

**PENNSYLVANIA GAME COMMISSION  
BUREAU OF WILDLIFE MANAGEMENT  
RESEARCH DIVISION  
PROJECT ANNUAL JOB REPORT**

**PROJECT CODE NO.:** 06210

**TITLE:** White-tailed Deer Research/Management

**PROJECT JOB NO.:** 21009

**TITLE:** Evaluation of biological effects and social acceptance of new antler restrictions for white-tailed deer hunting season in Pennsylvania.

**PERIOD COVERED:** 1 July 2001 through 30 June 2002

**COOPERATING AGENCIES:** Pennsylvania Cooperative Fish and Wildlife Research Unit, The Pennsylvania State University

**WORK LOCATION(S):** Centre and Armstrong Counties

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**Abstract:** We captured and attached radio transmitters to 129 male white-tailed deer (*Odocoileus virginianus*) to monitor their survival and dispersal in Pennsylvania. Ninety-one (80 fawns and 11 adults) and 38 (36 fawns and 2 adults) individual male deer were captured in Armstrong and Centre counties, respectively. As of 30 June 2002 in Armstrong County, 5 bucks (4 fawns and 1 adult) had died and another 18 (16 fawns and 2 adults) had lost their transmitter with no evidence of death. In Centre County, 5 bucks (5 fawns) had died and another 6 (5 fawns and 1 adult) had lost their transmitter. Of the 24 that lost their transmitter, 21 were ear tag attachments. We did not expect the high rate of ear tag transmitter loss. By the end of June 2002, 34 male fawns (26 in Armstrong County and 8 in Centre County) had made movements >2 miles. Average dispersal was 7 and 3 miles in Armstrong and Centre counties, respectively. We recommend continuing all aspects of this research program to accomplish the stated objectives.

**OBJECTIVES**

1. To estimate survival and identify mortality causes of male white-tailed deer from 6 to 30 months of age. Survival of males from 6 to 18 months of age will provide an estimate of how many yearling males survive the hunting seasons under antler restrictions. This will directly address how effectively antler restrictions protect yearling bucks.

- a. Survival of males from 19 to 30 months of age will estimate how many males surviving the hunting season as yearlings will be available in subsequent years as adults. This will directly answer whether protected yearling males leave the area, die, or remain in the same area.
- b. Identification of specific mortality causes is important to management. If human-caused mortality substantially impacts effect

of antler restrictions, management decisions can be made to address these problems.

2. To monitor movements of male white-tailed deer from 6 to 30 months of age. Some males are expected to disperse between 6 and 30 months of age. How far animals travel, when they disperse, and how many disperse are important questions to this study.

3. To monitor changes in male age structure of study populations.

4. To evaluate hunter acceptance and satisfaction with antler restrictions.

## **PROCEDURES**

We used drop nets (Conner et al. 1987) and modified Clover traps (Clover 1954, McCullough 1975) baited with corn and contracted with a helicopter capture company (Hawkins and Powers Aviation, Inc., Greybull, Wyoming) to capture deer. Helicopter capture was used only in Armstrong County. A shoulder-mounted net gun was used by a side gunner and a skid-mounted gun was operated by the pilot to capture deer after moving them into open areas.

Deer captured using drop-nets were sedated with a light, intramuscular (IM) dose of xylazine hydrochloride (XYL) and face-masked. XYL was delivered via hand syringe at about 0.6 mg/kg body weight, or about 20 mg for a fawn, 30 mg for a yearling, and 40 mg for an adult. These dosages were well below the dosage recommended by Bubenik (1982) for immobilization of white-tailed deer using xylazine alone. Dosages were not designed for complete sedation, but more for ease of handling deer tangled in the net. Deer captured with Clover traps were manually restrained and face-masked. Personnel conducting helicopter captures used manual restraint and hobbled the legs.

After capture, all deer were fitted with an ear tag in each ear. Male fawns were marked in one of 2 ways: with an ear tag in 1 ear and an ear-tag transmitter in the other, or with 2 ear tags and a radio collar. Adult males were fitted with a global positioning (GPS) collar.

Deer held with manual restraint (by personnel or hobbling) were released as soon as individual markers were applied. Chemical immobilizations were antagonized with IM injections of yohimbine hydrochloride (YOH; 0.4 mg/kg) using a hand syringe, or with IM injections of tolazoline hydrochloride (TOL; 4.0 mg/kg). Future reversal of xylazine-immobilized deer will be done exclusively with TOL, because it provides more consistent antagonism of xylazine (Kreeger 1996).

Radio-marked deer were monitored for survival at least once per week after capture. In March and April, telemetry locations were obtained twice per week to delineate home ranges before the anticipated spring dispersal during May and June. In May and June, locations were obtained 2 or more times per week. Deer that had dispersed were tracked via aerial telemetry.

## **FINDINGS**

A total of 384 deer were captured in the 2002 winter trapping season from 25 January-10 April (Table 1). This total includes some recaptures. There were 91 (80 fawns and 11 adults) and 38 (36 fawns and 2 adults) individual male deer captured in Armstrong and Centre counties, respectively. As of 30 June 2002 in Armstrong County, 5 bucks (4 fawns and 1 adult; Table 2) had died and another 18 (16 fawns and 2 adults) had lost their transmitter with no evidence of death.

In Centre County, 5 bucks (5 fawns; Table 2) had died and another 6 (5 fawns and 1 adult) had lost their transmitter. When the transmitter was found with no evidence of death, we believe that the transmitters were shed by the deer or removed by conspecifics. Most of transmitters shed by male fawns were ear tag transmitters, and most showed abnormal signs of wear. Specifically, the antenna on many ear tag transmitters were chewed or bitten off near the base. Also, 5 GPS collars prematurely detached as a result of software bugs, and 3 deer slipped out of collars shortly after attachment.

As of 30 June 2002, 26 male fawns in Armstrong County and 8 in Centre County had made movements >3.2 km (2.0 miles). Average dispersal distance in Armstrong was 11.3 km (7.0 miles), and in Centre was 4.8 km (3.0 miles). Maximum dispersal distances were 19.3 km (12.0 miles) in Armstrong County and 8.6 km (5.5 miles) in Centre County. Additional fawns were missing, and ground and aerial searches were continuing.

#### **RECOMMENDATIONS**

1. Continue telemetry monitoring to measure survival rates through the following year and dispersal parameters during the fall 2002 dispersal period.
2. Determine whether marked bucks are legal antlered deer for the 2002 deer-hunting season by obtaining visual confirmation after 1 August 2002.
3. Begin capture of male deer as soon as possible after the 2002 hunting season.
4. Conduct a pre-season deer hunter survey to evaluate satisfaction with changes in deer hunting regulations before being implemented.
5. Conduct a post-season deer hunter survey to evaluate satisfaction with changes in deer hunting regulations after their first year of implementation.
6. Work with telemetry vendor to redesign ear tag transmitters to avoid similar losses experienced in 2002.

#### **LITERATURE CITED**

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- Kreeger, T. J. 1996. Handbook of wildlife chemical immobilization. International Wildlife Veterinary Services, Inc. Laramie, Wyoming, USA.
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Table 1. Summary of white-tailed deer captures (including recaptures) by sex and age class from 25 January-10 April 2002 in Armstrong and Centre counties, Pennsylvania. An adult is classified as an animal 1.5 years old or older.

Sex/age class	County		Total
	Armstrong	Centre	
Adult males	11	2	13
Male fawns	98	45	143
Adult females	79	26	105
Female fawns	82	41	123
Total	270	114	384

Table 2. Summary of deaths of radio-marked male white-tailed deer in Armstrong and Centre counties from winter 2002 capture through 30 June 2002.

Cause of death	County		Total
	Armstrong	Centre	
Roadkill	2	1	3
Myopathy	1	0	1
Poached	1	0	1
Malnutrition	0	1	1
Recapture	0	1	1
Unknown	1	2	3
Total	5	5	10