

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 2005 through 30 June 2006

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

**WORK LOCATION(S):** Centre and Armstrong counties and statewide

**PREPARED BY:** Bret D. Wallingford, Christopher S. Rosenberry, and Eric S. Long

**DATE:** 28 June 2006

**Abstract:** We conducted survival monitoring on 32 and 25 adult bucks with radiocollars in Armstrong and Centre counties, respectively. From May through September 2005, 2 bucks died in Armstrong County, and none died in Centre County. During the 2005-06 hunting season, 17 adults were harvested in Armstrong County. In Centre County, 11 adults were harvested. Preliminary survival analyses of the previous 3 years of yearling and adult buck survival data indicated that survival varied by age and month of year, but did not vary between study areas or years. The probability of surviving a year was 0.47 (SE = 0.03) for juveniles and 0.28 (SE = 0.03) for adults, with the lowest survival rates occurring during the firearms season. Results from the dispersal study of yearling bucks were completed during this period. We conducted a survey of original panel member hunters who failed to respond to one or more of the following deer hunter surveys. This survey was designed to measure any bias between panel members who completed all 6 surveys, and those who dropped out. After adjusting for undeliverable surveys, 57% responded to the survey. A preliminary analysis of the previous deer hunter surveys was conducted and summarized in a report to the Board of Commissioners in January 2006, and included here as an appendix. Hunters supported antler point restrictions by a 2:1 margin during the first 3 years of the regulation change.

**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 over time.

2. To monitor movements of male white-tailed deer from 6 to 30 months of age. Some males are expected to disperse between 10 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 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

Radio-marked deer were monitored for survival once per month through the 2005-06 deer hunting seasons. Ground tracking was used whenever possible to locate deer, but deer that could not be found with ground tracking were located via aerial telemetry.

We conducted preliminary survival analyses using the known-fates procedure of Program MARK v. 4.2 (White and Burnham 1999), which is based on the Kaplan Meier survival model (Kaplan and Meier 1958, Pollock et al. 1989). This analysis allows the development of survival models based on 4 grouping variables (month of year, year, age (juveniles vs. adults), and study site). We used Akaike's Information Criterion, corrected for small sample size ( $AIC_c$ ) to select the most parsimonious model of survival (Burnham and Anderson 1998). We then used the best model to report survival rates and standard errors generated by MARK.

The deer hunter survey conducted over the previous 3 years included a panel (see LaPage 1994) of hunters who agreed to respond to all 6 deer hunter surveys over a 3-year period. This panel component was designed to monitor changes in attitudes and opinions over time. One critical component of the analysis of panel members is to determine if there is a bias between panel members who completed all 6 surveys and those who dropped out. We conducted a final survey in Fall 2005 to panel members who did not complete all 6 surveys.

To measure this bias, we mailed 1,113 surveys to panel members who did not complete the series of 6 surveys. The survey contained 21 questions verbatim to those asked on earlier surveys (Appendix 1). The survey followed the procedures described by Dillman (2000).

Summary statistics were conducted on 44 selected questions for the first 6 surveys from the randomly selected group of hunters. A Likert scale response (strongly agree, agree, neither agree or disagree, disagree, strongly disagree) was recorded for each question. We then lumped those in agreement (agree or strongly agree) and those who disagree (disagree or strongly disagree). This preliminary analysis was designed to show a trend across the past 3 years of hunting with the current antler point restrictions.

## RESULTS

In May 2005, there were 32 adult bucks radiomarked in Armstrong County. In Centre County, there were 25 adult bucks radiomarked. From May through September, 2 bucks died in Armstrong County, while 3 were censored, or removed from data analyses, after losing radio contact. In Centre County, 0 bucks died, and 8 were censored. During the 2005-06 hunting season, 17 bucks were harvested in Armstrong County, while 11 were harvested in Centre County (Table 1). This concluded the data collection for the buck study.

We developed 11 models *a priori* to estimate monthly survival rates with Program MARK. The most parsimonious model (AICc weight = 70.38%) of our preliminary analyses indicated that survival varied by age and month of year, but did not vary between study areas or year (Table 2). Monthly survival rates for juveniles and adults ranged from 0.99 to 0.64, and 1.0 to 0.36 for juveniles and adults, respectively (Table 3). The probability of surviving a year was 0.47 (SE = 0.03) for juveniles and 0.28 (SE = 0.03) for adults. As expected, the lowest survival rates were during the firearms hunting season.

Results from the dispersal study of yearling bucks were completed (objective 2). The final abstract of dispersal results is in Appendix 2. To read the complete dissertation, see Long (2005).

In a survey of 1,113 panel members who failed to respond to all 6 surveys, 78 were undeliverable, 19 were deceased, and 3 were on military leave. After adjusting for undeliverable surveys, deaths, and military leave, 57% (581 of 1,013) responded to our survey. Data analysis has not yet been conducted for the final panel survey.

Results of the preliminary analysis of survey results were provided as a draft manuscript to the Board of Commissioners at the January 2006 meeting (Appendix 3). The proportion of hunters supporting a statewide antler restriction varied between 56% and 65%, which compares favorably with the survey conducted by Luloff et al. (2002). Hunters who hunted in the 3-point area had slightly higher levels of agreement (62% to 72%) with antler restrictions than those who hunted in the 4-point area (53% to 61%). In both areas, support was significantly greater than opposition to antler restrictions, in most cases by more than a 2:1 margin. Additional summary results from the 2002-2005 deer hunter survey, and a comparison of selected questions from the 1995 and fall 2002 survey are found in Appendix 3.

## **RECOMMENDATIONS**

1. Complete survival estimation analyses.
2. Conduct data analyses of panel members who dropped out after the first survey. This is to determine if there are differences between hunters who were dropped from the panel and those who completed all 6 surveys.
3. Complete data analysis of hunter satisfaction surveys.

## **LITERATURE CITED**

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Table 1. Cause of death of radio-marked male white-tailed deer in Armstrong and Centre counties from May 2005 through 15 January 2006.

Cause of death	County		Total
	Armstrong	Centre	
Roadkill	2	0	2
Legal Archery	4	1	5
Legal Rifle	10	9	19
Legal Muzzleloader	0	0	0
Illegal Hunting	0	1	1
Hunting Unk. Legality	3	0	3
Poached (Out of Season)	1	0	1
Crop Damage / Red Tag	0	0	0
Predation	0	0	0
Disease	0	0	0
Malnutrition	0	0	0
Unknown	0	0	0
Other	1	0	1
Total	21	11	32

Table 2. Performance of 11 candidate models estimating survival rates of male white-tailed deer in 2 study sites in Pennsylvania, 2002 - 2005. Models were tested based on monthly monitoring periods from the 24<sup>th</sup> day of each month to 23<sup>rd</sup> day of the following month in each year and each site.

Model	Model description	<i>k</i> <sup>a</sup>	$\Delta AIC_c$ <sup>b</sup>	<i>w</i> <sup>c</sup>
Age*month	Survival varied between age and months.	24	0	0.704
Site*age*month	Survival varied between sites, age, and months.	48	1.73	0.296
Age*month (1-10 equal, 11 and 12 different)*site	Survival varied between age, site, and month when months 1-10 had equal survival rates but months 11 and 12 were different.	12	19.81	0.000
Age*month (1-10 equal, 11 and 12 different)	Survival varied between age and month when months 1-10 had equal survival rates but months 11 and 12 were different.	6	24.25	0.000
Age*month (1-10 equal, 11 and 12 different)*year	Survival varied between age, year, and month when months 1-10 had equal survival rate but months 11 and 12 were different.	21	43.09	0.000
Age*year*month	Survival varied between age, months, and years.	84	75.63	0.000
Age*month (months 1-11 equal, month 12 different)*site	Survival varied between age, site, and month when months 1-11 had equal survival rates but month 12 was different.	8	89.85	0.000
Age*month (months 1-11 equal, month 12 different)	Survival varied between age and month when months 1-11 had equal survival rate but month 12 was different.	4	90.57	0.000
Age*month (months 1-11 equal, month 12 different)*year	Survival varied between age, year, and month when months 1-11 had equal survival rates but month 12 was different.	14	101.88	0.000
Site*age*year*month (pool yr 1 adults)	Survival varied between sites, age, months, and years when year 1 adults from both study areas are pooled.	155	142.80	0.000
Null	Survival probability was constant between site, age, year, and month.	1	745.41	0.000

<sup>a</sup> Number of model parameters<sup>b</sup> Difference between  $AIC_c$  and  $AIC_c$  of best-fit model<sup>c</sup> Relative weight of  $AIC_c$

Table 3. Monthly survival estimates, standard errors, and 95% confidence intervals for bucks in Armstrong and Centre counties, 2002-2005, as derived from Program MARK.

Age class	Time Period	Survival Rate	Standard Error	95% Confidence Interval	
				Lower	Upper
Juvenile	Dec 24-Jan 23	0.98	0.02	0.94	1.00
	Jan 24-Feb 23	0.95	0.01	0.92	0.98
	Feb 24-March 24	0.96	0.01	0.93	0.97
	March 24-April 24	0.97	0.01	0.95	0.98
	April 24-May 24	0.98	0.01	0.96	0.99
	May 24-June 24	0.99	0.00	0.98	1.00
	June 24-July 25	0.99	0.00	0.98	1.00
	July 24-August 25	0.99	0.01	0.97	1.00
	August 24-September 25	0.99	0.01	0.97	1.00
	September 24-October 25	0.97	0.01	0.95	0.98
	October 24-November 26	0.91	0.02	0.87	0.94
	November 24-December 26	0.64	0.03	0.58	0.69
Adult	Dec 24-Jan 23	0.99	0.01	0.95	1.00
	Jan 24-Feb 23	0.98	0.01	0.95	0.99
	Feb 24-March 24	0.97	0.01	0.94	0.99
	March 24-April 24	1.00	0.00	1.00	1.00
	April 24-May 24	0.99	0.01	0.96	1.00
	May 24-June 24	1.00	0.00	1.00	1.00
	June 24-July 25	1.00	0.00	0.97	1.00
	July 24-August 25	0.99	0.01	0.96	1.00
	August 24-September 25	0.99	0.01	0.96	1.00
	September 24-October 25	0.95	0.02	0.90	0.97
	October 24-November 26	0.89	0.03	0.83	0.93
	November 24-December 26	0.36	0.04	0.29	0.45

Appendix 1. Follow-up survey to panel members who chose not to complete the series of six deer hunter surveys conducted from pre-hunting season 2002 to post-hunting season 2005.

**Pennsylvania Deer Hunter Survey  
Follow-up and Final Survey Fall 2005**

The purpose of this survey is to measure hunter opinion about deer and recent changes made to deer management. Receiving your completed survey is important to us for evaluating hunter attitudes and preferences. **It is important that the hunter to whom this was sent addressed complete the survey.**

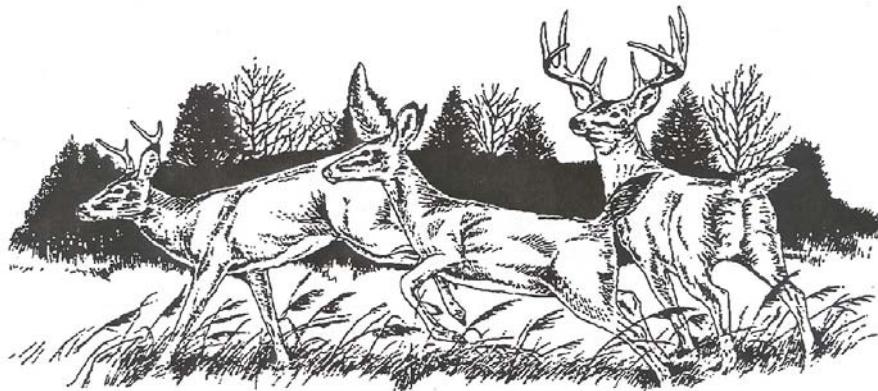
**If the hunter to whom this survey was sent has passed away, we apologize for the inconvenience, and express our sympathy to you and your family. Simply check the box below, and return the survey in the postage-paid envelope.**

**Hunter is deceased**

**ALL YOUR ANSWERS WILL REMAIN CONFIDENTIAL.**

This survey should be filled out as soon as possible. A prompt response is greatly appreciated. It will take about 10 minutes to complete.

**Thank you for your participation!!**



**Instructions for returning the survey:** Please place the survey in the postage-paid envelope and place in the mail. If you misplaced the postage-paid envelope, the address to return the survey to is:

Bureau of Wildlife Management  
Pennsylvania Game Commission  
2001 Elmerton Avenue  
Harrisburg, PA 17110-9797

**Part 1.** This section is designed to tell us about you, the Pennsylvania hunter.

**INSTRUCTIONS:** Please circle the number beside your answer(s). Some questions have only one answer; others may have more than one. Follow the directions provided by each question.

1. What is your gender? (Circle the number of your answer.)

1. Male
2. Female

2. Year of birth? 19\_\_\_\_\_

3. The most important reason I stopped filling out the deer hunter surveys was because: (Circle the ONE best answer.)

1. I stopped hunting deer
2. I do not like filling out surveys
3. I do not like antler point restrictions
4. I did not intend to stop filling out the surveys
5. I don't trust the Game Commission
6. I don't think my responses will be used
7. I don't like the increased antlerless allocations
8. Other: \_\_\_\_\_

4. In which of the following years did you harvest a buck? (Circle all that apply.)

1. 2002-2003
2. 2003-2004
3. 2004-2005
4. I did not harvest a buck in any of the years listed above.

**For each of the following years**, please tell us if you purchased an antlerless hunting license (**including DMAP permits** for the deer management assistance program), whether or not you actually hunted for antlerless deer, and if you harvested an antlerless deer. Place a check mark in the box next to the answer for each question for each year.

YEAR	5. Did you purchase an antlerless license?	6. Did you hunt antlerless deer?	7. Did you harvest an antlerless deer?
2002-2003	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2003-2004	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2004-2005	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

8. The wildlife management unit (WMU) where you hunted **most during the 2004 gun season** was  
\_\_\_\_\_ (write in the unit you hunted in.)

**Part 2.** This section is **very** important for the Game Commission to understand hunter opinion about antler restrictions. In 2002, Pennsylvania deer hunters had their first year of deer hunting with new antler restriction regulations that were designed to protect about 50-75% of yearling bucks (with their first set of antlers) in the fall population.

**Brief background:** One goal of the Pennsylvania Game Commission's deer management program is to decrease the harvest rate of yearling bucks allowing them to move into older age classes and develop larger antlers. In addition, this would increase the buck to doe ratio in the deer population and allow for a more natural breeding ecology (increased breeding competition, stronger bucks do most breeding). To accomplish this, the Game Commission passed regulations for new antler restrictions to protect some of the younger bucks. Most of these protected bucks are yearlings with their first set of antlers. In the following year, most of these bucks would no longer be protected by the antler restriction. Under the current antler restriction, a legal buck would have to have at least 3 points or 4 points on one antler, depending on the management unit.

The wildlife management units with a 4-point restriction are 1A, 1B, 2A, 2B, and 2D. All other wildlife management units are under a 3-point restriction. Junior hunters, disabled permit holders, and Pennsylvania residents serving on active duty in the U.S. Armed Forces can harvest antlered deer with two or more points to one antler, or one antler three-inches or more in length.

**INSTRUCTIONS:** Please circle the number that indicates your level of agreement with each statement about current antler restrictions in Pennsylvania.

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE
1. I support a <b>statewide</b> antler restriction, as described above.	1	2	3	4	5
2. I support an antler restriction, as described above, <b>in the wildlife management units I principally hunt for deer.</b>	1	2	3	4	5
3. I support a regulation that would increase the ratio of antlered bucks to antlerless deer in the statewide deer population.	1	2	3	4	5



**Part 3.** The following questions are designed to help us understand your past experience, opinions, and preferences concerning Pennsylvania deer hunting and hunting regulations.

Please circle the number that indicates your level of agreement with the following statements. **The current harvest regulations for bucks will result in...**

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE
1. more bucks with larger antlers.	1	2	3	4	5
2. a buck to doe ratio closer to 1:1.	1	2	3	4	5
3. more older-aged bucks.	1	2	3	4	5
4. no increase in quality of bucks because the large bucks will be poached before season.	1	2	3	4	5
5. no increase in older bucks because hunters will still shoot sub-legal bucks.	1	2	3	4	5

Please circle the number that indicates your level of agreement with the following statements.

	STRONGLY AGREE	AGREE	NEITHER AGREE NOR DISAGREE	DISAGREE	STRONGLY DISAGREE
6. It will be difficult to identify legal bucks with current antler restrictions.	1	2	3	4	5
7. Current antler restriction regulations are clear and easy to understand.	1	2	3	4	5
8. Hunters will shoot any antlered deer and leave them in the woods if they are not legal.	1	2	3	4	5
9. Current antler restrictions are a good change in Pennsylvania's deer management program.	1	2	3	4	5
10. I would rate the PGC's deer management program as (Circle the number of your answer):					

1. Excellent      2. Good      3. Fair      4. Poor 5. Don't know

**That's the end of the survey.** Please make sure you have answered all the appropriate questions. Instructions for returning the survey are on the front cover. Thank you.

PGC use only:

## Appendix 2. Dissertation abstract from Long (2005).

In Pennsylvania, as in many other states, historically intense hunting pressure has focused on adult male white-tailed deer (*Odocoileus virginianus*), and disproportionate harvest has resulted in populations demonstrating skewed sex- and age-structures with abundant does and relatively few adult bucks. In October 2002, the Pennsylvania Game Commission instituted state-wide antler-point restrictions that reduced annual hunting-related mortality rates of yearling (i.e., 18-month-old) male white-tailed deer from approximately 80% to 32%. In subsequent years, this management change doubled the number of 2.5-year-old bucks in the population and decreased the ratio of yearling bucks to older bucks from approximately 4:1 to 2:1. Concurrently, increased hunting opportunities for antlerless deer reduced abundance of adult does and decreased density of deer populations across the state. Together, these large-scale demographic manipulations likely affected many aspects of deer sociobiology. From 2002 – 2004, I investigated the effects of demographic change on dispersal, which is influenced by social mechanisms and has important implications for ecological processes such as gene flow, population dynamics, and disease spread. In two study areas in Pennsylvania, Armstrong County in western Pennsylvania and Centre County in Central Pennsylvania, I captured and radio-tracked 454 juvenile male white-tailed deer to estimate dispersal parameters during this time of large-scale population change.

I found that dispersal rates varied between areas, among years, and within years. In both areas, throughout the entire study, dispersal during spring fawning (mid-April to early June) and immediately prior to fall breeding season (mid-September to early November) accounted for 98% of all observed dispersal. In Armstrong County, dispersal rates remained relatively constant, ranging from 71.0% (95% CI = 60.0 – 79.9%) in 2003 to 78.2% (62.5 – 88.6%) in 2002. In Centre County, however, dispersal rates increased throughout the study, from 31.5% (17.8 – 49.4%) in 2002 to 73.5% (59.5 – 83.9%) in 2004. Reasons for these differences between study areas and the regularly increasing trend observed in Centre County are unclear. In both study areas in 2002, prior to management changes, most dispersal was observed during spring fawning (73% of all dispersal in Centre County and 50% of all dispersal in Armstrong County). In 2003 and 2004, after management changes increased density of adult bucks and decreased density of adult does, the majority of dispersal occurred in fall, prior to breeding season (69 – 79% in Centre County, 63 – 70% in Armstrong County). These results are consistent with hypotheses that maternal influences cue spring dispersal and fraternal social pressure elicits fall dispersal of juvenile male white-tailed deer.

From a meta-analysis of 14 North American populations of white-tailed deer, I found that dispersal rate does not relate to population density; however, average dispersal distance is predicated by percent forest cover ( $r^2 = 0.92$ ,  $P < 0.001$ ), such that white-tailed deer disperse farther in habitats with less forest cover. To my knowledge, these results represent the first study to document landscape-related plasticity in dispersal of a large mammal and the most complete effort to relate landscape patterns to dispersal distance for a single vertebrate species. Based on juvenile male deer equipped with radio-collars using global position systems, I found that dispersal paths were generally straight (mean straightness =  $0.81 \pm 0.07$ ), and dispersal durations were short (median = 12 h). In Armstrong County, distribution of dispersal directions did not differ from uniformity ( $U_{Rao} = 122.7$ ,  $P > 0.90$ ); but in eastern Centre County regularly trending topography comprised of numerous parallel ridges and valleys, tended to direct dispersal along these features ( $\bar{x} = 75^\circ$  and  $255^\circ$ , 95% CI = 51 – 108, 231 – 287, respectively;  $U_{GD} = 2.18$ ,  $P < 0.05$ ). Further, major roads and rivers were semi-permeable barriers to dispersal of juvenile male white-tailed deer, such that dispersal paths in Armstrong and eastern Centre counties were 34% ( $Z = -5.17$ ,  $P < 0.001$ ) and 51% ( $Z = -4.46$ ,  $P < 0.001$ ) less likely than simulated paths to intersect these barriers.

In this way, dispersal patterns of juvenile male white-tailed deer are influenced by both social processes and landscape interactions. Sociobiological cues are important for the initiation of dispersal (e.g., dispersal probability and timing), and landscape influences affect dispersal transition and termination (e.g., dispersal distance, path, and direction). Understanding dispersal mechanisms and processes for this species will improve management strategies for white-tailed deer; for example, these data may provide useful information for modeling spread of epizootics such as chronic wasting disease and for developing appropriate management efforts to control disease spread. Further, these findings improve understanding of mammalian dispersal, especially those of large mammals, whose dispersal patterns generally remain poorly understood.

Appendix 3. Draft report of summary findings from six deer hunter surveys conducted from fall 2002 to winter 2005. This report was given to the Board of Commissioners at the January 2006 meeting.

## **AN EVALUATION OF DEER HUNTER SUPPORT FOR ANTLER POINT RESTRICTIONS IN PENNSYLVANIA, 2002-2005**

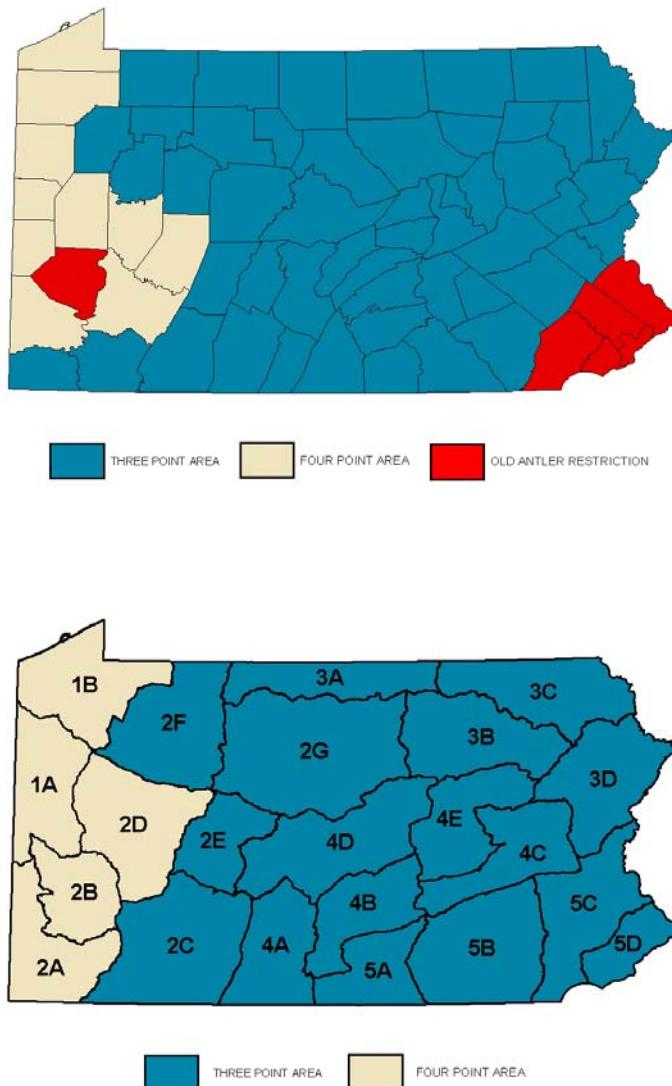
*January 2006*

In 2002, the Pennsylvania Game Commission (PGC) enacted new antler point restrictions for the deer hunting seasons. The objective of these antler restrictions was to reduce the harvest rate on bucks by protecting 50-75% of yearling bucks during the hunting season. After collection and analysis of antler point data in 2000 and 2001, each county was assigned either a minimum of 3- or 4-points per side regulation. These regulations increased the antler restrictions from the previous restriction requiring spikes of at least 3" or 2 points per antler (Figure 1).

Carpenter and Gill (1987) stated that changes to antler point restrictions should be accompanied by hunter surveys to determine their level of acceptance. Because the PGC was introducing a major change in Pennsylvania's deer hunting tradition, we wanted to survey Pennsylvania deer hunters to determine their perceptions and acceptance of new antler restrictions. A preseason survey was conducted prior to the rifle season, followed by a post rifle-season survey for the 2002, 2003, and 2004 hunting seasons. Fall surveys were conducted prior to the firearms gun season, and winter surveys were conducted after the close of the post-Christmas deer hunting seasons. This document presents summary statistics of the six surveys conducted during this time.

Completion of this survey was a joint effort of the PGC's Deer Management and Survey and Statistical Support sections in the Bureau of Wildlife Management, and the Pennsylvania Cooperative Fish and Wildlife Research Unit at Penn State. The PGC's Bureau of Automated Technological Services provided support for databases generated by the surveys.

Figure 1. Antler restrictions in counties for the 2002-03 hunting season (top) and in Wildlife Management Units for the 2003-04 to present (bottom).



## METHODS

Surveys were conducted using standard mail survey methods of Dillman (2000). For each survey, we randomly selected approximately 1,200 hunters from the pool of hunters with backtag licenses ending in "02" or "52", including licenses issued electronically. Previous surveys have used this procedure, and were shown to be highly representative of the hunting population (PGC, unpublished data (2001 Pennsylvania Turkey Hunter

SurveyTurkey survey), Luloff et al. 2002). Our goal was to receive at least 600 responses for each survey, thus achieving a 95% confidence level of  $\pm 4\%$  with a true population of 1,000,000 (Krueger 2001). During preseason surveys, only responses postmarked on or prior to the first day of the hunting season were used. This was to eliminate bias of experiencing the firearms season, then filling out a preseason survey.

## **RESULTS** (See APPENDIX for detailed response breakdowns)

We surveyed more than 1,100 deer hunters in each survey. Each survey received a minimum of at least 666 responses, and response rates varied from 63 to 70% (Table 1).

*Table 1. Sample sizes of six deer hunter surveys used to determine support for antler restriction regulations.*

Survey period	Surveys sent	Bad addresses	Surveys received	Response rate (%)
Fall 02	2,906	135	1,821	66
Winter 03	1,070	29	666	63
Fall 03	1,159	55	728	67
Winter 04	1,138	58	744	70
Fall 04	1,166	48	736	66
Winter 05	1,202	54	753	67

### **Type of land hunted**

A large majority of Pennsylvania hunters hunt on private land. We asked hunters to tell us if they hunted public or private land, or both. After adjusting for those who did not answer the question, 21% indicated they hunted exclusively on public land, 42% hunted only on private land, and 37% hunted on public and private land.

### **Antler Restrictions**

Throughout the first 3 years of antler restrictions, hunter support remained strong. The number of hunters supporting a statewide antler restriction varied between 56 and 65%. This compares favorably with the 57% support reported by Luloff (2002). Hunters who hunted in the 3-point area had slightly higher levels of agreement with antler restrictions than those who hunt in the 4-point area. In the 3-point area, support ranged from 62% to 72%, while in the 4-point area, support ranged from 53% to 61%. However, support was again significantly greater than opposition to antler restriction in 3- and 4- point areas. Although there was not a large increase from 2002-2005 in the number of hunters supporting antler restrictions, there was not a decrease either. It is clear that significantly more hunters supported current antler point restrictions than opposed them. In most cases, this support was by more than a 2:1 margin.

Similarly, 54 to 62% of hunters supported antler restrictions in the WMU they principally hunt, whereas 16-26% of hunters opposed them. Of hunters principally hunting in the 3-point area, 62-70% supported the antler restriction in the WMU they hunt. In the 4-point area, support started at its lowest point (48%; with 36% opposing them), and climbed to its highest level of 57% after the 2004 hunting season. Even in the 4-point area, there were significantly more hunters supporting antler point restrictions than opposed them.

Most hunters surveyed (47-68%) also supported a regulation that would increase the number of antlered to antlerless deer. The low of 47% came in winter 2005, but support was still greater than the 26% who opposed it. For hunters who hunt primarily in the 3-point area, 50-74% supported this type of regulation. The lowest level of support came after the 2004 deer hunting season. During this same year, 29% opposed this regulation, while 19% neither agreed nor disagreed. In the 4-point area, hunter support for this type of regulation ranged between 56 and 68%. For each of the surveys, support was greater than opposition by a margin of at least 2:1.

### **Hunter Opinion About Current Hunting Regulations**

More hunters disagreed (39-46%) than agreed (26-37%) when asked if the antlered to antlerless ratio was acceptable in the area they hunted the previous hunting season. Hunters disagreed by a 2:1 margin that the area they hunted in the previous season had an acceptable antlerless ratio. Between 18 and 28% of hunters agreed that the number of bucks was adequate in the area they hunted last year, while 50-59% of hunters disagreed. More hunters disagreed (41-65%) than agreed (12-32%) that they saw too many antlerless deer in the previous hunting season. Likewise, more hunters disagreed (73-80%) than agreed (3-6%) that they saw too many deer in the previous hunting season. Hunters agreed by a 2:1 margin that antler point restrictions would result in more bucks with larger antlers, with agreement ranging from 52-67%. The level of agreement (26-39%) that the new harvest regulations for bucks will result in a buck to doe ratio closer to 1:1 was considerably lower. However, when asked if new harvest regulations for bucks would result in more older aged bucks, hunters strongly agreed (53-68%).

Hunter concern for the effect of illegal activity on buck populations exceeded actual field results. Hunters tended to disagree by a 2:1 margin with the statement, "New harvest regulations for bucks will result in no increase in quality of bucks because the large bucks will be poached before season". However, a large proportion 26-30% neither agreed nor disagreed. Similarly, more hunters disagreed (36-47%) than agreed (21-

30%) that the new harvest regulations for bucks will result in no increase in older bucks because hunters will still shoot sub-legal bucks. This is the “shoot and sort theory” discussed by Carpenter and Gill (1987), where hunters first shoot a buck, then check to see if it is legal. This was one of the most controversial issues of antler point restrictions, and one we tested with field data on Pennsylvania bucks. Based on preliminary survival analyses of 549 radio marked bucks, we found only 1% of yearlings and 4% of adult bucks were poached before the hunting season. During the hunting seasons, only 10% of yearlings and 5% of adults were killed illegally. Hunter perception of illegal removal of bucks seems to be considerably higher than could be supported with data from radio-marked bucks. Based on results from field studies, Pennsylvania hunters adapted well to the new antler restrictions.

### **Hunter Opinion About the Effects of Antler Restrictions on Their Hunting Experience**

Identifying legal bucks remained challenging , but hunters gained confidence in properly identifying a legal buck. Hunters agreed (48-62%) that it would be difficult to identify legal bucks with the new antler restrictions, with the highest level in the fall prior to the first year of antler restrictions. For hunters in the 3-point area, 44-64% agreed, while 65-73% agreed in the 4-point area. Prior to the first season of antler restrictions, about half (51%) of hunters agreed that it would be too easy to accidentally kill an illegal buck in season. The level of agreement dropped to 35% after the third year of antler restriction regulations. This trend was very similar for hunters from the 3-point area. In the 4-point area, 62% agreed with this statement prior to the first season of antler restrictions. However, this number steadily declined with additional years of antler restrictions, reaching its low of 42% after the 2004 hunting season.

Concern over bucks being shot and left in the woods declined with experience hunting under the new antler restrictions. Prior to the first season of antler restrictions, more hunters agreed (42%) than disagreed (27%) that hunters would shoot any antlered deer and leave them in the woods if they were not legal. However, after 3 years of antler restrictions, 31% agreed with this statement, while 30% disagreed. In the 3-point area, 28-42% of hunters agreed with this statement, while 37-54% agreed in the 4-point area. Most hunters agreed (48-66%) that new regulations will improve their opportunity to harvest a larger buck in the future. Most hunters agreed (44-55%) that new antler restrictions are a good change in Pennsylvania’s deer management program.

Overall, hunters disagreed (39-55%) that new antler restrictions would reduce their enjoyment of deer hunting. In the 3-point area, 44-62% disagreed, while in the 4-point area, 39-55% disagreed. Overall, 26% believed their enjoyment of deer hunting would decrease. To explain why, we asked them to answer 3 additional questions. Seventy-seven percent of these hunters agreed that their enjoyment of hunting would be reduced because they were too concerned about shooting an illegal buck. When asked if their decrease in enjoyment was due to the restriction that they cannot shoot a sublegal buck (a buck they were able to shoot under the former regulation), 68% agreed with this reason. As a third question to isolate hunter reasons for reduced hunting enjoyment, hunters were asked if they felt the current regulations were too complex, and 47% agreed.

### **Deer Hunter Opinion about Deer Management Issues**

Hunters overwhelmingly agreed that controlling deer populations is necessary (82%), and that keeping deer populations in balance with natural food supplies is necessary (84%). Only 28% agreed that deer damage to forests is a problem, but 58% agreed that deer have the ability to affect plant and animal communities. About half (52%) believed that deer cause serious conflicts with other land uses, like forestry, farming, and highways. About half (53%) of hunters disagreed that deer populations would not need to be reduced if foresters put fences around newly timbered areas to prevent deer damage. About 61% disagreed that we don't have enough deer unless some are starving to death each year; however, 30% either agreed or were undecided. Seventy percent of hunters disagree that allocations for antlerless permits should be eliminated in the county they hunt. About 52% disagreed that antlerless allocations should be reduced in the county where they hunt.

In the final question, we asked hunters to rank the overall PGC deer program. The Fall 2002 survey, taken before the firearms hunting season, was our primary measure of hunter opinion of the separate antlered and antlerless season format. Thirty-six percent rated the deer management program as good or excellent, 37% rated it as fair, and 12% rated it as poor. After antler restriction regulations went into effect, 42-51% of hunters rated the program as good or excellent until the survey following the 2004 hunting season, when this measure dropped to 26%. During this same time period, 8-18% rated the program as poor, until the post 2004 season when 35% rated the program as poor.

## **CONCLUSIONS FROM THE 2002-2005 DEER HUNTER SURVEYS**

Based on the results of our survey, there is no doubt that hunters support the current antler restriction regulations. This support has remained relatively stable from the measurement of Luloff (2002) before antler point restrictions were passed by the Board of Commissioners through the following 3 years of application. There are, however, significantly more hunters that support antler restriction regulations than oppose them. This level of support has remained consistent. Many of the lowest levels of support for questions asked in the survey came after the 2004 deer hunting season. Deer management objectives during the time of the surveys included population reductions in many management units. Differences in deer populations during the years of the survey, were a confounding factor we could not control for during the survey. Reductions in support levels after the 2004 season appear to be attributable to the overall deer management program, not antler point restrictions.

## **COMPARISONS BETWEEN 1995 DEER HUNTER SURVEY AND FALL 2002 DEER HUNTER SURVEY**

We asked 9 questions identical to those asked on the 1995 Deer Hunter Survey. We used these questions to compare hunter opinion from 1995 to 2002 after extensive education seminars were presented statewide. These questions were asked only on the Fall 2002 survey.

Several differences were found between the 1995 Deer Hunter Survey (later published by Diefenbach et al. 1997) and the Fall 2002 Deer Survey. In 2002, more hunters agreed (31% vs. 21% in 1995) that deer damage to forests in Pennsylvania is a problem. Similarly, hunters in 2002 seemed more aware of deer conflicts with people. In 1995, only 37% agreed that deer cause serious conflicts with other land used, such as forestry, farming, highways, and other development, whereas in 2002, 57% of hunters agreed with this statement. Fewer hunters in 2002 (33%) agreed or were undecided that we don't have enough deer unless some are starving to death each year, compared to 44% in 1995. We found two differences regarding antlerless allocations between 1995 and 2002. Thirty-eight percent of hunters in 1995 either agreed or were undecided that antlerless allocations should be eliminated in the county where they hunted. This figure dropped in 2002 to 25%. When asked if allocations should be reduced in the county where they hunted, 44% agreed in 1995, while only 25% agreed in 2002. The results from the 2002 survey seem to show an increased awareness of the conflicts between deer and people, and the relationship between deer and habitat.

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APPENDIX. Summary of responses to primary questions asked on Deer Hunter Surveys.  
Questions 1-9 of Part 6 was used as a follow-up to a deer hunter survey conducted in 1995. Part 6 was deleted from subsequent surveys.

NOTE: Percentages will not add to 100% due to non-respondents.

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
I support a statewide antler restriction	Agree	57	61	64	59	65	56
	Neither	13	11	15	11	12	9
	Disagree	23	19	15	20	16	26
I support a statewide antler restriction - Hunters from 3-point area	Agree	63	71	71	69	72	62
	Neither	14	10	14	13	12	11
	Disagree	22	19	15	17	14	26
I support a statewide antler restriction - Hunters from 4-point area	Agree	53	61	59	55	60	59
	Neither	13	15	18	12	14	6
	Disagree	32	24	22	32	24	34
I support an antler restriction in the counties I principally hunt for deer	Agree	55	59	62	56	62	54
	Neither	14	13	14	11	13	10
	Disagree	24	18	16	22	17	26
I support an antler restriction in the counties I principally hunt for deer - Hunters from 3-point area	Agree	62	70	69	67	69	62
	Neither	14	11	14	13	13	12
	Disagree	22	18	15	18	15	25
I support an antler restriction in the counties I principally hunt for deer - Hunters from 4-point area	Agree	48	55	56	51	55	57
	Neither	14	16	17	12	15	6
	Disagree	36	29	25	35	26	36
I support a regulation that would increase the ratio of antlered bucks to antlerless deer in the statewide deer population	Agree	63	65	68	56	64	47
	Neither	15	13	16	16	16	17
	Disagree	15	12	9	18	13	26
I support a regulation that would increase the ratio of antlered bucks to antlerless deer in the statewide deer population - Hunters from 3-point area	Agree	67	74	74	64	67	50
	Neither	16	13	15	17	16	19
	Disagree	14	13	10	17	13	29
I support a regulation that would increase the ratio of antlered bucks to antlerless deer in the statewide deer population - Hunters from 4-point area	Agree	64	65	68	56	67	56
	Neither	15	20	21	18	17	15
	Disagree	19	15	10	25	13	28

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
In the area I hunted most often in the past, the bucks I saw had adequate antler size	Agree	39	31	28	26	32	26
	Neither	16	21	22	18	21	18
	Disagree	39	39	42	46	42	45
In the area I hunted most often in the past, the deer population has had an acceptable ratio of antlered to antlerless deer	Agree	26	21	21	18	21	17
	Neither	15	20	19	16	23	18
	Disagree	53	50	52	56	51	55
In the area I hunted most often in the past, the number of bucks I saw has been adequate	Agree	28	23	21	20	21	18
	Neither	15	18	19	14	16	12
	Disagree	51	50	53	56	57	59
In the area I hunted most often in the past, I saw too many antlerless deer	Agree	32	27	29	22	24	12
	Neither	20	22	22	15	20	13
	Disagree	42	42	42	53	50	65
In the area I hunted most often in the past, I saw too many deer	Agree	6	5	5	6	5	3
	Neither	13	12	12	10	11	7
	Disagree	74	73	76	75	79	80
The new harvest regulations for bucks will result in more bucks with larger antlers	Agree	64	63	67	58	63	52
	Neither	16	15	16	15	16	14
	Disagree	14	14	11	18	14	25
The new harvest regulations for bucks will result in a buck to doe ratio closer to 1:1	Agree	39	36	39	33	34	26
	Neither	29	31	29	24	30	25
	Disagree	25	24	26	33	30	39
The new harvest regulations for bucks will result in more older-aged bucks	Agree	66	63	68	60	66	53
	Neither	15	14	15	13	13	15
	Disagree	14	14	11	16	15	21
The new harvest regulations for bucks will result in older bucks doing most of the breeding	Agree	50	48	50	43	51	38
	Neither	28	27	31	29	28	29
	Disagree	17	15	12	19	15	23
The new harvest regulations for bucks will result in no increase in quality of bucks because the large bucks will be poached before season	Agree	23	19	18	20	21	25
	Neither	28	28	30	29	26	28
	Disagree	43	44	45	42	47	38
The new harvest regulations for bucks will result in no increase in older bucks because hunters will still shoot sub-legal bucks	Agree	31	24	21	22	22	28
	Neither	27	27	29	27	25	25
	Disagree	36	40	43	41	47	37

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
It will be difficult to identify legal bucks with the new antler restrictions	Agree	62	53	49	54	48	53
	Neither	11	15	15	14	13	13
	Disagree	21	23	29	23	32	24
It will be difficult to identify legal bucks with the new antler restrictions - Hunters from 3-point area	Agree	64	55	47	52	44	52
	Neither	11	15	15	16	15	15
	Disagree	23	28	37	31	39	30
It will be difficult to identify legal bucks with the new antler restrictions - Hunters from 4-point area	Agree	74	65	68	71	65	69
	Neither	7	15	12	13	10	11
	Disagree	18	20	19	16	20	19
It will be too easy to accidentally kill an illegal buck in the deer season	Agree	51	42	39	38	35	35
	Neither	16	20	20	18	19	20
	Disagree	26	30	35	35	38	35
It will be too easy to accidentally kill an illegal buck in the deer season - Hunters from 3-point area	Agree	51	41	38	35	33	35
	Neither	18	23	23	21	21	22
	Disagree	29	35	39	44	44	41
It will be too easy to accidentally kill an illegal buck in the deer season - Hunters from 4-point area	Agree	62	54	50	51	46	42
	Neither	15	16	20	18	21	20
	Disagree	22	29	29	30	28	38
New antler restriction regulations are clear and easy to understand	Agree	66	61	66	66	71	66
	Neither	15	14	17	13	11	10
	Disagree	13	17	11	13	12	13
Hunters will shoot any antlered deer and leave them in the woods if they are not legal	Agree	42	29	32	26	33	31
	Neither	25	33	25	35	25	29
	Disagree	26	29	37	30	36	30
Hunters will shoot any antlered deer and leave them in the woods if they are not legal - Hunters from 3-point area	Agree	42	27	32	25	30	31
	Neither	27	37	28	41	29	31
	Disagree	30	33	40	34	40	35
Hunters will shoot any antlered deer and leave them in the woods if they are not legal - Hunters from 4-point area	Agree	53	37	38	37	44	40
	Neither	24	34	26	33	19	26
	Disagree	21	29	35	30	32	34
Deer herd quality will improve with the new antler restrictions	Agree	51	54	59	46	54	36
	Neither	26	24	24	23	23	23
	Disagree	17	14	10	22	16	31

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
New antler restrictions will cause a dramatic decrease in the number of bucks harvested in the area I hunt	Agree	56	42	44	48	40	48
	Neither	21	30	26	24	28	22
	Disagree	17	20	23	19	25	20
New regulations will improve my opportunity to harvest a larger buck in the future	Agree	58	59	66	57	64	48
	Neither	22	19	18	18	18	19
	Disagree	14	13	10	15	12	23
In the area I hunt, there will be very few legal bucks harvested	Agree	46	44	35	54	37	60
	Neither	26	29	31	21	29	19
	Disagree	21	18	27	16	27	11
New antler restrictions are a good change in Pennsylvania's deer management Program	Agree	49	53	55	49	55	44
	Neither	23	20	22	21	21	17
	Disagree	22	18	16	22	17	28
New antler restriction regulations will reduce my enjoyment of deer hunting	Agree	28	25	21	28	22	33
	Neither	18	19	17	20	18	17
	Disagree	48	47	55	43	53	39
New antler restriction regulations will reduce my enjoyment of deer hunting - Hunters from 3-point area	Agree	27	22	20	24	22	34
	Neither	19	19	17	23	18	19
	Disagree	53	57	62	53	59	44
New antler restriction regulations will reduce my enjoyment of deer hunting - Hunters from 4-point area	Agree	38	40	26	43	29	39
	Neither	17	15	18	17	20	17
	Disagree	44	44	55	39	46	44
My enjoyment of deer hunting will change because I cannot shoot any buck with 3 inches or more to one antler	Agree	70	68	71	64	72	61
	Neither	16	14	17	19	14	17
	Disagree	11	15	10	14	11	18
My enjoyment of deer hunting in will change because new regulations are too complex	Agree	45	46	61	48	49	42
	Neither	23	25	20	21	31	24
	Disagree	28	27	15	29	17	29
My enjoyment of deer hunting in will change because I will be too concerned about shooting an illegal buck	Agree	79	80	78	78	82	66
	Neither	8	9	7	8	6	13
	Disagree	11	10	11	12	9	16

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
It will be difficult to identify legal bucks with the new antler restrictions	Agree	62	53	49	54	48	53
	Neither	11	15	15	14	13	13
	Disagree	21	23	29	23	32	24
It will be difficult to identify legal bucks with the new antler restrictions - Hunters from 3-point area	Agree	64	55	47	52	44	52
	Neither	11	15	15	16	15	15
	Disagree	23	28	37	31	39	30
It will be difficult to identify legal bucks with the new antler restrictions - Hunters from 4-point area	Agree	74	65	68	71	65	69
	Neither	7	15	12	13	10	11
	Disagree	18	20	19	16	20	19
It will be too easy to accidentally kill an illegal buck in the deer season	Agree	51	42	39	38	35	35
	Neither	16	20	20	18	19	20
	Disagree	26	30	35	35	38	35
It will be too easy to accidentally kill an illegal buck in the deer season - Hunters from 3-point area	Agree	51	41	38	35	33	35
	Neither	18	23	23	21	21	22
	Disagree	29	35	39	44	44	41
It will be too easy to accidentally kill an illegal buck in the deer season - Hunters from 4-point area	Agree	62	54	50	51	46	42
	Neither	15	16	20	18	21	20
	Disagree	22	29	29	30	28	38
New antler restriction regulations are clear and easy to understand	Agree	66	61	66	66	71	66
	Neither	15	14	17	13	11	10
	Disagree	13	17	11	13	12	13
Hunters will shoot any antlered deer and leave them in the woods if they are not legal	Agree	42	29	32	26	33	31
	Neither	25	33	25	35	25	29
	Disagree	26	29	37	30	36	30
Hunters will shoot any antlered deer and leave them in the woods if they are not legal - Hunters from 3-point area	Agree	42	27	32	25	30	31
	Neither	27	37	28	41	29	31
	Disagree	30	33	40	34	40	35
Hunters will shoot any antlered deer and leave them in the woods if they are not legal - Hunters from 4-point area	Agree	53	37	38	37	44	40
	Neither	24	34	26	33	19	26
	Disagree	21	29	35	30	32	34
Deer herd quality will improve with the new antler restrictions	Agree	51	54	59	46	54	36
	Neither	26	24	24	23	23	23
	Disagree	17	14	10	22	16	31

Survey question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005
New antler restrictions will cause a dramatic decrease in the number of bucks harvested in the area I hunt	Agree	56	42	44	48	40	48
	Neither	21	30	26	24	28	22
	Disagree	17	20	23	19	25	20
New regulations will improve my opportunity to harvest a larger buck in the future	Agree	58	59	66	57	64	48
	Neither	22	19	18	18	18	19
	Disagree	14	13	10	15	12	23
In the area I hunt, there will be very few legal bucks harvested	Agree	46	44	35	54	37	60
	Neither	26	29	31	21	29	19
	Disagree	21	18	27	16	27	11
New antler restrictions are a good change in Pennsylvania's deer management Program	Agree	49	53	55	49	55	44
	Neither	23	20	22	21	21	17
	Disagree	22	18	16	22	17	28
New antler restriction regulations will reduce my enjoyment of deer hunting	Agree	28	25	21	28	22	33
	Neither	18	19	17	20	18	17
	Disagree	48	47	55	43	53	39
New antler restriction regulations will reduce my enjoyment of deer hunting - Hunters from 3-point area	Agree	27	22	20	24	22	34
	Neither	19	19	17	23	18	19
	Disagree	53	57	62	53	59	44
New antler restriction regulations will reduce my enjoyment of deer hunting - Hunters from 4-point area	Agree	38	40	26	43	29	39
	Neither	17	15	18	17	20	17
	Disagree	44	44	55	39	46	44
My enjoyment of deer hunting will change because I cannot shoot any buck with 3 inches or more to one antler	Agree	70	68	71	64	72	61
	Neither	16	14	17	19	14	17
	Disagree	11	15	10	14	11	18
My enjoyment of deer hunting in will change because new regulations are too complex	Agree	45	46	61	48	49	42
	Neither	23	25	20	21	31	24
	Disagree	28	27	15	29	17	29
My enjoyment of deer hunting in will change because I will be too concerned about shooting an illegal buck	Agree	79	80	78	78	82	66
	Neither	8	9	7	8	6	13
	Disagree	11	10	11	12	9	16

## Fall 2002 Survey: Part 6

Adjustments for nonresponses were made to compare directly to 1995 survey.

Survey Question	Fall 2002			Fall 2002 adjusted for nonresponses			1995 Deer Hunter Survey		
	Agree	Undecided	Disagree	Agree	Undecided	Disagree	Agree	Undecided	Disagree
Controlling deer populations is necessary	82	7	4	88	8	4	87	6	8
Keeping deer populations in balance with natural food supplies is necessary	84	6	3	90	6	3	89	4	7
Deer damage to forests in Pennsylvania is a problem	28	32	32	31	34	35	21	22	57
Deer have the ability to affect plant and animal communities	58	23	11	63	25	12	56	24	20
Deer cause serious conflicts with other land uses, such as forestry, farming, highways, and other development	52	19	21	57	21	22	37	19	44
We wouldn't have to reduce the deer population if foresters put fences around newly timbered areas to prevent deer damage	12	27	53	13	29	58	21	28	51
We don't have enough deer unless some are starving to death each year	10	21	61	10	23	67	24	20	56
Allocations for antlerless permits should be eliminated in the county where I hunt	10	13	70	11	14	75	19	19	63
Allocations for antlerless permits should be reduced in the county where I hunt	23	18	52	25	19	56	44	19	37

Ratings of PGC deer management program after adjusting 2002-2005 surveys for nonrespondents to compare with ratings from 1995 Deer Hunter Survey.

Survey Question	Rating	Fall 2002	Winter 2003	Fall 2003	Winter 2004	Fall 2004	Winter 2005	1995 Survey
In past years (before 2002), I would rate the PGC's deer management program as:	Excellent/Good	39	56	53	47	53	29	49
	Fair/Poor	53	37	38	47	41	66	46
	Don't Know	8	6	9	7	6	5	5