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 2002 through 30 June 2003

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

WORK LOCATION(S): Centre and Armstrong Counties

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DATE: 21 October 2003

Abstract: We captured and attached radio transmitters to 199 male white-tailed deer (*Odocoileus virginianus*) to monitor their survival and dispersal in Pennsylvania. One hundred nineteen (106 fawns and 13 adults) and 80 (73 fawns and 7 adults) male deer were captured in Armstrong and Centre counties, respectively. As of 2 September 2003 14 bucks in Armstrong County and 16 in Centre County had died. Thirty-three percent of yearlings dispersed in Armstrong County, while 12% dispersed from Centre County. Pre- and post-hunting season deer hunter surveys were conducted. Sixty-six percent of those surveyed in the pre-season survey responded. These hunters were kept to establish a survey panel to be used to monitor trends in hunter opinion and attitude over time. In the post-season survey, 61% of the panel chose to remain as part of the panel, and 63% of a randomly selected group responded.

OBJECTIVES

1. To estimate survival and identify mortality causes of male white-tailed deer from 6 to 30 months of age.

    a. 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 information will be used, in part, to evaluate the effectiveness of Pennsylvania's antler restriction regulations for protecting yearling bucks.

    b. Survival of males from 19 to 30 months of age will estimate the proportion of males that survive consecutive hunting seasons. This information will quantitatively address survival rates of males, which will be used for modeling herd dynamics and to simulate population responses to proposed management strategies.

c. For explanatory purposes, it is important to determine proximate causes of mortality to individuals in a population. Further, this information will facilitate refining management strategies. For example, minimum-point restrictions may need to be adjusted if buck harvest rates do not significantly decrease overtime.

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. Information related to dispersal (distance, timing, and rates) may explain differences in behavior among deer populations occupying different landscapes. These movement data may be used to develop spatially-explicit population models and may assist in developing transmission of disease models.

3. To monitor changes in male age structure of study populations. We hypothesize the percentage of yearling males in the adult male harvest will significantly decrease as antlered harvest rates decrease overtime.

4. To evaluate hunter acceptance and satisfaction with antler restrictions. We anticipate hunter attitudes and satisfaction will change as hunter expectations change from an altered sex- and age-ratio in the pre-hunt deer herd. This information will provide insight about hunter acceptance and satisfaction of future changes in Pennsylvania's deer management program.

METHODS

We used drop nets (Conner et al. 1987) and modified Clover traps (Clover 1954, McCullough 1975) baited with corn to capture deer. 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; complete sedation was not required to facilitate handling deer tangled in the drop net. Deer captured with Clover traps were manually restrained and face-masked.

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 each ear or with 2 ear tags and a radio collar. Adult males were fitted with a global positioning (GPS) collar.

Deer held with manual restraints (by personnel or hobbling) were immediately released after individual markers were applied. Chemical immobilizations were antagonized with IM injections of tolazoline hydrochloride (TOL; 4.0 mg/kg) because it provides a more consistent antagonism of xylazine than yohimbine hydrochloride (Kreeger 1996).

Radiomarked 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. Ground tracking was used whenever possible to locate dispersing deer. Dispersing deer that could not be found with ground tracking were located via aerial telemetry.

A pre-hunting season and post-hunting season deer-hunter survey was mailed to a randomly selected group of hunters. Both surveys followed the procedures described by Dillman (2000). The pre-hunting season survey was conducted during October and November 2002. Only surveys received before the opening day of gun season for deer were accepted for the pre-season survey. The post-hunting season survey was sent out in mid-April 2003.

The pre-season survey was designed to measure hunters preconceived attitudes regarding the new antler restriction regulations, and to measure support for them before season. This is the pre-treatment data.—The post-season survey, was to compare hunters' real experiences with the new regulations to those preconceived before the hunt. This is the post-treatment data.

The survey was designed to monitor changes in attitudes and opinions over time. Survey participants responding to the pre-treatment survey were kept as part of a survey panel (LaPage 1994). Only those panel members who complete the series of 6 surveys will be used in the final analysis. A representative sample will also be used for each survey to provide accurate estimates for a given point in time. The confidence interval for the ramdom sample is ±4%. The confidence interval for the panel will depend on the number of participants who complete the series of surveys.

We mailed 2,906 and 2,911 surveys in the pre-season and post-season mailings, respectively. In the post-season mailing 1,841 were mailed to panel members, and 1,070 were randomly selected.

RESULTS

Seven hundred eighty-seven deer were captured in the 2003 winter trapping season from 18 January-8 April (Table 1). This total includes 206 recaptures. There were 119 (106 fawns and 13 adults) and 80 (73 fawns and 7 adults) individual male deer captured in Armstrong and Centre counties, respectively. As of 2 Sept 2003 in Armstrong County, 11 bucks (10 fawns and 1 adult; Table 2) had died of causes not related to capture and another 5 (5 fawns) had lost their radiocollar or both ear tag transmitters with no evidence of death. In Centre County, 15 bucks (15 fawns; Table 2) had died of causes not related to capture and another 9 (7 fawns and 2 adults) had lost their radiocollar or both ear tag transmitters. This loss of transmitters seems to be within the normal range.

During the spring dispersal, 33% of yearlings dispersed in Armstrong County, while 12% dispersed from Centre County.

In the pre-season deer hunter survey, after adjusting for undeliverable surveys (135), 66% of hunters responded (1,841 responses of 2,771 surveys mailed.) In the post-season survey of potential panel members (those responding to the first survey), 1,126 responded, 10 were undeliverable with bad addresses, and 235 requested to be deleted from the panel. After adjusting for undeliverable surveys, 61% (1,126 of 1831) chose to remain as part of the survey panel. Of the 1,070 hunters chosen for the random sample, 658 responded and 29 had undeliverable addresses, for a 63% (658/1041) response rate.

RECOMMENDATIONS

1. Continue telemetry monitoring to measure survival rates through the following year and dispersal parameters during the fall 2003 dispersal period.

2. Begin capture of male deer as soon as possible after the 2003 hunting season.

3. Begin data analysis of completed deer hunter surveys.

4. Conduct a pre-season deer hunter survey to evaluate satisfaction with changes in deer hunting regulations.

5. Conduct a post-season deer hunter survey to evaluate satisfaction with changes in deer hunting regulations after the second year of implementation.

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Table 1. White-tailed deer captures (totals including recaptures reported in parentheses) by sex and age class from 18 January-8 April 2003 in Armstrong and Centre counties, Pennsylvania. An adult is classified as an animal 1.5 years old or older.

	County		
Sex/age class	Armstrong	Centre	Total
Male adults	13 (14)	7 (10)	20 (24)
Male fawns	106 (138)	73 (103)	179 (241)
Female adults	121 (149)	87 (101)	208 (250)
Female fawns	98 (152)	76 (120)	174 (272)
Total	338 (453)	243 (334)	581 (787)

Table 2. Deaths of radiomarked male white-tailed deer in Armstrong and Centre counties from winter 2003 capture through 2 September 2003.

	County		
Cause of death	Armstrong	Centre	Total
Roadkill	5	2	7
Capture-Related	3	1	4
Poached	0	0	0
Red Tag Hunting	1	0	1
Predation	0	2	2
Disease	3	1	4
Malnutrition	0	7	7
Unknown	2	3	5
Total	14	16	30