cow with or without calf was considered to be one A.U. (Merrill, 1957).

METHODS

A population estimate of the deer herd on the Area was made annually, utilizing the walking-cruise census technique described by Hahn (1949) and by a 20-mile census conducted from a vehicle by two ovservers with spotlights at night.

Annual public deer hunts were held on the Kerr Wildlife Area beginning in 1954. The hunts were held during the regular fall deer season which usually began about mid-November. Participating hunters were selected by impartial drawing from the total applicants. No fee was charged to hunt on the Area. The length of the open season varied from 5-42 days. The number of hunters participating in the free hunt was as few as 70 in 1954 and as many as 761 in 1968 depending upon the desired harvest. Each participating hunter could legally harvest one deer. In 1954 and 1957 only forked-antlered bucks were legal. In 1955, both sexes were legal but legal bucks had to have forked antlers. In all other years there were no restrictions as to sex or number of antler points. The total number of hunters was equally divided among days of the season and the individual hunter or groups of hunters were assigned specific pastures in which to hunt. Hunters were allowed to walk or still-hunt as they wished. Hunting from vehicles was not allowed. There were no blinds to hunt from other than a few brush-blinds constructed by hunters themselves. Legal weapons and valid hunting licenses with tags were required of all hunters. All participants were re-

quired to report wounded deer which escaped and dead deer found while hunting to assist in determination of crippling loss. All harvested deer were brought immediately to the deer check station where Area personnel aged, weighed, measured, and removed required internal organs or specimens. This complete examination allowed Area personnel to assess the over-all body condition and reproductive potential of each animal as well as collect much valuable data regarding age structure and quality of the herd. A concerted effort was begun in 1966 to reduce the deer herd significantly. This, however, was achieved only after the erection of a 7½ foot deer-proof fence in 1968. The construction of the fence not only allowed complete enclosure of the resident deer population on the 5,500 acre hunting area, but also stopped the ingress of deer from neighboring ranches. Prior to the construction of the fence, the deer on adjoining ranches were drawn to the Area's high quality ranges on which they found desirable forage plants and abundant cover. Therefore, the effect of the annual harvest was soon negated and the Kerr Area restocked with poor quality deer from adjoining ranches. It would have been virtually impossible to effectively manage and control the Area's deer populaion wihout the high fence.

Throughout the years, Area personnel regularly checked the changes and improvements in the deer range on the Area. Vegetative line transects throughout the area were read periodically and were supplemented by field observations. The quality of desired forage plants has consistently improved, particularly since erection of the high fence.

FINDINGS

The estimated deer population on the Kerr Wildlife Area has fluctuated throughout the years, but showed a sudden unexplainable decrease in 1972 which cannot be directly attributed to hunting pressure (Table 1). The harvest averaged slightly over 23 percent during the nineteen year period. After the high fence was erected in 1968, an average of 27 percent of the fall pouplation was harvested annually.

The sudden decrease in the population cannot be written off as an error in census estimates because of the consistency of the counts, the age structure of recent harvests, and regular field observations which support the census data. The reproductive capacity of the herd should be excellent. However, conception rates based on the presence of corpora albicantia in the ovaries as described by Cheatum (1949) are low on the Area. Available data from the 1968, 1970, and 1971 hunting seasons shows that only 9 percent of the yearlings, 51 percent of the 2½ year olds, and 86 percent of 3½ through 8½ year olds had corpora albicantia in their ovaries indicating that they had conceived the previous mating season. Teer, et al. (1965) found that female deer in the Llano Basin of Central Texas had conception rates of 16 percent in fawns, 68 percent in yearlings, and an average of 81 percent in adults. The deer in the Llano Basin were on much poorer ranges than that found on the Kerr Wildlife Area. Cattle on the wildlife area are infected with granular vaginitis, a veneral disease, which prevents conception. It is not known if the deer on the Area are also infected by vaginitis or a similar disease.

The deer harvest decreased steadily after the erection of the high fence in 1968 although the number of hunters remained fairly constant. Hunter success correspondingly dropped to 24 percent in 1971 and 27 percent in 1972. The percent of young animals in the harvest has increased significantly (Table 2).

Favorable effects of the reduced population in addition to improved range conditions were several.

First, there have been no deer die-offs on the Area since 1965, although they have been common to the region.

Table 1. Kerr Wildlife Management Area. Summary of Annual Deer Census and Harvest 5,500 Acre Hunting Area 1954-1972.

Year	Acres/ Deer	Estimated Population	Number of Hunters	Percent Hunter Success	Females Harvested	Males Harvested	Antlerless Males Fawns Harvest	Antlered Males Harvest	Total Harvest	Percent Harvest
1954	9.7	567	70	52	0	37	0	37	37	7
1955	5.5	1,004	251	50	74	52	21	31	126	13
1956	9.1	604	308	48	95	54	20	34	149	25
1957	11.9	463	132	19	0	25	0	25	25	5
1958	7.6	724	201	58	53	67	15	52	120	17
1959	7.7	714	291	62	79	98	22	76	177	25
1960	7.8	709	264	66	50	123	36	87	173	24
1961	6.4	855	389	61	122	116	30	86	238	28
1962	12.7	434	316	62	97	99	9	90	196	45
1963	7.8	702	280	51	68	75	14	61	143	20
1964	7.7	717	271	48	44	86	20	66	130	18
1965	4.1	1,348	576	36	89	126	30	96	215	16
1966	5.7	973	719	60	198	235	44	191	433	45
1967	5.0	1,100	705	37	112	148	50	98	260	24
1968	5.3	1,038	761	48	167	202	44	158	369	36
1969	7.0	782	567	40	115	111	22	89	226	29
1970	7.2	766	583	32	97	87	35	52	184	24
1971	7.5	733	563	24	64	71	26	45	135	18
1972	12.7	433	375	27	46	56	16	40	102	24
			7,622		1,570	1,868	454	1,414	3,438	

Table 2. Kerr Wildlife Management Area Age Structure of Harvest 1964-1972

Year	Percent Total Fawns Harvested	Percent Total Yearlings Harvested	Combined Fawns and Yearlings Harvested	Percent Adults Harvested
1964	18%	27%	45%	55%
1965	20%	27%	47%	53%
1966	19%	23%	42%	58%
1967	21%	27%	48%	52%
*1968	21%	12%	33%	67%
1969	22%	25%	47%	53%
1970	31%	24%	55%	45%
1971	33%	24%	57%	43%
1972	32%	31%	64%	36%

*Date deer-proof fence was erected

Second, no spike-antlered bucks have been harvested except in the yearling age class since 1968. Prior to construction of the high fence, approximately 75 percent of the yearling bucks were spike-antlered. In 1972 only about 30 percent of the yearlings had spikes.

In addition, prior to 1968 and the high fence, fawns harvested field dressed about 30 pounds. Fawns now average about 38 pounds (Table 3). Field dressed weights of all age classes show a definate increase, although data are not sufficient to draw conslusions at this time.

Except for one year, 1970, records of crippling losses have been accurately maintained since 1966. Hunters reported all dead deer found in the pasture and they were marked on maps. Area personnel checked the location of dead deer in the field to prevent duplications and to determine the animal's sex and age when possible. During the six year period, 164 deer were found dead in the field, increasing the known harvest by 9.7 percent.

Although the deer population on the Area is young and vigorous, it is obviously not without problems, the primary problem being that the young, growing females simply will not produce as many fawns as older does. In addition, although young bucks with ample food will produce above-average antlers for the region, the trophy heads which hunters desire are very infrequent in a young pouplation. Biologists will attempt to determine if the deer are infected with the vaginitis disease found in cattle on the Area. The deer population will be held near its present low level for several years to determine the effect on body size, antler development, reproduction, and range improvement.

Table 3. Kerr Wildlife Management Area Average Fawn Weights 1964-1972

Year	Field Dressed Weights in Pounds
1964	32.26
1965	28.95
1966	28.86
1967	31.72
1968	28.37
1969	31.80
1970	31.80
1971	39.15
1972	37.21

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