

HISTORY OF DEER AND DEER MANAGEMENT IN PENNSYLVANIA

EXPLOITATION AND RECOVERY

Prior to European settlement in Pennsylvania, deer populations were likely limited by extensive tracts of mature forests, predation from wolves (*Canis lupus*) and mountain lions (*Felix concolor*), and Native American hunters (McCabe and McCabe 1984). Early attempts were made to regulate deer hunting in the Commonwealth beginning in 1721 (McCabe and McCabe 1984), but typically laws were passed and no one enforced them. Hardly anyone, consequently, obeyed them. Deer populations sustained relatively unregulated removals through the 1700s, but in the 1800s, losses to subsistence and market shooting, and habitat changes caused deer populations to decline dramatically.

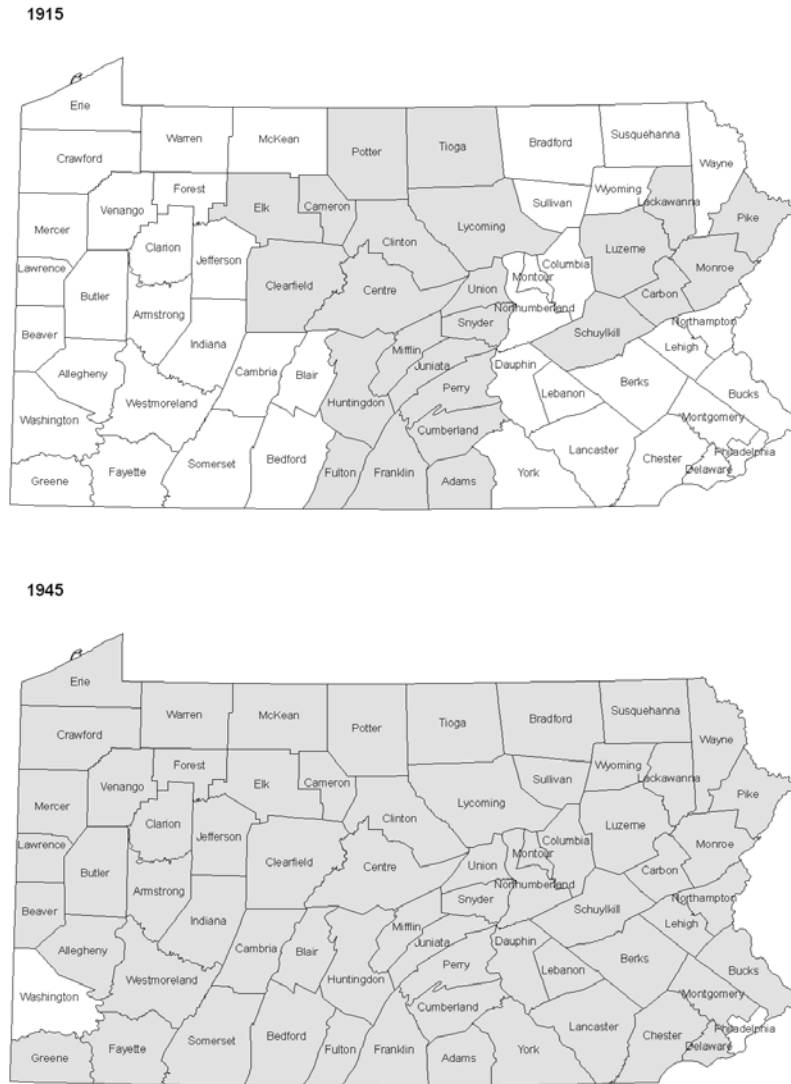
Deer were scarce throughout the Eastern and Midwestern United States around 1900 (McCabe and McCabe 1984), including Pennsylvania. The Pennsylvania Game Commission (PGC) was created in 1895 for the purpose of protecting and conserving game. Game protectors began enforcing deer harvest laws in 1897. The PGC released about 1,200 deer from 1906 to 1925 to restore the state's herd. The state's long-standing two-deer seasonal bag limit was reduced from two to one in 1905. The deer population recovery was further buoyed by enactment of a law in 1907 that protected antlerless deer. Prior to that, the harvest of antlerless deer was regulated with liberal statewide bag limits that didn't promote either local or statewide population management. The 1907 law quickly fostered opinions among Pennsylvanians that it was unsporting to shoot antlerless deer because it would impinge the herd's ability to recover. The protection afforded by this law, coupled with the increasing abundance of excellent deer range – early successional habitat – created by extensive logging during the late 1800s and early 1900s, provided outstanding conditions for deer populations to rebound. This comeback is one of the greatest success stories in the history of wildlife management (Kosack 1995).

Deer populations rebounded quickly (Figure 1). Increasing from about 1,000 deer in 1905 to about 1,000,000 in 1928 (Leopold et al. 1947), the white-tailed deer found the conditions of the early 1900s very favorable. In response to deer population increases and increasing impacts on crops and forests, additional deer management regulations were added including allowing landowners to kill deer for crop damage (1923) and the establishment of an antlerless season (1923). Public reaction to killing antlerless deer was often less than supportive, despite documented crop damage and range deterioration.

Documentation of deer impacts on crops and forests took many forms from the 1930s to 1950s. In 1931, a bulletin titled “The deer problem in the forests of Pennsylvania” was published. It provided photographic and field observations of deer impacts on forest regeneration from across Pennsylvania (Clepper 1931). In 1947, Aldo Leopold and others completed a survey of deer populations across the United States and stated of Pennsylvania, “There is a large literature on the Pennsylvania deer problem” (Leopold et al. 1947). Then in 1950, the Game Commission

published a special issue of the Game News titled “Pennsylvania’s deer problem” with the purpose of explaining the issues facing deer management (Latham 1950).

Figure 1. Counties where antlered deer harvests were reported by hunters, Pennsylvania 1915 and 1945.



Despite documentation and attempts to explain deer impacts and management, the issue of reducing deer populations and antlerless harvests remained a mainstay of the deer management controversy and disagreements between hunters and the Game Commission. From 1923 to 1956, the PGC closed antlerless deer season 13 times. The season closures were usually in response to public uneasiness that deer numbers were down, not a concern that the hunting harvest or winter mortality were too excessive. Although antlerless seasons have been held annually since 1957,

controversy over antlerless harvests and deer impacts continues. In 2008, calls for closing or shortening the antlerless deer season continue and calls for reduced deer impacts remain.

FOREST-BASED DEER MANAGEMENT

The Game Commission started deer carrying capacity studies on mixed-oak and northern hardwood forests in the 1960s and continued this work into the 1990s (Tzilkowski et al. 1994a, b). Based on these studies, in 1979 the Game Commission adopted a deer management system based on overwinter deer density objectives for each county. The system – used for about 25 years – assigned to each county an overwinter deer density objective based on the amount and quality of woodlands found in it. These objectives were set below a county's biological carrying capacity to ensure forest regeneration and minimize problems in agricultural, suburban and urban areas. Overwinter population objectives were used because winter is a critical time when deer foods are most limited.

Different forest size classes provide varying amounts of food. Seedling-sapling stands (brush to five-inch diameter trees) supply the most; sawtimber (trees larger than 11 inches in diameter) and non-commercial timber are in the middle; and pole timber (five to 11 inch diameter trees) are the least productive. Based on the carrying capacity studies, the Game Commission established the following overwinter objectives for these size classes: seedling-sapling, 60 deer per square mile; saw and noncommercial timber, 20; pole timber, 5; and non-forested areas, 0 (Drake and Palmer 1991). Non-forested areas, mainly agricultural and developed lands were arbitrarily assigned a carrying capacity of 0 because of conflicts caused by deer on these lands. Forested land figures for each county were determined through a U.S. Forest Service inventory conducted about every 10-12 years. County data were then applied to the deer densities established for each size class.

During their 25 years of use, county deer density objectives were rarely achieved and often disputed by hunters who claimed there were few or no deer where they hunted. At the end of the 20th century, Cameron County was the only county where the objective was met. Forty-five of the remaining 61 counties – the 5 special regulation counties were not assigned objectives based on forest characteristics – were 50% or more above objective and about half of these counties had 2 times the objective. After decades of use, setting deer density objectives and attempting to achieve them on a county-by-county basis was not working.

CURRENT DEER MANAGEMENT

With adoption of the 2003-2007 deer management plan, the method of defining deer management goals changed. Instead of management objectives based on density of deer in an area, measures of deer health, forest habitat health, and deer-human conflicts defined management objectives. Consequently, the number of deer in an area became secondary to measures of deer health, forest habitat health, deer-human conflicts, and deer population trends.

This shift has not been popular with all stakeholders given the Game Commission used deer densities to judge deer management success for decades. Critics of the impact-based deer management program view the change to goal-specific measures and deer population trends as

less credible than assigning a specific deer density objective to each Wildlife Management Unit. People want to know how many deer there are in Pennsylvania. And, when the Game Commission doesn't provide an answer, they question how the agency can possibly have the information it needs to manage white-tailed deer.

Like most things in deer management, this debate is not new, nor is it unique to Pennsylvania. More than 20 years ago, this topic was addressed by two wildlife biologists with expertise in deer management and population dynamics. In each case, they clearly stated that although deer population estimates are not necessary for deer management, understanding population trends and impacts on the environment are important (Hayne 1984, McCullough 1984).

Although, it is clear the credibility of a deer management program should not rest solely on its ability to answer the question of how many deer live in Pennsylvania, being able to accurately monitor the trend of deer populations remains important to the Game Commission's deer management program. Consequently, the Game Commission expends significant resources to monitor deer population trends.

Instead of using the specific number of deer in an area as a deer population measure, we monitor the trend of the deer population. In other words, instead of focusing on whether there are 20 or 30 deer per forested square mile, the Game Commission now concentrates on whether the population trend across several years is changing. Deer management recommendations are based on deer impacts on themselves, the forest, and the people, not a single number. If the forest is healthy, the deer are healthy, and people are tolerant of the level of deer-human conflicts, then it doesn't matter if there are 20 or 30 deer per square mile. The goals of the deer management plan have been met.

Today, the Game Commission's deer management program has access to valuable data that did not exist prior to 2001. The existence of forest regeneration data from across the Commonwealth gives the agency the opportunity to more directly assess the impact of deer on forest habitats. In addition, use of Citizen Advisory Committees provides a standard method of gathering public input on the value-driven measure of deer-human conflicts. The change from deer densities to goal-specific measures recognizes that improvements can and should be made when more and better information becomes available for deer management.

Given the long history of using deer density numbers in Pennsylvania, public and media expectations for and reliance on deer density information for each Wildlife Management Unit are understandable. However, any conclusion that a deer program without exact deer density estimates is not credible is not supported by the science and experience of deer biologists and managers throughout North America. While the Game Commission acknowledges the desire of hunters and the public to know how many deer are in Pennsylvania, we have a duty to implement a responsible and credible deer management program that addresses deer management goals through the most efficient use of available data.

HUNTING SEASONS AND BAG LIMIT CHANGES

“The deer problem in my mind will never be settled until you open the season on both doe and bucks, and have only one season for both and allow no deer to be shot under a certain size. This has been the remedy in other states and has been found to work to the satisfaction of every one.” -- Dr. W. H. Moore, state president of the Izaak Walton League of America addressing the PGC at May 16, 1930 board meeting.

Pennsylvania deer hunting has a long tradition. From the first deer season in 1721, to the concurrent firearms season today, deer hunting has been and continues to be an important part of Pennsylvania’s hunting heritage and deer management program. After a series of open and closed deer hunting seasons through the first third of the 20th century, the Game Commission has approved deer hunting seasons each year since 1935.

But, the process of setting deer hunting seasons and bag limits has not been without controversy. In 1928, in an effort to reduce the rapidly increasing herd, the agency closed the traditional buck season and held an antlerless deer hunt in 54 of the state’s 67 counties. It was a revolutionary step forward in deer management. However, many hunters disagreed.

The uproar over harvesting “mother” deer shook both the Commission and the state’s hunting fraternity. Antlerless licenses were bought and burned. Newspaper ads proclaimed “...only yellow hunters shoot does.” “No doe hunting” signs went up as fast as printers could make them. Hunters were convinced the 1928 antlerless-only season would wipe out the herd, but the Game Commission stayed its course and hunters took more than 25,000 antlerless deer. This was double the total number taken during the 1927 bucks-only season.

In 1938, faced with a burgeoning deer herd, the agency again closed buck hunting and adopted another antlerless-only season. Once again many hunters complained. They yelled even more loudly after more than 170,000 deer were taken – surpassing the state’s best annual harvest by more than 65,000 animals. Dissatisfied hunters exclaimed to everyone who would listen that “Pennsylvania’s deer herd is ruined!” Yet, during the next two years, hunters shot another 250,000 deer.

A review of deer management efforts from the late 1920s to the mid 1940s shows closed antlerless deer seasons led to many conflicts and high malnutrition losses. During this era, the Game Commission frequently closed antlerless seasons in response to pressures exerted by hunters, preservationists, and legislators. Deer were managed under broad guidelines. The herd was, after all, Pennsylvania’s sparkling gem. It was a supplemental food source for thousands of households, boosted local economies, and provided countless hours of recreation. Given the benefits, everyone had an opinion on deer management.

The 1950s brought changes in Pennsylvania’s deer management program. In 1951, the legislature eliminated the Game Law’s abrogation clause (enacted in 1949) that permitted residents to close, by petition, antlerless seasons in their respective counties. By the close of the 1950s, antlerless deer seasons had become a yearly standard of the deer management program. The last closed antlerless deer season was 1956.

During the early 1980s, Pennsylvania’s deer population increased substantially. Antlerless harvests were insufficient to dampen population growth due to weather, land posting, low allocations, and insufficient demand for antlerless licenses. In addition, overwinter survival and reproduction improved. In 1983, the Game Commission allocated a record 536,650 antlerless licenses to curb herd growth; only 519,000 were sold. Over the next four years the Commission continued to increase the annual allocation. But license sales seemed to reach a saturation point between 500,000 and 550,000; hunters simply were not buying them. It became necessary to modify the allocation program.

In the late 1980s, hunters continued to harvest a record numbers of bucks (Table 1). The rising buck harvest indicated the herd was still growing, even though the agency was allocating more antlerless licenses and hunters were taking more deer. The agency’s inability to sell the entire annual antlerless license allocations was impeding efforts to reduce the herd, and deer conflicts with other land uses increased.

Table 1. Deer harvests, antlerless allocations, and hunter success rates, Pennsylvania 1986-2008.

Year	Total Deer Harvest	Antlered Harvest	Antlerless Harvest	Antlerless Allocations	Antlered Hunter Success¹	Antlerless License Success
1986	300,014	150,359	149,655	565,500	0.15	0.29
1987	334,789	157,547	177,242	617,700	0.16	0.32
1988	381,399	163,106	218,293	679,300	0.16	0.33
1989	388,601	169,795	218,806	692,100	0.17	0.32
1990	415,561	170,101	245,460	806,100	0.17	0.31
1991	388,015	149,598	238,417	847,200	0.15	0.28
1992	361,224	163,159	198,065	716,650	0.16	0.29
1993	408,557	165,214	243,343	748,000	0.17	0.33
1994	395,081	157,030	238,051	780,000	0.16	0.31
1995	430,583	182,235	248,348	656,000	0.19	0.32
1996	350,997	153,432	197,565	724,350	0.16	0.24
1997	397,016	176,677	220,339	639,900	0.19	0.32
1998	377,489	181,449	196,040	890,700	0.20	0.26
1999	378,592	194,368	184,224	797,200	0.22	0.28
2000	504,600	203,221	301,379	836,550	0.22	0.36
2001	486,014	203,247	282,767	780,250	0.24	0.37
2002	517,529	165,416	352,113	1,029,350	0.21	0.35
2003	464,890	142,270	322,620	973,000	0.18	0.34
2004	409,320	124,410	284,910	1,039,000	--	0.28
2005	354,390	120,500	233,890	879,000	0.16	0.27
2006	361,560	135,290	226,270	859,000	0.18	0.27
2007	323,070	109,200	213,870	865,000	0.15	0.25
2008	335,850	122,410	213,440	849,000	0.17	0.26

¹ – Antlered hunter success rate based on antlered harvest divided by number of deer hunters. Number of deer hunters via survey not available in 2004.

To deal with inadequate harvests, in 1988 the Commission implemented a statewide program to allow hunters to purchase unsold antlerless licenses. For the first time, hunters could take more than one antlerless deer per year. The agency allocated 679,300 antlerless licenses. Under the new program, the entire allocation was issued to hunters. Through the late 1980s and early 1990s, increased allocations and hunter harvests stopped deer population growth and reduced the deer population by the mid 1990s.

This reduction in the deer population brought about the same negative response from hunters as in the past. In a series of nine public meetings held across the state in 1995, hunter complaints of seeing too few deer and requests to close antlerless deer seasons were again heard. Allocations were cut in many areas and unsold licenses were no longer available to hunters. As a result of lower antlerless deer harvests, deer populations ballooned. At the turn of the century, Pennsylvania's deer population was likely as high as it had ever been and contained nearly twice as many deer as recommended by forest-based deer management objectives.

In the early 2000s, the Game Commission again modified the framework of Pennsylvania's deer hunting season to reduce whitetail populations. More antlerless tags were allocated and the separate buck and antlerless deer seasons were combined to maximize hunter opportunities for harvesting antlerless deer. Historically, there was a two-week buck season followed by a three-day antlerless season that started on the Monday following the last day of buck season. The concurrent antlered and antlerless firearms season was put in place to give hunters more time to hunt antlerless deer and to reduce the impact of weather on the harvest during 3-day antlerless seasons. Giving hunters more time and flexibility in when, where, and how they hunt is important today when many activities compete for hunters' free time (Responsive Management 2004). A two-week season, during which hunters can hunt both antlered and antlerless deer, provides the time and flexibility for today's deer hunters.

The concurrent firearms seasons in 2004 and 2005 provided a good example of the effectiveness of the 2-week season. The opening two days of the 2005 season were plagued by poor weather. Fog and low visibility on the opening day were followed by wind and rain on the second day. Statewide, the harvest the first 2 days dropped from 49% of the firearms harvest in 2004 to 35% during 2005. For the first week, the firearms harvest dropped from 78% in 2004 to 68% in 2005. In other words, the second week of antlerless hunting in 2004 accounted for 1/5 of the harvest. In 2005, the second week accounted for 1/3 of the harvest. If the season were only 1 week long, the effectiveness of the antlerless allocation likely would have been reduced in 2005. Instead, the effectiveness of the antlerless allocation to harvest antlerless deer remained stable between 2004 and 2005 (i.e., it took approximately 4 licenses to kill an antlerless deer in both years, in spite of the differences in weather).

Reducing the impact of weather on antlerless harvests is important for deer management. Antlerless allocations are the primary management tool used to change deer population trends. However, allocations must be set 7 months before the opening of the concurrent firearms season. To properly allocate antlerless licenses, effectiveness of antlerless licenses must be predictable from year to year. In other words, managers should be able to predict how many tags it will take to harvest a deer to make recommendations for the number of tags needed to harvest a particular number of antlerless deer. For example, if it takes 4 tags to harvest a deer one year, but only 3

tags to harvest a deer the next year, the antlerless harvest will be higher than expected. The reverse also can be true in some years; if it takes more tags to harvest a deer, the antlerless harvest will be less than expected. Clearly, the more predictable the antlerless harvest is, the better deer managers can allocate licenses to achieve specific management objectives.

Today, many hunters incorrectly blame reduced deer populations on the concurrent season. Critics want the deer program to “go back to the ways things were,” and they often associate high deer populations of the past with the 2-week antlered season followed by a few days of antlerless hunting. Ignored in this viewpoint are the record antlerless allocations and record antlerless deer harvests from 2000 to 2004. These allocations were intended to reduce deer populations, and subsequently, they have in many areas since 2000. The 2-week concurrent season is not killing “extra” antlerless deer. Within a consistent season structure, the allocation controls the number of deer killed during the antlerless hunting seasons and maintaining a consistent season structure is advantageous to accurately predicting the impact of future allocations on deer population trends.

Hunting season and bag limit challenges faced by today’s deer management program are no different than they were 80, 50, or 10 years ago. Hunting is the primary tool used to change deer population abundance, and hunting seasons and bag limits are often the focus of disagreement between the Game Commission and hunters. Some hunters judge success by how many deer they see in the local area where they hunt. The Game Commission determines success based on attainment of its mission and deer management goals across the state. Often, these views are not compatible. However, the Game Commission must manage deer in accordance with its legal duties and responsibilities and, at times, this will result in recommendations of seasons and bag limits to which some hunters will be opposed. Responsible deer and wildlife management cannot be a popularity contest. It must be grounded in the best available data with consideration for Pennsylvania’s wildlife and natural resources, for today and tomorrow.