Profile of Road Hunters in Tennessee Observed During the Use of Decoy Deer

James A. Dooley, *Tennessee Wildlife Resources Agency, Ellington Agricultural Center, P.O. Box 40747, Nashville, TN 37204*

Daniel L. Combs, *Department of Biology, Tennessee Technological University, Cookeville, TN 38505*

Abstract: Hunters shooting white-tailed deer from roadways, illegal in Tennessee, is a problem that, among other things, creates a bad image and publicity for sport hunting. The Tennessee Wildlife Resources Agency (TWRA) has used decoy deer to help apprehend violators and combat this problem. We evaluated the use of this technique by designing and distributing survey forms to TWRA wildlife officers. We collected survey forms ($N = 100$) from 21 different counties. Only 17.8% of 734 vehicles that passed decoy deer during the survey periods stopped, but violations were committed by occupants of 46.6% of stopped vehicles. Violations occurred more often from slow moving (<16 km/hour) vehicles than from vehicles that were traveling at 16–48 km/hour ($P < 0.001$), and more often from vehicles that stopped suddenly than those that came to a gradual stop ($P = 0.016$). Violations occurred most often from pickup trucks with 2 male occupants of mixed ages. Violations occurred within 1 minute after stopping 63.3% of the time and within 5 minutes 96.7% of the time, and TWRA officers recorded only 1 instance where shooting occurred from a vehicle that passed the decoy >2 times before stopping. Almost 40% of 117 recorded behaviors of nonviolating occupants of stopped vehicles consisted of movements or noises apparently made to determine if the decoy were alive. Although decoy deer are an important tool in apprehending road hunters in Tennessee, our study indicates that some individuals are aware of its use and are taking measures to determine authenticity. Continued decoy refinement (e.g., use of moving decoys) and additional approaches (e.g., vehicle/gun laws) are needed for effective enforcement of road hunting laws.

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Shooting white-tailed deer (*Odocoileus virginianus*) from a motor vehicle (road hunting) was first identified as a problem in Tennessee in 1973. At that time, the annual statewide legal harvest was 7,400 deer (Barnes and Strom 1987), but the annual legal harvest has now risen to current estimates of >132,000 animals (B. W. Layton, Tenn. Wildl. Resour. Agency deer biologist,

pers. commun.). Shooting from motor vehicles, illegal in Tennessee, has increased with increasing deer herds, and road hunting is probably the most serious deer law enforcement problem facing the Tennessee Wildlife Resources Agency (TWRA) today (R. T. Bass, TWRA Area 21 law enforcement supervisor, pers. commun.).

One problem with road hunting is resulting bad publicity. The perception of hunting in a society is often influenced by the individual perception of hunters (Klein 1973, Lorenz 1980, Rohlfing 1978). Although road hunting is much less common than legal hunting activity, road hunting is more easily observed by the public and some individuals are unaware that it is not legal (Steffen et al. 1983).

Various hypotheses have been proposed to explain why road hunters violate game laws. Shafer et al. (1972) analyzed surveys from 1,140 New York hunters and determined that individuals who hunted both legally and illegally killed more deer legally per year than individuals who only hunted legally. He postulated that violators find regulations unnecessarily restrictive and ignore them. Increased hunting pressure and decreased hunter access in some localities may encourage otherwise legal hunters to shoot deer from a vehicle or roadway to meet expectations of a successful hunt (Shafer et al. 1972). Glover and Baskett (1984) hypothesized that deer poachers are members of a subculture with distinctive values including a view that poaching deer is acceptable and considered a sporting activity. Some poachers may hunt to express control or dominion over animals (Kellert 1978).

To apprehend and convict road hunters, either wildlife officers or private citizens must witness the violation and testify in court. Providing witnesses is often difficult because of the mobility and inherent seclusion of violators, remote location of most violations, and variability in violation incidence associated with deer population densities (Shafer et al. 1972). Consequently, 3 elements must be together at the same time: the violator, the wildlife officer, and the deer, a rare occurrence under natural settings.

To improve the chance of these elements coming in contact, decoy deer were first used in the United States in Tennessee in 1983 (Sigler 1995). This enforcement tool enables wildlife officers to provide 2 of the 3 elements (i.e., the deer and the officer) in areas of known road hunting activity and to wait for the violator, the third element. During the first year of use, a full-bodied, stationary decoy was used 6–8 times, resulting in 21 cases (Barnes and Strom 1987). Since 1983, many road hunters have become aware of the use of decoy deer in Tennessee, necessitating advancements in decoy technology (e.g., using decoys that move).

Information concerning decoy deer use in wildlife law enforcement is generally not widely publicized because of the concern over road hunters becoming more aware of the use of decoy deer, thereby losing its effectiveness. Few agencies have objectively assessed the effectiveness, cost of apprehension, or profiles of potential road hunters. Such assessment is useful in determining when, where,

and how to most efficiently use this enforcement tool. Our study was designed to fill this deficiency by evaluating the use of decoy deer in Tennessee. Specific objectives of our study were to: (1) characterize road hunters in Tennessee, (2) compare vehicles used by road hunters to passing vehicles used by the general public, and (3) evaluate the effectiveness of decoy deer when enforcing road hunting laws.

Methods

Decoy deployment locations were areas believed to have a high incidence of road hunting activity as determined by complaints received by TWRA wildlife officers. Official guidelines for decoy deployment were followed, including first meeting with landowners to discuss decoy placement and stakeout procedures. Individual operations involved 1–5 officers as determined by number of potential escape routes, personnel constraints, and other job related activities within representative enforcement areas. The type of decoy deer used was determined by decoy availability and amount of previous road hunting activity in that area. Attempts were made to simulate natural conditions sufficiently to maximize the likelihood of a violation occurring during decoy deployment.

We distributed survey forms to officers who deployed decoy deer in 21 counties in Tennessee. Surveys were conducted during deer hunting seasons 1990–91, 1991–92, and 1992–93. Copies of the form were distributed to TWRA officers before decoy deployment. The form consisted of 4 sections that were completed in a stepdown procedure (i.e., specific sections were only completed under particular circumstances). Officers were instructed on procedures to complete various sections of the form.

Officers completed Section A at the beginning of each deployment operation; it assessed general information including location, site description, specific decoy deployment procedures, and weather conditions. Section B was completed throughout the operation as vehicles passed; it assessed vehicle characteristics including vehicle type (passenger cars, pickup trucks, farm machinery, and others), approximate speed (<16, 16–48, or >48 km/hour), number of occupants, and presence or absence of visible guns. Officers only completed Section C for vehicles that stopped at the deployment sites; it included characteristics that were used to evaluate reasons for stopping including type of stop (sudden or gradual), number of times passed before stopping, length of time stopped, and activities of occupants (e.g., photographing the decoy, making noise to scare the decoy, or exiting the vehicle). Sex and age (<18, 18–35, 36–65, and >65 years) of each occupant were estimated and also included in Section C. Section D was only completed for vehicles from which violations occurred; it characterized violators including number of violators and nonviolators in each vehicle, position of the shooter in the vehicle (passenger or driver), reaction of violators during apprehension (e.g., fleed or resisted), number of shots fired, use

of alcohol or drugs by violators, weapons used in violations, types of confiscated equipment, and citations issued by TWRA officers.

Weather conditions and site descriptions from survey forms were categorized to test differences between survey periods in which violations occurred and those in which violations did not occur. We placed deployment sites into 4 categories (agricultural fields, pastures and other openings, forested areas, and ecotones between openings and forests), road types into 2 categories (paved and unpaved), and distance of decoy from the road into 4 categories (0–50 m, 51–100 m, 101–150 m, and 151–200 m). Mean temperature during stakeouts were categorized in 5.6 C increments and wind speeds by 8 km/hour increments. We categorized sky conditions as rainy, cloudy, or clear. Chi-square goodness of fit tests (Dowdy and Wearden 1983) were used to evaluate differences in these variables and descriptive characteristics of vehicles that stopped and those that did not stop and also between violators and nonviolators. We deemed $\alpha = 0.05$ as an appropriate level of significance.

Results

We received 100 completed survey forms from TWRA officers, accounting for 267.7 hours of decoy deer use during 1990–91–1992–93. Decoy deer were deployed 70% of the time on weekends, primarily in the morning (0600–0900) (43%) and evening (1500–1800) (36%). These periods were selected by officers because they correspond with what was to believed to be peak road hunting activity.

Only 17.8% of the 734 vehicles that passed decoy stations during the survey periods stopped (Fig. 1). Violations were committed by occupants of 61 (46.6%) of 131 stopped vehicles. We did not detect annual differences in percentage of vehicles that stopped ($P = 0.725$) or from which violations occurred ($P = 0.490$). A higher percentage of vehicles stopped before noon than during afternoon ($P = 0.015$), but we did not detect a difference in violation rates by time of day ($P = 0.219$) (Fig. 1).

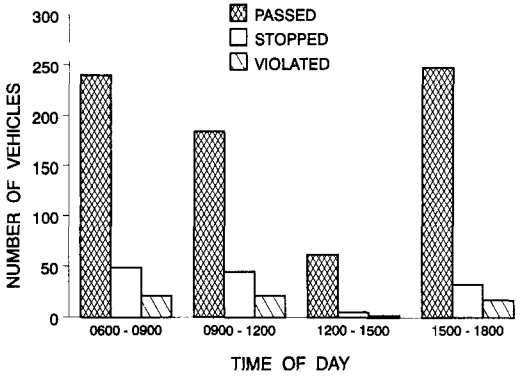

Figure 1. Number of vehicles that passed, stopped, and from which violations occurred during deer decoy deployment in Tennessee by time of day, 1990–91 – 1992–3.

We did not detect a difference between surveys in which violations occurred and those without violations among different deployment sites ($P = 0.341$) nor between deployment locations on paved or unpaved roads ($P = 0.353$). Likewise, the distance that the decoy was placed from the road appeared to have no influence on violation incidence ($P = 0.809$) (Fig. 2). We also failed to detect a relationship between violation incidence and temperature ($P = 0.599$), wind speed ($P = 0.215$), and general weather conditions ($P = 0.746$).

Vehicles that were estimated at traveling <16 km/hour stopped more often (61.0%, $N = 136$) than vehicles that were traveling at 16–48 km/hour (11.0%, $N = 363$) or >48 km/hour (3.4%, $N = 235$) ($P < 0.001$). Likewise, violations occurred more often from slow moving vehicles ($P < 0.001$). Shots were fired from vehicles that passed the decoy deer <2 times before stopping more often (69.2%, $N = 122$) than from vehicles passing ≥2 times (11.1%, $N = 9$) ($P = 0.027$). Violations occurred more often from vehicles that stopped suddenly (60.9%, $N = 46$) than those that came to a gradual stop (38.9%, $N = 85$) ($P = 0.016$).

Shooting occurred within 1 minute after stopping 63.3% of the time and within 5 minutes 96.7% of the time ($N = 60$). Shooting occurred more often from stopped vehicles when mechanical deer of ≤5 points were used (85.7%, $N = 14$) than when stationary deer mounts of ≤5 points were used (41.8%, $N = 98$) ($P = 0.002$). However, shots were only fired on 7 of 17 occasions at mechanical deer with 8 points. No 6- or 7-point decoys were used in Tennessee from 1990–91–1992–93.

Pickup trucks and passenger cars comprised 54.5% and 42.2%, respectively, of 734 vehicles observed during surveys. A higher percentage of pickup trucks than passenger cars stopped near the decoy deer ($P = 0.002$), and a higher percentage of violations occurred from pickup trucks ($P < 0.001$) (Fig. 3). Twenty-four other vehicles (i.e., all terrain vehicles, boats, farm machinery, and motorcycles) were observed during surveys. Although 3 of these vehicles stopped, violations were not committed from any of them.

Vehicles containing 2 individuals stopped more often than vehicles con-

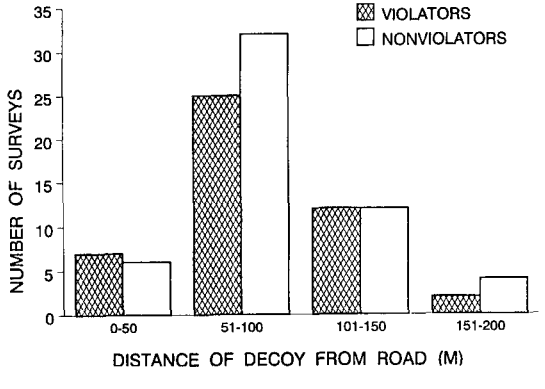

Figure 2. Number of surveys with and without violations from stopped vehicles near deer decoy deployment sites at various distances from roadways in Tennessee, 1990–91 – 1992–93.

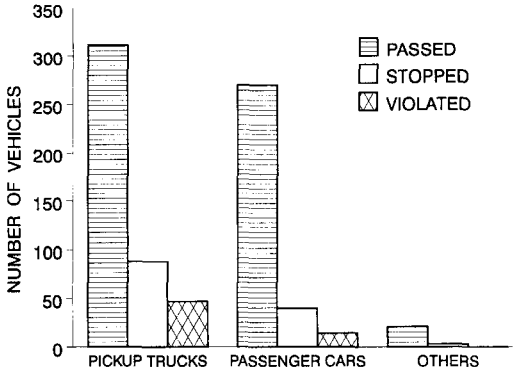

Figure 3. Number of vehicles that passed without stopping, stopped, and from which violations occurred during deer decoy deployment in Tennessee by type of vehicle, 1990–91 – 1992–93.

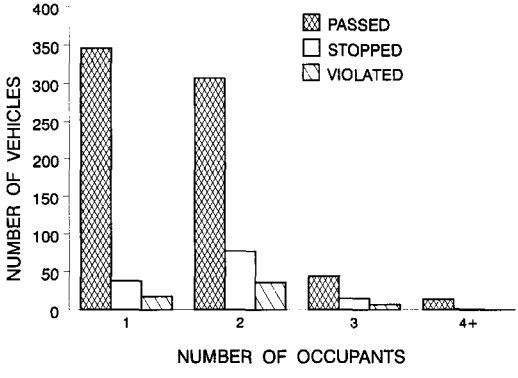

Figure 4. Number of vehicles that passed without stopping, stopped, and from which violations occurred during deer decoy deployment in Tennessee by number of occupants, 1990–91 – 1992–93.

taining <2 or >2 people ($P < 0.001$) (Fig. 4). Illegal activities were also observed more frequently from vehicles with 2 occupants ($P < 0.001$) (Fig. 4). Females were observed in only 9 of 131 vehicles that stopped, and violations only occurred from 1 of these vehicles. Stopped vehicles that contained occupants of mixed ages violated more often (71.4%, $N = 35$) than vehicles in which all occupants were estimated at <36 years of age (31.4%, $N = 70$) or >35 years of age (51.9%, $N = 27$) ($P < 0.001$).

Over 85% of occupants ($N = 113$) of vehicles from which violations occurred were ≥18 years old (Fig. 5). Only 6 of 18 juveniles in these vehicles were issued citations, but a higher percentage of individuals ≥18 years old were issued citations ($P < 0.001$) (Fig. 5). We did not detect a difference in the percentage of individuals that violated in the 18–35 and 36–65 year age classes ($P = 0.115$). Only 1 occupant in a vehicle from which violations occurred was >65 years old, and he was issued a citation.

Rifles were used by 83.9% of violators for which weapon type was recorded ($N = 56$). Only 1 shot was fired 73.8% of the time ($N = 61$), and violators attempted to flee 26.2% of the time before apprehension. Passengers were the

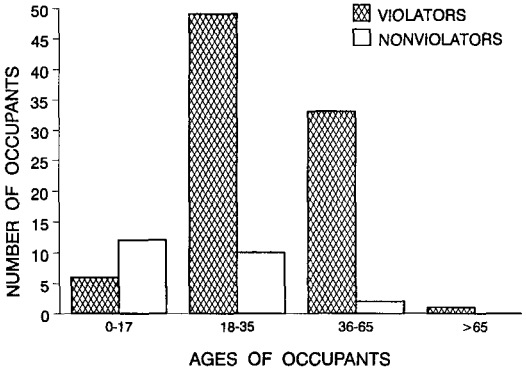

Figure 5. Number and estimated ages of violating and nonviolating occupants in stopped vehicles near deer decoy deployment sites in Tennessee, 1990–91 – 1992–93.

Table 1. Activities of occupants of stopped vehicles from which shooting did not occur as recorded by TWRA wildlife officers using decoy deer, 1990-91–1992-93.

Activity	% activities (*N*)
Observed decoy	60.7 (71)
Observed decoy without any aids	44.4 (52)
Observed decoy with riflescope	6.8 (8)
Observed decoy with binoculars	5.1 (6)
Photographed decoy	4.3 (5)
Made noise at decoy	29.9 (35)
Hit side of vehicle	8.5 (10)
Shouted at decoy	7.7 (9)
Whistled at decoy	6.8 (8)
Honked horn	5.1 (6)
Cursed decoy	0.9 (1)
Clapped hands	0.9 (1)
Made movements toward decoy	9.4 (11)
Walked toward decoy, unarmed	4.3 (5)
Walked toward decoy, armed	3.4 (4)
Threw rock at decoy	0.9 (1)
Waved arms at decoy	0.9 (1)

shooters 41.0% of the time. Alcohol consumption was recorded on only 4 occasions by arresting officers, and only 1 instance of violent behavior was noted.

TWRA officers recorded 117 behaviors exhibited by occupants of stopped vehicles in which violations did not occur (Table 1). Of these, 39.3% consisted of movements or noises apparently made in an attempt to startle the deer and cause it to move in an apparent effort to determine if it were alive. Five individuals photographed the deer with video or still cameras and appeared to have no intention of violating the law. Over 50% of all activities consisted of behaviors in which intent was difficult to determine (e.g., watching the decoy deer without making noises or motions).

Discussion

Although our results appear to indicate that variation among deployment procedures (i.e., deployment location, distance from road, and weather conditions) have little influence on the probability of a violation occurring, caution should be used when applying these results to random deployment of decoys. Decoy deer are only used in Tennessee at locations of known road hunting activity because of TWRA Law Enforcement Field Order No. 1-85. Our results indicate that deployment procedures are not critical when apprehending road hunters with previously established violation patterns. For example, we observed no difference in violation rates for decoys placed close to the road and those placed up to 200 m away. Differences undoubtedly occur when conditions become unreasonable (e.g., decoys are placed so far from the road that they cannot be observed or during extremely severe weather conditions). Additional studies in which decoys are placed at random locations are justified for comparative purposes.

Decoy deer are used most often in Tennessee on weekends because it is assumed that this is when road hunting violations are most common. Kaminsky and Giles (1974) suggested that a significantly higher number of spotlighting violations occur in Virginia on Saturdays. However, Glover and Baskett (1983) reported that deer violations in Missouri occur on all days of the week, with the largest percentage on weekends. Daily differences in apprehension rates should be evaluated in Tennessee by using decoy deer in a comparative temporal study.

Likewise, decoys are primarily used in Tennessee during early morning and late afternoon because these are the primary activity periods of white-tailed deer, and they are seen most often in open areas during these times (Barnes and Strom 1987). However, during years of poor mast production, deer are active for more extended periods (Barnes and Strom 1987). Although we did not detect a difference in violation rates by time of day, our observations that vehicles stopped more often in the morning indicate that decoy deer may be used more efficiently early in the day. This hypothesis is consistent with the likely reduction of road hunting during periods of high traffic activity.

Our study is useful in providing a profile of potential violators that can be used by law enforcement officers during operations in which decoy deer are used. Violations in Tennessee occurred most often from pickup trucks with 2 male occupants. The average number of individuals present in vehicles from which illegal road hunting occurred in Georgia and Virginia were 1.9 (Green et al. 1988) and 3.1 (Kaminsky and Giles 1974), respectively. Females also were rarely involved in road hunting in these studies. Other studies have also documented that road hunting occurs most commonly from pickups and secondarily from sedans (Kaminsky and Giles 1974, L. L. Jindrich, 1990, Idaho Game and Fish, unpubl. rep.). Violations in our study occurred most often from vehicles that were moving slowly and stopped abruptly. Keying in on this profile during stakeouts will help officers prepare for apprehension of violators.

The highest percentage of violators in our study were 18–35 years old, and most remaining violators were >35. Similarly, Kaminsky and Giles (1974) reported that 68% of all spotlighting violators in Virginia were 18–37 years old. These results contrast to a study in Missouri in which slightly over half of closed season violators were <26 years old, and <15% were >40 (Glover and Baskett 1984). Our observation that violations occurred more often in vehicles with occupants of mixed ages supports Hastings and Pelton (1988) observations that almost 60% of gun hunters in Tennessee hunt with family members.

Kaminsky and Giles (1974) reported that 31.4% of spotlighters in Virginia required a chase for apprehension. As noted, in our study, only 26.2% of road hunters attempted to flee, probably as influenced by the law enforcement apprehension procedures; decoys were placed on the opposite side of the road from on-scene wildlife officers, usually enabling officers to catch poachers unaware, thereby reducing the chance to flee. We also found a much lower correlation between illegal activity and alcohol use in our study (6.6%) than was found in the Virginia study (32.9%), and alcohol likely influences belligerent behavior and attempted escape in road hunters.

We interpret the higher violation rates of individuals who stopped suddenly as impulse behavior. Habitual violators appeared to be more cautious when deciding whether to shoot at deer decoys. We documented behaviors that indicated that some potential violators were suspicious. These behaviors included passing the decoy several times and observing it for several minutes but not shooting. Although the latter behavior can be interpreted as nature watching, we suspect that most of these people were trying to determine deer authenticity by watching for movement. Many individuals also made noises and movements, apparently to startle the deer and force it to move. These behaviors would not be normally be expected from potential violators unless they were suspicious because running deer are more difficult to kill than stationary animals.

Our study indicated that some additional stimuli sometimes result in negative responses. For example, mechanical deer with 8 points were shot less often than expected, perhaps because an 8-point rack caused potential violators to become more suspicious. This explanation is most logical in areas where large deer are rare and road hunters are familiar with the decoy deer program. Consequently, more realistic targets (e.g., decoys with moving heads or tails) may be needed to prompt such individuals to shoot.

The large number of behaviors observed in this study that were apparently directed at determining the authenticity of the decoy deer indicates that many potential violators are familiar with the decoy deer program and are often suspicious. The similarity in violation rates among years in our study indicates that this problem had not increased substantially. Although violation rates were similar statewide among years, localized or regional rates may vary more dramatically. We were unable to test local variation because of insufficient samples from individual counties. We are confident, however, that measures must be taken to minimize media exposure or the use of decoy deer will become less effective over time.

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