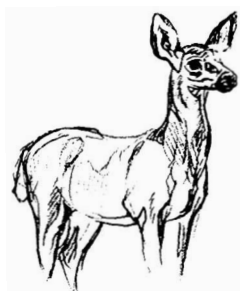


HISTORY OF THE WHITE-TAILED DEER IN NEW YORK



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ABSTRACT

The white-tailed deer is New York's most important big game species. Its history in the State is traced as a background for understanding its present status and the kind of management called for. While deer were plentiful in many localities in colonial times, they are generally not abundant there today—chiefly because such areas have been largely taken over for agricultural and urban development. Nevertheless, the total deer population of the State is much greater now than then. For the period since 1880 conditions are discussed separately and in some detail for the Adirondack, Catskill, and Central and Western regions, and Long Island. A summary of open seasons and hunting regulations is given, as well as a county by county record of the legal kill since 1900.

The trails of the white-tailed deer have not been marked with historical signs. Nevertheless, deer made an important contribution to the welfare of the pioneers and, indirectly, to the development of our country. Through the years they have been the quarry of armies of hunters who valued them highly for food, clothing, recreation, or as trophies.

The settlers cleared the land with little, if any, consideration for the possible effects on game. Indeed, by the middle of the nineteenth

¹ A contribution of Federal Aid in Fish and Wildlife Restoration Project W-28-R. This is the first of a series of papers regarding the ecology and management of deer in New York. They are based on 25 consecutive years of field investigation. Although there remains much more to learn, it seems appropriate at this time to bring together the major findings to date. It is hoped that the material presented will contribute to an understanding of the multiple and complex problems of deer management, and of the necessity for holding the deer population at levels compatible with the good of the deer, their range, and the human economy. It is hoped, too, that the reader will gain a better appreciation of the fact that the deer population throughout the State cannot be managed as a unit because of the diversity of physical and economic conditions in the various regions.

The authors wish to acknowledge the contributions of the many others who have participated in the project since its inception, especially Dr. E. L. Cheatum, R. A. Cookingham, N. Drahos, Dr. F. C. Goble, A. G. Hall, H. F. Maguire, G. H. Morton, and J. E. Tanck.

century deer were in serious danger of extermination throughout the State, except in the wilderness areas. However, as the poorer farm lands were abandoned deer exhibited remarkable ability to adapt themselves to the change in environment and reoccupied most of their former range. In recent years, and in spite of heavy hunting pressure, they have become so abundant locally as to interfere seriously with agricultural and forestry enterprise.

Since the white-tail is New York's most important big-game animal it was inevitable that it would be the subject of much concern and study by sportsmen, game officials, and biologists. The management of this magnificent animal has been a controversial subject for many years. Almost every community has its individuals or groups who are vitally interested, in one way or another, in any legislative or management measure which affects the deer population. Each group is a strong champion of its own interests and convictions. There seems to be an almost universal desire to evolve a simple panacea which will solve the problem of the local group, yet be acceptable on a statewide basis. Thus, those charged with the management of the deer herd have a host of people looking over their shoulders. In addition to the farmers and foresters already mentioned, hunters, resort and hunting camp owners, restaurateurs, sporting goods dealers, and many others have a vital interest in the welfare of the deer.

To provide a background for discussing the present status of the species in New York, it seems worthwhile to trace its history in this State. In the following account the early history is treated briefly, while that of the past half century is recounted in some detail, by regions.

DISTRIBUTION AND ABUNDANCE OF DEER IN PRE-COLONIAL TIMES

North American deer are thought to have descended from Asiatic forms which reached this continent at various times from the middle Miocene to the late Pleistocene epochs, i.e., sometime between one million and 18 million years ago. In terms of geologic time our deer, elk, moose, and caribou are comparatively recent immigrants and they are still quite similar in form to the Asiatic and European representatives of the deer family.

Knowledge of these prehistoric forms is based upon the findings of paleontologists and zoologists who have studied fossil and other buried remains. Hartnagel and Bishop (1922) described fossil remains of deer found in the muck of a swamp at Cedar Hill (Albany

County) in 1908, as well as a set of deer antlers found at Hinsdale in Cattaraugus County. The latter were discovered in gravel and sand 16 feet below the surface. The same authors reported the finding of deer and elk antlers 12 feet below the surface in a muck deposit in the town of New Hudson in Allegany County, and mentioned records of deer remains, from Cattaraugus County, found in sand and gravel with mastodon bones. They also noted several deer bones having been excavated from peat deposits near the east shore of Onondaga Lake at a depth of 10 feet.

Writing of more recent times, Ritchie (1950) stated: "No single game animal played as great a role in the economy of the Indian population of ancient New York as the Virginia deer. I venture this statement on the basis of twenty-five years of field research on scores of aboriginal camp and village sites pertaining to all periods of occupation, from the remote cultures of the Archaic horizon [about 4000 to 1000 B.C.] to those of historic times [about 1600 A.D.]. The direct evidence consists of the bone remains of food animals found as discards in the rubbish-filled pits and dumps, called middens . . . Of the birds, the turkey was apparently the most esteemed; of the mammals certainly the deer, of both sexes and all ages, furnished the bulk of the protein element, except on coastal sites and inland fishing camps . . .

"From our excavations in nearly all parts of the State we may conclude that although the deer was everywhere present, certain regions probably contained a heavier concentration of those animals and this may well account, at least in part, for the differences in population density of the Indian groups, especially of the ancient hunters who, unacquainted with agricultural practices [these started about 800 B.C.], depended solely for subsistence upon wild animals and vegetal foods."

Ritchie (1932) recorded the exhuming of the remains of literally thousands of deer at the site of an Indian village between Lomoka and Waneta Lakes in Schuyler County. This village has been dated around 3000 B.C. from study of radioactive charcoal discovered at the site. The same author mentioned (1945) that other Archaic and later sites in the Finger Lakes area were rich in deer remains, and later (1950) stated: "Large numbers of deer bones also occur in Iroquoian and earlier sites in western New York, throughout the Mohawk Valley, in Jefferson County, and along the Susquehanna River and its tributaries.

"On the other hand, the general areas embraced by the Adirondack and Catskill mountains are poor in Indian remains and therefore, in terms of our archeological knowledge, also in remains of deer and other food animals. The archeological record would at least suggest a cause and effect relationship in this connection."

It has been widely believed that large numbers of deer roamed the forests of the Northeast before the advent of the colonists. This apparently was true in local situations where the deer found suitable environment. However, the early explorers found the region now known as New York State rather completely covered with mature forests, varying in species composition according to latitude, topography, and other site characteristics (Bray, 1930; Smith, 1955).

We know that deer do not thrive in large tracts of undiversified cover, particularly mature forest having practically no undergrowth. Instead, they seek out the borders of clearings, lakes, and streams where food is accessible and cover close at hand. Known to biologists as "edge", this preferred habitat fulfills the needs of deer to a much greater degree than large areas of uniform forest cover. Thus, it appears questionable if deer found more than comparatively small areas of suitable habitat in the vast expanses of virgin timber.

Some of these exceptions were described in early records. Openings of various sizes existed in oak forests in what are now Erie, Genesee, and Livingston Counties. Other grassy openings occurred between Cayuga and Owasco Lakes (O'Callaghan, 1853:251; Edson and Merrill, 1894:40; White, 1898:2-3). These tracts were kept open by the Indians largely through periodic burning. It is assumed that the purpose was to prevent encroachment by the forest and to encourage the growth of smaller shrubs and grass that attracted deer.

The explorers found the Indians living chiefly in the fertile valleys, the Lake Plains, and the Finger Lakes regions. Since the Indians relied heavily on venison and deer hides, it seems logical to infer that the deer were found in greatest abundance in these regions and that the Adirondack and Catskill highlands harbored comparatively few of these animals.

As an interesting sidelight, two primitive methods of killing deer are outlined from the description of DeVries (1857). In a general hunt a hundred Indians, more or less, walked about 100 paces apart while beating on hollow bones with sticks. In this manner they drove deer ahead of them into water (in this case, the Hudson River), where waiting Indians in canoes threw snares around the animals' necks and



Mature evergreen timber in the Adirondack region showing lack of undergrowth, i.e., deer browse.

drowned or choked them. Another practice consisted of driving deer into a trap made from palisades split from trees, the stakes being 8 or 9 feet high and set close together. The trap was 1,400 or 1,500 paces along each side, the mouth being 2,000 paces wide and the narrower end about 5 feet wide. Making noises in imitation of wolves, the Indians drove the deer through the narrow end where they were easily snared.

There are many historical records concerning pre-colonial conditions in New York, but comparatively few details are available relative to the status of wildlife. Father L'Allemant, quoted by Edson and Merrill (1894:40), wrote of conditions among the Indians in 1641: "They are much employed in hunting deer, buffalo, wildcats, wolves, wild boar,² beavers and other animals. Meat is very abundant this year on account of the heavy snow, which has aided the hunters. It is rare to see snow in this country more than half a foot deep [far western New York], but this year it is more than three feet deep."

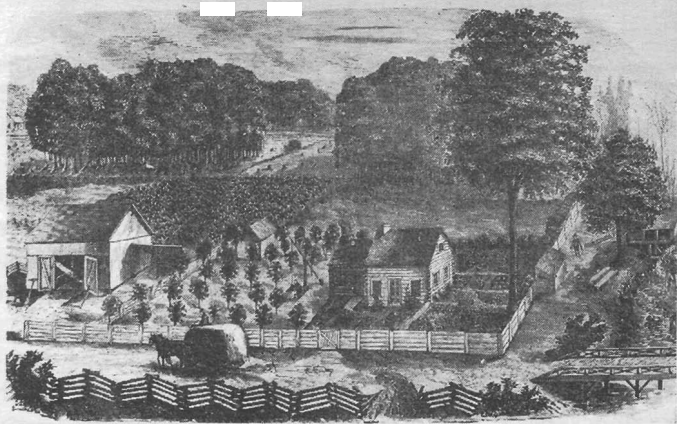
The Jesuit missionary Peter Raffex wrote in 1670: "More than a thousand deer are killed annually in the neighborhood of Cayuga" (O'Callaghan, 1853:251). Henry Hudson found deer in the valley which now bears his name, and Champlain likewise found them in the Mohawk lowlands. Edson and Merrill (1894:40) quoted from letters written in 1687 by Baron LaHouton about that part of Chautauqua County between the highlands and Lake Erie: "I cannot express what quantities of deer and turkeys are to be found in these woods and in the vast meads that lie upon the south side of the lake."

DISTRIBUTION AND ABUNDANCE OF DEER FROM THE COLONIAL PERIOD TO 1880

The advance of the white settlers into the wilderness was accompanied by changes which profoundly affected the wildlife. Trees were felled for the construction of homes, and more were cut and burned in order to clear land for crops and pasturage. A thriving trade developed in the export of lumber to Europe. The opening of the forest canopy caused by these activities resulted in excellent conditions for game. Encouraged by the sunlight, berry bushes, shrubs, and tree reproduction flourished except where kept down by farming operations and burning. The deer responded and were plentiful about the edges of the clearings. In this connection, it is interesting to note a colonial law of 1741 which prohibited the killing of deer from January through May, but permitted farmers to shoot deer in their cornfields (New York State, 1894b). Another factor which presumably affected the deer population was the gradual extermination of wolves and panthers by the settlers.

Published records vary widely as to the abundance of deer during the 18th century. Peter Kalm reported that the snow was very deep during the winter of 1705, and that great numbers of deer were found

² Translated by other historians as "black beasts" or "black squirrels"; there were no wild boar in New York at that time, either native or introduced.



Initial opening of forest and progressive clearing of land by pioneer settler and farmer. (Reproduced from History of Niagara County, N. Y. Sanford & Co., N.Y. 1878)

dead in the woods the next spring (Benson, 1937:310-311). Major Rogers, in his diary (Hough, 1883:107), wrote of his travels between Ticonderoga and Fort William Henry in December, 1755: "We found our boats in safety, and had the good fortune (after being almost exhausted with hunger, cold and fatigue) to kill two deer . . ." Later, following the battle of Rogers' Rock in March, 1758, he wrote: ". . . two officers and five English surrendered themselves prisoners, because they were wandering in the woods, dying of hunger." These men had wandered for 5 days without seeing game to shoot at. By way of contrast, Rogers found deer plentiful along the St. Lawrence River in the vicinity of old Fort Frontinac (now Kingston, Ontario) in September, 1760. He wrote (p. 179): "The Indians . . . supplied us with great plenty of venison and wild food." On the same trip, Rogers continued to find sufficient deer for his needs as he proceeded to the south side of Lake Erie. On January 8, 1761, while on his way to Fort Pitt, he wrote (p. 180): "I went a-hunting with ten of the Rangers, and by ten o'clock got more venison than we had occasion for."

From such reports it appears that deer were scarce on the eastern side of the Adirondacks between 1755 and 1760, but that they were quite abundant in 1761 in extreme western New York. Bruce (1896:936, 962) cited records of the abundance of deer in Onondaga County about 1790. Also, a Captain Williamson, writing in 1799, mentioned that about 500 deer were being killed annually in the vicinity of Bath in what is now Steuben County (O'Callaghan, 1849:1155).

Additional methods by which the Indians secured deer were described by writers of this era. Turner (1850:381), with reference to about 1795, described an area near what is now Groveland (Livingston County) where about 500 Indians set fire to a tract 7 miles on a side. Some stationed themselves inside the area, essentially a large opening in oak forest, and killed 17 deer, several bears, and other game as the fire drove the animals ahead of it. Another such burning area was located near Masonville in Delaware County, and it is conjectured that the Moose River Plains and Oswegatchie River Plains in the Adirondacks may have been used as burning grounds. Fleming (1789:507-508) described a fence of logs and brush, seen in 1789 west of the Unadilla River near the Madison-Chenango County line, that was used by the Indians to guide deer toward the hunters. Another brush barrier, this one with several openings, was located between the

northern ends of Skaneateles and Owasco Lakes. Deer were snared as they were driven through the openings in the fence. The fact that the Indians went to the trouble of erecting such fences would seem to indicate that deer were not always easy to secure by ordinary hunting.

Near Cherry Valley, the inhabitants of the settlement founded by John Lindesay had lived comfortably for several years, but in the winter of 1740 they were near starvation (Goodwin, 1859). Thus, it seems that deer were not plentiful enough in the vicinity to sustain the settlement.

In the winter of 1779-80 the snow was 5 feet deep in the vicinity of what is now Letchworth Park along the Genesee River. O'Reilly (1838:46) attributed to Mary Jemison, who spent many years as a captive of the Indians, the report that almost all the wild game disappeared, and that when the snow melted deer were found dead in vast numbers. The losses were so severe that the Indians were reduced to a starvation diet for 3 or 4 years thereafter.

Sanford (1903) published the fascinating diary of Elisha Risdon, who hunted in Parishville Township (St. Lawrence County) during the years from 1804 to 1833. According to Risdon his deer kill record varied from one to 43 per year, and averaged about 20 per year. The total amounted to 579 over the 28-year period.

Another early resident of St. Lawrence County, Thomas Meacham, was reported by Simms (1850:271) to have killed 214 wolves, 77 panthers, 219 bears, and 2,550 deer during his lifetime. Meacham died in 1849 or 1850 in the town of Hopkinton.

Other famous Adirondack hunters and trappers included John Cheney (Donaldson, 1921) and Nat Foster (Simms, 1850; Byron-Curtiss, 1897). Both had impressive lifetime records of game killed, but it must be remembered that they, like Risdon, often hunted on a year-round basis and that in all probability many of the deer were killed in winter in concentration areas.

Hinton (1834:108) wrote, concerning the value of deer to the pioneers: ". . . improvements in agriculture had long since rendered this supply of food of comparatively little value to the whiteman; yet vast numbers of this species are annually destroyed . . . Notwithstanding this extensive consumption, however, this species does not appear to be rapidly diminishing, if we except the immediate vicinity of very thickly populated districts." This is significant, for previous writers usually stressed the presence of deer near most centers of population. Hinton further emphasized this point by referring to laws intended to prevent the destruction of deer during the breeding season.

DeKay (1842:114) provided a slightly different interpretation of the abundance of deer in New York just prior to the middle of the 19th century: "This well known animal is still found in almost every part of the State, where there is sufficient forest to afford them food and cover." This observation appears to tie in with the fact that the land economy of the State at that time was becoming preponderantly agricultural. The same author stated further that: "From the mountainous regions of Orange, Rockland, and Delaware the city market is supplied [with deer] in great abundance during the winter. In the most northerly counties, they are not numerous; and in other counties, the united attacks of men and wolves are daily decreasing their number." DeKay's "other counties" probably referred to those bordering the Adirondack and Catskill highlands, and to western New York.

A definite change in the trend in numbers of deer was not generally evident until about 1840 or 1850, by which time the slaughter by the settlers and the tremendous increase in farm acreage had more than counterbalanced the earlier beneficial effects of the opening of the dense forest cover. Evidence of this is found in a number of contemporary accounts.

Goodwin (1859:314), writing of deer in Cortland County during the early part of the 19th century, stated: "They were almost as numerous as the dairymens' cattle are at the present day . . . Twenty, and even thirty, noble bucks have been counted in a drove, as they swept through the woods pursued by the hunters' well trained dogs . . . Notwithstanding this horrible crusade . . . his [the deer's] progeny have not been fully exterminated, for even to this day [1855] an occasional buck . . . may be seen bounding through the southern limits of this county."

Taylor (1873:41) wrote: "The principal of these animals found existing in the wilds of the now Town of Portland [Chautauqua County] were bear, wildcat, beaver, deer, fox, rabbit, porcupine, woodchuck, raccoon, muskrat, skunk, mink, weasel, and squirrel. The first five of these have entirely disappeared . . ."

Fisher was quoted by Miller (1899) to the effect that the last deer killed near Sing Sing (Westchester County) was shot in 1861. Mearns (1898) mentioned the capture of a deer near Middletown (Orange County) in 1878, and stated that it was the only authentic record that he knew of for the Hudson highlands although deer occasionally were found in northwestern Orange County.

In its second annual report (1887:116) the Forest Commission of New York stated, with reference to the Catskill Preserve: "Hunting in

this region is confined chiefly to grouse, rabbits, squirrels and such small game. Deer are rarely seen and much more rarely killed. The last of the deer were killed off some twelve years ago when there was a great body of snow fell, on which a crust formed of sufficient strength to bear the weight of a man. Pot hunters came into this region . . . and killed large numbers of deer, from which the hides were taken and the carcasses left to rot in the woods . . . It is fair to suppose that there are not a dozen deer in this whole Catskill region . . .”

According to Minard and Merrill (1896:141) the deer were killed or driven out of Allegany County, the last ones being seen near Independence about 1881. The lack of mention of deer in the local histories of western New York in the late 1800's lends support to the conclusion that the species had been extirpated from the region by that time.

On Long Island there was some concern during the middle and late 1700's about the decrease in their numbers (Lloyd Family Letters, 1927; New York State, 1886), but the deer persisted and eventually increased. Samuel Jones (1821:332) noted: “The principal hunting grounds are in the townships of South-Hampton, Brookhaven, Islip and Huntington . . .”

Some additional light is shed on the decline of the deer population by the following from Beck (1938): “The settlement of a large part of New York State took place soon after the American Revolution . . . The number of farms increased until about 1880, when there were about 241,000 farms in the State, comprising about 22,900,000 acres. Since that time the number has declined to about 177,000 farms aggregating about 18,686,000 acres in 1935. Most of the decline has been brought about by the abandonment of the land too poor for farming.”

The 1880 high in farm acreage represented about 75 per cent of the total land area of the State and, of the remaining 25 per cent, about four-fifths was in mountains and unavailable for agriculture. Small wonder that the deer had been exterminated except in the North Woods of the central Adirondacks.

The picture, then, is one of a marked decline of the New York deer population through most of the 19th century to a low between 1880 and 1890. The decrease was statewide except for the wild, nonagricultural region of the central Adirondacks, and can be compared with essentially parallel situations in many other states, although the time element varied somewhat.

For instance, in 1842 the only recent record of deer in Connecticut was of one killed the previous year in the town of Waterbury. In Massachusetts, the chief range of the species in 1893 was a triangle about 15 miles on a side at the base of Cape Cod with possibly 300 deer living in the area. There was also a residual population in the Berkshires. Deer seem to have increased gradually in Massachusetts and Connecticut from about 1884, spreading from the Berkshires and Cape Cod into adjoining areas (Allen, 1930).

In Pennsylvania and New Jersey, deer had been virtually extirpated by about 1900 and the killing of one was front-page news. In Pennsylvania they were probably most numerous in the Pocono and South Mountain region, although a few remained in some 30 other counties. In New Jersey there were only a few scattered stragglers (Rhoads, 1903:26).

In Vermont the bulk of the deer population in colonial days occurred in the more open southern part of the state. The settlement of this region at first led to an increase, but, as the area under cultivation grew, the deer herd began to decrease. This cycle rolled northward as the wilder, more densely forested parts of the state were opened up and by 1840 deer were extremely scarce. Remnants of the herd probably persisted in Essex County and possibly in the region around Mt. Mansfield. However, a long closed season from 1865 to 1887 prevented complete extirpation. Seventeen deer were obtained from sources outside the state and released near Rutland in 1878, and the present substantial population is generally considered to have stemmed from this release (Foote, 1945).

A brief review of legal restrictions on the taking of deer in New York is of value in connection with tracing variations in the numbers of deer since colonial days. The earliest known law regulating the taking of deer was enacted in 1705 (New York State, 1894a). It prohibited the killing of deer except between August 1 and January 1 in certain counties. Such laws were continued, or amended in later years with increased penalties.

The first statewide deer law was passed in 1788 and established a closed season from January to July, inclusive (New York State, 1886). In general, the laws enacted during the succeeding century expressed increasing concern with the problem of perpetuating the deer.

DEER POPULATIONS SINCE 1880

What are considered to have been the important centers of deer population in New York and those portions of neighboring states

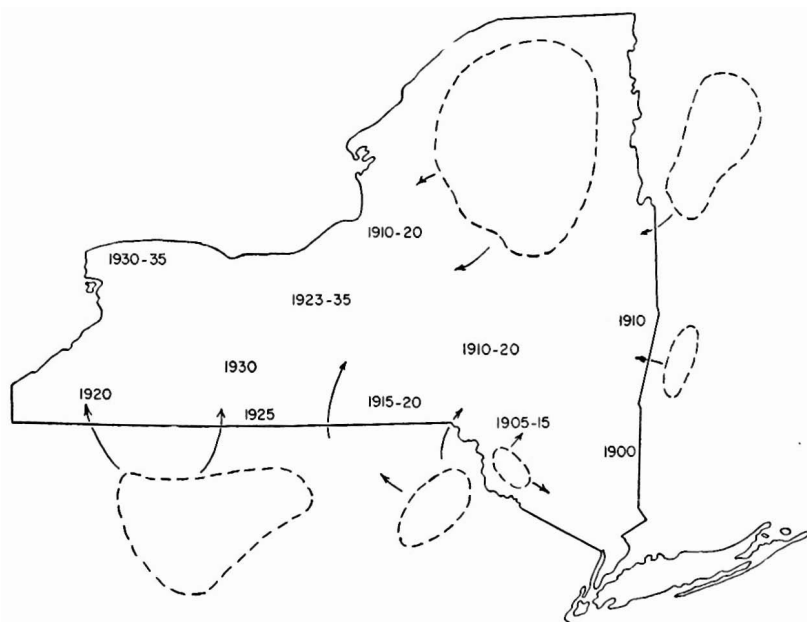


Figure 1. Major centers of population in 1890-1900 in New York and vicinity from which deer have since spread throughout the State. Dates represent approximate time deer appeared in various sections.

immediately adjacent to its borders, during the approximate period from 1890 to 1900, are shown in Figure 1. This map is based in part on published reports of Allen (1930), Foote (1945), Miller (1899), and Rhoads (1903). An attempt has been made to chart thereon the spread of deer from these centers, using information obtained through correspondence with Roger Seamans of the Vermont Fish and Game Service, Robert McDowell of the Pennsylvania Game Commission, and L. G. McNamara of the New Jersey Fish and Game Division, as well as data collected in New York by Severinghaus.

In describing the growth and spread of New York's deer population since about 1880 it has been deemed most convenient and logical to consider the following regions^a separately: Adirondack, Catskill, central and western New York, and Long Island. These regions (Figure 2) possess physical characteristics which set them apart, and they present different problems in deer management. Although con-

^a Cheatum and Severinghaus (1950) gave a more comprehensive discussion of these regions.

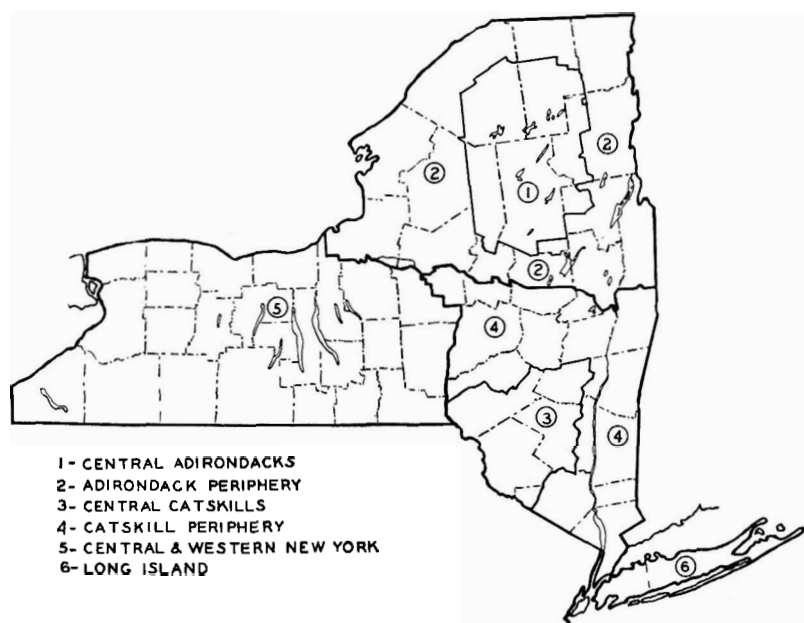


Figure 2. Regions of New York recognized with respect to deer management problems.

ditions intergrade, township boundaries have been used to approximate the lines of demarcation between them.

ADIRONDACK REGION

The number of deer in early historical times seems to have been greater in the area immediately adjoining the Adirondacks than in the central part of the region. The deer herd was reduced substantially in this peripheral area during the 1880's, but a decided increase occurred in the central portion as a result of lumbering. At first glance, one may question the latter statement since it is well known that large numbers of deer were killed for use in the lumber camps, resulting in temporary local scarcity. However, as the lumber operations moved from place to place sprouts and seedlings sprang up in their wake, encouraged by the more favorable light conditions, and the deer responded to the improved food situation. This was ably described by Fox (1896:166): "The best and most abundant feed is found in forests from which the larger spruce and pine trees have been removed years ago. These lumbering operations not only left the land well shaded by the remain-

ing hardwoods and small evergreens, but promoted a certain growth of underbrush, which is generally lacking in our primeval forests. This underbrush, together with the grasses and shrubs that spring up along the old abandoned log-roads, furnish an abundance of nutritious food . . . The reappearance of the deer on these burned and lumbered tracts, and their rapidly increasing numbers in these localities has been a matter of wonderment and frequent remark by the residents during the past few years."

This applied very well to the first selective cutting for choice pine and spruce. The deer found their food supply improved, and no real harm had been done to the forest from the standpoint of winter shelter. However, subsequent lumbering activities were not so benign. Actually, most of the larger operations since about 1905 or 1910 have been for pulpwood, whereas up to about 1850 the cutting was mostly for pine, and later for pine and spruce, for lumber. Fox (1902:24) gave the total cut for northern New York in 1900 as 533,339,072 board feet, of which 230,649,292 board feet were for pulp. The trend toward cutting for pulpwood continued at an accelerated pace as the supply of larger logs became depleted, and the value of stumpage for pulp came to exceed that for lumber. According to Fox (1901:277), "The effect on timber cutting was soon evident. Where the lumbermen formerly took nothing less than two-log trees, leaving nearly all that were 12 inches or less in diameter on the stump, the woodpulp men cut all the trees of certain species, large and small." This severe cutting of softwood species for pulp had a decidedly adverse effect on the winter range of deer, since the size of yarding areas was reduced through the removal of the protection afforded by the evergreens.

In conversations with Severinghaus, the late Wellington Kenwell described the destruction of winter deer habitat in the Moose River section as witnessed by him during the last decade of the 19th century. Removal of the spruce cover in the saddles connecting the Moose River and Red River valleys near their junction deterred deer from using the saddles for feeding or travelling from one valley to the other during periods of severe weather and deep snow, thus effectively reducing their winter range.

Subsequent adoption of scientific forestry methods by private timber owners has tended to reduce the damage done to wintering areas through cutting of softwoods, although in actual practice pulpwood still is cut to a very low diameter limit. Another development which has worked to the benefit of the deer during recent years has been the very considerable increase in the cutting of yellow birch and

other hardwoods since the advent of tractors, hard roads, and trucks has rendered their harvest economically feasible.

The peak deer population density in the central Adirondacks appears to have occurred soon after 1890 and quickly led to overbrowsing of the winter range. As a result of competition for winter food some of the better browse species were completely eliminated from many of the yarding areas. Among these was American yew (*Taxus canadensis*), sometimes known as ground hemlock or "shin" hemlock (Fox, 1896:165; Spiker, 1933:336). Witchhopple (*Viburnum alnifolium*) and white cedar (*Thuja occidentalis*), both preferred foods, became extremely scarce. Increment borings taken from white cedars in wintering areas on the south branch of the Moose River about 1945 showed the youngest specimens to be about 75 years old. These and older trees apparently were high enough to escape or survive the heavy browsing which occurred during the winters when the first overbrowsing occurred, and subsequent winter deer concentrations have prevented seedlings from developing.

Food shortages contributed to the heavy mortality which occurred in some localities during the severe winters of 1892-93, 1894-95, and 1903-04. The magnitude of the winter-kill in the first two years was appraised by Fox (1896) who mailed questionnaires to 248 reliable, permanent residents or landowners in the Adirondacks. It was clear that serious loss occurred in several areas. One correspondent, Wellington Kenwell, stated that about 250 deer died in the vicinity of Indian Clearing on the south branch of the Moose River (Hamilton County) during the winter of 1892-93, and that many died in the same area two years later. He expressed the opinion that there were too many deer for the food supply. Another, Cornelius Carter of Benson Mines (St. Lawrence County) described the heavy mortality in that region during both winters, citing the deep snow, severe cold, and lack of beechnuts. The section within which the heaviest losses were reported is shown in Figure 3.

Regarding the winter of 1903-04, the Forest, Fish and Game Commission carried on an investigation of the extent of mortality and concluded that substantial losses occurred mainly in the vicinity of Newcomb in Essex County, Big Moose Lake in Herkimer County, and the south branch of the Moose River in Hamilton County. Its 10th annual report (1905) included the autopsy records for four winter-killed deer and a discussion by Dr. Samuel B. Ward as to the probable causes of death as well as conditions in general. The dead deer examined contained large amounts of balsam needles and lesser amounts

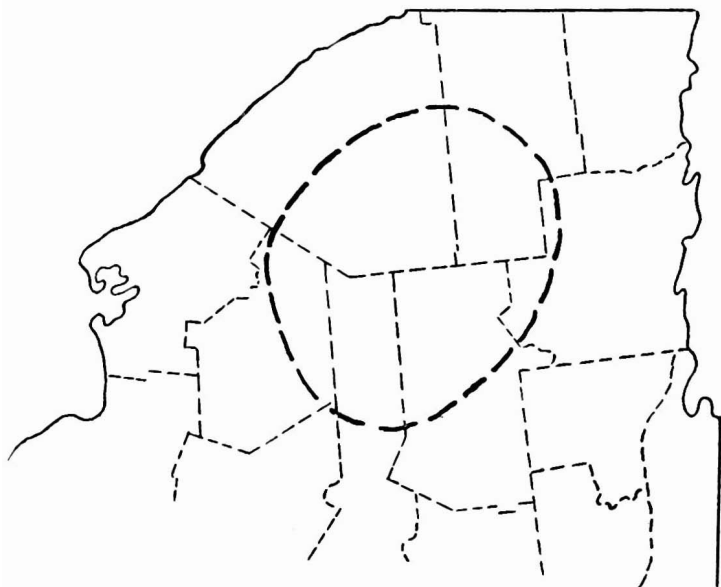


Figure 3. Portion of Adirondack region from which heaviest winter mortality was reported in 1894-95.

of hemlock browse. It is known today that a diet composed chiefly of balsam will not sustain deer, and that hemlock is but a mediocre food (Maynard *et al.*, 1935; Aldous and Smith, 1939). While Ward and his correspondents found it difficult to understand how a deer could starve with a full stomach, nevertheless several were forced to that conclusion. Others conjectured on the possibility of disease or poison, but the autopsies did not substantiate these theories. Dr. V. A. Moore, pathologist of the New York State Veterinary College, who examined three other specimens, also reported he could find no evidence of disease and concluded that the deer probably died from starvation.

The severe winter of 1903-04 was followed by several mild winters. The fact that deer mortality was negligible during these years was explained by Burnham (1907:179): "The favorable result is due to the light snow fall, which permitted the deer to travel far in search of food. During this time the heaviest cut of evergreen timber in the history of the Adirondacks has been made. Many famous yarding grounds for deer have been obliterated. The result will be that many deer will perish the first severe winter of heavy snows."

The decline in abundance of deer in the Adirondacks during the late 1800's and early 1900's spurred the enactment of measures calcu-

lated to conserve the remaining herd and, eventually, to increase it. Among these were shortening the open season in 1886⁴ and reducing the legal limit from three to two deer in 1892,⁴ and the outlawing of hounding as well as "floating" (hunting from boats) and the use of jack-lights in 1897 (Darrow, 1955). Throughout the region as a whole deer were at a low ebb, and these restrictions were sound in eliminating wasteful hunting methods. Nevertheless, over much of the more remote interior as well as on the larger private preserves, overbrowsing continued. Here, during the ensuing 50 years, the deer population has been able to prevent recovery of the carrying capacity of the winter range, due to inadequate harvests. Temporary increases have followed mild winters, only to be lost through starvation and winter-kill during the next severe winter.

During the first quarter of the 20th century estate owners, recognizing the scarcity of winter food for deer, experimented with winter feeding and, for a few years, game protectors cut and stacked marsh or "beaver-meadow" hay for use by deer in winter (New York Conservation Commission, 1914:187). These efforts were well nigh useless in the over-all picture: Controlled feeding experiments by Department biologists since have proven marsh hay (known to be low in protein and calcium) to be practically worthless as winter feed for deer (Maynard *et al.*, 1935). Although deer still are fed on a few private estates in order to bring small numbers of semitame animals through the winter, large-scale feeding and lopping of browse have been discontinued.

The central Adirondack deer herd built up somewhat during the period from 1905 to 1910, as a result of five consecutive mild winters, but was drastically reduced during the severe winter of 1910-11. The controversial "buck law" went into effect in 1912, setting the bag limit at two deer having antlers not less than 3 inches long. The intent of this law was to increase the numbers of deer by protecting does, thus in theory permitting them to breed and produce fawns without being exposed to hunting. Unfortunately, it was not that simple. A large illegal kill of does still occurred each year, and does and fawns continued to be the chief victims of winter starvation.

Although the population increased between 1911 and 1925, the winter of 1925-26 was very severe and the heavy winter-kill was re-

⁴ In the reference cited, both these dates were erroneously given as 1895. The shortening of the open season was from August 1-November 30 to August 15-November 1, although it was extended to November 15 in 1897. Also, prior to 1886, there had been no bag limit.

flected in the drastic drop in the legal take during the fall of 1926. District Game Protector Burmaster wrote to Chief Game Protector Legge on May 6, 1926, in part: "This has been the worst winter . . . I ever saw. We have had from four to five feet of snow on the level and there was no crust. This deep snow lasted all through April . . . This has been a very hard winter on deer. . . ." According to Weather Bureau records snowfall in some Adirondack localities amounted to as much as 53 inches in December, 42 inches in January, and averaged 31.6 inches in February.

Again deer numbers increased until the severe winter of 1930-31 and further growth was delayed by starvation losses until the period between 1935 and 1939. From then until 1948, moderate to heavy annual losses due to starvation prevented an increase. However, since the severe winter of 1947-48, a tremendous increase has occurred. If the pattern of the past prevails, the next severe winter will witness the loss of thousands of deer which might better have been harvested during the preceding few years.

The foregoing discussion has applied primarily to the interior of the Adirondack region in regard to the correlation of range quality and population trend. With respect to the peripheral sections as well as the vicinity of settlements and the major roads, on the other hand, the situation has been quite different. Deer abundance has seldom approached the carrying capacity of the range and winter mortality has been comparatively unimportant. It is believed that illegal hunting, both during and outside the open season, has been the chief factor in preventing an increase in the deer herd. Although this territory includes parts of counties that also fall within the central section, the following counties are considered to lie wholly within it: Clinton, Fulton, Lewis, Jefferson, Oneida, Oswego, Saratoga, and Washington.

In summation, the herd in the peripheral area is in reasonably good balance with the winter food supply and is being kept in that status by the degree to which antlerless deer are being taken illegally. By the same token it would seem desirable to provide for taking these deer legally during the open season. Over much of the central Adirondacks, however, there are too many deer for the available food and winter mortality is more important than hunting, either legal or illegal, in governing the population trend.

A long stride was taken toward the implementation of sound management plans when, during the open season of 1954, deer of both sexes were declared legal game in two large, essentially wilder-

ness tracts in New York's North Woods. This measure had been advocated by Department biologists, and was calculated to harvest surplus deer, as well as to obtain a better balance between the population and the carrying capacity of the winter range. The season was successful, by and large, although hunting pressure in the interior of the tracts was not as heavy as had been hoped.

CATSKILL REGION

The deer population east of the Hudson River from Rensselaer County south (Washington County being considered part of the Adirondacks) was extirpated between 1850 and 1900. In the New England area to the east, only a small residual population existed in the Berkshires during the late 1870's. By the middle of the 1880's this small herd had increased and deer again were being seen in eastern Connecticut by the 1890's (Allen, 1930). As the Berkshire population grew, it spread out in all directions. The date when this expansion reached New York State has not been determined. However, the deer season was closed in Putnam County in 1902, in Rensselaer County in 1903, in Dutchess and Columbia Counties in 1904, and in Westchester County in 1905 in order to protect and encourage the increase of the few deer that had come into these areas. It was a matter of considerable interest when five deer were seen in eastern Rensselaer County in 1913 (New York Conservation Commission, 1914:187).

Since that time, deer abundance in this part of the State has increased slowly. There can be little doubt that the major factor limiting growth has been the illegal killing of female deer. Predation and other causes of loss are considered to have had a relatively minor effect. Open seasons have been provided throughout most of the area in recent years.

The virtual disappearance of deer from the Catskill region west of the Hudson River about 1875 has been mentioned previously. Small residual populations persisted in portions of Sullivan and Orange Counties adjacent to the Pennsylvania border and, in addition, a few deer drifted across into New York from time to time.

In 1887 the Legislature passed an act providing for the establishment of three parks in the Catskills for the propagation of deer and other game species (New York Forest Commission, 1889). One park of 100 acres was fenced in Shandaken Township (Ulster County) and stocked with 45 deer trapped in the Adirondacks during 1889 and 1890. The herd grew to 53 deer by 1894 (New York Forest Commis-

sion, 1895:7). It was hoped that these deer would multiply to such an extent that their progeny, released from time to time, would serve to re-establish the population in this part of the State. However, the browse supply was soon exhausted, and it became necessary to feed the animals. Furthermore, they failed to reproduce in captivity as well as expected and in July, 1895, the 45 remaining were released (Fox, 1896:202).

In the meantime the region was being reoccupied by deer, presumably from the nucleus in Sullivan and Orange Counties and from the area south of the Delaware River (New York Fisheries, Game and Forest Commission, 1897:301). Thus, those released from the Catskill Park merely served to hasten slightly the natural expansion of this population. But, the herd grew very slowly, one reason, according to the same authority, being that deer were killed by local residents at all seasons. The fact that there were few deer outside the central part of the region in the late 1800's is attested to by the report that "three were killed in Chenango, and one in Albany County" in 1895 (Fox, 1896:202). But growth continued, and more and more of the territory was opened to hunting.

Throughout most of this period, densities were highest in Sullivan County in the southern half of which the population reached the carrying capacity of the winter range between 1929 and 1932. This became evident in the winter of 1933-34 when deer died of starvation in several areas. Again in 1935-36 starvation occurred in this part of the county, and the number of areas and number of deer found dead caused alarm to many people in the area. Losses due to starvation occurred once more during the winter of 1939-40, and that spring personnel of the deer research project made their first survey of the situation. This reconnaissance was concentrated on private lands in the township of Bethel.

During the next few years the deer population continued to expand into the central part of the county, and continued to grow in the northern part. However, it did not increase in the southern and southwestern portions. During the winter of 1944-45 substantial numbers died of starvation, chiefly in the townships of Tusten, Bethel, Thompson, Highland, Lumberland, and Forestburg. The losses were so large that local leaders and county officials asked the Governor to have the Conservation Department appraise the situation and recommend ways and means of alleviating it. A survey revealed that the best deer forage in the major wintering areas had been browsed so severely for many years that much of it had been killed. It was obvious

that there were far too many deer for the available supply. Although an open season for antlerless deer was recommended, it was not supported by local sentiment.

In other parts of the Catskills west of the Hudson River the deer problem was not as serious as in Sullivan County. However, in Bear Mountain Park and Harriman Park large numbers were found dead from starvation after the winters of 1939-40 and 1944-45. Deer damage to agricultural crops had been a serious problem in parts of Orange and Rockland Counties since the early 1940's and in some years many deer were killed under permit. This problem was temporarily relieved in Rockland County by the open season for antlerless deer in 1943.

In summary, deer abundance throughout the Catskill region has increased steadily during the past 50 years, and has now reached a point where, especially in the territory west of the Hudson River, excess numbers have begun to overbrowse the winter range.

CENTRAL AND WESTERN REGION

Deer had been exterminated from this part of the State by the 1860's, and did not begin to reappear until about 1910. Repopulation seems to have been a result of expansion from Pennsylvania, chiefly; there seems to have been little from the Catskill region and virtually none from the Adirondack periphery. Small permanent populations became established between 1915 and 1935 (Figure 1). This did not occur as the result of long migrations by individual deer. Rather the expansion was gradual. Apparently, a few deer moved a few miles and, as they became established and reproduced, their progeny repeated the process. The expansion seems to have been in all directions. Thus, by the mid-1930's, deer had spread throughout most of the region.

Permanent populations did not become established in central and western New York until population pressure from the south and southwest held deer there. This was true even in the northern parts of Cayuga, Onondaga, and Madison Counties. But here the expanding population encountered a belt, some 30 to 50 miles wide, representing the margin of the Adirondack region where, as already pointed out, the illegal killing of antlerless deer during the past half century has held deer abundance at a low level. As a consequence, growth in this territory has been stalemated.

This region affords the best deer range in the State. Once estab-

lished, the herd increased rapidly and, beginning in 1938⁵, hunting for antlered deer has been permitted annually. As would be expected, deer reached a high degree of abundance in the Southern Tier counties bordering Pennsylvania first. By the early 1940's they had come into conflict with agriculture and during the next decade this became a problem throughout the region. As a basis for later measures to check population growth, an experimental open season for antlerless deer was held in Steuben County in 1941. Since then, provisions for taking antlerless deer have, from time to time, been extended to most of the other counties. As a result deer damage has been minimized and the population has been held at a level where range depletion has been largely avoided.

LONG ISLAND

Deer never have been exterminated from Long Island. It was reported that the species was more plentiful there in 1893 than in Connecticut and Rhode Island, and that in 1895 there was enough land open to public hunting "to permit the killing of over two hundred deer each season" (Fox, 1896:203). Miller (1899) published a letter from a Mr. Helme who stated that, although deer formerly were common throughout Long Island, they were at that time (about 1899) restricted to an area of about 25 square miles in the townships of Brookhaven and Islip.

The population remained at about the same level during the period from 1900 to 1939. The chief centers of abundance were in the vicinity of Heckscher State Park, the Southside Sportsmen's Club, and the Tangier Smith Estate near Mastic, while lesser numbers occurred in the vicinity of Cedar Point, North Haven Point, and Lake Ronkonkoma. Deer increased in numbers between 1939 and 1945, and extended their range to include about half of Suffolk County and parts of eastern Nassau County with a resultant serious increase in crop damage. Since 1945 the herd has spread gradually but apparently has not increased appreciably in number, being estimated at between 1,500 and 2,000 in recent years.

A population of this size would produce from 500 to 700 fawns per year. It follows, therefore, that stabilization of the population at its present level must entail annual losses, from all causes, equal to the annual increment. The future potentialities of the Long Island deer

⁵ In 1928, hunting had been permitted in all counties of the State but this was of little significance in central and western New York.

herd will depend on the attitude and desires of the landowners and residents. It is obvious that the deer population could withstand an open season because such has existed, in effect, for many years. Comparatively little land would be open to public hunting, since the greater part of the deer range there consists of posted private land. The problems involved in eventually being able to have an open season lie in the field of human relations.

HUNTING REGULATIONS SINCE 1900

Under the foregoing topics brief references have been made to hunting regulations as related to the contemporary abundance of deer. In 1908 and 1909 more of the State was closed to deer hunting than



Figure 4. Lowest ebb of area open to deer hunting in New York (1908-09).

at any time before or since (Figure 4). In Tables 1 to 3, the regulations for the three major regions since 1900 are summarized; Long Island has had no open season since 1910⁶ (except in 1928) and is

⁶ From 1900 to 1909 deer hunting was permitted on the first two Wednesdays and first two Fridays after the first Tuesday in November.

TABLE 1. SUMMARY OF DEER HUNTING REGULATIONS IN THE ADIRONDACK REGION OF NEW YORK FROM 1900 TO 1955

Year	Open season	Bag limit	Remarks
1900-05	September 1–November 15	Two*	
1906	October 1–November 15	"	
1907-08	September 16–October 31	"	
1909	September 16–November 15	"	Bucks only after October 31
1910-11	September 16–October 31	"	
1912-18	October 1–November 15	" §	
1919	October 1–November 15	One	Deer of either sex, except fawns
1920-30	October 15–November 15	"	
1931	October 26–November 15	"	
1932	October 25–November 15	"	
1933-38	October 15–November 15	"	
1939-42	November 1–November 30	"	
1943	October 20–November 30	"	Anterless deer October 20-25†
1944-50	October 20–November 30	"	
1951	October 25–November 25	"	
1952-53	October 25–November 30	"	
1954	October 25–November 30	" ‡	Taking antlerless deer permitted in two wilderness tracts‡
1955	October 25–November 30	"	

* Taking spotted fawns prohibited.

§ Beginning in 1912, except as noted under "remarks", only deer having antlers 3 inches or more in length were legal game.

† Special license required.

‡ Special license required entitling hunter, if he also held a big game license, to take two deer (one antlered and one antlerless) on the wilderness tracts.

not included. The terms under which antlered deer could be hunted from year to year have been set by the Legislature. For antlerless deer or deer of either sex, however, they have been declared by the Conservation Department within the framework of conditions fixed by law.

As defined by law, there have been minor variations from time to time in the scope of the three regions of the State. The boundary between the Adirondacks and Catskills, in particular, has been subject to adjustment. In general, in recent years, the southern portions of Herkimer, Oneida, Oswego, and Washington Counties have been part of either the Catskill or the central and western regions with respect to deer hunting regulations.

The open season dates given are the ones primarily applicable from year to year. There have, however, been various local exceptions, especially in the Catskill region since 1917, but space does not permit giving these in detail. It may be mentioned that from 1903 to 1907 parts of some western Adirondack counties had no open season. Of interest, too, is the fact that in Dutchess County from 1917 to 1934, and in Columbia and Rensselaer Counties in 1917, deer hunting was restricted to the owners or lessees of land and their immediate families.

TABLE 2. SUMMARY OF DEER HUNTING REGULATIONS IN THE CATSKILL REGION OF NEW YORK FROM 1900 TO 1955

Year*	Open season	Bag limit	Remarks
1900-01	September 1–November 15	Two§	Sullivan County, November 1-15
1902	September 1–November 15	"	
1903-05	September 1–November 15	"	Orange and Sullivan Counties, November 1-15
1906	October 1–November 15	"	
1907	September 16–October 31	"	
1908†	September 16–October 31 (a)	"	Bucks only after October 31
	October 16–31 (b)	"	
1909†	September 16–November 15 (a)	"	
	October 16–31 (b)	"	Deer of either sex, except fawns
1910-11†	September 16–October 31 (a)	"	
	October 16–31 (c)	" ‡	
1912-18†	November 1–15 (c)	One	Antlerless deer in Putnam and Rockland Counties, December 9-11°
1919†	November 1–15 (c)	"	
1920-37	November 1–15	"	
1938	December 1–15	"	
1939-42	November 15–30	"	
1943	November 15–30	"	Deer of either sex in certain counties, November 28-29
1944-50	November 15–30	"	
1951	November 22–December 6	"	
1952	November 15–30	"	
1953-54	November 15–30	"	
1955	November 21–December 6	"	

* In 1900 and 1901 there was no open season in the counties of Delaware, Greene, Sullivan, and Ulster. The next year Sullivan County was opened, but by 1905 the counties of Columbia, Dutchess, Putnam, Rensselaer, Rockland, and Westchester had also been closed. From 1908 to 1919 the area open to hunting was further restricted as shown in a subsequent footnote. In 1920 hunting was permitted in the counties of Delaware, Dutchess, Orange, Rensselaer, Sullivan, and Ulster. Since then other counties or parts thereof have been added at various times.

§ Taking spotted fawns prohibited.

† From 1908 to 1919 the seasons for the areas open are indicated as follows: (a) Dutchess County; (b) parts of Orange and Sullivan Counties; (c) the area of (b) plus Ulster County.

‡ Beginning in 1912, except as noted under "remarks", only deer having antlers 3 inches or more in length were legal game.

° Special license required.

In addition to the open seasons as shown in the tables, there has been each year since 1948 a separate season for archers under a special license. This season has constituted the 14 days immediately preceding the gunning season in those counties having such a season. From 1948 to 1951 only antlered deer might be taken; since then any deer.

TABLE 3. SUMMARY OF DEER HUNTING REGULATIONS IN THE CENTRAL AND WESTERN REGION OF NEW YORK FROM 1900 TO 1955

Year	Open season *	Bag limit	Remarks
1900-05	September 1-November 15	Two §	
1906	October 1-November 15	"	
1907	September 16-October 31	"	
1908-27	No open season		
1928	November 1-15	One †	
1929-37	No open season		
1938	December 1-7	One †	
1939-40	November 24-30	"	
1941	November 24-30	"	Antlerless deer, December 8-10 ‡
1942	November 24-30	"	
1943	November 24-30	"	Antlerless deer, December 9-11 ‡
1944	November 24-30	"	Deer of either sex, November 24-30 ‡
1945	November 24-30	"	
1946	November 24-30	"	Antlerless deer, November 24-30 ‡
1947	November 24-30	"	
1948	November 24-30	"	Deer of either sex, November 24-30 ‡
1949	November 24-30	"	
1950	November 24-30	"	Deer of either sex, November 30 ‡
1951	November 22-December 6	"	
1952	November 24-30	"	Deer of either sex, November 28-29 ‡
1953-54	November 24-30	"	
1955	November 21-December 3	"	Deer of either sex, December 3 ‡

* Beginning in 1938, deer hunting prohibited on Sunday falling within dates specified.

§ Taking spotted fawns prohibited.

† Beginning in 1912, except as noted under "remarks", only deer having antlers 3 inches or more in length were legal game.

‡ In certain counties or parts thereof (see text); special license required in 1941, 1943, 1946, 1948, and 1950.

In Westchester County, where deer hunting in recent years was first permitted in 1942 and where it has been limited to use of the longbow, the open season has been from November 15 to December 15 since 1945. Also, deer of either sex might be taken in 1944, 1945, and 1946, as well as since 1952.

In central and western New York, deer hunting was permitted for the first time since 1907 (except for the Statewide open season of 1928) when Broome, Cortland, Livingston, Steuben, and Wyoming Counties were opened in 1938. Most of the other Southern Tier counties were opened the next year and the rest of the region has been added subsequently.

It is in this region that the taking of antlerless deer has most often been permitted. Following the limited season in Steuben County in 1941, another was held in 1943 embracing a 13-county area largely in the Southern Tier section. The next year a still larger area was

included. In 1946 the area was restricted to the counties of Monroe, Niagara, Orleans, and Wyoming. Since 1948 (as well as in 1944), deer of either sex might be taken on such occasions rather than antlerless deer only. In that year such a season was declared for most of the western half of the region, in 1950 and 1952 virtually the entire region was included, and in 1955 five eastern and 10 western counties were involved.

With respect to hunting methods, the use of buckshot was made illegal in 1940. Beyond this, the principal change in recent years has involved the type of firearm that might be used. Prior to 1931 there was no restriction, except that in Dutchess County from 1917 on, as well as in Columbia County (1917-19) and in Rensselaer County (1917-23), only shotguns were permitted. As the territory open to deer hunting began to extend further into agricultural areas, however, it was felt that the use of rifles entailed an unwarranted hazard. For this reason, only shotguns loaded with slugs (20 gauge or larger) and the longbow may now be used outside the Adirondacks and central Catskills. Provision for legal use of the longbow was first included in the Conservation Law in 1929.

TABLE 4. SUSPENSIONS OF DEER SEASON IN THE ADIRONDACK REGION BECAUSE OF FIRE HAZARD

Year	Date closed	Date reopened	Season extended (number days)
1924	October 31	November 14	0
1930	October 15	October 19	0
1938	October 17	October 24	7
1947	October 17	November 1	12
1952	November 2	November 7*	5
1953	October 24	October 28	4

* Season reopened November 10 in Saratoga, Warren, and Washington Counties.

Occasionally, the hazard of fire has been so great that the Governor has been obliged to close the woods to the public, which has had the effect of suspending the open season for deer. The instances in which this has occurred are given in Table 4.

LEGAL KILL OF DEER

The number of deer taken from year to year is of interest both from a historical viewpoint and because of the value of such information in evaluating management practices. Before 1918 hunters were

not required to report game taken. The number of deer killed was compiled from estimates by game protectors, forest rangers, and other Department personnel. From 1918 to 1926 a report was required at the time a new license was purchased as it is now for small game. Up to this time the great preponderance of the deer taken were killed in the Adirondacks. The number recorded from 1900 to 1926 is given in Table 5. The figures are for the region as a whole since no county tabulation was made.

TABLE 5. REPORTED LEGAL KILL OF DEER FROM THE ADIRONDACK REGION OF NEW YORK (1900-26)

Year	Both sexes	Male	Female
1900	4,816	..	..
1901	5,144	..	..
1902	6,640	..	..
1903	9,176	..	..
1904	7,576	..	..
1905	9,936	..	..
1906	10,492	..	..
1907	8,652	..	..
1908	8,696	..	..
1909	12,100	..	..
1910	9,344	..	..
1911	7,668	..	..
1912	..	4,516	..
1913	..	5,912	..
1914	..	6,072	..
1915	..	(No record)	..
1916	..	(No record)	..
1917	..	5,543	..
1918	..	8,293	..
1919	..	8,470	3,444
1920	..	7,839	..
1921	..	9,065	..
1922	..	8,935	..
1923	..	8,030	..
1924	..	4,958	..
1925	..	9,492	..
1926	..	4,650	..

Beginning in 1927 a special deer license was instituted incorporating a stub to be returned to the Department if a deer was taken. Among the information called for on the stub were the date and county where taken. The records since that time have been much more accurate than previously, although it is known that many successful hunters have not complied in returning their stubs. Efforts have been made to appraise the proportion of the total legal kill repre-

TABLE 6. CALCULATED TOTAL DEER KILL BY COUNTY FOR THE ADIRONDACK REGION OF NEW YORK FROM 1927 TO 1955*

County	Year, sex, and age																			
	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943			
	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male		Female	
																	Fawn	Adult	Fawn	Adult
Clinton.....	79	105	108	127	112	131	187	143	357	224	165	189	229	197	159	129	5	93	7	16
Essex.....	749	841	805	797	948	1,019	1,159	1,149	803	1,317	1,244	1,285	1,424	1,157	988	1,000	119	852	103	495
Franklin.....	924	1,116	1,000	1,212	1,165	1,112	1,336	1,211	1,077	1,415	1,312	1,567	1,696	1,224	1,228	1,088	119	933	117	669
Fulton.....	192	248	204	213	201	220	244	224	199	207	193	175	187	123	143	99	..	76	..	..
Hamilton.....	1,743	1,776	2,007	1,762	1,813	1,661	2,057	1,981	1,793	2,111	2,021	1,995	2,105	1,619	1,636	1,355	137	1,248	139	848
Herkimer.....	1,153	1,149	1,179	1,216	1,039	992	1,132	976	844	872	1,075	1,120	1,008	772	785	596	79	609	77	424
Jefferson.....	21	24	17	27	20	25	31	39	16	24	24	44	31	40	29	27	..	27	..	..
Lewis.....	631	525	409	495	445	433	483	496	343	541	563	595	631	475	508	397	39	428	48	203
Oneida.....	91	91	103	127	103	127	173	137	124	140	176	163	199	167	141	115	..	135	..	..
Cswego.....	71	53	65	65	85	135	167	151	92	91	145	140	187	156	175	152	..	168	..	..
St. Lawrence..	1,336	1,399	1,284	1,413	1,161	1,135	1,311	1,384	1,169	1,516	1,593	1,575	1,751	1,253	1,292	1,127	120	1,159	95	704
Saratoga.....	127	132	145	151	204	228	244	223	180	196	172	207	181	196	159	165	19	143	9	37
Warren.....	391	472	451	440	481	481	605	545	509	513	421	565	512	468	412	429	52	336	31	149
Washington...	63	64	69	49	44	52	87	89	84	67	83	80	88	165	157	161	27	189	12	79
Unknown.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1 total.....	7,571	7,995	7,846	8,094	7,821	7,751	9,216	8,748	7,590	9,234	9,187	9,700	10,229	8,012	7,812	6 840	716	6,396	638	3,624

TABLE 6. (CONTINUED)

County	Year, sex, and age															Square miles of deer range
	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954				1955	
	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male		Female		Male adult	
											Fawn	Adult	Fawn	Adult		
Clinton.....	115	92	113	128	139	168	169	181	151	210	..	204	..	..	198	763.6
Essex.....	632	709	867	945	803	1,129	1,015	930	881 (1)	924 (3)	..	1,020	..	1	943 (3)	1,669.1
Franklin.....	783	872	956	1,140	1,097	1,297	1,407	1,485	1,776 (3)	1,635 (1)	..	1,946	..	3	1,602 (3)	1,434.5
Fulton.....	61	63	96	141	72	112	85	102	110	155	..	179	..	..	155	382.8
Hamilton.....	1,060	1,013	1,161	1,504	988	1,568	1,504	1,462	1,468 (7)	1,801 (9)	107	2,137	105	386	1,822 (5)	1,734.4
Herkimer.....	479	563	687	823	511	684	712	662	745 (4)	895 (3)	95	1,383	81	359	977 (9)	1,119.1
Jefferson.....	37	39	77	61	64	67	59	45	89	67	..	134	..	..	79	637.4
Lewis.....	317	288	468	557	352	465	413	477	532	534	..	743	..	..	664 (1)	1,001.1
Oneida.....	76	83	152	204	139	224	183	246	232	276	..	382	..	..	375 (1)	613.0
Oswego.....	97	84	171	179	119	199	143	143	173	243	..	275	..	..	235	617.7
St. Lawrence.....	909	849	1,044	1,483	1,248	1,409	1,718	1,931	2,021 (2)	2,175 (4)	83	2,754	94	339	2,106 (3)	2,034.5
Saratoga.....	107	120	128	228	144	184	152	157	125 (1)	162	..	191	..	..	196	558.7
Warren.....	281	269	363	451	333	420	391	433	273	399 (1)	..	414	..	1	434 (1)	809.8
Washington.....	101	140	257	281	191	223	240	306	214 (1)	323	..	402	..	4	409 (3)	404.3
Unknown.....	..	..	..	..	..	..	..	..	..	..	..	12	..	..	69	..
Total.....	5,055	5,184	6,540	8,125	6,200	8,149	8,191	8,560	8,790 (19)	9,799 (21)	285	12,176	280	1,093	10,264 (29)	13,780.0

* In 1952, 1953, and 1955 when only antlered deer might be taken during the regular season, taking antlerless deer was permitted during the special archery season; the figures are given in parentheses.

TABLE 7. CALCULATED TOTAL DEER KILL BY COUNTY FOR THE CATSKILL REGION OF NEW YORK FROM 1927 TO 1955*

County	Year, sex, and age																				
	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943				
	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male		Female	
																		Fawn	Adult	Fawn	Adult
Albany.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24	..	..	..	..
Columbia.....	61	84	77	88	71	104	143	123	140	195	195	249	255	271	240	321	..	285	..	..
Delaware.....	96	84	83	120	119	136	340	221	171	232	325	415	419	507	483	549	..	607	..	..
Dutchess.....	4	3	15	15	19	28	23	29	107	113	112	245	245	267	243	353	..	399	..	..
Greene.....	36	40	47	84	56	65	145	157	172	192	192	331	344	335	320	353	..	359	..	..
Orange.....	95	128	147	312	217	227	236	341	340	367	353	417	505	485	343	485	..	528	..	..
Otsego.....	..	11	..	..	..	..	..	..	..	176	155	264	232	258	224	252	..	300	..	..
Putnam.....	..	59	..	..	..	..	..	..	..	..	..	..	..	..	..	..	60	29	55	184
Rensselaer....	28	40	28	36	41	35	85	76	56	63	81	105	111	137	116	143	..	131	..	..
Rockland.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	197	279	25	220	23	87
Schenectady..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Schoharie.....	..	27	..	..	57	36	68	93	103	104	108	251	243	252	231	268	..	264	..	..
Sullivan.....	467	543	431	560	472	559	652	717	693	741	792	824	1,071	856	760	871	..	889	..	..
Ulster.....	219	204	153	229	200	204	352	288	177	259	280	405	455	439	361	393	..	397	..	..
Westchester...	..	21	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
Unknown.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	1,006	1,244	981	1,444	1,252	1,394	2,044	2,045	1,959	2,442	2,593	3,506	3,880	3,807	3,518	4,292	85	4,409	78	271	

TABLE 7. (CONTINUED)

County	Year, sex, and age														Square miles of deer range	
	1944	1945	1946	1947	1948	1949	1950	1951	1952				1953	1954		1955
	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male adult	Male		Female		Male adult	Male adult		Male adult
									Fawn	Adult	Fawn	Adult				
Albany.....	56	87	104	127	183	176	184	232	70	351	44	229	260 (1)	324 (6)	345 (8)	283.1
Columbia.....	287	293	304	380	403	464	399	563	..	539	..	..	745 (3)	784 (8)	917 (6)	355.4
Delaware.....	632	520	673	881	884	1,303	1,297	1,554	248	2,078	188	940	1,632 (6)	1,991 (10)	2,267 (16)	1,002.0
Dutchess.....	371	243	349	299	403	469	593	641	..	658	..	7	836 (5)	993 (6)	1,127 (13)	509.4
Greene.....	417	428	543	516	575	657	734	829	254	1,560	193	1,142	720 (4)	813 (9)	923 (5)	500.1
Orange.....	480	345	495	497	515	575	535	592	3	515	..	1	665 (4)	816 (8)	940 (9)	479.3
Otsego.....	308	309	389	512	500	676	679	852	152	1,003	134	686	802 (10)	1,026 (10)	1,065 (10)	530.5
Putnam.....	..	185	319	292	199	247	215	275	..	322	..	1	375 (6)	598 (11)	599 (11)	200.2
Rensselaer.....	128	97	163	163	193	201	226	213	..	187	..	..	259	311 (1)	372 (1)	383.6
Rockland.....	120	116	157	155	119	168	114	136	..	158	..	1	133 (3)	291 (2)	206 (9)	145.5
Schenectady.....	..	..	49	63	33	61	53	28	..	44	..	..	60	59	81	104.5
Schoharie.....	257	295	329	427	467	505	507	607	180	959	86	669	518 (4)	576 (9)	641 (10)	315.7
Sullivan.....	928	857	1,391	1,301	1,299	1,692	1,766	1,724	4	1,762	..	3	2,194 (30)	2,192 (10)	2,902 (27)	785.2
Ulster.....	428	437	660	761	683	867	874	999	..	1,017	..	..	1,440 (20)	1,440 (12)	1,504 (25)	911.3
Westchester.....	4	19	..	9	8	13	23	34	7	32	..	23	61 (41)	92 (48)	67 (90)	286.6
Unknown.....	..	..	..	..	..	..	..	..	..	..	..	..	..	8	95	..
Total.....	4,416	4,231	5,825	6,383	6,464	8,074	8,199	9,279	918	11,185	645	3,702	10,700 (137)	12,314 (150)	14,051 (240)	6,792.4

* In 1953, 1954, and 1955 when only antlered deer might be taken during the regular season, taking antlerless deer was permitted during the special archery season; the figures are given in parentheses.

TABLE 8. CALCULATED TOTAL DEER KILL BY COUNTY FOR THE CENTRAL AND WESTERN REGION OF NEW YORK FROM 1928 TO 1955*

County	Year, sex, and age																						
	1928	1938	1939	1940	1941				1942	1943				1944				1945	1946				1947
	Male adult	Male adult	Male adult	Male adult	Male		Female		Male adult	Male		Female		Male		Female		Male adult	Male		Female		Male adult
					Fawn	Adult	Fawn	Adult		Fawn	Adult	Fawn	Adult	Fawn	Adult	Fawn	Adult						
Allegany.....	1	..	1,990	1,049	..	1,133	..	..	1,265	265	1,792	243	826	880	2,481	853	1,625	883	..	1,339	..	..	1,224
Broome.....	7	322	238	270	..	184	..	..	255	24	238	22	103	136	442	133	253	213	..	276	..	..	367
Cattaraugus.....	7	..	1,403	1,343	..	939	..	..	1,147	144	1,621	132	640	507	1,663	492	937	702	..	1,038	..	..	1,107
Cayuga.....	..	..	..	..	..	228	..	..	133	..	144	..	..	..	79	..	..	61	..	85	..	..	121
Chautauqua.....	..	..	258	412	..	339	..	..	453	37	648	33	157	225	799	219	417	435	..	640	..	..	504
Chemung.....	..	..	355	252	..	240	..	..	226	30	312	27	103	132	472	127	244	174	..	301	..	..	441
Chenango.....	1	..	..	474	..	27	..	..	328	15	315	13	100	166	540	160	307	243	..	294	..	..	291
Cortland.....	..	216	180	225	..	154	..	..	136	..	226	..	..	..	135	..	..	160	..	181	..	..	336
Erie.....	..	..	..	..	..	492	..	..	487	36	465	33	147	138	547	133	255	160	..	432	..	..	315
Genesee.....	..	..	..	..	..	..	..	..	75	6	84	4	28	85	432	84	159	130	..	165	..	..	195
Livingston.....	..	..	..	..	..	544	..	..	460	60	502	57	232	229	780	222	424	265	..	439	..	..	604
Madison.....	1	..	..	..	..	..	..	..	144	..	130	..	..	..	151	..	..	132	..	153	..	..	243
Monroe.....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	133	13	168	12	72	187
Niagara.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	12	105	10	73	93
Onondaga.....	..	..	..	..	..	..	..	..	99	..	78	..	..	..	115	..	..	66	..	99	..	..	133
Ontario.....	..	..	..	..	..	316	..	..	264	13	331	12	54	180	609	174	331	166	..	333	..	..	484
Orleans.....	..	..	..	..	..	..	..	..	..	..	..	..	..	58	289	57	109	132	42	159	39	111	144
Schuyler.....	..	..	250	234	..	199	..	..	241	..	216	..	..	84	274	81	154	132	..	235	..	..	163
Seneca.....	..	..	..	..	..	..	..	..	..	..	120	..	..	18	117	18	33	48	..	63	..	..	85
Steuben.....	..	1,534	1,055	1,123	174	921	211	273	1,076	219	1,373	201	631	522	1,742	505	963	744	..	1,380	..	..	1,054
Tioga.....	..	..	..	532	..	307	..	..	295	40	369	37	126	198	636	192	364	234	..	316	..	..	435
Tompkins.....	..	..	..	390	..	195	..	..	220	..	204	..	..	142	406	138	264	127	..	231	..	..	301
Wayne.....	..	..	..	..	..	..	..	..	..	..	..	..	..	54	250	52	102	70	..	94	..	..	94
Wyoming.....	1	..	..	..	..	606	..	..	534	64	625	58	252	180	576	175	333	169	82	385	76	241	468
Yates.....	..	..	226	190	..	162	..	..	243	..	276	..	..	108	370	103	198	142	..	237	..	..	297
Unknown.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total.....	19	2,072	5,955	7,144	174	7,236	211	273	8,085	953	10,069	872	3,399	4,042	13,905	3,918	7,472	5,721	149	9,148	137	497	9,686

TABLE 8. (CONTINUED)

County	Year, sex, and age																			Square miles of deer range	
	1948				1949 Male adult	1950				1951 Male adult	1952				1953 Male adult	1954 Male adult	1955				
	Male		Female			Male		Female			Male		Female				Male		Female		
	Fawn	Adult	Fawn	Adult		Fawn	Adult	Fawn	Adult		Fawn	Adult	Fawn	Adult			Fawn	Adult	Fawn		Adult
Allegany.....	1,759	2,056	1,936	3,691	1,278	424	956	492	673	1,231	520	1,386	329	1,902	744 (17)	962 (11)	574	1,383	580	1,213	668.7
Broome.....	..	360	..	..	483	172	511	175	271	738	181	603	131	750	550 (2)	845 (6)	331	874	297	675	399.3
Cattaraugus..	1,189	1,392	1,069	2,038	1,543	318	899	314	457	1,673	474	1,638	351	1,858	912 (35)	1,095 (14)	582	1,505	505	1,045	871.2
Cayuga.....	..	141	..	..	168	65	235	125	169	196	62	267	42	219	125	196 (1)	138	305	144	292	278.4
Chautauqua..	885	1,035	771	1,471	910	204	626	222	240	1,226	460	1,195	312	1,382	726 (9)	900 (5)	411	1,134	361	799	597.4
Chemung.....	..	313	..	..	592	170	410	231	362	496	121	415	101	513	306	405 (5)	242	610	229	514	237.2
Chenango.....	..	510	..	..	648	237	730	225	466	1,027	341	992	207	1,211	741 (7)	1,190 (11)	882	1,810	1,020	2,108	543.8
Cortland.....	..	238	..	..	388	78	456	92	173	516	157	535	113	623	326	524 (5)	243	548	235	478	282.7
Erie.....	423	495	316	603	268	35	299	56	72	385	94	385	54	323	241 (1)	370 (4)	147	471	106	253	498.0
Genesee.....	205	241	186	354	142	41	159	45	97	190	53	184	33	240	137	173 (4)	86	239	69	156	186.6
Livingston...	576	675	501	954	313	107	350	95	205	434	143	531	113	581	268 (3)	353 (1)	181	525	177	406	256.4
Madison.....	..	247	..	..	367	..	312	..	..	459	..	308	..	6	367 (7)	605 (4)	..	583	2	4	311.0
Monroe.....	..	118	..	..	136	44	146	53	101	118	17	125	9	95	91 (1)	127 (1)	1	118	..	2	223.1
Niagara.....	64	76	48	90	42	6	41	14	21	72	15	54	12	47	61	72	26	90	13	28	120.7
Onondaga.....	..	75	..	..	147	35	157	57	72	181	29	160	21	133	133 (1)	239 (3)	83	282	57	127	295.3
Ontario.....	403	472	472	901	319	77	306	90	143	404	161	483	107	623	291 (4)	401 (4)	..	535	..	4	259.1
Orleans.....	..	84	..	..	126	38	101	51	80	107	60	115	29	189	57	111 (4)	..	159	..	..	126.7
Schuyler.....	..	240	..	..	388	95	344	163	249	389	122	318	83	338	246	333 (4)	..	429	..	4	190.5
Seneca.....	..	69	..	..	91	6	83	21	33	125	14	98	30	83	52 (3)	134 (1)	1	147	..	..	111.9
Steuben.....	1,861	2,175	1,897	3,619	1,263	278	1,083	437	633	1,330	504	1,330	398	1,449	1,038 (8)	1,318 (4)	682	1,715	595	1,295	755.4
Tioga.....	..	489	..	..	567	173	30	294	463	653	264	673	190	822	346 (5)	625 (3)	3	723	..	1	281.1
Tompkins.....	..	288	..	..	429	101	42	189	342	510	133	469	116	478	300 (8)	429 (17)	2	493	..	4	258.8
Wayne.....	..	81	..	..	174	42	667	56	103	143	26	155	14	83	100 (1)	119	..	195	..	3	208.6
Wyoming.....	399	468	337	645	222	62	416	77	124	401	103	397	81	404	218 (4)	318 (1)	179	470	142	323	250.5
Yates.....	..	241	..	..	370	149	162	205	275	281	131	320	94	425	203	286 (3)	..	332	..	4	141.7
Unknown.....	..	..	..	..	..	2..	..	..	..	..	..	..	..	..	..	5	24	92	9	84	..
Total.....	7,764	12,579	7,533	14,366	11,374	2,957	10,021	3,779	5,824	13,285	4,185	13,136	2,970	14,777	8,579 (116)	12,135 (116)	4,818	15,767	4,541	9,822	8,354.1

* In 1953 and 1954 when only antlered deer might be taken during the regular season, taking antlerless deer was permitted during the special archery season; the figures are given in parentheses.

TABLE 9. PERCENTAGE OF TOTAL LEGAL DEER KILL REPRESENTED BY LICENSE STUBS RETURNED

Year	Region		
	Adirondack	Catskill	Central and western
1927-49	75.0	75.0	66.7
1950-52	72.8	75.5	66.3
1953	74.9	78.7	76.9
1954	75.9	79.7	79.0
1955	75.8	79.3	77.0

sented by the stubs returned. Estimates by game protectors were used for the years from 1927 to 1949. Since then, more detailed checks have been made by project technicians. The figures are given in Table 9.

Using these values as correction factors, the total legal kill has been calculated from the number reported each year since 1927. The figures are given in Tables 6, 7, and 8 for the three major regions of the State.

The past 20 years have witnessed a tremendous increase in the number of those interested in hunting deer with the longbow. Use of this weapon during the regular open season has been permitted since 1929. Beginning in 1948, however, a special season for archers only has been provided immediately preceding the regular season. The number of deer taken in each region is shown in Table 10.

TABLE 10. DEER REPORTED TAKEN UNDER SPECIAL ARCHERY LICENSE (1948-55)

Year	Region			Total
	Adirondack	Catskill	Central and western	
1948	..	8	..	8
1949	..	13	..	13
1950	..	26	21	47
1951	3	45	27	75
1952	29	125	187	341
1953	40	253	236	529
1954	70	335	265	670
1955	40	435	464	939

In Tables 6, 7, and 8 are given, in addition to the number of deer taken, the square miles of deer range in each county. These values are of interest in connection with comparing the kill in different areas.

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