THE EFFECTS OF DOG HARASSMENT ON RELOCATED WHITE-TAILED DEER

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Abstract: A telemetric study on the effects of dog harassment on released white-tailed deer (*Odocoileus virginianus*) was conducted at the Buffalo Springs Research Center in eastern Tennessee from May 1973 to July 1977. Thirteen female deer, 2 fawns and 11 adults, were released. Five deer died either directly or indirectly because of dog harassment. Three experimentally controlled dog chases involving a single chase dog averaged 2.5 km in 21 minutes. Two chases, involving both "control" and free-running dogs, averaged 5.6 km in 42 minutes. One chase involving only free-running dogs covered 1.9 km in 25 minutes before the dogs caught the deer. With over 50% of the released deer lost directly or indirectly due to dogs, dog harassment could have a significant effect on the success or failure of deer restoration in similar areas.

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The subjects of white-tailed deer in the southeast United States and their relationship with the domestic dog (*Canis familiaris*) has been investigated. Scott and Causey (1973) found that feral dogs in Alabama existed mainly on garbage and carrion, having little effect on local deer and cattle populations. Sweeny et al. (1971) monitored the effect of dogs chasing deer on 3 coastal plain sites in the southeast and determined that dogs had little effect on deer. Dog harassment had no effect on reproduction of harassed deer in a high density herd in Virginia (Gavitt et al. 1974).

Corbett et al. (1972) used dogs to harass deer on a wildlife management area in mountainous western North Carolina. He determined that deer harassed by dogs in mountains were much more susceptible to hunters and to physical injury than were deer in the coastal plains. Direct mortality of deer due to dogs occurred in Corbett's study, but was confined to older age classes or parasitized animals. Gipson and Sealander (1975) found no direct mortality of deer occurred in experimental chases in the mountains of northeast Arkansas, and dogs had little or no effect on home ranges or reproduction. Three of 7 deer, 2 pregnant does and 1 fawn, died as a result of dog harassment in a confined area.

Hawkins and Montgomery (1969) studied the movements of deer relocated in a National Forest in Illinois. Nineteen of the 28 deer released were dead 7 months after release. The deer were killed an average of 3.2 km from the release site. The cause of the deer movements and deaths, other than legal harvests, were not discussed. Hamilton (1962) studied the effects of sex and age on dispersal of released deer in Indiana. Dog harassment caused such great dispersal of deer from one site that another site had to be chosen for the study. Two of 26 tagged deer released at the site were known to have been killed by dogs shortly after release.

Studies of dog harassment of white-tailed deer have thus far been confined to work on resident deer. Undoubtedly this lack of research on dog harassment of released deer has been due to few states still being in the process of restoring deer. In Tennessee, a considerable amount of the eastern quarter of the state has remained devoid of deer, and deer restoration has been continuing. The objective of this study was to determine the effects of dog harassment on deer restoration in East Tennessee.

MATERIALS AND METHODS

Study Area

Thirteen deer were released at the Buffalo Springs Research Center in Grainger County, TN from May 1973 to July 1977. The county, located in the northeast portion of Tennessee, is in the Ridge and Valley physiographic region. The study area was restricted to a 25,000 km^2 area in the southeastern portion of the county. Elevation of the area varied from 280 to 494 m above sea level. The area was typical of much of the Ridge and

Valley region of East Tennessee with nearly 50% in various types of openings, mainly pasture and agricultural crops. The major forest type was Oak-history (*Quercus – Carya*) with 10% of the area in yellow pines (*Pinus* spp.). Based on deer observations and data collected at checking stations, the estimated native deer density was 2 deer per km^2. A census of free-roaming dogs in the study area estimated the dog population at 2.3 dogs per km^2. Seventeen free-running dogs were located within 1 km of the release site. Two large creeks, Buffalo and Richland, and the Holston River were located within the study area.

Capture and Instrumentation

Deer were captured by box trap, rocket net, noosing in the water, and dart rifle. The dart rifle utilized a premeasured dose of powdered succinyl-choline chloride (PNEU Dart, Inc.). All deer captured, other than with the dart rifle, were tranquilized with 1 cc of Acepromazine. Capture sites varied from 16 to 240 km from the release site.

The deer were fitted with 151 MHz transmitters furnished by Wildlife Materials, Inc. Ten of the 13 transmitters had built-in motion sensitive switches which would vary the pulse rate of the transmitter when the animal moved. The dog utilized for "control" chases, a female black and tan hound, was also fitted with a radio transmitter of the 151 MHz range. General age, weight, sex and physical condition of the deer were determined at the time of capture.

Radio-tracking

Upon release the deer were monitored 1-3 times daily to determine post-release movements and behavior. Activity was determined by visual observation and interpretation of the varying pulse rate. When the deer was moving considerably, the radio locations would be recorded hourly until the movement subsided. Home ranges were considered established when the deer had utilized the same area continuously for a 2-month period.

Experimental chases were conducted primarily in the morning to achieve better tracking conditions. Prior to the release of the chase dog, the deer's location and activity were determined. The chase dog was released on the deer's trail by 1 member of the team, while another member remained in a vehicle to follow the chase. The chases were followed by radio-tracking and visual observation. Both members of the team plotted the course and duration of the chases. Additional information collected included tracking conditions, number and breed of free-running dogs that entered the chase, and the reaction of transmittered deer when the chase dog either lost the trail or switched to trails of native deer. After the chase, the subject deer was monitored until it bedded or stopped moving.

Information on the occurrences of free-roaming dog chases of released deer came from 2 sources, either observation of the chase by team members, or local residents reporting the deer being chased by dogs. Positive identification of the monitored deer as being chased by free-roaming dogs was required before the chase was listed as a known chase. Suspected chases were deer-dog chases where dogs were observed running deer in the area used by the released deer, but were not actually observed running the monitored animal. Length of the chase and movements of the deer during these chases were not known, only the movements and behavior of the deer after the chase could be determined.

RESULTS

Dog Harassment

Five control chases of relocated deer were conducted. One free-roaming dog chase was monitored during the study. Five additional free-running dog chases occurred, but were not monitored. Five suspected dog chases were reported by local residents, but it could not be verified that the dogs were chasing the monitored deer. Two types of chases developed during the controlled chases (Table 1). The first type was where only the single

Table 1. Summary of data for dog harassment of released deer at the Buffalo Springs Research Center, Rutledge, Tennessee, 1976.

Deer No.	Chase Type[a]	No. of Chases	Length (Km) Max.	Min.	Avg.	Duration (Minutes) Max.	Min.	Avg.	Dist. (Km) moved one day after chase ended
BSR-8	FR	1	1.9	—	1.9	25	—	25	3.7
BSR-10	C	1	2.3	—	2.3	22	—	22	1.9
	C-FR	1	3.9	—	3.9	39	—	39	1.3
BSR-11	C	2	2.6	2.3	2.3	25	17	21	0.3
	C-FR	1	7.1	—	7.1	45	—	45	15.2

[a]FR-Free-running dog chase; C-controlled dog chase; C-FR-Controlled dog chase where free-running dogs became involved.

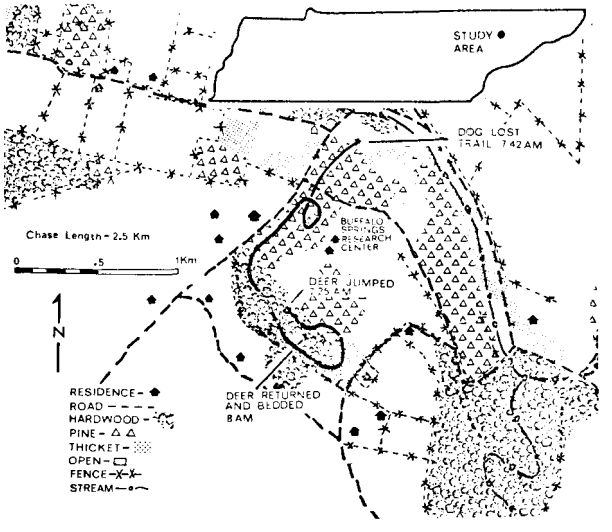

Fig. 1. Dog chase of Doe BSR-11 on October 15, 1976, chase involved only single chase dog.

chase dog was involved and the deer moved slowly. These chases covered an average of 2.5 km in 25 minutes. When jumped, the deer circled back to near the "jump site", before moving in a straight-away direction. The deer returned to near where they were juimped within 15-20 minutes after losing the dog (Fig. 1). Such movement, while shorter in distance, was similar to many of the reported chases of native deer, where they readily returned to their home range after dog chases (Corbett et al. 1972, Gipson and Sealander 1975). The data indicated that the "control" chase using a single dog put little pressure on the deer and was more of an inconvenience than harassment. However, such harassment would not normally be expected as free-running dogs normally travel in packs of 2 or more animals.

The second type of chase would more likely occur under natural conditions. On 3 of the 5 controlled chases, local free-running dogs became involved. In 1 case, local dogs entered the chase area, but pursued resident deer instead of the monitored animal. In the 2 other cases, the local dogs entered the chase of the subject deer. On both chases, the local dogs shortcut, or entered the chase in front of the control dog. The local dogs entered the chase area within 15 minutes of the time the control dog began barking on the trail of the deer. The result of local dogs entered the chase was to greatly extend the duration and length of the chases. These chases covered an average of 5.6 km in 42 minutes. In both cases the local dogs left the trail upon sighting the chase vehicle, rather than upon losing the trail of the deer. When this type of chase occurred, the deer would continue moving to new areas after the chase, rather than returning to near the jump site as had occurred when only 1 dog was involved. Does BSR-11 moved over 22 km returning to her capture site and original home range during a chase that local dogs entered (Fig. 2).
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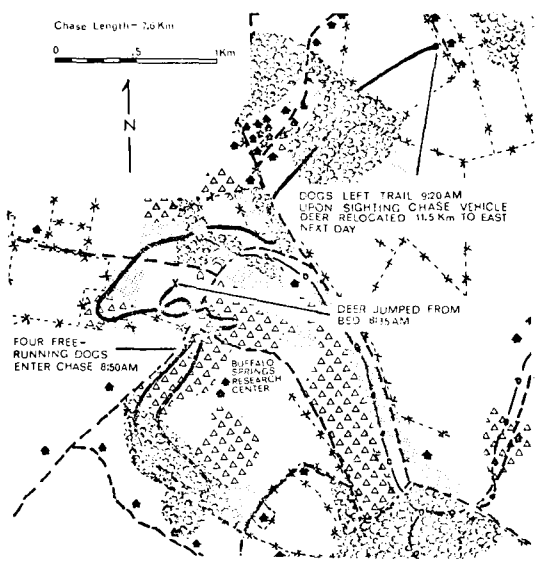

Fig. 2. Dog chase of Doe BSR-11 on October 27, 1976, involving both control dog and free-running dogs.

While measured dog harassment of relocated deer occurred on only 6 occasions, there were 8 other cases of known or highly suspected dog harassment of released deer (Table 2). During 4 chases the deer abandoned the area they had been inhabiting, with 1 doe, BSR-6, moving more than 17 km back to her original home range.

Mortality

Six of the 13 deer released in the study died. One doe, BSR-2, died as a result of injuries sustained during her capture. Five deer died as the result of known or suspected dog harassment. On February 28, a local resident reported that dogs had been chasing deer in a 37 ha woodlot adjacent to this residence. The previous evening, Does BSR-4 and BSR-5, had been bedded in the woodlot. BSR-5 was found dead the following morning, in an open field adjacent to the woodlot, partially eaten by dogs. BSR-4 was not located until 1 week later, when she was found almost 6 km to the north. Two weeks later, while in the same area, BSR-4 was observed by local residents being chased by 2 German

Table 2. Known and suspected free-running dog chases of released deer at the Buffalo Springs Study Area, Grainger County, Tennessee, 1975-1977.

Deer Number	*Date*	*Type of Chase*	*Distance Deer Moved (Km)*	*Number and Breed of* Dogs	Results
BSR-4	2/28/75	S[a]	5.6	5 Foxhounds	Deer abandoned use area
BSR'5	2/28/75	S	unknown	5 Foxhounds	Deer caught in field and killed
BSR-4	3/10/75	K	0.2	2 German Shepherds	Deer chased into fence and killed
BSR-6	4/25/75	S	16.9	3 Foxhounds	Deer returned to original home range
BSR-7	4/25/75	S	unknown	3 Foxhounds	Deer hit fence, broke neck
BSR-8	6-23-76	K	1.9	4 Mixed Breed	Deer caught and killed
BSR-9	1/04/77	K	unknown	4 Beagles	Deer hit by auto while being chased
BSR-11	10/27/76	K	22.5	1 Hound, 3 Mixed Breed	Deer returned to original home range
BSR-12	4/20/77	K	10.7	3 Mixed Breed	Deer abandoned use area, in home range
BSR-13	3/18/77	S	10.5	2 or more	Deer abandoned use area in home range

[a]K-Known dog chase; S-Suspected dog chase.

Shepherd dogs. The dogs chased the deer less than 200 m before the deer became entangled in a fence, and was killed by the dogs.

On April 26, dogs were reported to have been running a deer the previous night in an area 1 km north of the Research Center. BSR-7 was found dead in the same area that morning, having hit a fence and broken her neck. The radio transmitter from Doe BSR-6 was found the same morning on the Research Center. The collar was covered with blood and hair and had been torn from the deer (Fig. 3). The two areas were less than 1 km apart, and the same dog pack had been reported running in both areas. BSR-6 was recaptured 2 years later at her original home range, almost 17 km away.

On June 8, BSR-8 was released at the Research Center. Less than 4 hours later, the deer was jumped by 4 free-running dogs. The dogs bayed the deer in a small creek 25 minutes later, and probably would have killed the deer except for a local resident who chased the dogs away (Fig. 4). When the doe was approached by team members the next day, the deer appeared weak and in shock. The deer was found dead the next day less than 50 m from her last location. The last deer to die during the study was an adult doe, BSR-9. This deer had established a home range in an area bisected by a major highway. On January 4, the deer, while being pursued by a pack of 4 beagles, was killed by an automobile.

In addition to determining actual mortality that occurred during the chases, the possibility of mortality occurring was also measured. This involved determining the number of fences and roads crossed during the control chases, and the increased potential

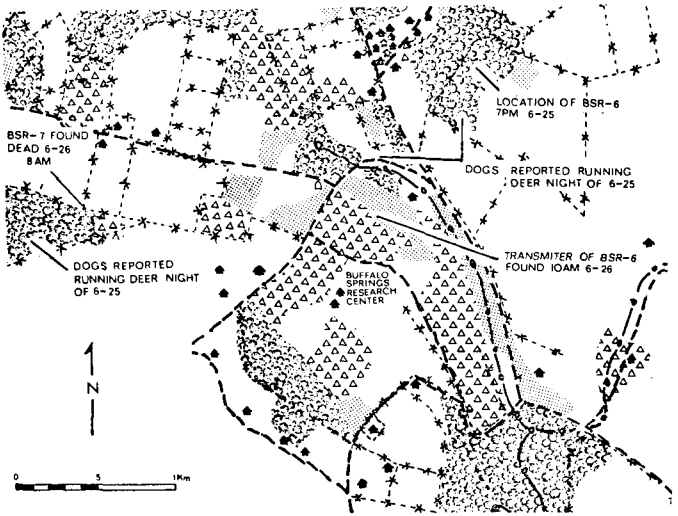

Fig. 3. Suspected free-running dog harassment of Does BSR-6 and BSR-7 on June 26, 1976.

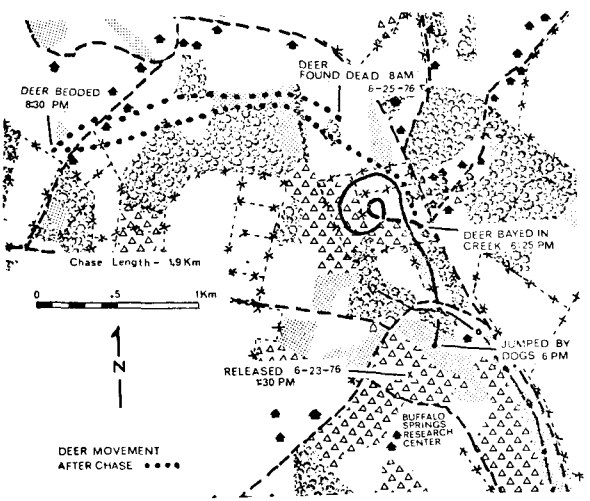

Fig. 4. Free-running Dog Chase of Doe BSR-8 on June 23, 1976.

for the deer to be shot. During the 5 control chases the deer crossed an average of 5 fences per chase. There were no instances of the deer hitting fences. However, if the chases had occurred at night the deer might have been entangled.

There were no deer-automobile collisions during the 5 control chases in spite of the deer averaging 3 road crossings per chase. One chased deer did cross the road less than 7 m in front of an automobile during a chase. It was observed during the study that deer being chased by dogs would burst across roads, rather than easing across the road as would non-harassed deer.

The increased potential of harassed deer being shot was determined during the controlled chases. This was done by determining the number of times that the deer were sighted in open areas during the chase. The deer were easily observed during the chases, averaging 4 sightings per chase. Nearly 30% of the time the deer were being chased, they were in the open. The deer seemed concerned only with the danger from the case dog, and quite often approached to within 5-10 m of the observers. Similar to resident deer in other studies (Corbett et al. 1972, Gipson and Sealander 1975), the relocated deer utilized the same route for escape purposes when possible.

DISCUSSION

Over 50% of the deer released in a simulated restoration at the Buffalo Springs Research Center were lost to the restoration effort either directly or indirectly because of dog harassment. The effects of a loss of this magnitude on an actual restoration would be significant. The minimal effect would be to greatly slow the buildup of a herd in the area. When the loss of deer due to dogs is combined with the loss due to shooting, automobiles, and accidents, the restoration could easily fail.

The most effective method to control dog harassment would be through a strict statewide dog control law. Such a law has thus far not been passed in Tennessee. A saturation stocking of deer in an area, anticipating losses due to dogs, might well establish deer. In Tennessee, where the typical deer restoration would involve releasing 0.7 deer per km^2, it may be necessary to release 1.0 - 1.5 deer per km^2 to overcome losses to dogs. In most cases if it was anticipated that dog harassment would be severe, no restoration would be attempted even though good deer habitat might exist.

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