

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

PROJECT CODE NO.: 06210

TITLE: White-tailed Deer Research/Management

JOB CODE NO.: 21016

TITLE: Survival and harvest rates of white-tailed deer in rifle and shotgun hunting areas of southeastern Pennsylvania

PERIOD COVERED: 1 July 2013 through 30 June 2014

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

WORK LOCATION(S): Private and public lands in Wildlife Management Unit 5C

PREPARED BY: Christopher S. Rosenberry, Bret D. Wallingford, Lauren Fenstermacher, and Joshua Johnson

DATE: 26 June 2014

ABSTRACT In January 2012, we initiated fieldwork to capture and monitor white-tailed deer (*Odocoileus virginianus*) in Wildlife Management Unit (WMU) 5C to estimate survival and harvest rates of deer in rifle and shotgun only (Special Regulations counties) hunting areas. We estimated survival and harvest rates using radio-collared and reward ear-tagged deer. During this study, we captured and marked 550 white-tailed deer with radio-collars or reward ear-tags. Preliminary harvest rates varied by age and sex; females 0.17 ± 0.02 (SE, standard error), sub-adult males 0.17 ± 0.03 , and adult males 0.43 ± 0.07 . Harvest rates did not differ significantly between shotgun and rifle areas of WMU 5C; females 0.15 ± 0.03 vs. 0.18 ± 0.03 , sub-adult males 0.15 ± 0.04 vs. 0.20 ± 0.05 , and adult males 0.48 ± 0.09 vs. 0.39 ± 0.09 (shotgun vs. rifle areas, respectively).

OBJECTIVES

1. Determine the harvest rate of antlered and antlerless deer in Wildlife Management Unit (WMU) 5C.
2. Determine the effect of rifle versus shotgun on harvest rates of antlered and antlerless deer in WMU 5C.
3. Determine annual survival rates of antlered and antlerless deer in WMU 5C.
4. Determine mortality causes of antlered and antlerless deer in WMU 5C.
5. Determine whether the Pennsylvania Sex-Age-Kill model can estimate deer populations in WMU 5C.

6. Determine feasibility of current regulations to reduce deer populations in WMU 5C.

METHODS

Deer Capture, Survival, and Mortality Causes

We conducted fieldwork to capture and monitor white-tailed deer (*Odocoileus virginianus*) in WMU 5C. Firearms for deer hunting are limited to shotguns in half of the study area (Special Regulations counties), while in the other half, shotguns and centerfire firearms are legal (Fig. 1). We used drop nets (Conner et al. 1987), rocket nets, and modified Clover traps (Clover 1954, McCullough 1975) baited with corn to capture deer. Deer captured using drop-nets and rocket nets were sedated with a light, intramuscular (IM) dose of xylazine hydrochloride (XYL), and face-masked. Xylazine 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. Our XYL 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 nets. We manually restrained and face-masked deer captured in Clover traps.

We marked all deer with numbered ear tags or reward ear tags. Most male deer received numbered ear tags and 2 ear-tag transmitters to ensure continued monitoring if 1 transmitter is lost. Some males received radio collars designed to allow for growth via the breaking of a loop sewn into the collar as described by Diefenbach et al. (2003). The transmitter for female deer was attached to a collar. Adult doe collars for were fixed in size, while collars for fawn does were padded with foam designed to deteriorate and allow growth. We marked all deer receiving radio markers with numbered ear tags inscribed with a toll-free phone number. All remaining deer received bicolored reward ear tags (white on the inside of the ear and black on the outside) to reduce visibility of tags to hunters. Each reward tag was labeled with a random identification number, toll-free phone number, and \$100 reward for reporting the tagged animal. Rewards would be paid by the Pennsylvania Cooperative Fish and Wildlife Research Unit (PCFWRU) through a grant agreement with the Pennsylvania Game Commission (PGC).

We antagonized chemical immobilizations with IM injections of tolazoline hydrochloride (TOL; 2.0 mg/kg) because it provides a more consistent antagonism of xylazine than yohimbine hydrochloride (Kreeger 1996). Deer manually restrained by personnel were immediately released after individual markers were applied.

We determined cause of mortality with gross examination of the carcass or a necropsy by the PGC veterinarian.

RESULTS

Deer Capture, Survival, and Mortality Causes

No additional deer were captured during this reporting period. From May 2013 to February 2014, 19 radio-collared deer died (Tables 1 and 2). The primary cause of mortality was from legal hunting. Preliminary harvest rates using both radio-collared and reward tagged deer varied by age and sex; females 0.17 ± 0.02 (SE, standard error), sub-adult males 0.17 ± 0.03 , and adult males 0.43 ± 0.07 . Harvest rates did not differ significantly between shotgun and rifle areas of WMU 5C; females 0.15 ± 0.03 vs. 0.18 ± 0.03 , sub-adult males 0.15 ± 0.04 vs. 0.20 ± 0.05 , and adult males 0.48 ± 0.09 vs. 0.39 ± 0.09 (shotgun vs. rifle areas, respectively).

RECOMMENDATIONS

1. Continue to record mortality reports through February 2015.
2. Complete final report by June 2015.

LITERATURE CITED

- Bubenik, G. A. 1982. Chemical immobilization of captive white-tailed deer and the use of automatic blood samplers. Pages 335-354 *in* L. C. Nielsen, J. C. Haigh, and M. E. Fowler, editors. Chemical immobilization of North American wildlife. Wisconsin Humane Society, Milwaukee, USA.
- Conner, M. C., E. C. Soutiere, and R. A. Lancia. 1987. Drop-netting deer: costs and incidence of capture myopathy. *Wildlife Society Bulletin* 15:434-438.
- Clover, M. R. 1954. A portable deer trap and catch-net. *California Fish and Game* 40:367-373.
- Diefenbach, D. R., C. O. Kochanny, J. K. Vreeland, and B. D. Wallingford. 2003. Evaluation of an expandable, breakaway radiocollar for white-tailed deer fawns. *Wildlife Society Bulletin* 31:756-761.
- Kreeger, T. J. 1996. Handbook of wildlife chemical immobilization. International Wildlife Veterinary Services, Laramie, Wyoming, USA.
- McCullough, D. R. 1975. Modification of the Clover deer trap. *California Fish and Game* 61:242-244.

Table 1. Mortality causes for radio-marked white-tailed deer in rifle area of Wildlife Management Unit 5C, Pennsylvania May 2013 – February 2014. Adults are classified as animals older than 2 years of age. Red tag harvests represent deer taken under an agriculture depredation permit.

Sex – age class	Hunting			Roadkill	Unknown/other
	Legal	Red Tag	Illegal/unknown		
Male adults	0	0	0	0	0
Male juveniles	2	0	0	0	2
Female adults	0	0	0	1	0
Female juveniles	4	0	0	2	1
Total	6	0	0	3	3

Table 2. Mortality causes for radio-marked white-tailed deer in shotgun area of Wildlife Management Unit 5C, Pennsylvania, May 2012 – April 2013. Adults are classified as animals older than 2 years of age. Red tag harvests represent deer taken under an agriculture depredation permit.

Sex – age class	Hunting			Roadkill	Unknown/other
	Legal	Red Tag	Illegal/Unknown		
Male adults	1	0	0	0	1
Male juveniles	1	0	0	0	1
Female adults	0	0	0	0	0
Female juveniles	2	0	1	0	0
Total	4	0	1	0	2

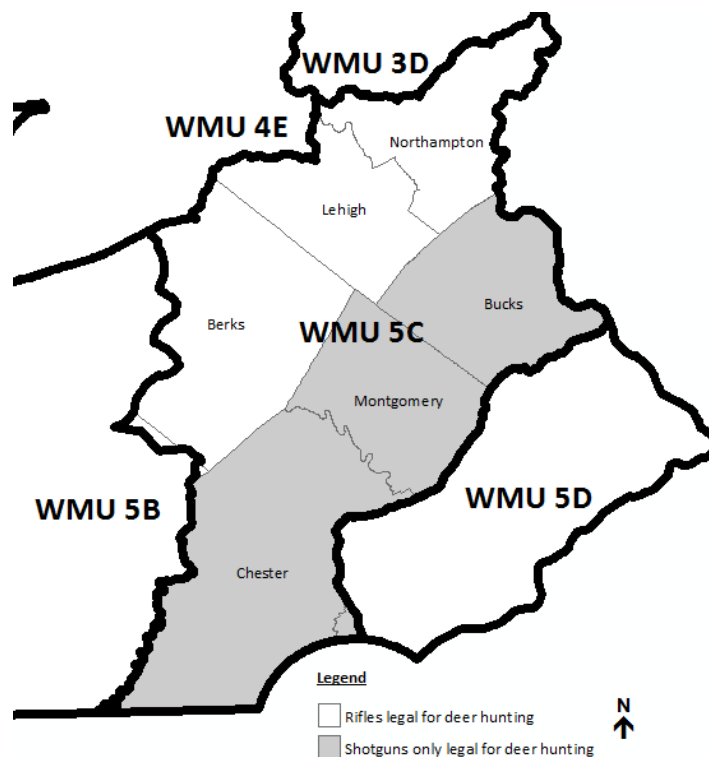


Figure 1. Map of Wildlife Management Unit 5C study area identifying counties where rifles and shotguns are legal firearms for deer hunting, Pennsylvania 2012.