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AN EVALUATION OF OKLAHOMA'S DEPREDATION PROGRAM FOR HANDLING DEER DAMAGE TO AGRICULTURAL CROPS

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Abstract: A stepwise approach was developed in 1993 to handle agricultural damage complaints caused by white-tailed deer (*Odocoileus virginianus*). Results from 2 seasons were evaluated to determine the effectiveness of the procedures implemented. Approximately half of the damage complaints received were handled by prescribing non-lethal techniques such as fencing, harassment, and repellents. The remainder of the complaints required 1 or more types of lethal control. Although doe harvest rates were similar under the 2 permit options, Damage Control Assistance Permits (DCAP) provided several distinct advantages over out of season shooting using Depredation Permits (DEPR). The DCAP permits increased hunting opportunity, eliminated the need for landowners to expend considerable time and effort shooting deer out of season, and fostered a cooperative relationship between landowners and hunters. Recipients of DCAP tags tended to continue with the program, thereby providing long-term control.

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Key words: crop damage, depredation, fruit trees, nurseries, *Odocoileus virginianus*, ornamental plantings, white-tailed deer.

White-tailed deer (*Odocoileus virginianus*) are a valuable ecological and economic resource and provide countless recreational opportunities to the citizens of Oklahoma. Market hunting and unrestricted harvest nearly extirpated deer in Oklahoma; the statewide deer population was estimated to number 500 animals in 1916 (Lindzey 1951). A 17-year prohibition on deer hunting, a successful trap and transplant program, and increased emphasis on law enforcement resulted in the re-establishment of the state's deer herds (Shaw and UMBER 1983). The statewide population is now estimated to number 325,000 animals.

Concurrent with increased deer numbers, the Oklahoma Department of Wildlife Conservation (ODWC) has received an increased number of complaints resulting from deer damage to agricultural crops, fruit trees, and nursery stock. In 1984, the Department received 6 complaints of agricultural damage by deer in 6 counties. By 1994, the number of complaints had increased to 53 in 26 counties. Many more complaints were received involving ornamental plantings and home gardens, but these complaints were generally handled by providing technical assistance on a case by case basis.

In 1987, Conover and Decker (1991) surveyed wildlife and agricultural professionals from each state to determine their perceptions of wildlife-caused damage to agricultural crops. A majority of respondents believed that wildlife-caused damage had increased in their states in the past 30 years, and all groups listed deer as the primary species causing damage (Conover and Decker 1991). Similarly, 55% of agricultural producers surveyed by Wywiałowski (1994) in 1989, reported wildlife-caused commodity losses, citing deer as the species most frequently involved. These findings present a difficult

dilemma for state wildlife agencies, particularly in states with an agriculture-based economy and a majority of land in private ownership. Agencies must be sensitive to the needs of agriculturists, but are often expected to manage deer herds at high densities for the benefit of their constituents.

Prior to 1993, the ODWC had no standardized procedures for handling complaints of deer damage and did not allow landowners to kill depredating deer. Conover and Decker (1991) reported 87% of state agencies issued some form of shooting permits to farmers in 1987, and 22% allowed unrestricted shooting. In Oklahoma, complaints were usually handled at the local level by recommending a variety of non-lethal options. As a result, response time and recommendations varied considerably depending on the accessibility and work loads of local personnel, perceived severity of the problem, and the expertise of the individuals involved. In spring of 1993, concurrent with growing pressure from the agricultural community, the ODWC developed a depredation program and sought input from the public on proposed procedures at 4 public hearings. Minor modifications were made as a result of public input and the program was implemented in fall 1993. The program includes standardized procedures for responding to depredation complaints, and a multifaceted approach for reducing or abating deer damage.

METHODS

Upon experiencing damage to agricultural crops, orchards, or commercial nursery stock, owners must contact the Game Division Office of ODWC in Oklahoma City, where a standardized complaint form is completed. Information obtained is similar to that reported by Erickson and Giessman

(1989) in Missouri. Program procedures and available options are explained and the landowner is advised that local personnel will be in contact within 2 working days to investigate the complaint. Game and/or law enforcement personnel, accompanied by a county agriculture agent whenever possible, visit the site, assess the damage, and make recommendations for short and long term control. If damage is minimal, recommendations generally include chemical repellents, harassment, and allowing or increasing hunting with an emphasis on doe harvest. In cases involving moderate to severe damage, 2 options are available in addition to the non-lethal techniques recommended above. Damage Control Assistance Permits (DCAP), which allow licensed hunters to harvest antlerless deer any day during the 9-day primitive or 9-day gun seasons, are made available to the landowner to help achieve an adequate antlerless harvest. Finally, in severe cases, or when high value crops are involved, depredation permits may be issued allowing the landowner or designated agent to kill a specified number of deer out of season.

Landowners who receive permits are furnished a packet which contains instructions appropriate for the type of permit issued, a log book in which to record harvest information, and a specified number of plastic, self-locking tags for tagging harvested animals. Harvest information and unused tags must be returned to ODWC within 10 days following the close of deer season or expiration of the permit.

RESULTS

Technical Assistance

In 1993, deer were responsible for 22 complaints of agricultural damage. In 9 of these cases, damage was considered minimal, or landowners did not want to pursue lethal control methods, opting for fencing, harassment, repellents or doing nothing. In 1994, 53 deer damage complaints were received and 28 were handled with technical assistance only.

Damage Control Assistance Permits

In 1993, 165 DCAP tags were issued to 12 individuals in 7 counties (Table 1). The number of tags issued to an individual was based on the size of the property and varied from 3 to 30 tags. Eight (66%) of the recipients used at least 1 tag and 2 landowners used all of the tags issued. A total of 85 deer were harvested on DCAP properties including 78 does. In 1994, 225 DCAP tags were issued to 23 individuals in 18

counties. Of these 23 landowners, 14 (61%) used at least 1 tag resulting in a harvest of 72 deer including 63 does. Among landowners who used at least one tag, the doe harvest rate was 0.54 does/tag in 1993 and 0.38 does/tag in 1994.

Depredation Permits

One depredation permit was issued in 1993 and no deer were harvested (Table 1). In 1994, 4 of 5 landowners who received depredation tags utilized at least one tag. The 40 tags yielded a total of 13 deer including 11 does resulting in a harvest rate of 0.36 does/tag.

DISCUSSION

Technical assistance alone was considered adequate to handle 41% and 53% of the deer damage complaints in 1993 and 1994, respectively. These values are similar to those reported from Arkansas, where 45% of the landowners surveyed indicated that they used non-lethal control measures (Wigley et al. 1989). Many complaints were the result of perceived damage when deer and/or deer tracks were observed on and around the property. Upon investigation of the site, landowners often agreed that there was little or no damage visible. In cases where light damage was observed, emphasis was placed on the use of techniques designed to alter deer feeding behavior, thus preventing deer from becoming accustomed to using the food source. To date, none of the cases handled with technical assistance have required subsequent investigation or permit issuance.

A majority of landowners receiving DCAP tags thought the tags were somewhat effective in reducing deer numbers and most expressed an interest in continuing the program. Two landowners indicated tags received in 1993 and 1994 allowed for sufficient herd reduction and additional tags would not be needed the following season. Tag use for these landowners was generally higher than other recipients averaging 0.58 does/tag.

The DCAP permits provided several distinct advantages over out of season permits. Deer were taken during the legal season by licensed hunters thereby increasing hunter opportunity and eliminating the need for the landowner to spend considerable time and effort to kill animals out of season. More importantly, this type of permit fostered a more cooperative relationship between hunters and landowners and encouraged landowners to continue with the control program to provide

Table 1. Number of Damage Control Assistance Permits (DCAP) and Depredation Permits (DEPR) issued, used, and harvest results in Oklahoma, 1993-1994.

Permit type	Year	No. of counties	No. permits issued	No. permits used	No. tags issued	No. tags used (%)	Harvest	
							Buck	Doe
DCAP	1993	7	12	8	165	85 (52)	7	78
	1994	18	23	14	225	64 (28)	9	63
DEPR	1993	1	1	0	10	0 (0)	0	0
	1994	5	5	4	40	13 (32)	2	11

better long-term control.

Oklahoma's DCAP program has many similarities to the crop-damage permit program offered in Missouri. During the 10 years of operation, participation increased dramatically, including a 1257% increase in requests during the last 4 years (Erickson and Giessman 1989). The program was terminated due to the personnel requirements, potential for public controversy, and lack of effectiveness. Like Missouri, the initial years of the program resulted in relatively few permits issued, and the demands of the program have not yet surpassed the ability of the agency to provide a timely response.

Depredation Permits (DEPR) yielded a doe harvest rate similar to DCAP permits. The high percentage of does taken indicated deer hunters and landowners aggressively targeted does for removal. Wigley (1989) reported that many landowners are unable to reduce deer numbers effectively because they do not control the surrounding forest land. The DEPR permits may be the most effective means of reducing the herd in these situations. Although most landowners initially thought that DEPR permits would enable them to receive immediate relief by shooting deer out of season, half of the recipients expressed dissatisfaction with this control method. This dissatisfaction occurred even though this control method was initially requested by them. One individual who had considerable damage to soybeans, returned the entire information packet, record books and tags, indicating that the system was too complicated and required too much time to shoot the deer using his fields.

In Missouri, Erickson and Giessman (1989) reported crop-damage permits occasionally caused problems with neighboring landowners. This was especially true if their property was nonagricultural, leased for deer hunting, or deer hunting

was a primary land use. The DEPR permits were the source of complaints from adjacent landowners in 2 locations in Oklahoma. Both landowners feared the increased doe harvest would negatively impact the deer population.

When lethal control methods were deemed necessary, DCAP permits were the method of choice in reducing deer numbers to tolerable levels. When compared to out of season kill permits, these permits provided several advantages to both landowners and hunters. Lastly, the control achieved by using licensed hunters increased hunter opportunity, was likely to provide better long-term control, and was more acceptable to the public.

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